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Rice Production Enhancement through Spatial Utilization "Land for Plant Life" in Industrial Crop Forest (ICF) Zone for Avoiding of Peat Fire

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Abstract. Approximately 588,841 hectares of the 645,249 hectares of degraded peat land in Ogan Komering Ilir (OKI), South Sumatra Province are being rehabilitated through ICF. Under government regulations that the layout of the plantation land use intended by 70 percent for staple crops with of *Acacia crasicarpa* species, and 5 percent is allocated to the plant life that aim for cultivating by people around ICF as a source of income. Land to plant life can be used for food crops, horticulture, and plants that have woody tree. Around the plantation, is still there, the local people who do farming activities by burning peat (the local term is "Sonor System"). Farmers Rice conducting Sonor System not fully willing to work the land because prohibited to burn the peat. Former transmigran farmers who live around of ICF has begun starting clearance through the cultivation of land life or Tillage System. Research conducted in Simpang Tiga Sakti Village, Tulung Selapan Sub district and in Simpang Heran Air Sugihan Sub district in OKI Regency, using Disproportionate Stratified Random Sampling Method. Results of research showed that farming Sonor System only produced rice was 0.47 tons and revenues was 1,507.00 million rupiah per hectare, while farmers Tillage System got rice yield by 3.30 tons and revenues was 6,060.50 million rupiah per hectare. Excess production that was produced by farmers using Tillage System without burning peat reached by 7.0 times compared with the farmers of Sonor System.

Keywords: Plant Life, Land Cultivation, Rice Production

1. Background

Indonesia's forest area until the year 2009 was 88.17 million hectares. Deforestation that occurred in the 2000-2009 Period covering 15.16 million hectares (Sumargo *et.al.*, 2011). Until the Year 2008, in Indonesia there were 84.70 million hectares of degraded land, that there was 69.86 percent in forest zone. Shrinking forests in Indonesia could not be separated from land and forest fires events resulting from El Nino phenomenon of 1997. Rehabilitation of degraded land in Indonesia of which is done through the development of plantation forests or industrial crop forest (ICF). Its target reach until 9.2 million hectares or 16 percent of production forest area. Minister of Forestry Decree No. 70/Kpts-II/1995, Minister of Forestry Decree No. 246/Kpts-II/1996 and Minister of Forestry Regulation No. P.21/Menhut-II/2006 have set layout of ICF space. Space of ICF allocated by 70 percent for staple crop, 5 percent for area of the plant life, 10 percent for area of local species plant, 10 percent for conservation area, and 5 percent for infrastructure (General Directorate of Forestry Production Development of The Forestry Ministry Republic of Indonesia, 2010).

In Ogan Komering Ilir Regency of South Sumatra, in its production forest area, there were 645,249 hectares degraded peat land. Amounting to 90.73 percent or 585,405 hectares of it allocated for ICF. Realization of planting acacia as staple crop until year 2012 reached approximately 250,000 hectares. Area for plant life allocated was 32,777.87 hectares or 6.0 percent. Activities in the area of plant life effort to create jobs for the people live around ICF through agribusiness activities in agriculture and forestry. Other plants are cultivated in this area were food crops, forest trees or woody species and types of fruits. ICF activities not only for the company's interests in the timber business, but also simultaneously increase economic activities based on agriculture and social welfare (Armaizal, 2012).

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ICF company has implemented a variety of plant life activities such as paddy rice and corn, and other crops such as citrus. ICF companies do guidance for communities to undertake land clearing without burning (Armaizal , 2012). Habits of local people who live around or in area of ICF were used to plant rice with clearing land by burning, which known as "Sonor System". "Sonor" means the traditional rice planting in peat swamps in the long dry season, with no attempt to control the fire. Planting is done by way of sowing rice seeds, left without maintenance such as fertilizing, pest control and weeding grass until harvest (Suyanto and Khususiyah, 2004). Ashes resulted by burning of peat as a medium as plant nutrients (Abidin, 2011). In the other hand, former transmigran farmers have been done plant rice without burning. Their land preparation were done chemically by using herbicides (Asmani *et al.*, 2011).

Based on the above description, the purpose of the study was to assess the potential for development of food crops in the area of plant life through rice cultivation by way of land clearing without burning to change the traditional way "Sonor System".

2. Method

Research method used in this study was Case Study, and the sampling was done by using a Disproportionate Stratified Random Sampling Method. Strata in this study consisted of local farmers who did rice cultivation by land fire or Sonor System (1st Stratum), and farmers who did rice cultivation by land management or Tillage System (2nd Stratum). Total of samples of each stratum was 30 people. The study was conducted at Simpang Tiga Sakti Village Tulung Selapan Sub district for 1st Stratum, and for 2nd Stratum performed at Simpang Heran Air Sugihan Sub district, which all the location are in the OKI Regency South Sumatra Province. Primary data collected through interviews using a questionnaire, carried out in June 2013. To find out the losses peat fires was obtained from one of the employees of the company as an example of the in-depth study. Secondary data drew from variety of sources such as the District Head Office in Simpang Tiga Sakti, Cooperatives of Bina Andalas in Simpang Heran, and Main Office PT.SBA Wood Industries in Palembang. Data was processed in tabulation and presented using quantitatively description.

3. Result and Discussion

32,777.87 hectares of plant life in the areal of ICF is a potential to be developed as rice fields, swampy or tidal rice fields. This area if used for planting rice one time per year potentially can support rice supplies. In addition, there are many spaces, around 5 thousand hectares, are delimiter between embankment blocks which can be used to plant rice or other food crops. The total of these two areas are 5 percent of the 758,732 hectares of rice fields in South Sumatra Province (Central Bureau of Statistics of South Sumatra Province, 2012). If both types of these areas were utilized, the potential rice can be obtained around 100 thousand tons per year.

Table 1. Cost and Revenue Analysis of Rice Farm between Sonor System in Simpang Tiga Sakti Village and Tillage System Simpang Heran Village Ogan Komering Ilir Regency South Sumatra Province, in June 2013

No.	Parameter	Unit	Sonor System	Tillage System
1.	Land zise	ha^{-y}	2.20	1.60
2.	Production	kg^{-ha-y}	470.00	3,300.00
3.	Cost production	Rp^{-ha-y}	373,000.00	3,400,000.00
4.	Selling price of rice	Rp^{-kg}	4,000.00	3,800.00
5.	Revenue	Rp^{-ha-y}	1,880,000.00	12.540,000.00
6.	Net revenue	Rp^{-ha-y}	1,507,000.00	6,060,500.00
7.	Net revenue total	Rp^{-y}	3,315,000.00	9,696,800.00
7.	R/C		5.04	1.93

The results of research in Table 1 has indicated that rice grown on degraded peat land by way of opening the land without burning, farm produced production of rice 7 tomes more than the way of the Sonor

System. The land area under cultivation using Tillage System by farmers of the former transmigran was capable only 1.60 hectares. Farmer who did the activities of Sonor System, open land for rice reached 2.20 hectares. After rice seed spreading, Sonor farmers were not doing plant maintenance activities such as fertilizing, pest control, and weeding. Its cost production was lower than Tillage System. Costs incurred only for the purchase of seed rice, whereas labor is derived from his own family. Sonor System income was lower around four times than the Tillage System. Its cost production only 10.97 percent compared to Tillage System. Comparison of revenue and costs of production (R/C) in Sonor System was 5.04 whereas Tillage System was 1.93.

Base on the description of the results of these studies that managing peat land by using inputs such as fertilizers and herbicides can increase rice production compared to the way of fires. Tillage Systems in addition to increase production and income as well as reduce the release of green house gas emission. The amount of emissions from the burning degraded peat land based on research results Asmani *et.al.* (2011) reached 49.90 tons of carbon dioxide per hectare per year. Preventing sonor can reduce green house gas emission. Firing peat causes reducing soil quality, biodiversity and hydrological cycle (Muhendar, 2012). The losses of socioeconomic activities of Sonor System can cause laziness nature for farmers because they want to achieve something easily and not productive. The productivity of rice was low. Farmers who continue to implement Sonor System has a reason that did it very simple, low input, low labor and low cost.

ICF companies are very interested in the prevention of peat fires. Peatland fires resulted in the destruction of investment in plant acacia and depletion of peat as media acacia. The company of ICF for fire prevention caused by sonor activity spent of money around 500 thousand per hectare. If one hectare of land has been planted with young acacia burning causes an average loss of about 5 million rupiah per hectare Anticipating the peat fire-, the company invites the public about HTI joined the group Concerned Citizens Fire (Armaizal, 2012).

4. Conclusion

From the results of the study concluded that:

1. The area of plant life on the plantation and embankment spatial divider block potentially planted for the development of rice field as big as 5 percent of total rice land of South Sumatra to support food stock.
2. Managing peat land with cultivating of rice with tillage potentially to increase production of rice 7 times and net revenue 4 times compared with sonor by burning of peat.
3. People who seek sonor cultivation system still continues to strive to do such activities because of the relatively low cost of production that do not require a lot of inputs and labor employment.
4. The company of ICF very concerned to prevent peatland fires because it would destroy investment in plant and eliminate peat as a medium crop.

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