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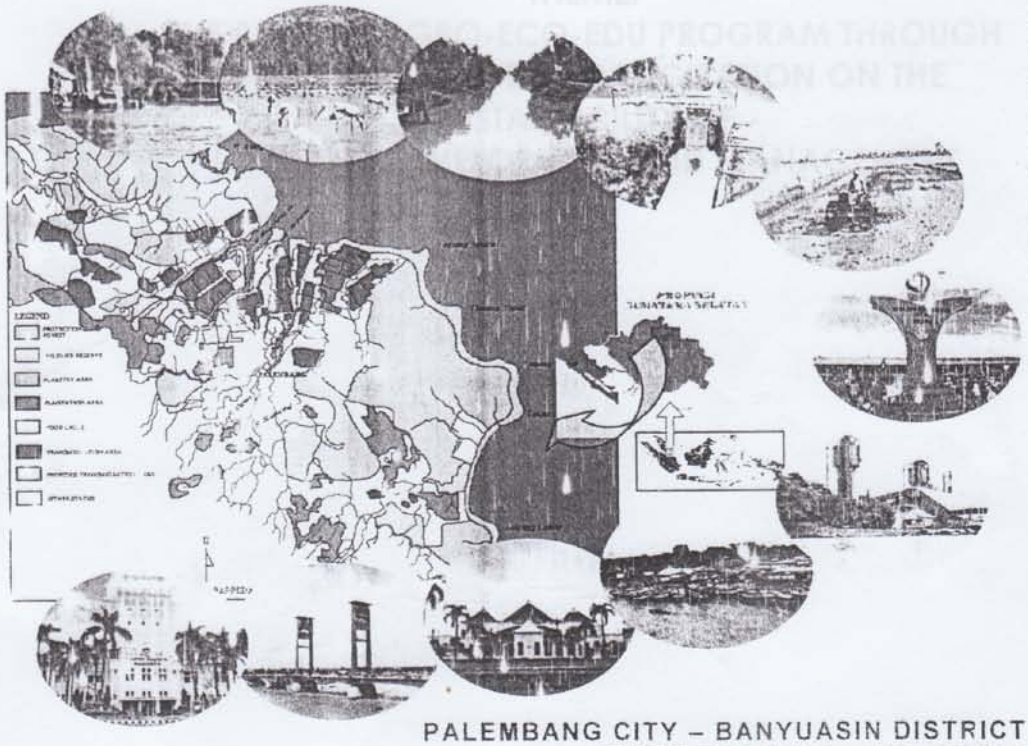
Proceedings

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



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CONTENTS

A9. Feeding Habits and Langth-Weight Relation of Senangin Fish (*Eleutheronema tetradactylum*)(Shaw) Caught in Sungsang Waters, South Sumatera *(Moh. Rasyid Ridho, MF. Rahardjo, Ade Yusni Franata)*

A10. Conservation of Mangrove Ecosystem as Alternative for Global Warming Adaptation in Estuarian and Coastal Lowland (Study Management of Mangrove Ecosystem on Coastal-Lowlands, Coastal Area of East Sumatera, Banyuasin, SumSel) *(Yetty Hastiana, Fachrurrozie Sjarkowi, Dinar Putranto, Rasyid Ridho)*

B. Presentation in Room II

B1. Water Management and Flood Protection of Agropolitan Gandus For Agriculture Development *(RA. Marlina Sylvia, FX., Suryadi, RH.Susanto, Bart Schultz)*

B2. Strengthening The Local Economic Institution of Fisheries Village Community in Banten Province *(Samadi)*

B3. Ecotourism for Rural Development and Environmental Restoration in The Lowland Area of Jeneberang River Basin, District of Gowa, South Sulawesi Province *(Muhammad Nathan)*

B4. The Diversity of Bacteria and its Pontentions from Nipah Mangrove Sediment *(Nypa fruticabs Wurmb.)* at Pulau Rimau District in Banyuasin, South Sumatera *(Dwi Puspa Indriani, Hary Widjajanti, Desy Mayasari)*

B5. Illegal Logging Study on Land Areas Gambut in Forest Merang Kepayang *(Lulu Yuningsih dan Solihin)*

B6 Threatening of Food Security in South Sumatera Due to Land Conversion of Rice Field to Oil Palm (A Case Study in Telang II Tidal Lowlands Reclamations Areas of Banyuasin District of Indonesia)*(Bakri, Purnomo, K.H., Imanudin, M.S.)*

B7. Citrus/Orange Pamelo Development Guideline at Betasuka Area, District of Magetan *(Gunawan Prayitno, Chairul Mauilidi)*

B8. Design of Aquaculture Pond Development Based Environmental Characteristics: Case Study of Water Elevation and Salinity Dynamics in Pasir - Jati River at the Coastal Area Between Bogomonto River and Jali River *(Bambang Triyatmo, Sudarmadji, Kamiso Handoyo Nitimulyo, Junun Sartohadi)*

B9. The Role of Flood Plain Swamp for Fish Production *(Dina Muthmainnah and Abdul Karim Gaffar)*

B10. What to Consider to Build Farming Cities? *(Tinjung Mary Prihtanti)*

C. Presentation in Room III

C1. An Analysis of the Water of Telang River, Gasing River and Liquid Waste of Influent, Effluent Agroindustry in Banyuasin *(Hasmawawaty, AR., M. Faiza M. Said, and Robiyanto H. Susanto)*

C2. Development of Acid-Soil Tolerant Corn *(Zea mays L.)* with Ability to Coc Dry Condition *(E.S. Halimi)*

C3. Soil Performance Indicator as a Soil Health Assessment in Correspond to Lettuce Growth Indicator *(Riwandi dan Merakati Handajaningsih)*

C4. Effect of Submergences Stress at Early Vegetative Stage on the Agronomic Characteristics of Some Rice Genotypes *(Rujito Agus Suwignyo)*

C5. Kinetics Approach of Biodegradation of Petrolium Contaminated Soil by Using Indigenous Isolated *Pseudomonas pseudoalcaligenes, Bacillus magaterium and Xanthobacter autotrophicus BACTERIA (Bambang Yudono, M.Said, M. Sabarudcin, Adipati Napoleon, Zainal Fanani)*

C6. The Correlation of Water Level Fluctuation to Fish Production Dynemics and Physico-Chemical Features of Lubuk Lampam Floodplain in South Sumatera *(Agus Dioko Utomo, M. Rasyid Ridho, Dinar DW Putranto, and Edward Saleh)*

C7. The Screening of Petroleum Hydrocarbons Degrading Bacteria as a Bioremediating Agents from Mangrove Areas *(Hary Widjajanti, Iswandi Anas, Nuni Gofar, and Moh. Rasyid Ridho)*

C8. Analysis of Lead (PB) Levels in the Work Environment as a Risk Factor of Aanemia in the Electronic Industry Workers *(Amar Muntaha)*

C9. The Urgency of the City Swamp Forest in Palembang (*Apriadi and Ana Heryana)*

C10. Analysis Spatial of River Ecosystems. Case Study : Palembang, South Sumatra *(Sumi Amariena Hami, Fachrurrozie Sjarkowi, Totok Gunawan, Dinar Dwi Anugerah Putranto, F.X. Suryadi)*

D. Presentation in Room IV

D1. Land Conflict and Sustainable Development: Case of Steam Electricity Power Plant Construction in Padang, West Sumatra Indonesia *(Syaifudin Zakir)*

D2. Dimension Analysis of Drainage Channel at Water Shed Lambidaro River in Palembang City *(Reini Silvia Ilmiaty, Noviyanti, Agus Lestari Yuono, Yunan Hamdani)*

D3. Improving Water Management Using Virtual Rainfall Stations with Radar Derived Rainfall Data *(Amin MSM, Waleed ARM, M. Yazid Abdullah)*

D4. Between Land Use Plan and Decreasing of Green Area as Natural Mitigation to Tsunami Hazard in Disrtrict of Pacitan *(Fadly Usman)*

D5. Agricultural Development in the Lowlands: Dynamics, Perspective and Time Frame Lesson Learnt from Strengthening Tidal Lowlands Development (STLD) and the Way Forward *(Hartoyo Suprianto, Erwin Ravaie, Sumarjo Gatot Irianto, Robiyanto H. susanto, Bart Schultz, Martijn Elzinga, F.X. Suryadi, and Ad van den Eelaart)*

D6. Effects of Climate Change and Land Subsidence on Hydro-Topographical Condition in Tidal Lowlands, Case Study Telang I, South Sumatra *(Rahmadi, F.X. Suryadi, Robiyanto H.Susanto, and Bart Schultz)*

D7. Some Legal Aspects of Promoting the Lowlands Ecotourism to Support the Sustainable Development in South Sumatra *(Achmad Romsan)*

D8. Palembang Urban Drainage and Flood Protection Systems, Case Study Jakabaring Urban Area *(Eka Gustini, Eddy Santana Putra, F.X. Suryadi, and Bart Schultz)*

D9. The Role of Suspended Particle Size on the Formula of Sedimentation Area in Modada PT Freeport Indonesia *(Yuanita Windusari, Robiyanto H. Susanto, Zulkifli Dahlan, Wisnu Seseiyo, and Indra Yustian)*

D10. The Analysis of Biomass Carbon Potential and Benefit of Drainage Networking Development in Industrial Plantation Forest *(Najib Asmani, Fachrurrozie Sjarkowi, Robiyanto H. Susanto, Kms. Ali Hanafiah, Soewarso, Chairil Anwar Siregar)*

BACKROUND

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 (Murdiyarso, 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 Salapan District and Sungai Batang village, Air Sugihan District, Ogan Komering Ilir Regency, South Sumatra Province. Research was done from September to December 2009.

Carbon potential measurement data was done, taken of 12 acacia (Acacia Crassicarpa) 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 benefit 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 weigh 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 analysed 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 CO_2 absorption from atmosphere (Table 1).

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

C content (ton/hectare)	1.5 year	3.5 year	5.5 year
-Tree	11.22	87.66	97.42
-Necro-mass	0.00	2.39	2.70
-Under-tree	4.08	9.94	14.13
Total	15.30	99.99	114.25
Average/year	10.20	28.57	20.73

Carbon potential of Acacia crassicarpa 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 ton dry weigh per hectare per year (Cheol, 2002 *in* Sumitro 2005). Carbon absorption potential from primary jungle was as much as 9.0 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 3,876,791.64 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 around. The result of research shown that the fish capture volume was decrease, their income just 7,147,670 rupiahs, 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 rupiahs to 8,553,600.00 rupiahs, which increase as much as 4,820,000.00 rupiahs 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.

Resources of Respondent Income	Income (Rps/year)		
	Before *Drainage*	After *Drainage*	Up (+) or *Down (-)*
Water transportation	3,733,060	8,553,600	+4,820,000
Water Fish			
Laborer	13,955,030	6,807,360	-7,147,670
Trading	1,405,810	4,819,860	+3,414,050
Farming	2,396,100	4,459,300	+2,063,200
Wood Earning	1,188,450	2,320,000	+1,131,710
	2,216,000	336,00	-1,880,00

Research result of Rohmattika, Asmani and Lifianthi (2009), shown that existence of IPF also gave benefit for society lives around IPF. Society income at Bukit Batu Village Jalur 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 rupiahs per year contributed to the total income to be 13.10 million rupiahs. In contrast, the farmers who avoid to work with IPF, they total income only 11.70 million rupiahs per year.

CONCLUSION

1. Biomass carbon potential absorbed in Acacia crassicarpa plats was 19.83 tons per hectare per year similarly absorbed 72.79 tons of CO_2 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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