

Evaluation Of Land Suitability For Durian (*Durio Zibethinus*) Plants In Pangkatan District, Labuhanbatu Regency

Evaluasi Kesesuaian Lahan Untuk Tanaman Durian (*Durio Zibethinus*) Di Kecamatan Pangkatan Kabupaten Labuhanbatu

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ABSTRACT

*Durian (*Durio zibethinus*) is known as a plant that has a fairly high economic value which is widely planted on community land in Pangkatan District, Lauhanbatu Regency, North Sumatra Province. This study aims to evaluate the land suitability class for durian as an agroforestry plant in Pangkatan, Labuhanbatu Regency. Research activities include several stages of activities, namely: preparation, survey, soil analysis in the laboratory, data processing, and mapping. The survey method was carried out to collect soil samples in the field. Durian land suitability class was analyzed using the matching method. The method refers to the references and criteria adopted from the Soil Suitability of Agricultural Crops by the Center for Soil and Agroclimate Research, Bogor, Indonesia. The results showed that the actual land suitability class for durian plants in Sitellu Tali Urang Julu sub-district, was marginally suitable (S3) on Land Units 1 and 6 and not suitable (N) on Land Units 2, 3, 4, and 5 with limiting factors. are temperature and soil texture. The results of the GIS analysis show that 52.5% of the total sub-district area is marginally suitable (S3) and 47.8% of the total sub-district area is not suitable (N).*

Keywords: *Durian, Land evaluation, Pangkatan District*

ABSTRAK

Durian (*Durio zibethinus*) dikenal sebagai tanaman yang memiliki nilai ekonomi cukup tinggi yang banyak ditanam di lahan masyarakat di Kecamatan Pangkatan Kabupaten Labuhanbatu, Provinsi Sumatera Utara. Penelitian ini bertujuan untuk mengevaluasi kelas kesesuaian lahan untuk durian sebagai salah satu tanaman agroforestri di Kecamatan Pangkatan, Kabupaten Labuhanbatu. Kegiatan penelitian meliputi beberapa tahap kegiatan, yaitu: persiapan, survei, analisis tanah di laboratorium, pengolahan data, dan pemetaan. Metode survei dilakukan untuk mengumpulkan sampel tanah di lapangan. Kelas kesesuaian lahan tanaman durian dianalisis dengan menggunakan metode *matching*. Metode tersebut mengacu pada referensi dan kriteria yang diadopsi dari Kesesuaian Tanah Tanaman Pertanian oleh Pusat Penelitian Tanah dan Agroklimat, Bogor, Indonesia. Hasil penelitian menunjukkan bahwa kelas kesesuaian lahan aktual untuk tanaman durian di kecamatan Sitellu Tali Urang Julu, adalah sesuai marginal (S3) pada Unit Lahan 1 dan 6 dan tidak sesuai (N) pada Unit Lahan 2, 3, 4, dan 5 dengan faktor pembatas adalah suhu dan tekstur tanah. Hasil analisis SIG menunjukkan bahwa 52,5% dari total luas kecamatan adalah sesuai marginal (S3) dan 47,8% dari total luas kecamatan adalah tidak sesuai(N).

Kata kunci: *Durian, Evaluasi lahan, Kecamatan Pangkatan*

INTRODUCTION

The increasing demand for land, the scarcity of fertile and potential agricultural

land, as well as the competition for land use between the agricultural and non-agricultural sectors, require appropriate technology to optimize land use in a

sustainable manner (Harahap *et al.*, 2018).

Land evaluation is an effort to assess land for a particular user so that land suitability is the level of land suitability for a particular use (Harahap *et al.*, 2019).

Land can be assessed on current and future conditions after being repaired so that land evaluation is a process of assessing the potential of land for certain uses (Hardjowigeno da Widiatmaka, 2007).

The suitability class of an area may differ depending on the type of land use under consideration. In contrast to land suitability evaluation, capacity evaluation is generally intended for wider uses such as agricultural, urban, and so on. Land suitability assessment can be in the form of selecting suitable land for certain plants (Sitorus, 1985).

Pangkalan sub-district is one of the sub-districts where a lot of people grow durian on community land, but information about which locations are suitable for durian plants has not been mapped. Therefore, this research is very necessary to do.

This study aims to map the actual land suitability class for durian as one of the agroforestry plants in Pangkatan District, Labuhanbatu Regency, North Sumatra Province.

MATERIALS AND METHOD

This research consists of 4 stages, namely: the preparation stage which begins with literature study and secondary data collection, a study of slope class maps, land cover maps, and soil maps. The results of this study are used as a reference in determining the location of the research observation area.

The implementation of research in the field, namely: primary data collection which includes physical parameters of soil sampling for analysis in the laboratory and data processing with the matching method.

Land suitability classification according to the FAO method (1976) in Rahmawaty *et al.* (2011) can be used for

quantitative and qualitative land suitability classification, depending on the available data.

Quantitative land classification is land suitability that is determined based on an assessment of the characteristics (quality) of land quantitatively (with numbers) and usually, economic calculations (costs and income) are also carried out, taking into account aspects of land management and productivity (Hardjowigeno, 2003).

Qualitative land suitability is land suitability that is determined based on a qualitative assessment of the characteristics (quality) of the land and no economic calculations. Usually by comparing (comparing) the criteria for each land suitability class with the characteristics (quality) of the land it has. Land suitability class is determined by physical factors (land characteristics/quality) which are the toughest inhibiting factors (Hardjowigeno, 2003).

Actual land suitability is the current land suitability, namely land suitability based on data on soil biophysical properties. Potential land suitability is land suitability that will be achieved if improvement efforts are made. The land being evaluated can be in the form of conversion forest, abandoned or unproductive land, or agricultural land whose productivity is less than satisfactory but it is still possible to increase if the commodity is replaced with more suitable crops.

The structure of land suitability classification according to the FAO framework (1976) can be distinguished according to its level, namely the level of Order, Class, Subclass, and Unit. Order is the global state of land suitability. At the level of the land suitability order, it is distinguished between land that is classified as suitable (S = Suitable) and land that is not suitable (N = Not Suitable). Class is the degree of conformity within the order level. Land suitability classes are distinguished as shown in Table 1.

Table 1. Definition of land suitability class

Class Level	Information
S1 class, very suitable	Land has no significant or significant limiting factor for sustainable use
S2 class, quite appropriate	Land has limiting factors, which will affect productivity, require additional inputs, usually the farmers can handle themselves
S3 class, according to class margin	Land has a severe limiting factor, affects productivity, requires more input than S2, requires high capital, farmers are not able to overcome it.
N = not suitable	Land that is not suitable because it has limiting factors that are very heavy or difficult to overcome

Source : (BPT, 2011)

RESULTS AND DISCUSSIONS

Labuhanbatu Regency Biophysical Condition

Labuhanbatu Regency with its capital Rantauprapat has an area of 922,318 ha (9,223.18 km²) or equivalent to 12.87% of the total area of North Sumatra Province. As the second-largest district after South Tapanuli Regency, Labuhanbatu Regency is the eastern route of Sumatra Island with a distance of 285 km from Medan, the capital of North Sumatra Province, 329 km from Riau Province, and 760 km from West Sumatra Province. Labuhanbatu Regency is located at coordinates 10 260 – 20 110 North Latitude and 910 010 – 950 530 East Longitude with the following boundaries: Northside with Asahan Regency and Malacca Strait, Eastside with Riau Province, Southside with South Tapanuli Regency, Westside with Toba Samosir Regency and

North Tapanuli. The average air temperature ranges from 27°C-31°C.

Labuhanbatu Regency also experiences a dry season and a rainy season. The dry season occurs from February to October, because the average temperature in that period is relatively higher than the period from November to January. The maximum temperature is 35oC in May, while the minimum temperature is 23.50C in October.

Land Suitability Class

The actual and potential land suitability classes for Durian plants in Pangkatan District are shown in Table 2. The results of the data obtained in the field and the laboratory, the actual land suitability class for sorghum plants in Table 2. The suitability of durian plants in Pangkatan District can be seen in Table 2.

Table 2. Suitability of durian land in Pangkatan District

Land Unit No.	Actual Land Suitability
1	S3 -tc, rc, nr,na
2	N-tc
3	N-tc.rc
4	N-tc.rc
5	N-tc.rc
6	S3 -tc, rc, nr,na

Based on Table 2, it can be seen that the characteristics of nutrient retention in

base saturation and availability of P₂O₅ soil nutrients in other use areas in Sitellu Tali

Urang Julu District, for durian (*Durio zibethinus* Murr.) are relatively low.

The limiting factor for nutrient retention and availability is not the main limiting factor in assessing the suitability of the land because it can still be managed by adding nutrients to the soil and making terraces. Meanwhile, the main limiting factor in the assessment of land suitability class for durian in Pangkatan District is temperature.

In addition to temperature, the main limiting factor is also on the root media in the form of soil texture, because the soil texture will not change in a short time, for example, the texture of the sand is difficult to convert into clay or clay texture is difficult

to convert into the sand. This is supported by Rayes (2007) which states that in the evaluation of land with root media factors in the form of texture, improvement efforts cannot be made.

Land suitability for Durian (Durio zibethinus Murr.)

Actual and potential land suitability classes for Durian plants located in Pangkatan District. From the results of Table 3 analysis, the actual land suitability area in Pangkatan District is obtained, for durian plants the actual and potential land suitability areas in Pangkatan District for durian plants are 4,050.81 ha,

Table 3. Land Suitability Area for Durian Plants in Pangkatan District

Land Unit No.	Actual Land Suitability	Large (ha)	Percentage (%)
1	S3-tc, rc, nr, na	1148,51	28,4
2	N-tc	367,38	7,8
3	N-tc, rc	407,84	9,9
4	N-tc, rc	596,80	17,2
5	N-tc, rc	633,17	12,8
6	S3-tc, rc, nr, na	897,11	23,8
	Total	4.050,81	100

Durian (*Durio zibethinus* Murr.) has long been known by the public. The durian plant is a type of tropical fruit native to Indonesia (Rukmana, 1996). The characteristics of the durian plant are tree-shaped, 27-40 m high. Taproot. The stem is woody, cylindrical, erect, cracked skin, rough surface, sympodial branching, many branches, horizontal direction (Soedarya, 2009).

Durian plants include the following botanical classification, Kingdom: Plantae, Division: Spermatophyta, Class: Dicotyledoneae, Order: Malvales. Family: Bombacaceae, Genus: Durio, Species: Durio zibethinus L. (Rukmana, 1996).

Furthermore, Rukmana (1996) explained that the original habitat of durian is in the wilderness with a hot (tropical) climate. The best development of durian cultivation is in the lowlands to an altitude of 800 m above sea level and the climate is wet, the air temperature is between 25-32°C, the humidity (rh) is around 50-80%, and the

sunlight intensity is 45-50 % (Rukmana, 1996)

The types of soil suitable for planting durian are Latosol, Podsolik Merah Kuning, and Andosol, and the soil acidity must be neutral, which is in the range of pH 6.0-7.0 (Rukmana, 1996).

CONCLUSIONS

The actual land suitability class for durian plants in Sitellu Tali Urang Julu Subdistrict, is marginally suitable (S3) on Land Units 1 and 6 and not suitable (N) on Land Units 2, 3, 4, and 5 with the limiting factors being temperature and texture. soil. The results of GIS analysis show that 52.5% of the total area of Pangkatan sub-districts is marginally suitable (S3) and 47.8% of the total sub-district area is not suitable (N).

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