INTERNATIONAL SEMINAR-WORKSHOP ON "INTEGRATED LOWLAND DEVELOPMENT AND MANAGEMENT"

THEME:
THE ROLE OF AGRO-ECO-EDU PROGRAM THROUGH MULTISTAKEHOLDERS PARTICIPATION ON THE SUSTAINABILITY OF LOWLAND DEVELOPMENT AND MANAGEMENT

PALEMBANG CITY - BANYUASIN DISTRICT
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ABSTRACT

Concerning about development scenario industrial plantation farms or estates (Modada PT Freeport Indonesia), the potential for plantations not only to produce economic benefits but also to absorb carbon dioxide could improve ecological and economical benefit for social panorama. The research was aimed to analyze potential of carbon biomass carbon and to gain the benefit of economic benefit. The objective was to determine the benefit for local community. Research was conducted at PT. Sumber Bibit Anakas in south Sumatra as one of the concession holders. Biomass was measured using destructive sampling such as CO2 was estimated from the carbon stock of trees within the forest concession. Simple random sampling method within the forest was conducted to determine the parameters of socio-economic and environmental benefits. The socio-economic benefit was estimated from amount of livestock, fish catch from river to estimate. More, socio-environmental benefit estimated from water transportation in the village, before and after the existence of OFP. The result showed that mean annual increment of C biomass was 9.33 t CO2 ha-1 per year. The amount of fish catch from the river increment by local community per year per year before the existence of OFP was 2,423.00 kg and after the existence of OFP declined to 573.50 kg, taking fish catch extrapolation about 41.4% (973.50 kg). The gain of socio-economic benefit for local community per year from water transportation service before existence of OFP was such as 10,132.00.00 rupiah and after existence of OFP as much as 3,271.000.00 rupiah or increased as much as 4,861,000.00 rupiah or 113.07 percent.

Key words: OFP, Carbon Potential, Drainage Networking, Benefit.
BACKGROUND

Perspective to exert activity rehabilitation degraded forest area with industrial plantation forest (IPF) must be integrated to provide resources for industry, environment preservation and social prosperity. In order to increase society welfare, the orientation of forestry industrial investment should be changed, not just for business and state’s income (Nugraha and Istoto, 2007). Forest must be managed to give benefit for local society around the forest area, in providing goods and services widely (FAO, 1978 in Awang, 2000).

Activity of IPF management in forest has to be applied from cutting and replanting. The activity of agro-ecosystem must be done according to holistic, integrated and systematically includes ecological, economical and social aspect to give benefit for society, businessman and government. The aim of IPF development is to increase forest value according to quality and quantity of production, not only produce wood and non-wood, but also for environment service (Sjarkowi, 2007). Carbon absorption from IPF has opportunity such as commodity in global carbon marketing to get certified of emission reduction (Murdyiarso, 2005).

Getting maximal productivity for IPF in peat swamp, it should be arranged to utilize and optimize the water resources preservation. Drainage system is very important for water restrain, toxic wash, fishing cultivation media and transportation tool (Wetlands International, 2005).

Existence of IPF in peat swamp often evokes controversy such as arguments about IPF in peat swamp can cause peat subsidence and carbon emission. Ideally, degraded forest area rehabilitation should be planted with natural forest tree rather than with IPF. The facts, it is difficult for government to maintain the degraded forest caused by financial, man resource and experience limitation, then the total of forest tend to wrinkle every year and the tree finally will be up.

Vicinity community around IPF often feels displeasure for drainage networking and too difficult getting the benefit from water resources, especially for fish catching. Society has felt the fresh water fish haul on the wane because catching area has been dominated by company’s IPF. Income from fish source tends to decreased, although the income from water transportation service.

The aims of this research are to detect acacia biomass carbon potential as dioxide carbon absorption magnitude’s indicator and to get the description of ecological and economical benefit from drainage networking existence in IPF.

RESEARCH METHODOLOGY

Research of biomass carbon potential measurement was carried out in acacia IPF Teluk Pulai Unit, PT. SBA Sinarmas Group. Research of ecological (fish preservation) and economical benefit (water transportation services) of acacia IPF drainage networking was carried out from two villages, that are Simpang Tiga Sakti village, Tulung Satapan District and Sungai Batang village, Air Suhlan District, Ogan Komering Ilir Regency, South Sumatra Province. Research was done from September to December 2009.

Asmani, Sjarkowi, Susanto, Hanafia, Soewarso, and Siregar. The Analysis of
Carbon potential measurement data was done, taken of 12 acacia (Acacia Crassicaarpa) plants samples destructively by age class, 1.5 year, 3.5 year and 5.5 year respectively. The research method is to count drainage networking benefits for the surrounding society’s study case with simple random sampling method of 100 respondents.

Biomass carbon potential data was analyzed with measuring of wet and dry weight of acacia tree parts (stick, branch, twig, leaf and root), necro mass and under plant, then done by laboratory analysis to detect the carbon content of plant.

The benefit of drainage networking data was analyzed using tabulation, as result of respondent review. Fish preservation benefit was analyze by the amount of fish captured from the river. Economy benefit was analyzed from respondent income resulted from water transportation services. Ecological and economical benefit was done to compare between the area before IPF implementation (natural river peat swamp) and after existence of IPF (peat swamp with drainage networking).

Carbon Absorption
The concession of Acacia IPF for Sinarmas Group in OKI’s peat swamp is 585,425 hectares, from its 645,249 production forest area. Total area planted was 69,039,50 hectares. Almost of peat swamp area was degraded forest caused by forest fire. Acacia plant produces biomass as result of carbon absorption from atmosphere. From this research give the result for content of biomass from acacia planting harvested in three age of classification. Averagely, carbon total results as much as 76.51 tons per hectare. The carbon potential was 19.83 tons per hectare per year, equal to 72.79 tons of CO₂ absorption from atmosphere (Table 1).

Table 1. The content of acacia biomass carbon potential per hectare per year at IPF Pl. SBA Teluk Pulaí Unit OKI.

<table>
<thead>
<tr>
<th>C content (ton/hectare)</th>
<th>1.5 year</th>
<th>3.5 year</th>
<th>5.5 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree</td>
<td>11.22</td>
<td>87.66</td>
<td>97.42</td>
</tr>
<tr>
<td>Necro-mass</td>
<td>0.00</td>
<td>2.39</td>
<td>2.70</td>
</tr>
<tr>
<td>Litter-tree</td>
<td>4.08</td>
<td>9.94</td>
<td>14.13</td>
</tr>
<tr>
<td>Total</td>
<td>15.30</td>
<td>99.99</td>
<td>114.25</td>
</tr>
<tr>
<td>Average/year</td>
<td>10.20</td>
<td>28.57</td>
<td>20.73</td>
</tr>
</tbody>
</table>

Carbon potential of Acacia crassicaarpa was higher than Acacia mangium, oil palm, tropical natural forest and primary jungle. Acacia mangium at age of 10 years old planted at Bogor, West Java, had carbon saving as much as 82.24 tons per hectare (Heriansyah et al., 2003). Oil palm with 150 trees per hectare at average 25 years old produced biomass of fresh fruit and leaf per hectare for year as much as 20.0 tons and 10.0 tons and its carbon absorption as much as 6.0 tons and 5.0 tons (Sulma et al., 2007). Productivity of biomass from tropical nature forest was 240 to 400 tons per hectare with average around 4 tons dry weigh per hectare per year (Choe, 2002 in Sumitro 2005). Carbon absorption potential from primary jungle was as much as 3.0 tons per hectare per year (Ditjen RLPS Forest Department, 2007).
Ecological and economical social benefit of IPF Drainage Networking

Before drainage networking was built by IPF Company, volume of highest fresh water fish haul as passive cultivation by means the water level increase and watery the peat swamp area and moment of water wane after the existence of IPF. Currently, this condition is less applicable for vicinity society because of the difficulty to catch the fish caused by the existence of IPF. IPF makes fishing area narrow and people are forbidden to enter IPF area. The length of IPF drainage network is 3,876,916.64 meters; consist of primary, semi primary, secondary and tertiary canal.

Fresh water fish volume that respondent captured after the existence of IPF was only as much as 515.50 kgs per year per respondent was smaller than before when swamp condition naturally. The fish capture result per respondent was as much as 3,988.00 kg per year. The reduction was as much as 3,472.50 kg or 87.07 percent. In fact, even though the total of respondent acceptance reducing from environment side, it was a preservation fresh water fish resources. From interview got the information that fish volume in swamp area still high, fish were free to move and enter the river in any season and water level condition and were not congested at one particular basin.

IPF drainage network as transportation infrastructure have given economically benefit as source of living for society residing in IPF area. The result of research shown that the fish capture volume was decrease, their income just 7,147,670 rupiah, decreased 51.22 percent, while the income compensation enhanced from water transportation services. The income from water transportation services increased from 3,733,600.00 rupiah to 8,553,600.00 rupiah, which increase as much as 4,820,000.00 rupiah or 129.07 percent per respondents per year.

Although enhanced income from water transportation service effort was really not as much as the reduction from fish capture, in general increased income was subsidized by trade effort, labor and farming. Reduction income came from wood earning caused wood source from nature forest has already gone. Its wood resources from collapsible wood in peat pile and it is not from straightened tree of nature forest (Table 2).

Table 2. The differences between respondent income average around of Sinar Mas IPF in OKI Regency, South Sumatra 2009.

<table>
<thead>
<tr>
<th>Resources of Respondent Income</th>
<th>Income (Rps/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before Drainage</td>
</tr>
<tr>
<td>Water transportation</td>
<td>3,733,060</td>
</tr>
<tr>
<td>Water Fish</td>
<td></td>
</tr>
<tr>
<td>Laborer</td>
<td>13,955,030</td>
</tr>
<tr>
<td>Trading</td>
<td>1,405,810</td>
</tr>
<tr>
<td>Farming</td>
<td>2,396,100</td>
</tr>
<tr>
<td>Wood Earning</td>
<td>1,188,450</td>
</tr>
<tr>
<td></td>
<td>2,216,000</td>
</tr>
</tbody>
</table>
Research result of Pohmattika, Asmani and Lifianthi (2009), shown that existence of IPF also gave benefit for society lives around IPF. Society income at Bukit Batu Village Jalan 31 Air Sugihan District OKI Regency, as transmigrates from acacia planting harvested in three age of classification, averagely carbon result as much as communities with main job as farmer, give income contribution per year as much as 32.41 percent from previous total income. Farmer income which come along activity as worker IPF was increased by 11.17 percent from farmer income alone. Farmer as IPF labors got surplus income per year as much as 17.04 percent and the farmers avoid to work with IPF faced the deficit as much as 2.75 percent. The farmers work at IPF had addition income as much as 4.20 million rupiah per year contributed to the total income to be 13.10 million rupiah. In contrast, the farmers who avoid to work with IPF, they total income only 11.70 million rupiah per year.

CONCLUSION

1. Biomass carbon potential absorbed in Acacia crassicarpa plats was 19.83 tons per hectare per year similarly absorb 72.79 tons of CO₂ from atmosphere.
2. As socio-ecological benefit, the existence of drainage networking development in IPF preserved fresh water fish haul as much as 87.07 percent, and equal saved its was 51.22 percent.
3. Water transportation service income as socio-economical benefit by drainage networking existence in IPF while company activities to appear greater will increased to be 129.09 percent.

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