Assessment of Land Allotment Support Power Industry In Grati, Pasuruan Regency

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Abstract. The industrial sector is always in need of land for factory as well as other supporting facilities, on the other side of the ability of the environment (support) the uneven terrain of every area in favor of intensive activities such as industry. Land uses that are not adapted to the support power, will cause pollution, damage, disaster and loss that generally uses the environment. The purpose of this research was to assess the resources support neighborhood Grati district associated with the existence of a plan to build an industrial area in accordance with the direction of Grati utilization of space in the spatial plan of the Pasuruan Regency area. In this study of land carrying capacity power comparison capability and land use. The Analysis technique used is the technique of overlay with analysis tools namely software using the software Arcgis 10.1. The parameters of the ability of land-adapted to the characteristics of the land for industry, namely the slope the slope ranges 0-25% on the slope of 25-45% can be developed with industry improvement area contours, and on a slope above 45% not allocated as an industrial area, the type of soil that is not easy slopes, the intensity of the rain of less than 3000 mm, potential landslide and flood-prone lowlands. Each parameter will be provided scoring between 1-5. Score of 1 was given to the condition of land the most harm, and a score of 5 is given for the condition of the land which supports most of the location industry. The result scoring is divided in 5 classes those are bad (5-9), is bad (9,1-13), medium (13,1) good (17,1-9) and good (21,1-25). The need for industrial land, calculated from the vast land of existing industries. Based on research results, obtained the ability to land on the area of research has 3 classes of 5 classes, i.e. good, moderate and bad. The results of the comparison between the broad capabilities and the needs of the farm industry, it can be concluded that the power of the land to support the industry in Grati still has not been exceeded.

1. Introduction
In the regulatory area of the Pasuruan Ragensi number 12 in 2010 about Plan Room System Regency Pasuruan 2009-2029 Pasuruan Regency Government wanted to expand the industrial park in the Eastern District, this is done to reduce the disparity of development between the eastern region and Western region. Seen from accessibility, Grati will pass by Surabaya-Pasuruan toll road. Accessibility is important because of the large and medium industry trend in big cities is no longer oriented on the market and raw material but on transportation infrastructure sector (roads) and labor (Farid, 2004). The toll road development plan currently in the work by the Ministry of public works to support the traffic of heavy payloads.
The industry desperately needs land to set up factories and its supporting facilities. The land becomes an important parameter to consider his ability especially for large industry events because the land has a very limited with the ability that vary and tend to experience a decrease in serving the demands of development (Hadi, 2005). To find out how the ability to do analyses the ability to land by using some parameters. Land that could be used for industry have in common parameters with land for settlements (Lutfi, 2012) i.e, slope, rainfall, soil type, and the potential for disaster. See the potential and that problem, then research has the objective to analyze how the ability to land on the area of research and identify how the land use activities of big industry. Land use is important to know because it can show where the big industry is located. Location of big industry mandatory are in industrial areas. This is contained in Government Regulation No. 2 of 2009 about industrial area. In addition the identification of land use can provide information land area used large industry activities. The land area required for the land needs to see of great industry. A comparison between the requirements of the land and the ability to land this is called power carrying capacity of the land. Power support's assessment of land important to do so that development remains sustainable. Any activity that will be carried out, power support into a mandatory note because of land use which does not comply with supporting power will result in decreasing a quality environment such as pollution, damage, disaster and other losses.

The purpose of this research was to assess the resources support neighborhood Grati district associated with the existence of a plan to build an industrial area in Grati district. This is in accordance with the direction of the utilization of space in the spatial plan of the Pasuruan Regency area.

2. Literature Review

2.1 The ability and suitability of the land
Land capability is land quality that judged as a whole, while the land suitability is the quality of the land with respect to the request that is balanced with the demand and supply in a scope of special interests. Land suitability is determined by comparing the results of measurements of parameters in the standard field or criteria that apply (Senoaji, 2009).

2.2 Geographical information system (GIS)
Geographic Information System (GIS) is a component consisting of software, hardware, data, geography and human resources working together effectively to catch, keep refine, reform, manage, manipulate, integrate, analysis and show the data based on geographic (Budianto, 2002). Additionally the method of interpretation of the map used to help analyze environmental impact so that when applied to identify the suitability of power support industry of the land is suitable.

2.3 Overlay
Overlay is the main of a geographic information system operation that seems to define geographic information system (GIS) itself. Overlay process requires precision and in common locations. Overlays a graphic is to merge data between two or more graphic data to gain new graphics owned a combined mapping of some of the graphics data (fedra, 1996).

3. Methods
Basis of preparation of the study, starting from the dotted issues arising, namely the question of industrial and needs industrial area. The methods that are used are evaluative analysis uses overlay.
Figure 1. Research flow chart

4. Results and Discussion
To know the ability of land suitable for industrial activities done with information systems approach using geographical analysis of overlay, and to know the power support industry land conducted with interpretation using the software Arcgis 10.1.

Engineering overlay done with using 4 parameters the unit ability (SKL), i.e. the units the ability of land slope slopes of 0-25%, or 45%, unit ability rain intensity less than 3000 mm/th, unit ability of soil types and Disaster-Prone Parameter. Each parameter of a unit's ability to land will be mapped, and provided scoring between 1 to 5. Method of weighting (scoring factor) is technical type in analyzing data by creating a value against the circumstances that exist, and are arranged according to the ranking. A score of 1 was given to the condition of land which is most detrimental to the industry, location and score 5 given for the condition of the land that supports most industrial locations. The results of the scoring are divided into 5 classes, namely bad (5-9), it is bad (9.1-13), medium (13.1), rather good (17.1-9) and good (21.1-25).

Table 1. The slope line parameter

| No. | The slope of the | Description   | Score | Interpretation |
|-----|------------------|---------------|-------|----------------|
| 1   | 0-8              | Flat          | 5     | Good           |
| 2   | 8-15             | Ramps         | 4     | Good           |
| 3   | 15-25            | A Bit Steep   | 3     | Is being       |
| 4   | 25-45            | Steep         | 2     | Bad            |
| 5   | > 45             | Very Steep    | 1     | Bad            |

Source: Agricultural Minister DECREE No. 683/KPTS/UM/8/1981
Table 2. The Rainfall Parameters

| No. | Rainfall Intensity (Mm/Yy) | Score | Interpretation |
|-----|--------------------------|-------|----------------|
| 1   | 0 – 1500                 | 5     | Good           |
| 2   | 1500 – 2000              | 4     | Good           |
| 3   | 2000-2500                | 3     | Medium         |
| 4   | 2500-3000                | 2     | Bad            |
| 5   | > 3000                   | 1     | Bad            |

Source: DECREE of the Minister of agriculture no. 683/KPTS/UM/8/1981

Table 3. The Parameter Types Of The Land

| No. | Soil Type | The Level Of Sensitivity Of Soil Erosion | Score | Interpretation |
|-----|-----------|------------------------------------------|-------|----------------|
| 1   | Alluvial, Gley, Palnosol, Hidromorf Grey | Insensitive                               | 5     | Good           |
| 2   | Latosol Timberland Bergamping No Chocolate, Mediteran | Rather Sensitive                          | 4     | Good           |
| 3   | Andosol, Laterite, Grumosol, Padosol, Padsolik | Less Sensitive                            | 3     | Medium         |
| 4   | Regosol, Litosol, Organosol, Renzina | Sensitive                                 | 2     | Bad            |
| 5   | Organosol, Renzina | Very Sensitive                            | 1     | Bad            |

Source: DECREE of the Minister of agriculture no. 683/KPTS/UM/8/1981

Table 4. Disaster-Prone Parameter

| No. | Potential Landslide-Prone | The Amount Of Surface | Score | Interpretation |
|-----|---------------------------|-----------------------|-------|----------------|
| 1   | Low                       | < 0.9                 | 1     | Good           |
| 2   | Medium                    | 0.9 – 0.18            | 3     | Is being       |
| 3   | High                      | > 1.1                 | 5     | Bad            |

Source: Muta’ali 2012 BPBD 2012

To find out the impact of the development of the industry to changes in land use (Fandelli; 2000.177) then must power level value is known to support industrial land is divided into 5 classes i.e. good, rather good, rather bad, and bad. Power analysis results support against the conditions of land in Pasuruan Regency Grati in more details can be seen in the following table:
Table 5. Land Capability Classification

| No. | Soil Type | Total Score |
|-----|-----------|-------------|
| 5   | Good      | 13.1-25     |
| 4   | Good      | 17.1-21     |
| 3   | Medium    | 13.1-17     |
| 2   | Bad       | 9-13        |
| 1   | Bad       | 5-9         |

Source: Fandeli, 2000

The Data is the slope of the slopes, rainfall parameters and the soil type of the map Spatial Plan area of East Java province in 2009-2029.

From the data unit of the ability of land above, then overlayed to get Grati ability and usage data existing to assess land resources carrying capacity of the land Grati with software Arcgis 10.1. Based on the regulation of the Minister of the environment number 17 in 2009 regarding the determination of the power guidance support environment, then an assessment of the status of land support resources are formulated as follows:

\[ DDLi = \frac{SL}{DL} \]

Description:

DDLi = Power Support Industrial Land  
SL = Availability Of Land  
DL = Land Needs

The formula above indicates if:

- SL more than DL or where land availability is greater than their needs then the power support land declared surplus has not been exceeded
- The SL less than DL or where the availability of land smaller than on its needs, then the power support its deficits have been exceeded.

The Grati district is located in the town of Pasuruan Regency and has 14 villages and 1 village. The geographical conditions of the Grati district is dominated by rice fields reached 1,013.70 hectares, then settlement 595.90 hectares, bordering with 2,448.90 acres, 595.90 acres of State forest and other 348.90 hectares. In the current study produced four map IE sloping map, soil type, rainfall maps and map the disaster-prone therefore each can be seen in Figure 2.a and 2.b, 3.a, 3.b. In the area of research, the results of the analysis a map of the layout of the Jawa Timur planning Spatial in 2009-2029 it is known that 2811 hectares having average slope between 0-2%, 1267 hectare land has average slope 2-5%, 408 hectares of land has slope an average of between 5-15% and the rest is about 6 acres have average slope between 15-40%.

The results of the analysis of the map of soil types, note that on the area of research have 2 soil types that is Alluvial and non-cal (Tanah Hutan Coklat). The soil is Alluvial soil that is relatively young, because normally this type of soil is derived from sea water or sediment deposits of the river water and usually the ground situated around the coast or located around upstream of the River, the land of this type has properties that are labile, thus having high sensitivity towards erosion, this type of soil is not suitable for buildings with heavy loads, because the soil is prone to move are right soil type non cal or commonly called the land literit have less soil is sensitive to erosion, so that still allows for the establishment of the buildings. At Pasuruan Regency especially in Grati district there is land of about
2,816.12 Ha Alluvial type and soil type non cal (literit) covering an area of 1,675.59 Ha, while scoring soil type has a score of 3-5. Parameters for rainfall, spatial analysis of interpolation, known in the area of research has an average rainfall of between 1500-2000 mm/year. By using that data, then scoring for this parameter is 4. For the parameters of flood prone, according to BPBD, in the area of research has a region prone to floods covering an area of 222.98 Ha with an average of flooding height reaches 1 meter so that flood prone area for scoring is 4, while the avalanche-prone parameter to data BPBD sub Regency Pasuruan Grati has an area of 44.68 Ha had the threat of avalanche, landslide-prone area for scoring is 3. So the scoring disaster-prone areas for floods and landslides is 4.

From the results of these maps overlay noted that in the area of research has only 3 the class of 5 classes, namely the classes either with an area of approximately 1,675.59 Ha, class good with an area of 2,816.12 Ha and poorly with a broad 267.66 Ha. This is due to the total scores range between 9-25. With those results, then the land area which can be used for industrial activity is a good class and being with a total area of 326.65 Ha. For the needs of the land area of the industry in East Java around 200 Ha located on the ability of the land well and being. With that data, then comparisons between the ability of land to the use of its land is as follows:

\[ DDLi = \frac{326.65}{200} = 126.65 \]

From those results indicated that the availability of land (SL) is still larger than in land use (DL) or can be said to support the region's power industry in Grati district surplus or has not exceeded. The following is slope map, map of soil types, rainfall maps and map the disaster-prone Grati, Pasuruan Regency, Subdistrict:

![Figure 2](image1.jpg)
![Figure 3](image2.jpg)
5. Conclusions
Based on the results obtained in the research conclusions as follows:

a) Ability to land in Pasuruan Regency especially in Grati district is divided into three classes, namely class good 1,675.59 Ha, good 2,816.12 Ha and bad 267.66 Ha. Land area which can be used for the area of industry is 267.66 Ha.

b) Comparison of Results obtained by power support environment Grati surplus or has not been exceeded. This means that the physical condition of land in Grati district capable to support industrial activities are directed in this district.

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