In South Sulawesi, the program for maize development (called Gong) has recently been implemented by the provincial government, as part of promoting regional food security program. In some parts of the region, cultivation of maize (Zea mays L.) has long been practiced in different soil environments including marginal land. To help address this phenomenon, there is a need for information that will allow land managers to identify both the inherent suitability of land for maize production and development, and the spatial distribution of land areas where possible development can be implemented taking into account present land use types. This paper describes a spatial based qualitative suitability evaluation of marginal soils for maize production and development at a region where marginal land predominates. The research project implements land suitability evaluation method based on the spatial-qualitative query approaches in Geographical Information Systems (GIS). The main sources of data bases used include digital topographic map, soil map and soil characteristics derived from available data at reconnaissance level and semi detailed survey, climate data, and satellite imagery. The results of analysis of potential development area for maize cultivation show that more than 90 percent of study region are suitable (at S2 and S3 classes) for maize cultivation. Comparing to the existing maize cultivation and land use types on the ground, about one third of the area is available for maize cultivation (extensification). This study reveals that there are some limiting factors in term of chemical soil characteristics that can still be improved, but there will be almost no limitation in terms of land cover type for maize development. This spatial based method demonstrated in this study can be further used at a micro scale where the spatial data are available with a good mapping accuracy.

Keywords: GIS, spatial analysis, land management, land suitability evaluation, marginal land.
KETERSEDIAAN FOSFAT DAN PENGURANGAN TOKSISITAS Ni (II) DAN Cu (II) DENGAN BAHAN ORGANIK, Bacillus megaterium DAN Pseudomonas aeruginosa PADA TANAH OXISOL DI KABUPATEN LUWU TIMUR

The Availability of Phosphate and Minimizing The Toxicity of Nickel and Copper with Organic Matter, Bacillus megaterium and Pseudomonas aeruginosa on the Oxisol Soil, Luwu Timur Regency

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ABSTRACT

Oxisol soil is found in most parts of Malili District, East Luwu Timur Region, South Sulawesi Province. The Oxisol complex is recognized as an important nickel mining and nickel processing in Indonesia. Besides, most of the Oxisol soil with low nickle and copper contents are cultivated by local farmers to produce various kinds of agriculture product, such as horticulture commodities, corn, soybean etc. The nickle contents as required by the international market must be about 3 – 5% and located at the depth of 20-40 meters below the soil surface. In order to mine the nickle ores which are required by the international market, the 20-40 meters soil lays and other vegetative covers must be removed, and filed around the mined area, and be placed back to its original place after the mining activities is completed. The former mining sites which have been covered now become the targets and seen by the farmers as promising areas to be developed into agriculture areas. As we know, heavy metals, such as nickle and copper be reduced due to formation of the less soluble pfosphate salts. We need the exert more effort in order to minimize the toxicity of nickle and copper and to increase the sollubility of phosphate salts if we want to promote the Oxisol soil as a promising agriculture productive area. Hence a research has been carries out the availability of phosphate as well as on how to minimize the toxicity of both nickel and copper by applying Organic Matarials, Bacillus megaterium dan Pseudomonas aeruginosa on the Oxisol Soil in Malili District, East Luwu Regency. The organic matter divided into 3 levels: 0 g, 200 g and 400 g, and are combined with Bacillus megaterium and Pseudomonas aeruginosa, each level is without any bacteria, 10 ml/polybag and 20 ml/polybag (with 2 x 10^6 sel/ml population) are able to increase the solubility and availability of phosphate from 13,6 ppm to 23,7 ppm and to reduce the concentration of Ni(II) from 576,450 mg/kg to 427,572 mg/kg, Cu(II) concentration from 15.755 mg/kg to 5,799 mg/kg. The field plot demonstration on the farmers’ land shows a very significant results with application of 19 ton/Ha organic matter combined with Bacillus megaterium and Pseudomonas aeruginosa 20 ml/plan (2 x 10^6 sel/ml population); the yield being 4,24 ton/Ha of hybrid corn compared to only 0,09 ton/Ha without any treatment.

Keyword: Avaibility of phosphate, toxicity of heavy metals, Oxisol, agricultural farming area
Pemanfaatan Cairan Ekstrak Rumput Laut (*Eucheuma spinosum*) Terhadap Perbaikan Sifat Kimia Tanah Dan Pertumbuhan Tanaman Jagung

(*Utilization of Seaweed (*Eucheuma spinosum*) Extract to Improve Soil Chemical Properties and Plant Growth of Corn*)

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ABSTRACT

Utilization of liquid seaweeds as fertilizer has been widely used in International world, but in Indonesia research and utilization of seaweeds as fertilizer is still in its infancy. Therefore, this research aims to find the right formulate that can be used in the manufacture of organic fertilizer from seaweeds and its tested can be improving soil properties and plant growth. The method used in this study are extraction of seaweed by immersion and incubation for 2 weeks, experimental study using 6 standard dosage with 3 replication. Doses used: without seaweed liquid (PO), with 200 ml/pot seaweed liquid (P1), 400 ml/pot (P2), 600 ml/pot (P3), 800 ml/pot (P4) and 1000 ml/pot (P5). The result showed that seaweed liquid significantly affect to various soil chemical properties, plant growth and plant nutrient uptake of N, P and K. But the effectiveness of liquid seaweed extract did not significantly affected to increase C-Organic and soil pH. More higher dosage treatment more increase plant growth. Achieved the highest plant growth responses at a dose 1000 ml/pot with plant dry weight reached 21.53 g/pot. The response of plant growth increased to very high.

Keywords: seaweed extract, dose 1000 ml / pot, nutrient uptake, plant growth
Characteristics and Classification of Soils in the Different Land Systems of Luwu Timur Regency

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ABSTRACT

Landform is one of the soil forming factors other than climate, relief, parent materials and organisms through their effects on both the surface and groundwater flow and accelerated disintegration of soil, weathering and soil genesis. Land system concept assumes that there are close relation between rock type, hydroclimatic, landform, soil, and organism. Based on RePPProt system, land system of Luwu Timur Regency (from south to north) consisted of: 1) Tidal swamp (KJP), 2) Alluvial plain (KHY), 3) Swamp (MDW), 4) Alluvial valley (BKN), 5) Plain (TWH), 6) Hills (MPT), 7) Mountains (LNG, OKI, BPD). Three soils type found in the alluvial plain system (KHY and DLU) are Typic Fluvaquents, Typic Dystrudepts and Xanthic Hapludox, on the alluvial basin system (BKN), two soil type are Aquic Dystrudepts and Typic Hapludults, was found. In the plain system (TWH), one soil type is Typic Paleudalfs, on the mountain system (BGA), one soil type found is Typic Hapludults, and on the hill system (OKI, LNG), three soil type found are Xanthic Hapludox, Typic Hapludults and Typic Paleudalfs. The presence of several types of soil in the same land system is more due to differences in the slopes and parent material.

Keywords: land system, soil classification, Luwu Timur
ABSTRACT

The study was carried out to investigate the role of soil mineralogy in determining soil development rate in a topographical range (Toposequence) along Batu-Batu River in Soppeng Regency of South Sulawesi Province. The sample profile was selected based on the difference in altitude of the site, its sloping nature, and rock unit. The soil profiles can be described as follows: P1 Soil level, 15%, sedimentary rock); P3 (20 meters above sea level, 3%, alluvium sediment), and P4 (5 meters above sea level, <3%, alluvium sediment). The differences in the sample profile based on topography and rock unit are usually called topolithosequence range. Mineralogy analysis consists of: sand fraction and clay minerals analyses. Sand fraction mineral used is 116 meshes or 0.124 mm, identified by means of binocular microscope following line counting method. Meanwhile, the clay mineral is transformed into powder which is later analysed with X-ray diffraction under treatments of oriented sample, Mg\(^{++}\) saturation, Mg\(^{++}\) saturation with Glycerol, and K\(^+\) with 550\(^\circ\)C heating. In the identification of sand fraction mineral for each profile, minerals such as Garnet, Apatite, Olivine, Hornblende, Biotite, Feldspar, Muscovite, Quartz, Hematite, and Pyrite are found. In general, the minerals like feldspar, apatite, garnet, and quartz are the most dominant ones. The availability of quartz mineral is smaller than those of feldspar, apatite, and garnet, but compared to olivine, pyrite, hematite, hornblende, biotite, and muscovite it is much bigger. Therefore, in general it can be concluded that the soil profile has not further developed. If the quartz mineral is to be used as a benchmark for the rate of the soil development from its vulnerability against decomposition, the development rate of the soil among the profiles can be arranged as follow: P4>P3>P2>P1. The X-ray diffractogram analysis of every soil profile indicates that the diffractogram peaks: 3.2; 3.4; 3.56; 9.9; 12.4; 14.5; 15.4; 16.8; and 17.7 A\(^\circ\) are identified as montmorillonite clay mineral, and the diffractogram peaks 7.2 and 10.1 A\(^\circ\) are halloysite. Meanwhile, the diffractogram peaks 3.58, 3.59, and 7.15 A\(^\circ\) are identified as kaolinite. Each soil profile with its diffractogram peak signifies that all profiles have clay mineral montmorillonite, halloysite, and kaolinite, except soil profile P1 only bears montmorillonite, and halloysite. Therefore, it could be said that P1 has been through longer decomposition process than P2, P3, and P4 have, although it never leads to a soil development rate. The overall results of both sand fraction minerals and clay minerals signify that the soil development rate of each profile slopes down. This eventually indicates that the decomposition process is transported in its nature (lateral translocation).

Keywords: Soil development, mineralogy, topolithosequence, profile
IDENTIFIKASI KEJADIAN GERAKAN MASSA DAN UPAYA PENANGGULANGANNYA DI KAWASAN DAS JENEBERANG

(Identification of Mass Movement and Mitigation Efforts in the Jeneberang Watershed)

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ABSTRACT

The mass movement is a process of moving soil or rock with the obliquity of its original position, so that apart from a solid mass due to gravity. This event is a lot going on and often times we met in the region Jeneberang watershed during the rainy season and at the same point. This needs to be identified so that prevention efforts are likely to harm the movement can be resolved. The purpose of this study was to determine the type of movement and the causes of mass movements, and to formulate alternative mitigation efforts are expected as supplementary information and considerations for researchers, planners, and government in an effort to control and mitigation of mass movements in the watershed Jeneberang. The study was conducted in February through August 2009 Jeneberang watershed area of Gowa who experience ground motion. The research was done by identifying the point of observation (field surveys), analysis of soil and rock samples in the laboratory, identification of the type of movements and causes movement, making a sketch of the morphology of avalanches as an approach in the study and analysis in formulating mitigation efforts. Mass movements that occur in the catchment area of rockfalls Jeneberang, mudflow, debristopple, debrisslide, debrisfall and earthslide. Formulation of mitigation done through vegetative or mechanical and or combinations of both.

Key words: Mass movement, watershed Jeneberang
Humate derived from organic matter decomposition is very effective in chelation toxin elements and increase nutrient availability for soil and nutrient uptake of plants. This research aims to produce liquid fertilizer derived from bagasse and waste vegetables compost extract which effective to improve soil chemical properties of Ultisol and enhanced plant growth. The method use in this study were composting of bagasse and waste vegetables, compost extraction with alkaline, experimental study using 6 treatments with 3 replications. The treatment; without humate substance (E0), with 100 ppm concentration of humate substance (E1), 200 ppm (E2), 300 ppm (E3), 400 ppm (E4) and 500 ppm. The result show that 262 ppm concentration of humate substances is a better concentration to increase mustard plant growth. Humate substances effective to decrease solubility of aluminium and iron elements as well as to increase nutrient availability of soil and plant.

Keywords: Compost, humate, nutrient uptake of plant
The lowland area of Jeneberang river basin in the District of Gowa, South Sulawesi Province has a great potential for ecotourism development due to a number of bio-physical and socio-economical reasons. This paper evaluates and maps the spatial distribution of biophysical characteristics (i.e. topography, soil, climate, landuse, Jeneberang River physical condition) of the study site, corresponds with the development of ecotourism. The results of the data analysis, then, is used as a foundation to establish scenarios, to spatially use the land around the Jeneberang River in the lowland area, for the development of several ecotourism attractions, where the local community participate and obtain the economical benefits to the ecotourism, and at the same time, they are also expected to involve in maintaining and restoring the ecology and environment. The study findings show that, the Jeneberang River could be the main ecotourism attraction, where visitors can travel by water along the river from Sungguminasa City in the downhill to the uphill area of 7 km. In addition, several ecotourism attraction i.e. outbound and camping ground, bicycle track, fruit and vegetable plantation, and bird park etc., can be developed to complete the ecotourism attractions. To avoid soil erosion, restore the ecological condition, and acquire the scenic view, the area of the river bank (sempadan sungai) should be afforested with multipurpose or woody varieties.

Keywords: Ecotourism, Lowland Area, Jeneberang River Basin, Ecology and Environment