Research project of counterparts funded at IPB

Name	Counterpart	Title
I Nengah Surati Jaya, Tatang Tiryana, Mohammad Zuhdi, Nitya Ade Santi, Ali M Muslih, Rodrigo Vera Ramirez	**B05**	Updating the forest and land cover map of Jambi in 2018: The underlying factors and changes detected during the last 3 years

Background

The Indonesian landscape is currently threatened by the conversion of land into monocultures of crops such as oil palm (Villamor 2014). This change of land use to commercial oil palm causes land degradation that greatly increases the vulnerability to fire of the remaining forest. Such forest fires must receive great attention because they greatly impact the environment. Fires increase deforestation rates, greenhouse gas emissions, and species extinctions (Prasetyo 2016). Despite the big negative impacts, fire cannot be eliminated as a cultivation technique and part of agricultural practice in tropical countries. In addition to being used by the community, fire is also used by companies and concessionaires to reduce production costs. Such activities are likely to initiate land fires, especially if there is an El Niño anomaly. And over the years Indonesia has experienced repeated forest fires. The most severe fire incident occurred in Jambi in 2015 (Prasetyo 2016). It is therefore useful to determine the land changes that occurred between 2015 and 2018 due to the forest fires of 2015. The main objective of this research is thus to discover information on land use changes that occurred between 2015 and 2018 and to determine the factors that drove them.

Material and Methodology

The study was conducted in Jambi province July-August 2018. The tools used were ArcMap10.1, GPS, Tallysheet, voice recorder, and a camera. The material that was used were Land use maps and Landsat Images from 2018 (path/row 125/61, 126/61, 125/62, and 126/62). The second part of the research, the analysis of factors driving changes in land use, was investigated by in-depth interviews.

Landsat image processing began by correcting the Land use map and updating the map by overlaying the Land use map with the Landsat Image. We then ground-truthed the maps by field surveys and carried out in-depth interviews at 8 sites in the districts of Batanghari, Tebo, Tanjung Jabung Barat, and Tanjung Jabung Timur where land use changes had occurred.

Figure 1. EFForTS-ABS team in July 2018, from left to right: Rodrigo Vera, Nitya Ade Santi, Ali M Muslih

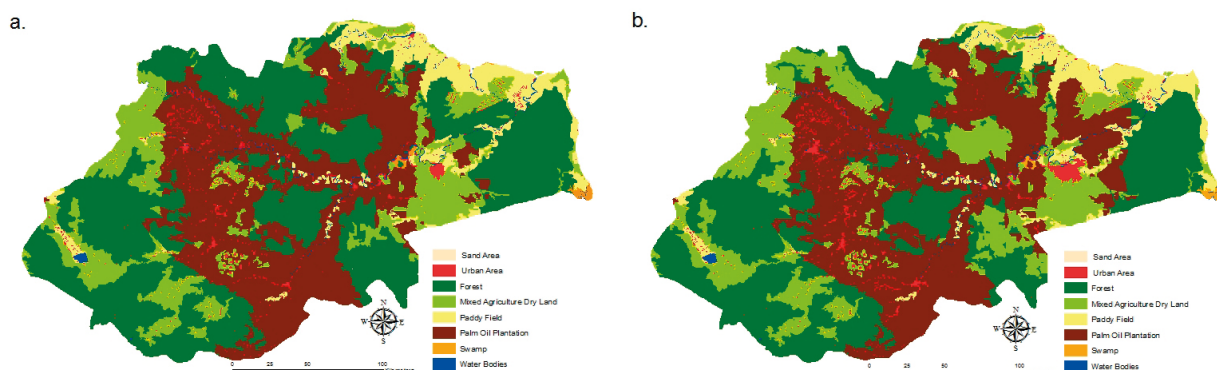## Results and Discussion

Figure 2. LUCC maps in Jambi: a. 2015 and b. 2018

Land use is categorized as forest, water bodies, urban area, swamp, mixed dry land agriculture, oil palm plantation, sandy areas, and paddy fields (Fig 2). In 2015 Jambi province was still dominated by forest (Fig 2a).
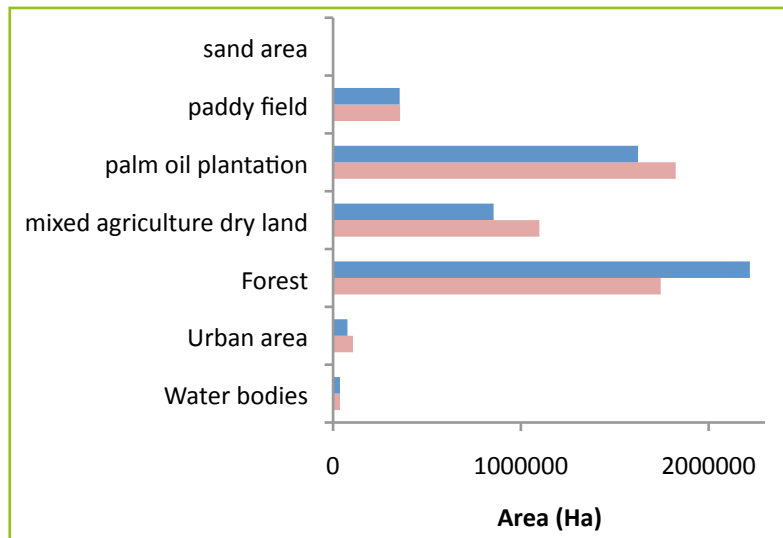
Figure 3. Transformation derived from LUCC 2015-2018

Between 2015 and 2018 forest area in Jambi province decreased from 42.81% to 33.65% (Fig 3). This decrease came about because rapid population increase led to demand for land for housing, agriculture and plantations. It is this that caused forest to be the only category that greatly decreased. In addition, forest commodities loose out to oil palm because they are less profitable than palm oil. Palm oil has a higher selling value than forest commodities, faster harvesting time, and requires less intensive maintenance. These considerations help push people to change from rubber farmers to oil palm farmers. In consequence, the land use category oil palm plantation increased from 31.32% to 35.19%. High population also resulted in the growth of urban areas. This growth underlies the increase in this category from 1.48% to 2.05%. Changes of land use to urban area results from the basic needs of the increasing community. This increase in urban areas will continue along with the increasing population. The major increase in urban area occurred in Jambi city (Fig. 2).

A further factor driving the reduction in forest area is the increase in mixed dry agriculture land from 16.49% to 21.19%. People usually get into forest areas by clearing the forest. This is usually done using fire because it is cheap, fast, and increases soil fertility. This should be avoided because it will have a negative impact on the environment. In 2015, Jambi experienced a serious forest fire disaster due to the practice of land clearing by means of uncontrolled burning.

The biggest change in land cover is from forest to dry land agriculture by 281 993.30 ha in 2018. Communities clear fields for farming using burning because it improves soil fertility, pH, saves time, and is cheaper. However, it can have a serious impact because it can cause land fires if not properly controlled. Forest fires have negative impacts on social, economic and health aspects (Hartmann et al. 2018). Changes in forests to oil palm plantation also experienced a large increase to 191 800.71 ha. And this was the second greatest change in land use. It lead, by 2018, to oil palm plantations becoming the largest area of land use in Jambi province. Plantation development will indirectly contribute to land change and will subsequently lead to land ownership conflicts (Tarigan 2017).

Conclusion

The largest decline in land cover was the forest from 42.81% in 2015 to 33.65% in 2018. The largest increase in land cover was mixed agricultural land from 16.49% in 2015 to 21.19% in 2018. In 2015 the land use with the greatest area was forest with a total area of 42.81%. In 2018, however, the largest land area was oil palm plantation with an area of 35.19%. Land use changes are due to social, socio-economic factors. Land use change from forest to other types are due to economic factors that drive land clearing for dry land agricultural and oil palm plantations on both private and state land.

References

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