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Preliminary Study of Landslide Hazard in Kutai Kartanegara Regency, East Kalimantan using Digital Elevation Model S M Polawan1 and N A Raharjanti1. 1Departement of

Geological Engineering, Faculty of Science and Engineering, Univer- sitas Muhammadiyah Kalimantan Timur, Samarinda, Indonesia. ssm340@umkt.ac.id Abstract. The Kalimantan Island is part of the Sundaland crust, namely the Eurasian Continental Plate. The plate is moving to the southeast colliding with the Indo- Australian plate which is moving north. There was a reversal of direction on the Sulawesi Island which was originally relatively US-S to BL-Southeast and finally west- east. The collision zone is located west of Sumatra Island, south of Java Island, to the south of Bali and Nusa Tenggara, and forms sea trench known as the subduction zone. Whereas for the Borneo Island position is far from the collision zone, so it is relatively stable tectonically. However, due to tectonic processes that occurred earlier, resulting in the formation of geological structures, especially faults. The purpose of the study was to determine the morphotectonic and landslide hazards in the Kutai Kartanegara Regency, where this research was carried out quantitatively with data collection techniques, namely only analyzing landslide hazards based on data; DEM (Digital Elevation Model) namely the slope, slope direction, and slope length for vulnerability analysis, Geological data from Regional Geological Maps, namely, rock formations and distances from faults and Administrative boundary spatial data in the form of vector GIS for the preparation of landslide hazard maps. Introduction Kutai Kartanegara regency based on geographic and administrative is included in8 East Kalimantan Province. Kutai Kartanegara Regency is located at 115o26’28” East Longitude–117o36’43” East Longitude and 1o28’21” North Latidude–1o08’06” South Latitude. Kutai Kartanegara is surrounded by Malinau Regency in the north, Kutai Timur Regency and Makassar Strait in the east, North Penajam Pasir and Balikpapan City in the south, and North Kutai Regency in the West. The land area of the Kutai Kartanegara Regency is around 27.263.10km2 or 2 .726.310 Ha around 12% from the total area of East Kalimantan Province, meanwhile the water area is 4.097Km2 [1]. Kutai Kartanegara Regency was divided into 18 districts and 237 villages. The districts in Kutai Kartanegara Regency are Kecamatan; Samboja, Muara Jawa, Sanga-Sanga, Anggana, Muara Badak, Marang Kayu, Tenggarong Seberang, Loa Janan, Loa Kulu, Tenggarong, Sebulu, Muara Kaman, Kota Bangun, Muara Muntai, Muara Wis, Kenohan, Kembang Janggut, dan Tabang. Kutai Kartanegara Regency has many rivers that spread in all district and become the main transportation facilities along with land transportation. The biggest river is Mahakam River about 920 km long. The disaster potential that can happen ini Kutai Kartanegara Regency can be divided into geological disaster including landslide, and hydrometeorology disaster including, flood, drought, forest fires, and extreme weather [2]. From the elucidation above, it can be concluded that the problem formulation that becomes the limitation of the research is disaster geomorphology one of the approaches in disaster studies. Disaster geomorphology examines aspects of landforms, processes, and results of physical processes that have the potential and can cause disasters. Sustainable development requires spatial data and information about the potential for landslides and information dissemination to the public about disasters. Regional Geology Kalimantan is a part of Sundaland and a part of Eurasia. Eurasian plate moves to the southeast and collide with Indo- Australian plate which moves to the north. The direction of Sulawesi movement reversed causing the direction from north – south become northwest – southeast and now have the direction west – east. The subduction zone located in western Sumatra, southern Java extends to Bali and Nusa Tenggara. The Position of Kalimantan is far from these subduction zone, therefore Kalimantan relatively stable in tectonic, but due to the tectonic activity which happened beforehand faults were formed in the Island. Physiographic condition of Kutai Kartanegara Regency varies and can be categorized into ten (10) physiographic units namely: (1) Beach Sand Sediment, (2) Tidal Swamp, (3) Alluvial Plain, (4) Meander Belt, (5) Swamp, (6) Alluvial Valley, (7) Terrain, (8) Plain, (9) Hill, and (10) Mountain. Based on [3, 4] physiographic classification Kalimantan divided into five zones, namely Kutai Basin Zone, Kuching Highland Zone, Schwanner Block, Pasir Basin Zone, and Pathenosphere Block (Figure 1). The physiographic characteristic of East Kalimantan is part of Tertiary Kutai Basin located in southern of Kuching Highland. The Basin was divided from Barito Basin by tectonic called paternoster cross high. The stratigraphic characteristic of Kutai Basin consists of sediments that deposited from early Tertiary and filling the basin to the east (Billman, 1974 in [5]. The earlier sediment deposited in the west side of the basin about 1000 – 2000 m in depth, than moved toward east continuously and increase in depth (Figure 2). Figure 1. Regional geology of the Kutai Basin in [5]. Methodology The aim of the research is to identify morphology-tectonic and the hazard of landslide in Kutai Kartanegara Regency. The data was collected from study literature and analysed with quantitative method to identify the zone of the landslide hazard. The location of the research was Kutai Kartanegara Regency and research was done in November 2020 to February 2021. The process of the research that done presented in Figure 2. Penyiapan Data DEM Data Geologi Kemiringan Lereng Analisis Morfotektonik Tipe Batuan >15% Arah

Lereng Struktur Geologi Panjang / Bentuk Lereng Batas administrasi Delineasi Daerah Bahaya Tanah Longsor Nilai Kelas Bahaya Tanah Longsor Indeks Bahaya Tanah Longsor Figure 2. The Process design to produce landslide hazard map based on DEM and Geological Data 1.1. Quantitative data collection The data collection to analyze the hazard of the landslide using 3 data namely (1) DEM (Digital Elevation Model) to identify the slope, the direction of the slope, and the dimension of the slope to analyze the vulnerability to the landslide. The data was collected from the official website DEMNAS https://tanahair.indonesia.go.id/demnas [6]. (2) Geology Data taken from Regional Geology Map including rock formation and the structure geology, and (3) Spatial data of the administrative border in vector GIS to arrange the landslide hazard map. The component of the data that was used in this research included primary and secondary data. The primary data are strike dip and lithology from the regional data and added with the field observation in the area that affected from the landslide. The secondary data including DEM and Regional Geology Map. The data is processed using software Microsoft Word 365 Pro Plus, Microsoft Excel 365 Pro Plus, and ArcGIS Version desktop 10.6. 1.2. Hazard analysis method Hazard analysis method is done by identifying the areas that have potential in slope failure, calculating the probability of the event, and interpretation of the landslide that happen. All of these process was analyze using software ArchGIS Dekstop-ArcMap. 3.2.1. Preparation step The research started with literature study of the research area and collecting secondary data which have regional scale including comparison of the SRTM image, landsat image, geology map, topography map, and administrative map (RBI= Rupa Bumi Indonesia map) that support the research. Primary data were processed specially divided by districts and villages. 3.2.2. Processing data step This step of the research was processing the data from the DEM, which resulting working map. This work map that processed to prepare the data management for the interpretation. The data that were used are slope, lithology, the direction of sunlight, and faults line. Several components that become concern are: ? Administrative border of Kutai Kartanegara ? Source of Digital Elevation Model (DEM). ? The DEM data processing that will resulting the slope, direction of slope, and dimension of the slope. ? The geological factor especially lithology, the distance to the fault, fault type, and strike/dip data. 3.2.3. Result analysis step Analysis process using ArcGIS was the process to compile information from several different layers data, the steps that was done are: ? Analysis morphotectonic which including the historical geology ? Classification of the topography including determining the score and weight of the data that already collected. The classification, score determination, and weighting using parameter for producing landslide hazard map with deterministic method based on Technical Module to Arrange the Analysis of the Landslide Disaster Risk (Modul Teknik Penyusunan Kajian Risiko Bencana Tanah Longsor) [7]. ? Determining the border of the morphology unit ? Determining the administrative border of the Kutai Kartanegara regency, to determine the border of the areas of interest which have potential in landslide. ? The calculation of the parameters, in this step we calculate the result of the multiplication of the score and weight of each parameters that collected from previous steps polygon to raster method in ArcGIS 10.6 so the classification can be made based on the data from previous steps. ? The next step is making landslide hazard index. Due to the classification of the landslide hazard that resulted from previous step was more than 3 values, so the index was simplified or reclassified using software ArcGIS. The value of the indexes is, the lowest Hazard have the value of the index ≤0.333, the moderate index have value 0.333 < H ≤ 0.666 and the high index of hazard have value H > 0.666 [7]. 3.2.4. Result presentation step This step was divided into 2 steps of presentation namely landslide risk map and report of the hazard supported with the result table of the representative data. Landslide is a mass movement process of soil or rock from the initial position. When the mass detached from the stable mass can be caused by gravitational factor with the types of movement are rotation and translation. Meanwhile the landslide is of the category in soil or rock mass movement. From those definition, the landslide potential symbolized with H (Hazard), V (Vulnerability), C (Capacity). The presentation of the Hazard map. The concept and definition of the hazard is a situation, condition or biological, climatology, geography, geology, social, economy, politic, culture and technology characteristics of the community in an area at the certain time that have potential to caused damage and victims, empirically can be formulated: $R \approx H * V\ C$ From those definition the procedure analysis is done based on Technical Instruction of Area Vulnerable to Landslide Disaster (Juknis KRB Tanah Longsor) [7] with identification areas that have potential affected area, volume, and speed of the movement. All the analysis that resulting landslide hazard analysis processed with ArchGis Dekstop with the adjustment with the aim of the research and the data that available following the basic principle of the projection of world mercator and mathematical analysis with the measurement of the hazard: magnitude, area, intensity and duration. The hazard map must meet of these requirements: ? Meets the analysis level rules (the depth of the analysis in the regency level or city minimum in village). ? The scale of the map minimum 1:50.000 for the regency or city level. ? Can be used to calculate the area of the affected zone (hectare). ? Utilizing 3 class of hazard index, namely high, moderate, low. ? Using Geographic Information System in disaster mapping. The Presentation of the Hazard Analysis Table. The table of the hazard analysis result presented in the village level area, including the information of: districts and village location, the area of the hazard class (low, moderate, high, and total area), the class of the hazard. Results Based on the analysis that was conducted the landslide in the kutai kartanegara regency divided into 3 categories namely low, moderate, and high. The low categories zone located in Anggana districts which the area of this zone is ±76.469Ha. The moderate hazard zones have the largest area which include in district Kembang Janggut, Kenohan, Kotabangun, Loa Janan, Marang Kayu, Muara Badak, Muara Jawa, Muara Kaman, Muara Muntai, Muara Wis, Sanga-Sanga, Semboja, and Kota Tenggarong with total area ± 901.841Ha. The highest class of landslide hazard only located in four districts namely Loa Kulu, Sebulu, Tabang, and Tenggarong Seberang with the total area is ± 932.696Ha. Table 1. The result of landslide hazard base on districts in Kutai Kartanegara No District Area of Each Hazard Class (Ha) Low Moderate High Hazard Class 1 Anggana 2 Kembang Janggut 3 Kenohan 4 Kotabangun 5 Loa Janan 6 Loa Kulu 7 Marang Kayu 8 Muara Badak 9 Muara Jawa 10 Muara Kaman 11 Muara Muntai 12 Muara Wis 13 Sanga-sanga 14 Sebulu 15 Semboja 16 Tabang 17 Tenggarong 18 Tenggarong Seberang Kutai Karatnegara 248,787 901,841 1,367,936 76,469 6,367 4,450 50 1,564 17,479 18,480 63,503 22,428 31,027 1,395 5,576 23,373 79,582 82,231 46,245 34,219 45,004 66,989 28,989 18,689 225,175 38,382 77,078 8,511 22,778 41,824 35,963 12,416 14,406 6,121 102,111 35,195 44,405 28,652 124,448 44,415 14,840 8,232 45,272 24,890 40,633 2,082 44,320 23,686 726,832 14,671 37,096 Low Moderate Moderate Moderate Moderate High Moderate Moderate Moderate Moderate Moderate Moderate Moderate High Moderate High Moderate High Moderate Table 1 showing the Kutai Kartanegara regency which the area of the highest class of landslide hazard have total area ±1,367.936Ha. Lithological characteristics dominated with alluvial sediment from the large and small rivers also swamp that affect the area of the hazard classification. Based on the Table 2, Anggana districts that identified as the representative area. Data that showed more detailed including the representative from the sample then presented in landslide hazard map based on slope classification data and hazard classification in Table 3 and Figure 3. Figure 3. The geomorphological map in Kutai Kartanegara Regency Table 2. The result of the analysis in the representative location Anggana District District Village Low Hazard Moderate High Total Area Class Hazard Anggana Anggana Anggana Anggana Anggana Anggana Anggana Anggana Anggana District Anggana Handil Terusan Kutai Lama Muara Pantuan Sepatin Sidomulyo Sungai Meriam Tani Baru 226 10,549 12,931 10,088 27,201 8 209 15,257 76,469 743 1,049 9,030 4,647 3,701 2,125 660 1,418 23,373 13 8 5,785 316 6,121 982 11,605 27,745 14,734 30,90 22,450 869 16,676 105,963 Moderate Low Low Low Low Low Low Low Low Table 3. Data slope class and hazard class Slope Class Hazard Class Sub-district <15% Sloping Low Anggana 15-30% 30-50% 50-70% Moderately Steep Steep Very Steep Moderate Steep Slope Extremely Steep Kembang Janggut, Kenohan, Kotabangun, Loa Janan, Marang Kayu, Muara Badak, Muara Jawa, Muara Kaman, Muara Muntai, Muara Wis, Sanga-Sanga, Semboja, Kota Tenggarong. Loa Kulu, Sebulu, Tabang, Tenggarong Seberang In the geomorphology map shown in Figure 4 the slope percentage divided into four class namely: ? The green color, has slope class <15% (gentle slope) categorized as low hazard class only happen in Anggana districts. ? The yellow color, has slope class 15 – 30% (moderate steep slope) categorized as moderate haard class, which occupied almost all the area in Kutai Kartanegara Regency. ? The orange color, has slope class about 20 – 50% (steep slope) and red color has slope class about 50 – 70% (extremely steep) Figure 4. The landslide hazard map of the Kutai Kartanegara Regency Figure 5. The stream flow map of the Kutai Kartanegara Regency The analysis of the landslide hazard supported by the stream flow map (Figure 5) of the Kutai Kartanegara Regency showing that the research area predominantly controlled by dendritic river. The resumed analysis in the Table 4 showing the landslide hazard classification calculated from the lithology, the distance from the fault as the discontinued plane, and the length or the dimension of the slope. Table 4. Data analysis of the distance of faults and length of slope Districts Forma tion Lithology the distance from the fault The direction of the slope the length / the dimension of slope hazard classificatio n Landslide Total area of the hazad (Ha) Datar - Anggana Qa Aluvial > 400 m Tenggara < 200 - 500 m Low - High 105.963 Tpkb Sedimen Tmbp Sedimen Tomp Sedimen Kembang Datar - Timur Janggut Qa Aluvial > 400 m Laut < 200 - 1000 m Low - High 188.060 Tea Vulkanik Teh Sedimen Ter Sedimen Tmbp Sedimen Tmm Vulkanik Datar - Barat Kenohan Qa Aluvial > 400 m Daya < 200 - 1000 m Low -

High 121.876 Tmbp Sedimen Tmm Vulkanik Tpkb Sedimen Kota Datar - Barat Bangun Qa Aluvial > 400 m Laut < 200 - 1000 m Low - High 90.700 Tmpb Sedimen Tomp Sedimen Datar - Barat Moderate - Loa Janan Tmbp Sedimen > 400 m Laut < 200 - 500m High 62.871 Tmpb Sedimen Tomp Sedimen Tpkb Sedimen Strike slip - Moderate - Loa Kulu Tmbp Sedimen > 400 m Southeast < 200 - 1000 m High 169452 Tmpb Sedimen Tomp Sedimen Marang Strike slip - Moderate - Kayu Qa Aluvial > 400 m Northwest < 200 - 1000 m High 113.004 Tmb Sedimen Tmpb Sedimen Tomp Sedimen Tpkb Sedimen Muara Badak Qa Aluvial > 400 m East - North < 200 - 1000 m Low - High 61.294 Tmbp Sedimen Tmpb Sedimen Tomp Sedimen Tpkb Sedimen Muara Jawa Qa Aluvial > 400 m East - North < 200 m Low - High 45.401 Tmbp Sedimen Tmpb Sedimen Tomp Sedimen Muara Kaman Muara Muntai Muara Wis Sanga- Sanga Sebulu Semboja Tabang Tenggaro ng Tenggaro ng Seberang Tpkb Qa Tmpb Tomp Qa Tmpb Tomp Qa Tmbp Tmpb Tpkb Tomp Tmm Qa Tmbp Tmpb Tpkb Qa Tmbp Tmpb Tomp Qa Tmbp Tmpb Tomp Tpkb Qa Tmbp Toma Tou Tek Jkm KTe Teh Tem Ter Kum Tea Mts TmQ m Toms Qa Tmbp Tmpb Tomp Qa Tmbp Sedimen < 200 - > 1000 Moderate - Aluvial > 400 m East - North t m High 333.950 Sedimen Sedimen 0 - > 400 < 200 - > Aluvial m East - North 1000m Low - High 85.700 Sedimen 0 - > 400 < 200 - > 100 Aluvial m East - North m Low - High 148.737 Sedimen Sedimen Sedimen Sedimen Vulkanik 0 - > 400 Strike slip - Aluvial m North < 200 m Low - High 11.988 Sedimen Sedimen Sedimen Moderate - Aluvial > 400 M Datar - Utara 200 - > 1000m High 67.097 Sedimen Sedimen Sedimen Strike slip - Moderate - Aluvial > 400m North < 200 - 500m High 71.086 Sedimen Sedimen Sedimen Sedimen 0 - > Strike slip - < 200 - > 1000 Moderate - Aluvial 400m North m High 762,795 Sedimen Sedimen Sedimen Sedimen Sedimen Sedimen Sedimen Sedimen Sedimen Sedimen Vulkanik Sedimen Sedimen Sedimen 0 - > 400 Strike slip - < 200 - 1000 Moderate - Aluvial m North m High 27,086 Sedimen Sedimen Sedimen Aluvial Sedimen 0 - > 400 m Strike slip - Moderate - North < 200 - 100 m High 51,502 Tmpb Sedimen Tomp Sedimen Discussion Kutai Kartanegara based on slope class data about 50% -70% (very steep) located in Loa Kulu, Sebulu, Tabang and Tenggarong Seberang sub-districts is an area with a high level or extremely steep. If we relate with the National Capital City (IKN) development program, these areas are included in ring II (two) and ring III (three), meaning they are very nearby to the center of government. This requires vigilance for the implementation of regional planning, especially the capital city. The approach in this research is very simple, namely based on geomorphological analysis of GIS data and geology. The interpretation results interpret that the unique boundaries of Kutai Kartanegara are combined with the interpretation of geological data that this area has a landscape that is influenced by faults. That things to be realized is that modern human activities in land use greatly affect landscape changes, all of which have a significant impact on deforestation, land degradation, air and water pollution which can lead to potential natural disasters. Conclusion & Recommendation Kutai Kartanegara is the largest area in East Kalimantan. Disaster studies require modeling of landforms and modeling of geomorphological processes that exist on the earth's surface, which may have potential disasters and have an impact on aspects of human life. The sustainable development system in Indonesia must have a disaster mitigation base. Integrated disaster database through competent institutions such as BNPB which contains the information; zoning data on the level of disaster vulnerability in each region, licensing and supervision of land conversion which refers to the zoning of the level of disaster vulnerability, and preparedness for landslides and floods from high rainfall intensity.

References [1] RPIJM 2018 RPIJM Kabupaten Kutai Kartanegara. Kutai Kartanegara. [2] Syamsidar, S M and Alam F 2019 Memahami Bencana Banjir dan Longsor (Samarinda: RV Pustaka Horizon) [3] Van Bemmelen R W 1949 The Geology of Indonesia Vol IA (The Hague: Netherlands, Govt. Printing Office) p.732. [4] Nuay 1985 Kerangka Tektonik Pulau Kalimantan: Peta Geologi Lembar Kotabaru [5] https://tanahair.indonesia.go.id/demnas/#/ accessed 19 April 2021 [6] Allen G P and Chambers J L 1998 Sedimentation In The Modern and Miocene Mahakam Delta (Indonesia: IPA) [7] Badan Nasional Penanggulangan Bencana 2019 Petunjuk Teknis Kawasan Rawan Bencana Tanah Longsor Jakarta [8] Moss S, Chambers J, Cloke I R, Nas D S 1997 New observations on the sedimentary and tectonic evolution of the Tertiary Kutai Basin, East Kalimantan [9] Sasmito K, Wahyudi A, Sutan S, and Alam F 2019 Ecotourism Potential of Batu Gelap Cave, Kutai Kartanegara, East Kalimantan (IOP Publishing) Vol. 1363 [10] Satyana A H 1999 Kalimantan An Outline of The Geology of Indonesia (Indonesian Association of Geologist) p.69-89 [11] Syamsidar, S M (2020) Pengenalan Daerah Rentan Gerakan Tanah Studi Kasus Kestabilan Lereng Kawasan Selili. Gerbang Etam (Balitbangda Kab. Kukar) Vol. 14 No.1. pp 44-54. [12] Rahmat S D 2007 Batubara di Daerah Longiram dan Sekitarnya Kabupaten Kutai Barat Provinsi Kalimantan Timur Proceeding Pemaparan Hasil Kegiatan Lapangan dan Non Lapangan Tahun 2007 (Pusat Sumber Daya Geologi)