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SPATIAL ANALYSIS OF THE CRITICAL RATE LAND WITH A POVERTY RATE OF THE POPULATION IN GLAGAH SUB-WATERSHED

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Abstract

Glagah Sub-Watershed is part Bogowonto watershed located in Purworejo, Regency. Intention of writing about the relationship Spatial Analysis criticality land level with local people's poverty rate is the critical level of watersheds determine the relationship and the level of poverty in Sub-watershed Glagah. The aim is to know about the spatial distribution of the land critical level and poverty in sub-watersheds Glagah and evaluate land level of critical subzone Glagah and its relationship with the population poverty level.

Research methodology for critical area analysis is based on Regulation Director General of Watershed Management and Social Forestry No. P.4 / V-SET /2013 on Technical Guidelines for Preparation of Spatial Data Wasteland. Basically, the techniques used in spatial analysis is the overlay method or overlaying and checks or direct surveys in the field.

The distribution of the critical level of land in the study area is not critical (1532.04 ha), the critical potential (3986.11 ha), somewhat critical (1015.75 ha) and areas including critical land (6.37 ha), is the District Bener with total area of 30.95 hectares spread in the village Benowo (27.09 ha) and Kalitapas (3.861 ha), and the District Kaligesing (3.183 ha), located in the village Tlogobulu (3.183 ha) and a very high level of poverty population in the study area are in Kemejing 260 households (78.31%), Mudalrejo 215 households (34.62%), and Tepansari 181 households (44.80%).

Factors that influence the degree of criticality of land in the study area is the village Benowo, Kalitapas and Tlogobulu is very steep slope and erosion hazard level, including very heavy. Distribution of degraded land are included on the mountain peak landform units andesite (S4) and eroded rocky hills andesite (S8). Poverty levels are very high in the village Mudalrejo, Kemejing and Tepansari are included in the District Loano and the critical level of land included in the category of critical potential, it shows that the criticality of land in the subzone Glagah not affected by poverty level. Critical land in subzone Glagah caused by severe erosion hazard level and the slope is very steep need for conservation action with silvopastoral agroforestry technique.

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I. INTRODUCTION

Watershed management as mandated by Minister of Forestry Decree Number: P. 39/Menhut-II/2009 regarding Guidelines for Integrated Watershed Management Practices, consist of 4 (four) stages of implementation, first planning stage, second organizing, third implementation, and fourth monitoring and evaluation. Planning stage of Watershed management required high degree of data availibility and accuracy, for producing effective and efficient plan.

Revegetation and replanting activities as part of watershed management also need planning based on sufficient water basin biophysics data, especially critical land. On the other side, there are arrised different perception regarding definition of critical land, which resulted on low accuracy of available critical land data (Endang Savitri and Priyono, 1998). To cope with uncertainty regarding definition of critical land in order to collect more accurate data regarding critical land wide, there are agreement on critical deforested land plot criteria, those criteria was agreed during *Lokakarya Penetapan Lahan Kritis* 1997.

Having critical land distribution map will bring benefits, such as provide information of distribution pattern, thus enabled to calculate area wide based on administrative unit or based on sub-watershed, by overlay those thematic map with administrative map or sub-watershed map. Distribution pattern may related to land biophysics issue(s) and/or socio-economic issue(s), such as poverty, faced by people resides nearby those critical land plot. There are analysis could be done, for example, by corelated critical land distribution pattern to biophysisc aspect, such as land capacity, or to socio-economic aspect, such as population pressure, conflict of interest between stakeholders, and other socio-economic issue.

Glagah sub-watershed are part of Bogowonto watershed which is located at Purworejo Regency and Kulonprogo Regency. Previous study, 2007, conducted by Balai Pengelolaan DAS Serayu Opak Progo has shown that Bogowonto watershed is critical watershed and become first priority for rehabilitation measures. Glagah sub-watershed physical condition such as slope inclination between 15% up to 65% (slope up to steep), structural landform origin (structural hill complex), and high rate of rainfall are triggering factors for erosion process. High rate of erosion triggering critical condition on Glagah sub-watershed. Based on mentioned facts, it's necessary to collect spatial data regarding

rate of criticallity in Glagah sub-watershed.

Watershed have some function, which are: Daerah aliran sungai memiliki beberapa fungsi, yaitu: (a) Spatial, production, and habitat; (b) Hydrological function, which regulate hydrologic cycle; and (c) Ecosystem function, as an integrated system formed by various environment components. There are some problems happened in Galagah sub-watershed, as follows:

a. Land resources utilization are not suitable to land capacity and regional land planning, thus increasing erosion and landslides occurance, decreasing of water deposit, increasing of run-off, and at the end, all of it will cause sedimentation, flood, and drought.
b. High poverty rate suffered by people living in Glagah sub-watershed, could be on eof triggering aspect for land destruction.

The Goals of study of spatial analysis correlation between land criticallity rate and poverty rate is to find out how poverty rate could relate to watershed criticallity. While the objectives are:

a. To find out spatial distribution of criticallity rate and poverty rate in Glagah sub-watershed.
b. To evaluate criticallity rate and its corelation to poverty rate in Glagah sub-watershed.

II. METHODOLOGY

Research methodology for critical area analysis is based on the Regulation Director General of Watershed Management and Social Forestry No. P.4 / V-SET / 2013 on Technical Guidelines for Preparation of Spatial Data Critical Land. Basically the techniques used in spatial analysis is the overlay method / overlaying and checks / direct survey in the field. Stages in the critical area analysis methods include, stages of preparation, field data collection, processing and analysis of data, spatial data input, spatial analysis, and presentation of spatial data.

Spatial analysis conducted with overlay multiple spatial data (determining degraded land) to produce the new mapping unit that will be used as the unit of analysis. On each unit of the analysis carried out an analysis of the data attributes that no other tabular data, so analysis is also called tabular analysis. Results of subsequent tabular analysis associated with spatial data to generate spatial data critical land. The method used in the tabular analysis is a method of scoring. In the unit of analysis results overlay spatial data, scores are then

summed. The sum score further classified to determine the critical level of land.

The poverty level is based on the population of the Central Bureau of Statistics Purworejo about the number of poor families were grouped into five categories: Very Low, Low, Medium, High, and Very High. The data are used as indicators of determining the level of poverty of citizens according to BPS 14 indicators are as follows:

a. The floor area of residential buildings with units of m^2: 0-100 m ^{2}, a score of 6; 101-500 m^2, a score of 3; 501 - 1000m^2, score 2; > 1001m^2, a score of 1
b. Type floors of residential buildings widest Ceramics, a score of 1, Cement, a score of 2, Wood ugly situation, a score of 5; Wood good condition, the score; Low quality bamboo, a score of 3; High quality bamboo, score 4
c. Type the walls of residential buildings widest choice: Bamboo, a score of 5; Walls, a score of 1; Wood ugly situation, a score of 3; Wood good condition, a score of 2
d. facilities where defecation (latrine / toilet); With the option: Together / general, a score of 6, Others, score 3
e. Sources of drinking water with a choice: tear wells or unprotected, a score of 7, water river, a score of 5, Rainwater, a score of 6, bottled water, a score of 1, tap water, a score of 3, Pump, a score of 4, springs protected , a score of 2
f. The main lighting source with a choice: No electricity, a score of 4, PLN, a score of 1
g. The primary fuel for cooking everyday with a choice: Wood / charcoal, a score of 6, kerosene, a score of 4, Gas / Electric, a score of 2
h. How many times a week households buy meat / chicken / milk with a choice: Do not ever buy, a score of 6, one time, a score of 5, Twice and more, score 1
i. How many times a day are usually members of the household to eat with a choice: One time, a score of 6, Twice, a score of 4, three times and more, score 1
j. How many sets of new clothes in a year is usually bought by / for all / most of the members of households with a choice: Do not ever buy, a score of 6, A set, a score of 4, two sets and more, a score of 2
k. If any member of the household who are sick, are able to go to the clinic, or clinic with a choice: yes, a score of 3, no, a score of 5
l. Does the household have the following goods each worth at least Rp 500,000, - with Options: Savings, a score of 5, Golden, a score of 2, a color TV, a

score of 1, Livestock, score 4, Motorcycle, a score of 3, None have, a score of 6

m. Does the household had received business loans (such as SMEs / SME) a year ago with Options: Yes, a score of 1, No. score 5

n. Status control of building stay occupied with the option: Owned own / rent-free, a score of 1, No, score 4.

III. RESULTS AND DISCUSSION

3.1 Land criticality subzone Glagah

Land criticality of data obtained from the analysis of some of the spatial data is a critical parameter determining land. Parameter determining the criticality of land under Regulation Director General of Watershed Management and Social Forestry No. P.4 / V-SET / 2013 on Technical Guidelines for Preparation of Spatial Data Critical Land include:

a. the condition of vegetation cover
b. slope
c. the rate of erosion and outcrop (outcrop), and
d. the condition of management (management)

The results of spatial analysis regarding the criticality of land in the watershed SUB Glagah each determinant parameters are as follows.

a. the condition of vegetation cover

Determination of land cover each unit of land, which is composed of tumpangsusun map landforms, slope and land use, are presented in the appendix. Summary results according to landform units are presented in Table 1., The results obtained are the general condition of land cover in the study area was classified as very good with an area 3098.71 ha (69.07%).

Table 1. Broad distribution Slopes In Sub-watershed Glagah

Landform	Sloping	Slanting	steep	Very steep	Area (ha)
F4	458	80,95	5,577		544,532
K1	12,37				12,366
S10	257,7	18,09			275,837
S13	0,457				0,457
S4	186,9	2,573		65,196	254,636
S8	1746	1035	423,321	194,884	3398,524
Area (ha)	**2661**	**1136**	**428,898**	**260,08**	**4486,352**
Percentage (%)	59,31	25,33	9,56	5,80	100,00

Land cover conditions are very bad influence on the rate of erosion, it is shown in units of alluvial terraces landform / colluvial (F4) very severe erosion hazard level reached 8.053 hectares wide. Land cover on the landforms unit in cover an area of 304.14 hectares of land currently.

b. Slope

General condition of the slope in some parts of the study area are ramps that area of 2661 hectares (59.31%) and very steep only 260.08 ha (5.80%). Unit landforms rocky hills eroded andesite (S8) is a unit of diverse landforms land slope is very steep ramps up to a total area of 3398.52 hectares. The distribution unit is almost landforms scattered throughout the region except in the Village Pandanrejo, District of Kaligesing.

c. the rate of erosion and outcrop

Determination of erosion potential is based on secondary data from the Department of Forestry Purworejo made in the rehabilitation of the land and soil conservation. Based on the spatial data of the erosion hazard level in the study area included in the lightweight class, moderate, severe and very severe. Attribute data processing rate of erosion according landform units as presented in Table 2. Showed that more than half the land is still relatively mild conditions (R) covering an area of 2,355 hectares (52.51%), Medium (S) (1629.3 ha), weight (B) (489.37 ha) and very heavy (SB, 12 , 07 ha).

Table 2 Erosion Hazard Levels According To Landform Units

Landform	Erosion Hazard level				Area (ha)
	Lightweight	Medium	Weight	Very weight	
F4	246,32	212,147	78,012	8,053	544,532
K1	4,829	2,403	5,134		12,366
S10	229,305	30,754	15,778		275,837
S13	0,299	0,158			0,457
S4	29,47	172,134	53,032		254,636
S8	1845,388	1211,707	337,41	4,019	3398,524
Area (ha)	**2355,611**	**1629,303**	**489,366**	**12,072**	**4486,352**
Percentage (%)	52,51	36,32	10,91	0,27	100,00

Source: Secondary Data Analysis (2014)

d. The condition of management

Management is one of the criteria used to assess the criticality of land in protected forest areas, which is assessed based on the completeness of management aspects include the existence of regional boundaries, security and surveillance as well as implemented or not counseling. Data obtained through field checking the sampling system. Survey data were processed to be used as the renewal of existing data.

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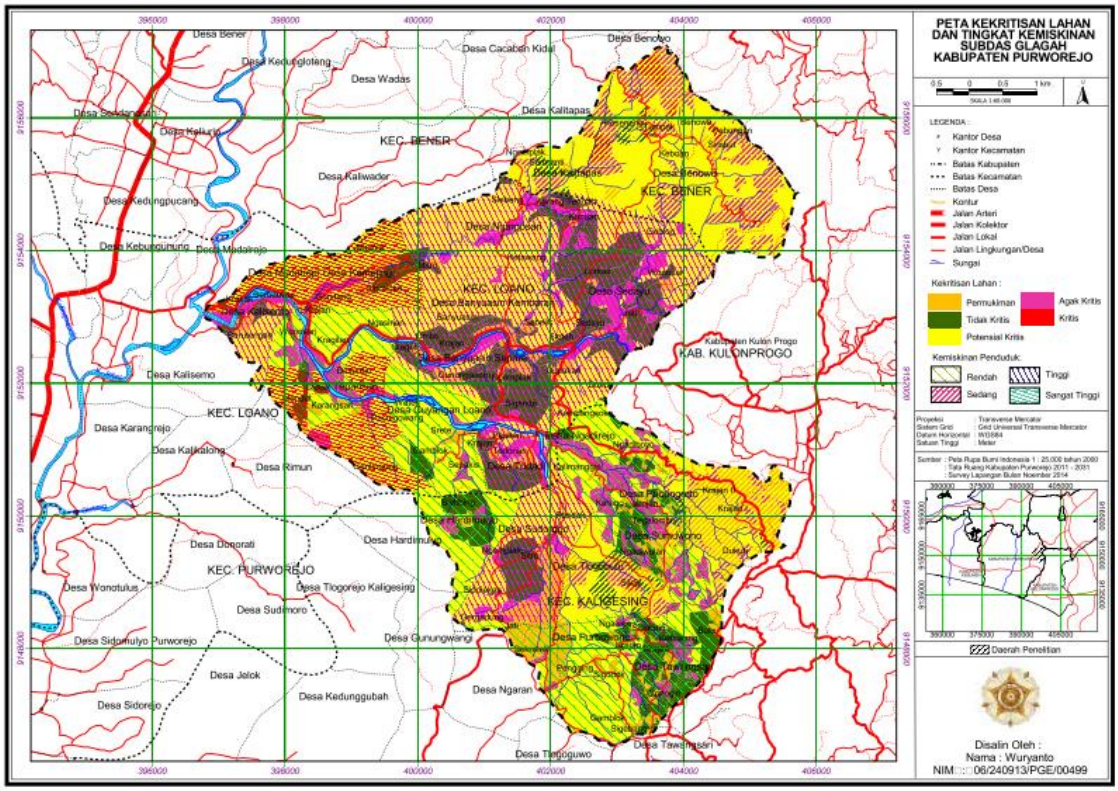
Land management classification well judged complete when Tata area boundaries exist, there are security supervision and counseling activity carried out. Conditions of land management in protected forest areas in the study area are included in either the management class. This is shown in the field for agroforestry systems with conservation techniques forest plants and annuals (Silvopastoral).

Silvopastoral system is very suitable for land rehabilitation by involving the community in land and forest management. In addition to harvesting pine resin community can also enjoy the fruits of the plant between among the pine trees. This is consistent with the opinion Matatula J. (2009), Agroforestry understood as a pattern of a harmonious blend of seasonal crops, herbs, shrubs and trees cultivated in a land unit that physical appearance and dynamics resembles a primary or secondary forests. In the study mentioned, Vegetation has an influence that is against the influence of other factors such as erosive rainfall, topography and soil characteristics. Vegetation also able to improve soil aggregation. The formation of soil aggregates beginning of the destruction of blocks of soil by plant roots. The roots of the plant will go into the chunk of land, then chunks of the land is split into secondary granules. The root system also causes the aggregate becomes more stable.

Condition critical land in the study area were classified into 4 (four classes) is not critical, critical potential, rather critical and critical. This is also reflected in the research area, a critical area that is 34.13 ha (0.76%) caused by the physical damage that is over the land, that is not in accordance with the use and capabilities.

The use of which should be used for rain-fed agricultural areas. In addition, the rate of erosion heavy to very heavy also lead to criticality of land. Critical land in the study area is located in the district of Bener include Village Benowo Kalitapas 27.09 ha and 3.86 ha. Both villages are included in the category of moderate poverty, it indicates that the critical land in the district of Bener occur due to changes in land use and not in accordance with the ability of the land.



The poverty situation in the region study population especially around most of the forest area included in the category of medium - high located in the district of Bener and Kaligesing. Critical Land with population poverty rate was only 0.76 percent of the subzone Glagah. Factors that cause the criticality of land on the hills eroded rocky landforms with andesite stones. The location of critical land are located in the village of Kalitapas, Benowo, and Tlogobulu. Critical land is defined as land that is undergoing a process of physical damage, chemical and biological because it does not suit the use and capabilities, which ultimately jeopardize the hydrological function, orologis, agricultural production, resettlement and socio-economic and environmental areas of influence. The main cause of the criticality of land in three villages is the attrition rate is very heavy and very steep slope. The physical condition of the slope is very steep slopes

and very severe erosion rates, the corresponding landing area function is intended as a buffer zone.

Low poverty level in ten villages, namely Guyangan, Hardimulyo, Kaliglagah, Kaliwader, Ngadirejo, Ngaran, Pandanrejo, Purbowono, Sumowono, and Tawangsari. The total area of 1342.39 hectares and ten to the village nothing is included in the degree of criticality of critical land, most or area of 739.88 hectares belongs to a class of critical potential. Kaliwader village is a village which has a poverty rate of the population is very high but the critical level of land only including the level of critical potential. This suggests that the high level of poverty of the population will lead to criticality of land, in addition to the livelihood of the village are mostly working in the agricultural sector. Efforts to conserve forest areas located in residential areas is to involve village communities to play an active role in managing forests with community (Pengelolaan Hutan Bersama Masyarakat [PHBM]).

IV. CONCLUSIONS

a. Distribution of the critical level of soil in the study area is not critical (1532.04 ha), the potential critical (3986.11 ha), somewhat critical (1015.75 ha) and areas including critical land (6.37 ha), is the District Bener with a total area of 30.95 hectares in the village spread Benowo (27.09 ha) and Kalitapas (3.861 ha), and the District Kaligesing (3.183 ha), located in the village Tlogobulu (3.183 ha) and a very high level of poverty population in the study area Kemejing contained in 260 households (78.31%), Mudalrejo 215 households (34.62%), and Tepansari 181 households (44.80%).

b. Factors that affect the critical level of soil in the study area is the village Benowo, Kalitapas and Tlogobulu is a very steep slope and level of hazard, including severe erosion. Distribution of degraded land is located on the mountain peak landform units andesite (S4) and rocky hills eroded andesite (S8). Poverty levels are very high in the village Mudalrejo, Kemejing and Tepansari included in the District of Loano and the critical level of land included in the category of critical potential, it shows that the criticality of land in the subzone Glagah not affected by the level of poverty of the population. Critical land in the subzone Glagah caused by the rate of erosion is very heavy and the slope is very steep the need for conservation measures with the technique agroforesty

(silvopastural), namely plant pine forests in forest areas with plants rempon-rempon such as ginger, turmeric, saffron and others.

c. Rehabilitation of degraded land due to the high degree of criticality and high levels of poverty population, the need for empowering communities around forest areas in forest management with agroforestry systems (silvopastoral).

2. Need for monitoring changes in land use of forest areas into agricultural land and the application of soil conservation techniques in accordance with the level of land degradation. Studies on the Determination of the area function in DAS SUB Glagah is needed to determine the suitability of the allotment of land to his ability.

V. BIBLIOGRAPHY

_____, 2001. SK Menhut Nomor. 52/Kpts-II/2001 , tentang *Pedoman Penyelenggaraan Pengelolaan Daerah Aliran Sungai*, Pemerintah Republik Indonesia.

_____, 2013, Peraturan Direktur Jenderal Bina Pengelolaan Daerah Aliran Sungai dan Perhutanan Sosial NOMOR : P. 4/V-SET/2013 tentang Petunjuk Teknis Penyusunan Data Spasial Lahan Kritis Direktur Jenderal Bina Pengelolaan Daerah Aliran Sungai dan Perhutanan Sosial

Arsyad, S. 2006. Konservasi Tanah dan Air, Institut Pertanian Bogor Press, Bogor.

Bintarto & Surastopo Hadisumarno, 1979, Metode Analisis Geografi, Jakarta : LP3ES.

BPS, 2013, Statistik Potensi Desa Kabupaten Purworejo 2011, No. Publikasi 33062.12.20, Badan Pusat Statistik Kabupaten Purworejo.

Tiorita H, 2012, Rehabilitasi Lahan Kritis dengan Sistem Agroforestry, Jurnal Lingkungan Hidup, http://uwityangyoyo.wordpress.com/2012/ Diakses tanggal 22 Desember 2014

Matatula J,2009, Upaya Rehabilitasi Lahan Kritis dengan Penerapan Teknologi Agroforestry Sistem Silvopastoral di Desa Oebola Kecamatan Fatuleu Kabupaten Kupang, Politeknik Pertanian Negeri Kupang.

Karmono, M. 1985. Pemanfaatan Penelitian Sumberdaya Lahan, PUSPICS-Fakultas Geografi, UGM, Yogyakarta.

Ruslan Wirosoedarmo, Bambang Rahadi dan Dony Anggit Sasmito, 2007. Penggunaan Sistem Informasi Geografi (SIG) Pada Penentuan Lahan Kritis Di Wilayah Sub Das Lesti Kabupaten Malang. Universitas Brawijaya Malang. Malang.

Anik Sarminingsih, (2007) Evaluasi kekritisan lahan daerah aliran sungai (das) dan Mendesaknya langkah-langkah konservasi air, Jurnal PRESIPITASI Vol. 2 No.1 Maret 2007, ISSN 1907-187X.