Study on Prospective Agroforestry Location in Senami Baru and Bungku Villages at Grand Forest Park Sultan Thaha Syaifuddin, Jambi

Technical Report No 5

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Abstract

The aim of this research is to know the bio-physical condition, especially species and plant species composition in degraded forest, also general socio-economialc aspect in candidate locations for agroforestry activity. Result of field survey and observation on agroforestry forest shows that rubber is dominant species, followed by fruits trees and forestry plants (trees).

Key words: Agroforestry, Secondary forest

INTRODUCTION

Man activities, worsen by poverty and population stress on one side, and greedy on the other side, are dominant causal factors of forest degradation. Degraded primary forest come from unsustainable use of primary forest or managed primary forest, especially by over harvested forest product and/or uncontrolled wood extraction.

Secondary forest has been an integral part of subsistent agricultural system. Definition of secondary forest is wood vegetation that re-grows on land massively after it was cleared from original forest cover (less than 10% of original forest cover). This type of forest is usually developed on abandoned land after shifting cultivation, fixed agriculture, grazing, or failed tree planting and often has physical, chemical, biological constraints that limited tree and forest capacity to re-grow.

Secondary forest is often used by the poorest part of sub-urban people, because it can be accessed and provide various items that fulfill the livelihood needs (energy, food and medicine). Most of this resources can support food production, and by improving land use practice, such as in agroforestry, conversion from secondary forest to this alternative land use can minimize stress on the remaining primary forests.

In general, secondary forest is managed for various purposes. Specific objective depends on the need, interest and capacity of land, labor, capital, and skill of farmer or land owner, resources, such as species existence, density, and size of economically valuable species, and external factors, i.e. market of forest products and services, policy, and rule.

Secondary forest can be directly managed for sustainable yield, without specific need for restoration or rehabilitation. Management challenge of such forest is to keep the composition and structure of particular species unaltered on long term basis, and ensuring the regeneration of desired species. Pre requirement that is important for

sustainable secondary forest management is social acceptance, adequate policy and introduction of ecological and economical value of secondary stands.

Managed secondary forest can provide various socio-economic products and services. Varied management strategy from one location to another depends on the available resources, such as land, labor, and capital, biophysical characteristics, as well as market, ands opportunity cost. Managing fallow vegetation as part of shifting cultivation system will need techniques enabling short fallow period.

Secondary forest managed similar to an agricultural system, to produce forest product, either for subsistent or market purposes, needs sylviculture techniques that create optimum growth of locally desired tree species. This is usually done through seeding or planting targeted species during agricultural cycle (taungya) plant phase, followed by maintaining and weeding when the trees develop. Several species characteristic that is easy to be managed on this condition includes re-shooting capacity (after fire and logging), suitability with agricultural cycle, for example: peak of seed distribution before or during plant production, short production cycle, which means able to produce product for market on fallow period, and tolerance of plant shade beside trees.

The objective of this research is to know the bio-physical conditions, i.e. species and plant species composition in degraded forest land, and general socio-economical aspect from candidate location for agroforestry activity. Information and data obtained is very useful to determine secondary forest management, to achieve better forest and people quality.

Materials and Methods

Field survey at Senami Baru and Bungku Village was carried out to collect primary data: on biophysical factors, i.e. forest and agricultural plant species, species composition, and secondary forest structure. Survey was also made on socio-economical aspects, such as farmer capacity, capital, area width, labor; subsistent and/or commercial product type; the availability of production facility; market for products and services; etc. Survey to collect data on plant species composition on agroforestry candidate location was conducted by establishing sampling plots, size 20 x 20 m.

Survey to related institutions and literature study to collect secondary data was done for information on climate, soil map, socio-economical and cultural data. The last phase was processing and analyzing the collected primary and secondary data.

Results and Discussion

Prospective agroforestry location in Senami Baru and Bungku Village is rubber agroforestry. General steps to establish rubber agroforestry (de Foresta *et al,* 2000) are as followed:

a. Year 1: land opening and rubber seed planting, and afterwards, paddy planting.

b. Year 2: after paddy and subsidiary crops for several months, rubber plantation will look like rubber-monoculture plantation; fruit trees around hut will become 'fruits island'.
c. Year 2 to 10-12: the land will be left after vegetables such as eggplant and chilly stop producing subsidiary crop; at this phase, rubber plantation looks like common shrubs and young rubber trees will compete with forest pioneer plans.
d. Year 10-12: the land cleared, forest plants cut and logged, except for various useful trees; rubber trees start to be sapped and fruit trees start to be harvested.
e. Year 12 to 30-50: forest plants slowly grow back under rubber trees shade until the plantation looks like 'forest'; even though sapping period of each tree will not be longer than rubber monoculture system, natural regeneration of rubber tree will be assisted by farmer through seed protection techniques causing longer production of rubber on rubber agro forest. Theoretically, mixed rubber plantation management can be done and will cause unlimited rubber production period.

Result of field observation and measurement on agroforestry forest, showed that rubber is dominant species, followed by fruit trees and forestry plants (trees). Those conditions showed relatively similar result with research result conducted by de Foresta,*et al* , (2000) and Joshi, *et al* (2001). Result of field measurement and observation in detail is presented on Table 1 and Table 2.

The rubber agro-forest is often misinterpreted as forest-shrub, because it doesn't seem like rubber monoculture plantation, hence this rubber agro forest come from people planting and management. de Foresta, *et al.* (2000) said that agro forest can be an example of agricultural system where biodiversity gives direct economic benefit. In the case of rubber agro forest, biodiversity has given two economic functions which are: (1) increasing farmer income in form of cash or food for self consumption, (2) enable farmer to extends planted land with minimum capital and labor.

Market network for rubber has been adequate; the most pessimistic price prospect is USD 0.70 per kg on 2000, compared to USD 0.85 - 1.15 in the last five years. While optimistic prediction tends to predict an increasing price, Indonesia, particularly Sumatra, have comparative advantage for rubber production, which is low labor cost. If production can be increased, Indonesian farmer can improve their income from rubber because they can produce with lower cost compare to their main competitor from Malaysia and Thailand (de Foresta, *et al*., 2000).

Recommended method to increase rubber production is using improved planting materials, i.e. various superior clones, with intensive weeding. Using this methods the plant growth is faster and better, that opportunity to combine rubber plant with another plant is little, except for temporary interval plants or inter-subsidiary crops (tumpang sari). The usage of improved planting materials, however need big fund, that only rich farmer will be able to apply this in their fields. Other poorer farmers who have smaller income would be less able to buy and plant superior clones. Cosequently in order to get additional income they would try to find job opportunity in sub-urban area. This phenomenon should be avoided to prevent the more obvious difference between the rich and poor farmer.

Other alternative way to increase farmer income is by maintaining rubber agro forest as various source of income. Research is needed to find the best combination of crops and

rubber trees, cultivation methods, and self-production of improved planting materials in rubber agro forest, without losing too much biodiversity and its economical value.

Tree species exist in rubber agro forest, which have economical value should be conserved together with other less important tree species. Improved planting material is prioritized to regenerate old or unproductive rubber plantation. Enrichment planting using species that have economic value, such as MPT species, into rubber agro forest system also can improve farmer's income and decrease or prevent their dependency on the wood from state forest. Tolerant plant species, which has high economic value should also be used to fill the empty space under rubber tree stand, so that the rubber agro forest space use is more optimal.

Table 1. Profile of Candidate Agroforestry Location in Senami Baru Village

No. Plot	Seeding		Sapling		Pole and/or tree			Note
	Species	Amount	Species	Amount	Species	Diameter (cm)	Height (m)	
1.	Sebekal	1	Kubung	1	Kubung	10.3	3	No tree, bushes, ground vegetation: penyanit root, fern, fresh palm juice (lahang) and siangit; there is
2.	Sigam	1	Simpur	3	Simpur	12.3	3	cassava and
	Balam	1	Mahang	1	Simpur	10.9	3	banana.
					Simpur	11.2	3.5	
					Simpur	12.3	3	
					Rubber	17.2	5	No tree, bushes, ground vegetation: fern, penyanit
3.	Rubber	5	Rubber	1	Rubber	22	15	root, puar and
	Mahang	2			Rubber	25	23	fresh palm
	Sigam	1			Rubber	23	13	juice (lahang);
					Rubber	26	17	there is
					Rubber	25	17	cassava and
					Rubber	27	18	banana.
					Rubber	22	18	
					Rubber	21	13	Old rubber
					Rubber	23	13	plant, plant
					Rubber	26	18	distance 3 x 3
					Rubber	21	13	m, ground
					Mahang	23	15	vegetation:
					Klat	26	3	siangit, sarang
					Rubber	21	12	buaya, lembo
					Rubber	22	14	and penyanit
					Rubber	12.5	10	root.
					Rubber	12.2	13	
					Terentang	11.2	13	3
					Rubber	12.0	10	
					Rubber	14.5	10	
					Rubber	15.5	13	
					Jengkol	10.5	4	

No. Plot	Seeding		Sapling		Pole and/or tree			Note
	Species	Amount	Species	Amount	Species	Diameter (cm)	Height (m)	
					Terentang	11.0	12	
4.	-	-	-	-	-	-	-	
5.	Klat Rubber Sebekal Rambutan hutan Kandis	1 2 2 1 2	Rubber	1	Klat Mahang Mahang Leban Rubber Rubber Pinang	20 23 22.5 20 11.5 13.5 19.3	10 13 13 15 8 8 8	- Open land, former rubber plantation, there is tempinis plant, sungkai, medang, labu, terap and bulian. Old rubber plantation, there is salak, rattan, jernang; ground vegetation: akar ampelar, puar.

Table 2. Profile of Candidate Agroforestry Location in Bungku Village

No. Plot	Seeding		Sapling		Pole and/or tree			Note
	Species	Total	Species	Total	Species	Diameter (cm)	Height (m)	
1.	Mangkirai Jengkol Terap Lisau Balam Kedumpu Punai Bulian	17 3 1 1 1 2 1 1	Terap Balam Medang jahe Medang kuning	1 1 1 1	Tulang	10	6	No tree, bushes exist only since last year, ground vegetation: akar penyanit, rumput paitan, and amplas kijang, elevation: 60 m.
2.	-	-	Rubber Klampean	2 2	Tempinis Tempinis Tempinis Tempinis	30.5 23.1 36 23	23 17 21 18	Bushes, already planted with rubber and marked with plant distance

No. Plot	Seeding		Sapling		Pole and/or tree			Note
	Species	Total	Species	Total	Species	Diameter (cm)	Height (m)	
3.			-	-	Mahang	21.3	18	of 6 x 3 m, there is bamboo cluster, no seeding and sapling, elevation: 62 m.
					Sungkai	28	21	
	Sungkai	5			Trembingil	20	18	
	Bedi	1			Bedi	36	22	
	Medang kuning	1			Maru	23	23	
					Mahang	15.6	13	
	Semantuy	1			Sungkai	13	13	
					Trembingil	13	10	
4.	Rubber	1			Mahang	26	18	There is bamboo cluster, no sapling, near to roadway.
	Rambutan hutan	2	Jengkol	1	Rubber	24	21	
			Rubber	2	Rubber	20	21	
			Lisau	2	Rubber	39	24	
	Tempinis	1	Serkubung	1	Jengkol	32	23	
					Rubber	36.5	23	
			Sigam	1	Trembingil	18	11	
			Semantung	1	Buluh	18	8	
					Semantung	19	13	Old rubber plant or mixed, there is salak cluster, near to roadway edge, elevation: 63 m
			Buluh	1	Trembingil	16	10	
					Mahang	10	7	

Conclusions

Secondary forest for prospective agroforestry location in Senami Baru and Bungku Village is rubber agro forests that have high plant species biodiversity with rubber as the most dominant species.

Agroforestry activity in rubber agro forest location can be directed to enriched tree species composition that have high economic value. Replacing non productive rubber plantation should be done with improved planting materials without changing the existing rubber agro forest system.

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