

The Analysis Of Land Cover Change Bukit Soeharto Grand Forest Park Area East Kalimantan Province

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Abstract: In Indonesia, there are 22 location of Grand Forest Park spread in different region in Indonesia (Kemen LHK, 2013), while in east Kalimantan has 2 grand forest park, those are The Bukit Soeharto Grand Forest Park in Kutai Kertanegara Regency and The Petangis Grand Forest Park in Paser Regency in Tanah Paser. Grand Forest Park is the conservation area for the purpose of natural or artificial flora and fauna collecting. The native or artificial species are used for many purposes of research, science, education, cultivation supporting, culture, tourism and recreation (UU No. 5, 1990). The purpose of research to know the extent of land cover caused by degradation as resulted from plantation land clearing, agriculture, mining and the residents who settled in Bukit Soeharto Grand Forest Park Region. The land cover in 2016, the extent of plantation land that have been used was 836.100 ha, community 27.371 ha and mining 1.587.640 ha.

Keyword: Land Cover, Bukit Soeharto Grand Forest Park Degradation

1. INTRODUCTION

In Indonesia, Grand Forest Park or well known as TAHURA has 22 locations spread in different region in Indonesia (Kemen LHK, 2013). In East Kalimantan has 2 grand forest park, those are The Bukit Soeharto Grand Forest Park in Kutai Kertanegara Regency and The Petangis Grand Forest Park in Paser Regency in Tanah Paser. Grand Forest Park is the conservation area for the purpose of natural or artificial flora and fauna collecting. The native or artificial species are used for many purposes of research, science, education, cultivation supporting, culture, tourism and recreation (UU No. 5, 1960). Grand Forest Park (Tahura) of Bukit Soeharto is located in conservation forest (Forestry Minister Decree No. SK.577/Menhut-II/2009) with large of land 67.766 Ha. The area of Bukit Soeharto is a tropical rain forest area in low land which is dominated by kind of Dipterocarpaceae species. The near Sub-District to Bukit Soeharto Grand Forest Park among other Loa Janan Sub-District, Loa Kulu Sub-District, Muara Jawa Sub-District dan Samboja Sub-District. While there is one the nearest Sub-District to Bukit Soeharto Tahura called Sepaku Sub-District located in the region of Penajam Paser Utara District (PPU). The problem exist in the Bukit Soeharto Tahura is decreasing in function and potential of forest along with reducing on the large of land as the conservation area that is maintainable. There are some factors that has caused forest damages generally occur in land clearing for community residential, plantation, agriculture, mining, public road and forest road connecting to public road and so the road network as an access road can be used as transportation asset for people and plantation product or other needs for people who live in Tahura area and in case of any forest fire in the Tahura area.

Forest Fire in Bukit Soeharto Tahura is one of the causes that result on the land cover change. The purpose of research to know the extent of land cover caused by degradation as resulted from plantation land clearing, agriculture, mining and the residents who settled in Bukit Soeharto Grand Forest Park Region. The area of Bukit Soeharto entered into the area of Kutai Kertanegara Regency with large 27.263,10 Km³ with total population at the end of 2015 was 717.789 peoples which consist of 377.070 men and 340.719 women. (Kukar Regency Statistic data, 2016). Penajam Paser Utara Regency has large of area 3.333,06 Km² which consist of 3.060,82 Km² land area and 272,24 Km² marine area, with total population in 2015 was 162,571 people (PPU in numbers, 2015) The using of Geographic Information System (GIS) in conducting the analysis of land covers change is very helpful in giving the information needed by government in order to take action and precaution to the exploitation activities and conversion on the forest land (Narulita, Ida, friends, 2008). Land cover, based on the imaging result has illustrated the vegetation construction close an area from land surface. Mapping on land use and land cover has result that some wise decision has to be made and mapping result cannot be avoided contain some information which is generalized in according to the scale and the application purpose.

2. RESEARCH METHODE

This research in Bukit Soeharto Grand Forest Park is located in Kutai Kertanegara Regency and in small part in Penajam Paser Utara Regency. East Kalimantan lies in 1° South Latitude and 117° East Longitude (PPU in numbers, 2015). The material that used in this research was landscape image map 7 and 8 on the year 2003, 2009, 2001 and 2016 in the Bukit Soeharto Tahura area. The tools that were used Personal Computer (PC), Laptop, Processing Software and Data Analysis GIS with ArcGis, and Digital Camera. The data that used in this research was primer data and secondary data. Primer Data was direct observation on boundary sign installed by UPTD. The manager of Bukit Soeharto Tahura, discussion, interview with related institution and people who settled in Tahura area.

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3. RESULT AND DISCUSSION

Biophysics condition in Bukit Soeharto Grand Forest Park, in order to know the condition of biophysics appearance using the data from the map until the land cover is known in the area of Bukit Soeharto Tahura. The land use in Bukit Soeharto Tahura from times of imaging result from the map to analyze the setting, activity and input of the kind of land cover.

Land Cover in 2003

Land cover dry land agriculture mix with bush colored light yellow with the biggest extent area located in Kutai Kertanegara Regency that is in Muara Jawa Regency, the second is located in Loa Janan Regency and Samboja Regency, land cover map in 2003 as follows:

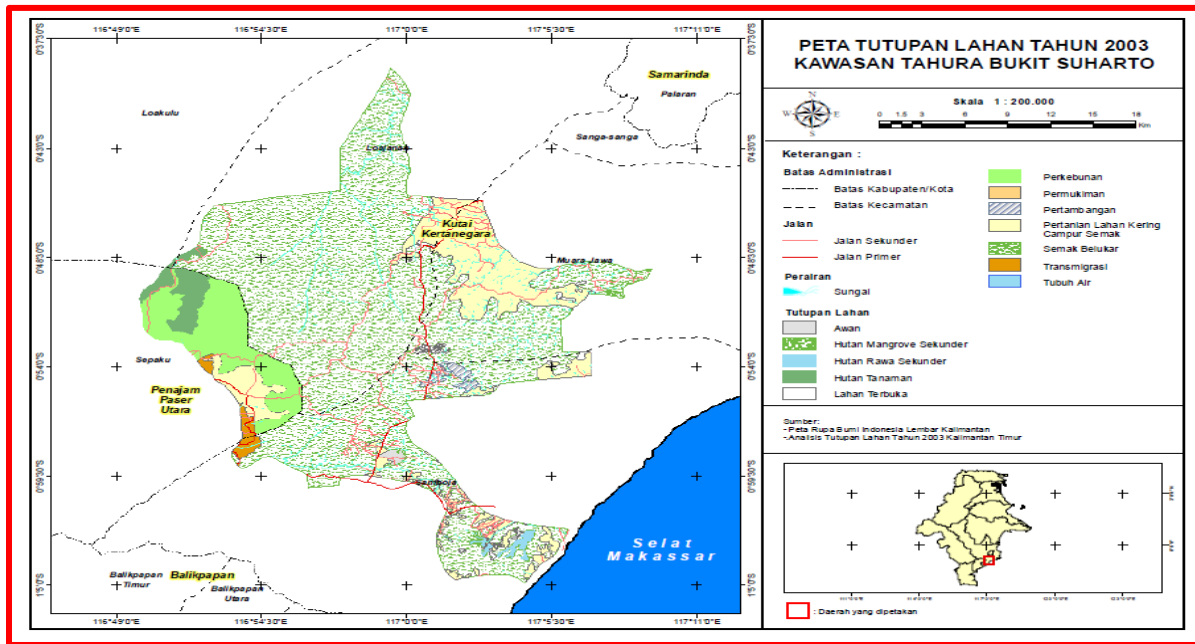


Figure 1 : Land cover map of Bukit Soeharto Tahura in 2003.

Sub-district Sepaku in Figure 1 was seen land cover with the kind of activity the dry land agriculture mix with bush. Land cover of secondary mangrove forest was seen with green spot color on its location by seen just in Muara Jawa

Regency. The bushes and water catchment by seen just in Samboja Regency, and mining land cover by seen just in Samboja Regency.

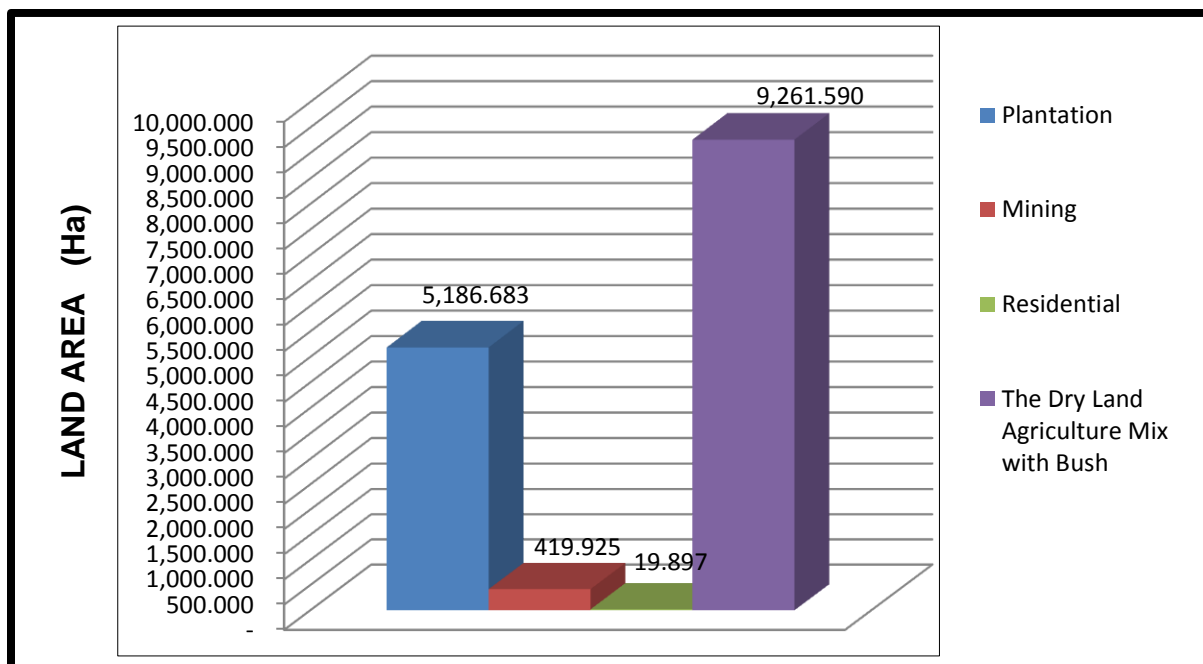


Figure 2: Graphic of the large of plantation land cover

From the figure 2, the large of plantation area is the third biggest with the large of area 5.186,663 Ha. Mining area from the land cover map seen in Samboja Regency with the large of area 419,925 Ha. Land cover dry land agriculture mix with bush with large of area 9.261,590 Ha and the large of residential with the large of area 19,897 Ha and this is the smallest land extent in land cover map on 2003. Bukit Soeharto Tahura is the area for nature conservation used for research by maintained the existence of the area. By the existence of land clearing such as the land clearing for plantation, land clearing for mining and land clearing for residential, have change the area which is not suitable with it purpose as the conservation area.

Land Cover 2009

The result of Pawitan research (2002) by the increasing of pressure from the society against water and land source has show some numbers of serious negative effect such as changes on uncontrolled land use in form of penetrating forest and illegal logging to the upstream, which cause flood and drought are becoming more frequent, accompanied by land slide, casualties, displacement, health problems, hunger and school drop-out. Land cover map 2009, land covers which the biggest bush was occurred land degradation 9.535,997 Ha or 19,749%. In order to clarify the land cover, it can be seen on the figure 3 as follow :

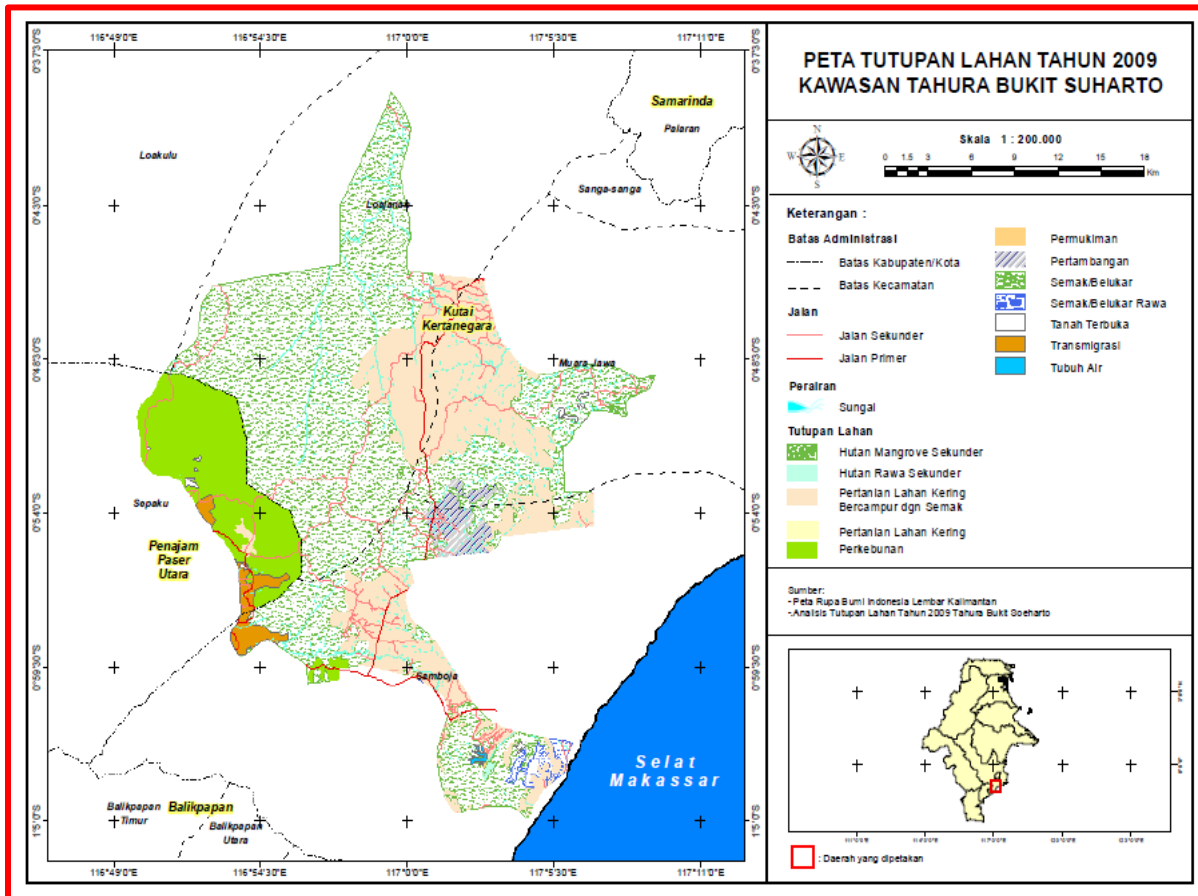


Figure 3 : The Large of Plantation Area Which Has Occurred Degradation on 2009

From Figure 3, the large of plantation area which has occurred degradation on 2009 was 7.705,152 Ha from 5.186,683 Ha on 2003. Degradation on plantation area has occurred caused by the additional of land clearing by the people who live in Tahura and doing the plantation activity such as rubber and palm oil. Land degradation caused by mining land clearing. Land mining with the large of area

was 1.511,675 Ha from 419,925 Ha on 2003. Land activity of coal mining was occurred in Samboja Regency. The people who live in Tahura and conducting land clearing have caused the land change from 2003 with the large of residential just 19,897 Ha and change on 2009 become 27,391 Ha, the area that change was 7,494 Ha.

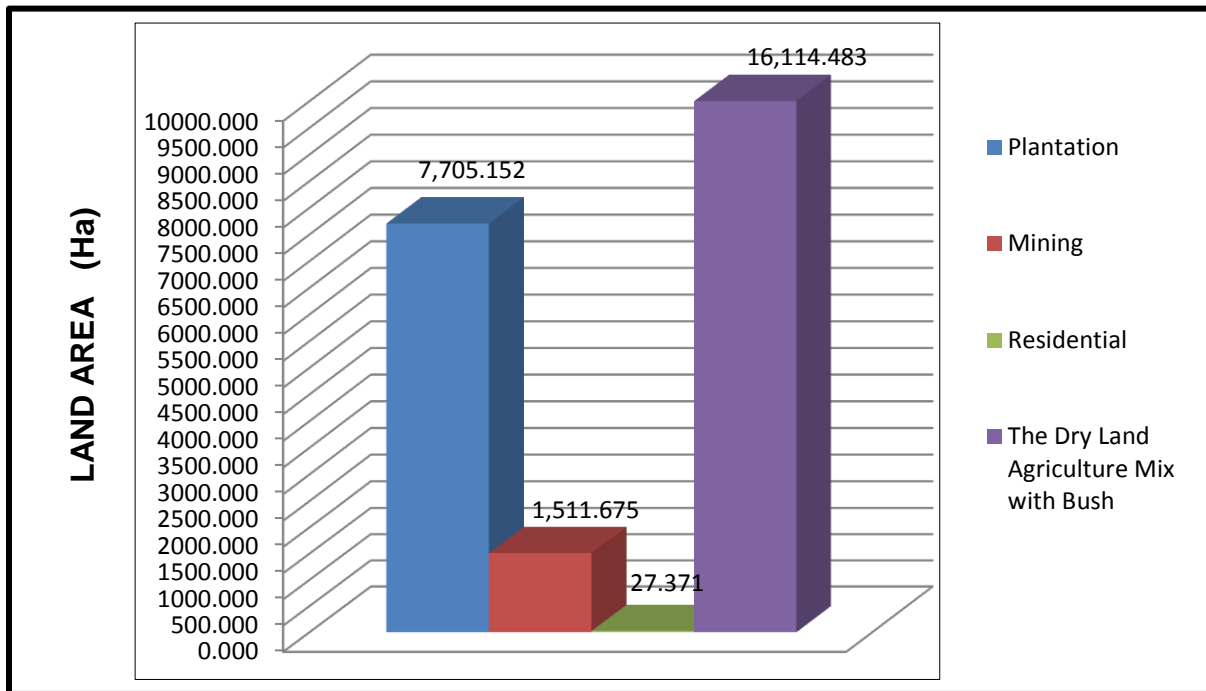


Figure 4: Graphic of the large of plantation and mining land cover.

The large area of dryland agriculture mixed with bush in 2009 was 161.042 Ha from the opened land in 2003 was 254,161 Ha. The large of changing was 93,119 Ha. The

analysis of land cover change on plantation, mining, residential and open land as shown in the following figure 5:

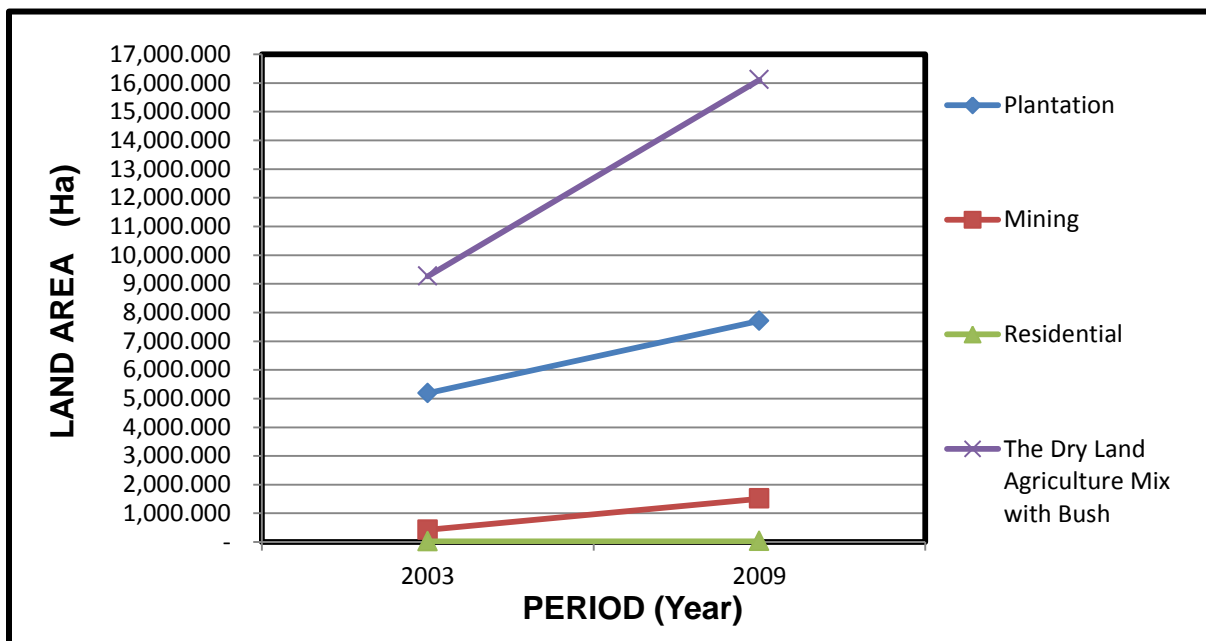


Figure 5: Graphic on land cover change from 2003 – 2009

In figure 5, the plantation land cover from 2003 - 2009, the graphic increased was caused by degradation on plantation land for the amount of 2.518,469 Ha or 32,686 %. The land cover with kind of mining activity has occurred degradation for the amount of 1.091,750 Ha or increase 72,221%.

Land cover on 2011

With many residents living in the Tahura area, the needs of land become increase. Until 2011 changes, especially land cover of dryland agriculture mixed with bush where since 2003 to 2011, the extensive have been increased for the amount of 42,526% and on that year land cover has increase 72.047%. The kind of land that changes during the time of 2009 to 2011, can be found in the following graphic:

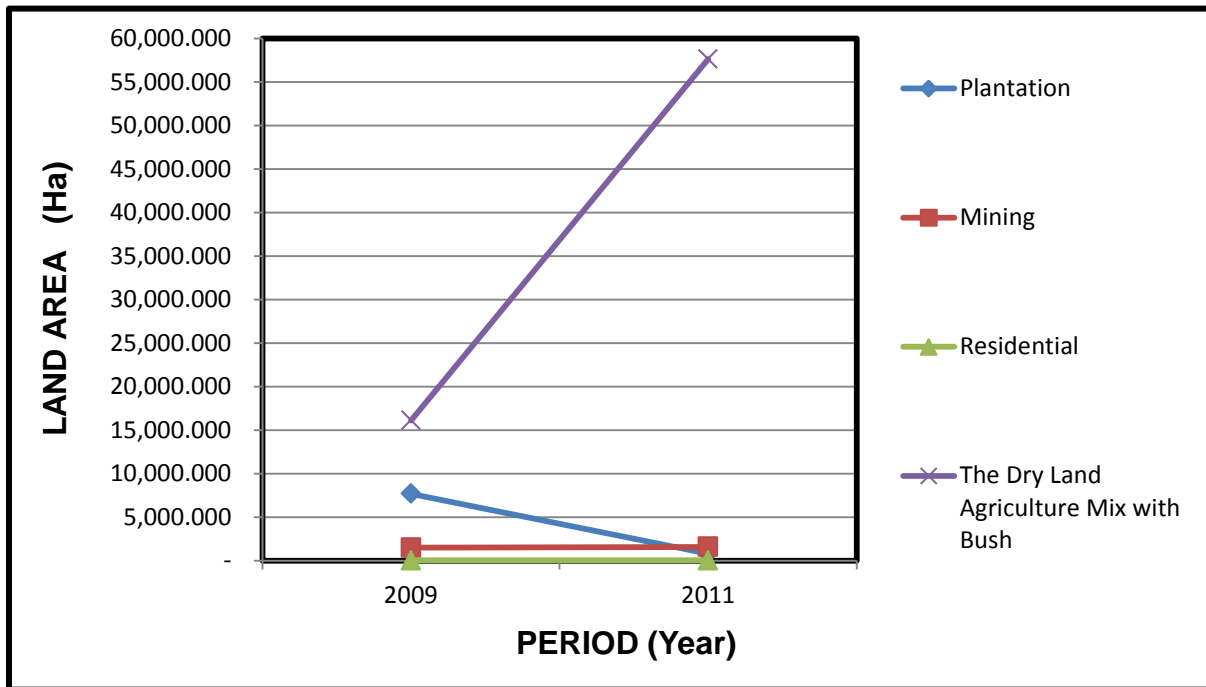


Figure 6 : Graphic on land cover change from 2009 – 2011

Land use changes in Bukit Soeharto Tahura area from 2009 to 2011 on plantation land has decrease in land use with the large of an unused area 6.901,428 Ha or 89,659%. By the existence of empty space land as result from the large of land which has reduce on the plantation land and increasing the large land of bush mixed with agriculture in 2009 with the large of land 16.144,483 Ha. In 2009, the large of land become 57.651,624 Ha or the large increase

in dryland agriculture mixed with bush for amount of 41.537,141 Ha. The large of land that used for mining increase become 75,962 Ha or 5,025%. The bush wide area has increase to 77,089 Ha or raise 99,105%. The large of swampy bush land area in 2011 was 606,327 Ha. The large of opened land increased in 2011 become 418,923 Ha comparing from 2009 as 161,042 Ha, the increase of opened land was 257,881 Ha or 162,4447%.

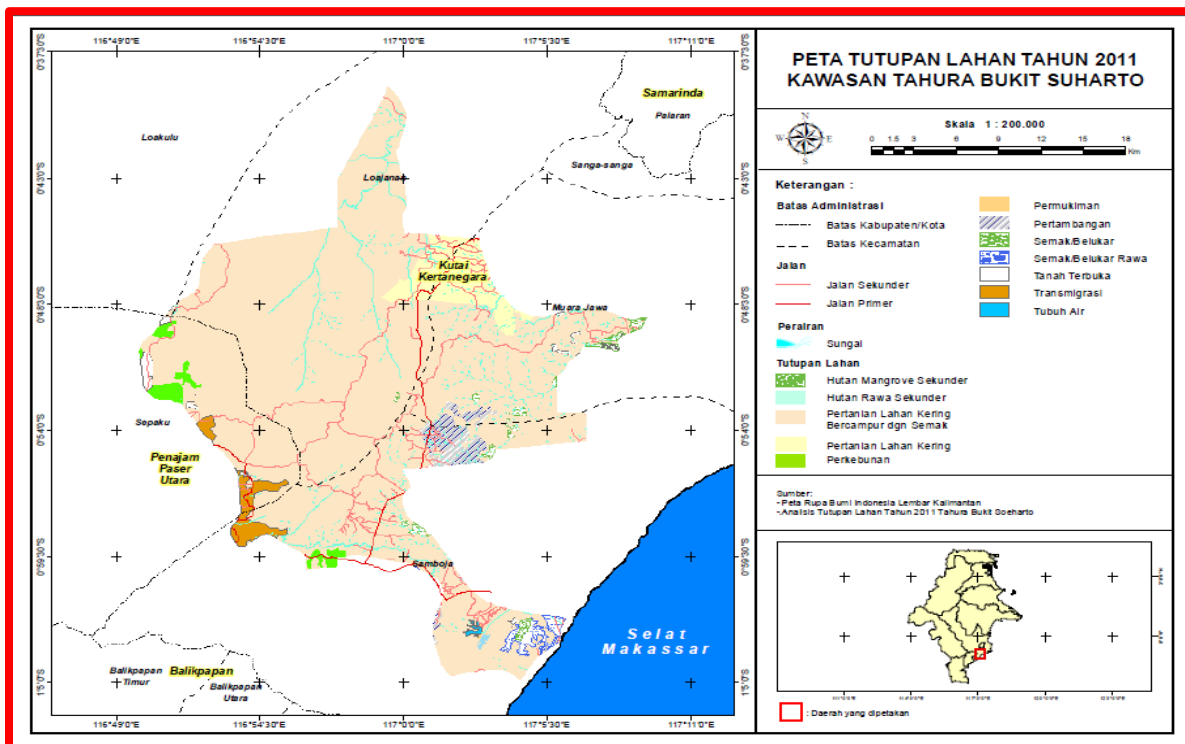


Figure 7: Land cover map of Bukit Soeharto Tahura Area in 2011.

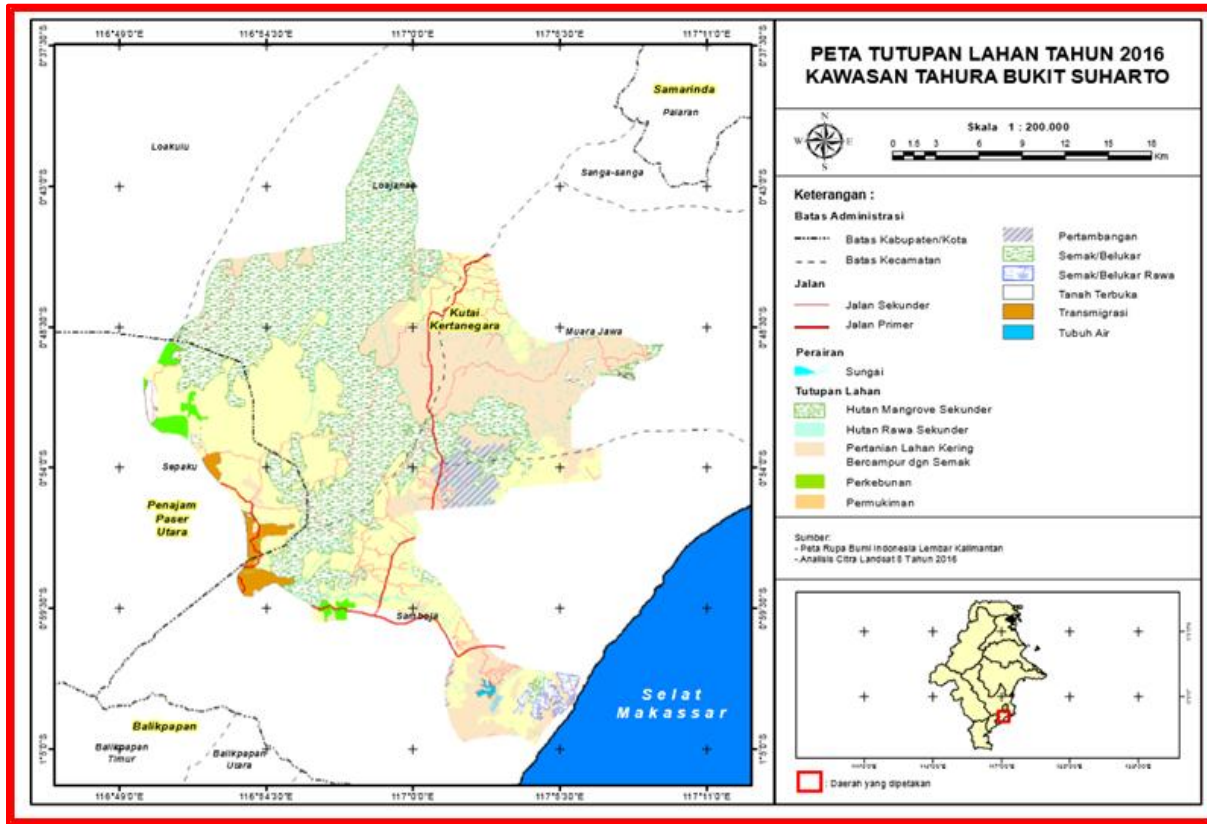


Figure 8 : Land cover map of Bukit Soeharto Tahura Area in 2016.

Land cover in 2016

Land-cover in 2016 in Figure 8 for Bukit Soeharto Grand Forest Park, the extent cover of bush dryland is very dominant comparing in 2011 and 2016 as 6,077%. While for swampy bush land cover occurred the changing

42,750%. The land cover that has no change or still permanent since 2011 to 2016 is the land cover on secondary mangrove forest, land cover on residential, land cover on transmigration area and land cover in water body.

Table 3 : Bukit Soeharto Tahura Area Land Cover 2016

No	Land Cover	Large (Ha)
1.	Secondary Mangrove Forest	281,37
2.	Secondary Swampy Forest	49,22
3.	Plantation	836,10
4.	Residential	27,37
5.	Mining	1.587,64
6.	Dryland Agriculture	21.408,08
7.	Dryland agriculture mixed with bush	14.133,63
8.	Bush	25.840,16
9.	Swampy Bush	606,33
10.	Opened land	360,63
11.	Transmigration	1.090,94
12.	Water Body	81,13
Grand Total		66.302,58

The extent in the table 3 of total land cover is 66.305,58 Ha with the biggest area is bush with the extent of land cover for 25.840,16 H, the second land cover extent is agriculture for 21.408,08 Ha, and the third is dry land agriculture mixed with bush for 14.133,63 Ha. The residential is the smallest

land cover with 26,37 Ha, Secondary swampy forest is the second smallest with 49,22 and the third is body water with 81,13 Ha. The open land entered into Penajam Paser Utara Regency in Sepaku Sub-District, the extent of land cover is 360,63 Ha.

CONCLUSION

1. Land-cover in 2003, the extent of plantation area that has been used was 5.186,683 Ha, Residential 19.897 Ha and Mining 419,925 Ha.
2. Land-cover in 2009, the extent of plantation area that has been used was 7.705,152 Ha, Residential 27.371 Ha and Mining 1.511.675 Ha.
3. Land-cover in 2011, the extent of plantation area that has been used was 7.705.152 Ha, Residential 27.371 Ha and Mining 1.511.675 Ha.
4. Land-cover in 2016, the extent of plantation area that has been used was 836.100 Ha, Residential 27.371 Ha and Mining 1.587.640 Ha.

SUGGESTION

1. with the land extent that is functionally changed especially in plantation land in 2011 with 7.705,152 Ha and in 2016 the extent of plantation land become 836.100 Ha, it has reduce to 6.869,052 Ha or 87,828%. In order the abandoned land can be replanted with the forest tree originated from Kalimantan species.
2. Pressing the rate of land clearing that is functionally changed especially in plantation land, agriculture, mining and residential. The immediate action shall be taken for any action of land clearing that against the rules.
3. Create the buffer zone in the Bukit Soeharto Grand Forest Park by plant the local trees such as Meranti (*Shorea acuminata*), Bengkirai (*Shorea laevifolia*), keruing (*Dipterocarpus borneensis*), Ulin (*Eusyderoxylon zwageri*), Jabon Kadamba (*Anthocephalus cadamba costata*).
4. The existing road network with dirt roads, aggregates and concrete roads does not increase road length, while the existing roads are supposed to be managed and organized to facilitate in managing the function of Bukit Soeharto Tahura area as the conservation area with the special purpose.

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