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Submission date: 17-Oct-2018 01:15PM (UTC+0800)
Submission ID: 1021494693
File name: Papers_Dinar_HOLIDI_EEC.pdf (410.86K)
Word count: 2247
Character count: 11081

EVALUATING OF HOTSPOT ON VARIOUS OF PERMANENT LAND USE IN OGAN KOMERING ILIR DISTRICT SOUTH SUMATERA DURING 2014-2016

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ABSTRACT

Land and forest fires in Indonesia are a serious problem not only at the local level but also at the global level. Ogan Komering Ilir (OKI) Regency is the highest hotspot area in South Sumatera Province. This study aims to evaluate the distribution of hotspots in various permanent land uses and type of soil during 2014-2016 in Ogan Komering Ilir Regency. The study was conducted in the area of Ogan Komering Ilir Regency at the position of 104˚20'- 106˚00 'East Longitude and 3˚30'- 4˚15' South Latitude with total area of 1.90 million ha which has peat and non peatlands. Hotspot data obtained from firms Modis fire period of 2014, 2015 and 2016 while monthly rainfall data of OKI regency region 2014, 2015 and 2016 obtained from Indonesian Climatology Agency. The results show that the number of hotspots in 2014 is 7,242, 2015 there were 18,981 and 2016 there were only 39 hotspots. The highest number of hotspots in the shrub area with total 14,515 hot spots followed by 8,987 hotspot in plantation area, in Imperata grassland area with total 1.898 hotspots and other land used with 154 hotspots. The shrub has high risk of fire because it has faster growth in wet season and faster dry in dry season.

Keywords : Peat land, hotspot, land used, South Sumatera

INTRODUCTION

Land and forest fires in Indonesia had been a serious problem not only for the local level but also at the global level. This is because the fire caused ecological damage such as loss of vegetation, loss of biodiversity and other impacts such as smoke, carbon emissions and disruption to human health. Forest fire correlated to land use change in land peat (Armanto et al., 2010; Imanudin *et al*., 2011; Armanto et al., 2013).

There are three factors that influence the occurrence of fire namely the fuel in the form of biomass, fire source and weather. This condition occurs during low rainfall in during dry season due to dry biomass and easy fire (Armanto et al., 2013; Keane, 2015).

According to Kirana *et al*. (2016), land fires occurring that show by the number of hotspots, in the peatland area of Sumatra Island between in 2001 and 2014 continue to increase with the highest frequency in 2006 and in 2014. The number of hotspots in 2006 as many as 18,851 and 2014 as many as 26,193 hot spots while in non Peat in 2006 is 23,652 points and 2014 as many as 13,214 dots. Ogan Komering Ilir Regency is the highest hotspot area in South Sumatera Province.

Ogan Komering Ilir (OKI) District covers an area of 1.90 million ha which consists of peatland and peatland of 1.45 ha or about 76 percent (OKI Regency Government, 2016; Wetland Indonesia, 2014). This condition causes the area is very prone to burn. Peatlands are formed from piles of organic materials in wetland ecosystems over long periods of time. This pile of organic matter occurs as the rate of production of organic matter from plants in the forest is faster than the rate of decomposition (Najiyati et al., 2005; Osaki et al., 2016).

Peatlands have several limiting factors for agriculture and plantation cultivation. So that if peatland is converted into cultivated land so its water level must be lower (Najiyati et al., 2005; Kalsum *et al.,* 2013; Armanto, 2014.; Holidi et al., 2014; Holidi

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et al., 2015). This condition causes the land to be easily burned, especially during the dry season.

Potential impacts that may result from the conversion of peatland from forest to non-forest are subsidies, water shortages and pollution, fire and air pollution, changes in soil physical and chemical properties, habitat loss and biodiversity and socioeconomic changes (Nuruddin *et al.*, 2006; Miettinen and Liew, 2010; .Lim *et al.*, 2013). Of these impacts, fires are a global issue and contribute enormously to carbon emissions.

This study aims to evaluate the distribution of hotspots in various land used in both peat and non peatlands in the 2014 and 2015 periods in Ogan Komering Ilir District, which is associated with monthly rainfall conditions. Thus it is expected to provide inputs to be a guide in taking policy in handling land fires .

METHODOLOGY

The study was conducted in Ogan Komering Ilir District at the position between 104˚20'- 106˚00 'East Longitude and 2˚30'- 4˚15' South Latitude with coverage area of 1.1 million ha (Fig. 1) having area peat and non peat. Hotspot data obtained from firms Modis fire period of 2014, 2015 and 2016 while monthly rainfall data of OKI regency period 2014, 2015 and 2016 obtained from Indonesian Climatology Agency. The OKI peatland map is obtained from Wetland International in 2012. Map of OKI Regency and OKI Regency Land Use from OKI Regency Local Government. Analysis of spatial data and hotspot distribution using ILWIS 3.8 Program.

RESULT AND DISCUSSION

Total Hotspot Based On Year

In 2014 the number of hotspots in the region of OKI reached 7,242, in 2015 there were 18,981 and in 2016 there were only 39 hotspots (Fig. 2). The highest of hotspots numbers in during 2014-2016 is in 2015, the number of hotspots is closely related to the monthly rainfall of the year (Fig. 3).

Total Hotspots Based on month

Total hotspot based on month during 2014 to 2016 (Fig. 3) shows that total hotspot increase on August until November both in 2014 and 2015. Total hotspot correlated to monthly rainfall (Fig. 3), when monthly rainfall under 100 mm (dry month) the number of hotspot will increase. In 2014 and 2015 hotspot numbers increase from August to October and decrease to November and December. This condition because of on August, September and October in 2014 and on July, August, September and October in 2015 rainfall under 100 mm (dry month) so material water content in the field decrease.

Hotspot Distribution Based on Soil Type

OKI Regency has an area of 1.9 million ha consisting of 1.45 million ha of peatland (76%). Based on Fig. 5, the number of hotspots in 2014 and 2015 shows that fire incidence is still dominated in peat reaching 20,740 points (78.97%) while in non peat only 5,522 hotspots (21.03%). The highest hotspot distribution on peatlands on medium peat is 15,738 followed by shallow depth peat of 4,760 and peatland 242 (Fig. 6).

Based on peat soil type shows that the highest number of hotspots at medium peat depth is 15,378 followed by non peat as much as 5,522, shallow peat depth 4,760 and very shallow peat as much as 242. Based on this data it can be seen that at the depth of peat affects the highest fire at medium depth. This is because the depth of peat affects the amount of biomass that is the source of fuel especially in the dry season. Fires in peatlands are difficult to control because fires occur under ground fire.

Hotspot Distribution Based on permanent land used

Land covered in OKI district dominated shrubs 706,751 ha followed by plantation 541,545 ha and alang-alang 202,401 ha. Hotspots distribution based on permanent landused during 2014-2015 on shrubs area amounted to 14,515 points followed by plantation 8,987 points, alang-alang 1,898 and others 154.

Moisture Content of Material

Hotspot shows the fire area, the higher number of hotspot the higher area of fire. Moisture content of material is very dynamic and it influences nearly all of fire processes, especially ignition, combustion, and smoldering. The combustion of fire material depends on material water content. Peat soils with a moisture content of less than 115% have a high fire risk, 115 to 135% moderate fire risk and more than 135% low fire risk (Rein et al., 2008). Fuel lives with 151% to 180% low fire rate, 126% to 150% moderate fire rate, 101-125% high fire rate and 75% to 100% extreme fire rate (Pollet and Brown, 2007; Denisson et al , 2008). In the dry season the moisture of material will decrease and it will be the trigger of fire.

In the shrubs and grass area has high risk of fire because the condition of these vegetation has short layer. According to Keane (2015), grasses and shrubs have very rapid biomass growth especially in the rainy season compared to trees. Conversely, in dry season, the grass and shrubs are easy to dry due to low water holding capacity so it is easy to burn.

CONCLUSION

In 2014 the number of hotspots in the region of OKI reached 7,242, in 2015 there were 18,981 and in 2016 there were only 39 hotspots. Based on land use, the highest number of hotspots in the shrub area is 14,515 hot spots followed by 8,987 hot spots, 1,898 hot spots and 154 hotspots. The shrub is a vegetation that produces very high biomass during the rainy season and is easy to dry in dry and flammable seasons.

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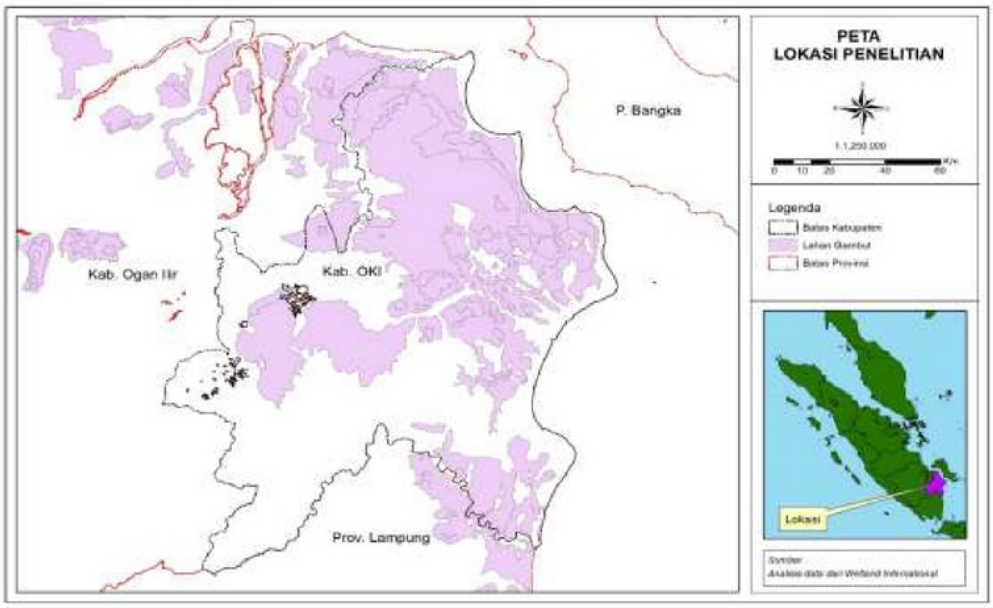

Fig. 1. Research Location

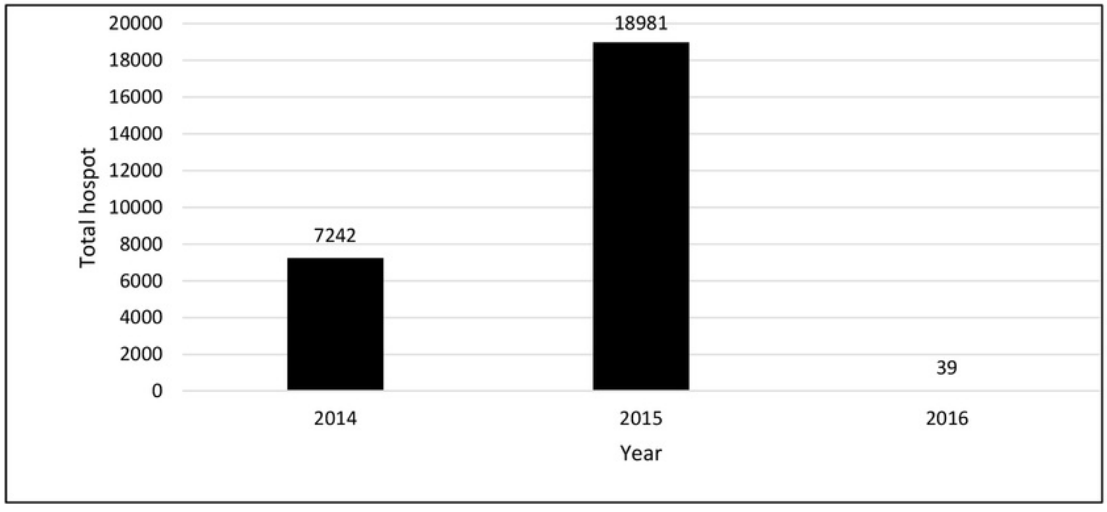

Fig. 2. Total hotspot in OKI District during 2014-2016

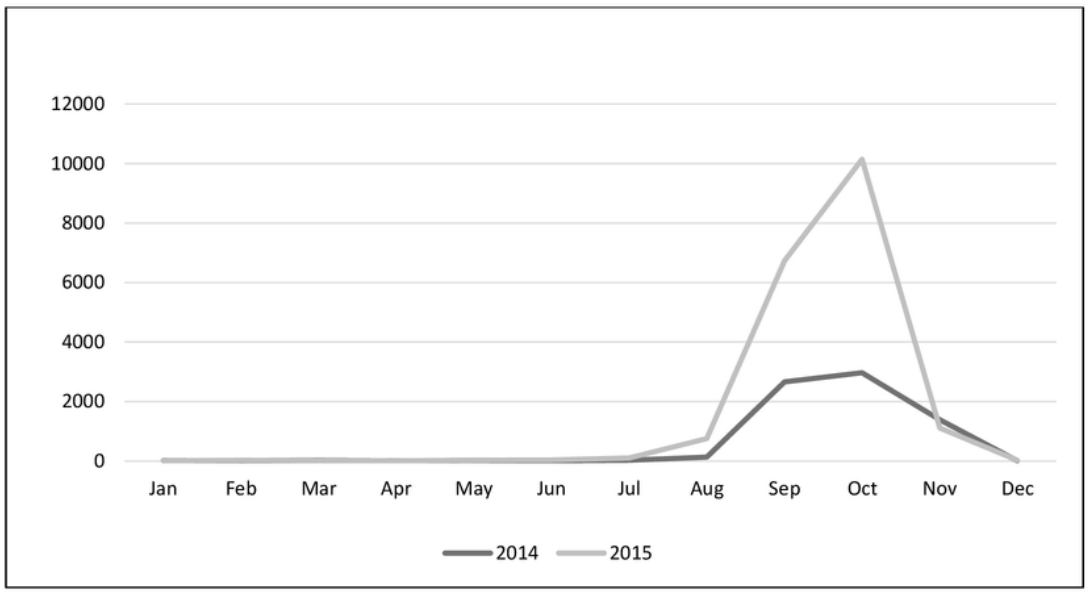

Fig. 3. Total hotspot in OKI District during 2014-2016

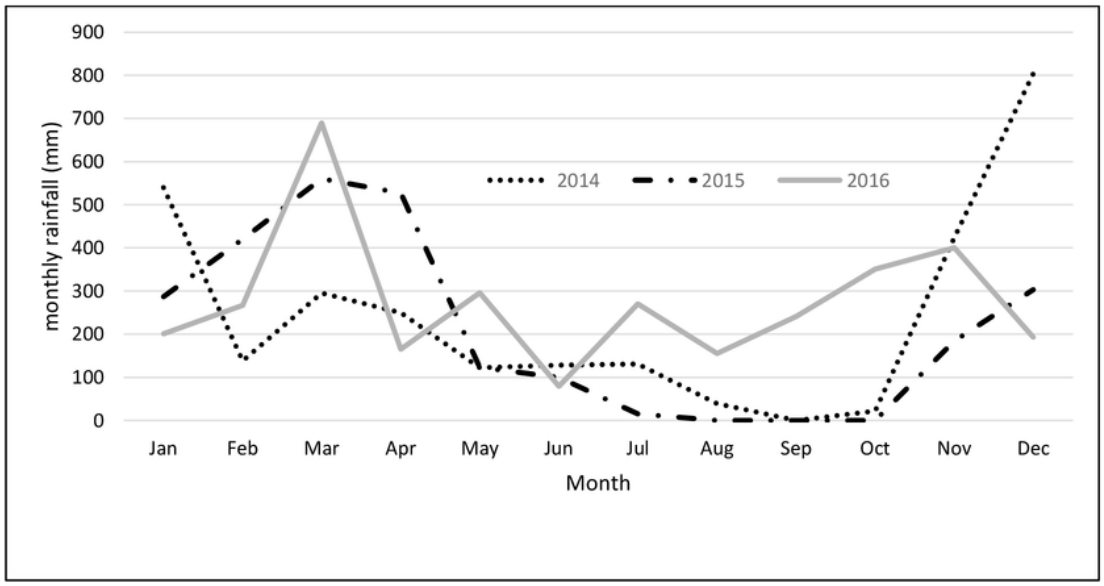

Fig. 4. Monthly rainfall in 2014, 2015 and 2016

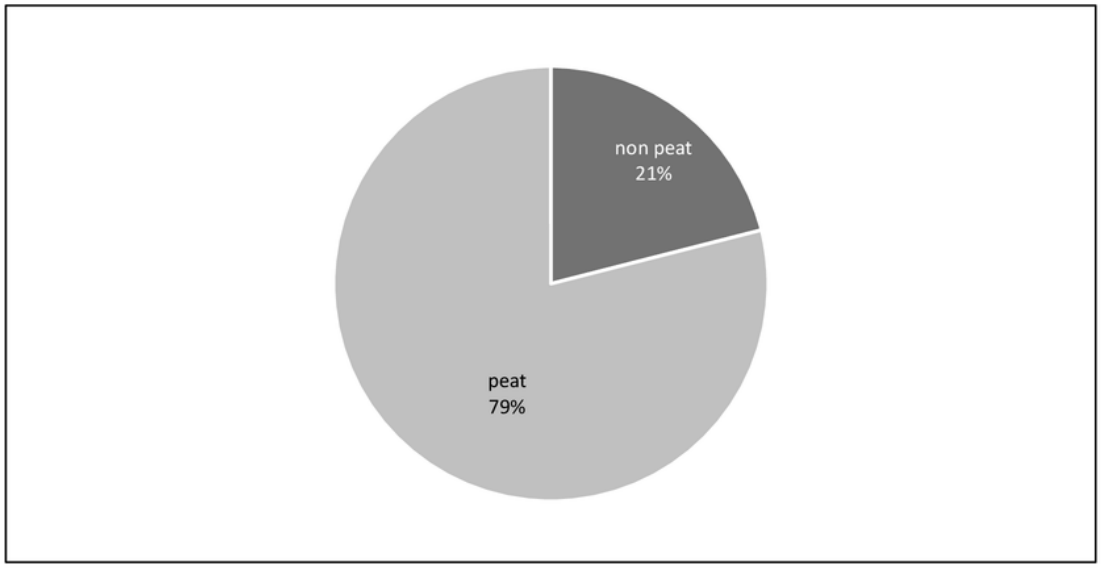

Fig. 5. Distribution hotspot on mineral and peat

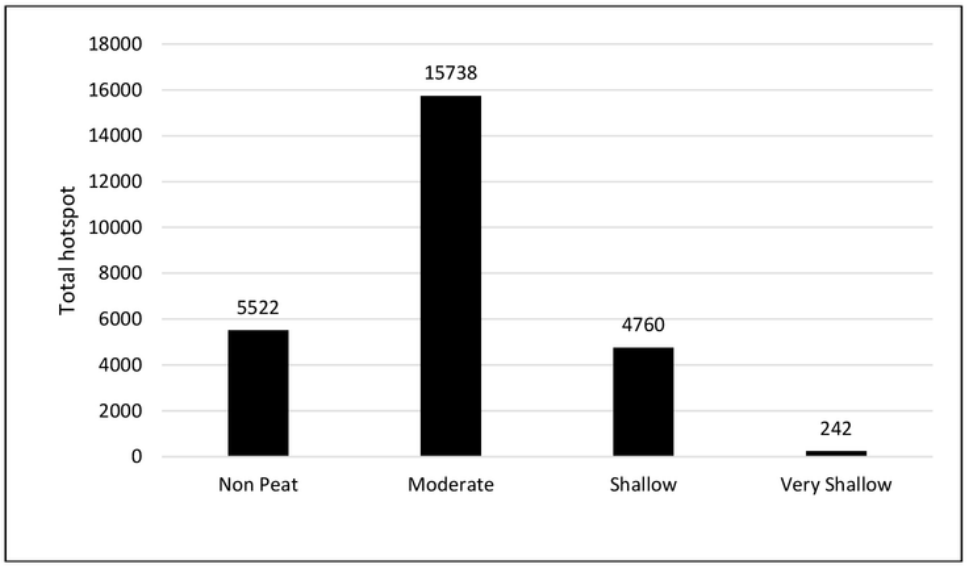

Fig. 6. Distribution hotspot on various of peat depth

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