

Millions of households in Indonesia depend on cultivation of natural rubber (*Hevea brasiliensis*). These smallholder farmers (with <5 ha plots) constitute 84% rubber area that provide 68% of the total natural rubber production in the country. However, most available rubber technologies are developed for estate plantations and management and are less appropriate for smallholder farmers. Rubber Agroforestry System Type 1 (RAS-1) is a adapted technology developed for smallholder rubber production. The traditional practice of growing rice in the first year is maintained. Instead of rubber seedlings, improved clones of rubber are used. Weeding is limited to a narrow strip along the rubber rows. Space between rubber rows are not weeded while naturally regenerating valuable timber and fruit trees are retained. A series of long term observations-cum-demonstration plots were established in Jambi and West Kalimantan to monitor the performance of rubber trees and other observations.



Objectives

- to test various weeding intensity in the rubber plots
- to monitor cost of different management options
- to observe effect of weeding intensity on natural regeneration of local plants.

Table 1. Weeding intensity - recommended versus actually implemented by participant farmers in Jambi

Weeding Intensity	Recommendation			Azwar			A. Roni			Sahroni			Azahri		
	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3	Y1	Y2	Y3
Intensive	9	6	6	9	6	6	3	3	1	9	6	3	9	9	9
Medium	6	3	3	6	6	3	3	3	1	6	3	3	6	6	6
Seldom	3	1	1	5	3	1	3	3	1	3	1	3	4	4	4
Intensive+LCC	9	6	6	9	6	6	3	3	1	9	6	3	3	3	3

Methodology

- Previous land use: old jungle rubber or secondary forest
- Location: Jambi and West Kalimantan
- Rubber clone: PB260
- Rubber planting distance: 6m x 3m
- Weeding intensity: intensive, intensive+LCC, medium and seldom
- Fertilizer application: urea 200g/tree/year and SP-36 115g/tree at planting.

Jambi

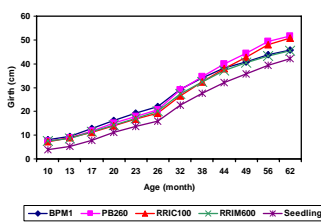


Figure 1. Growth of clonal rubber

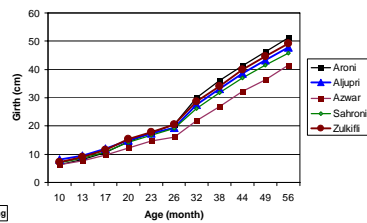


Figure 2. Rubber growth at different sites

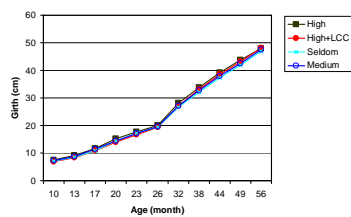


Figure 3. Effect of weeding frequency on rubber growth



West Kalimantan

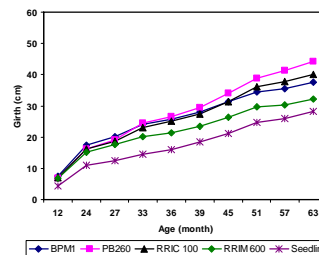


Figure 4. Growth of clonal rubber

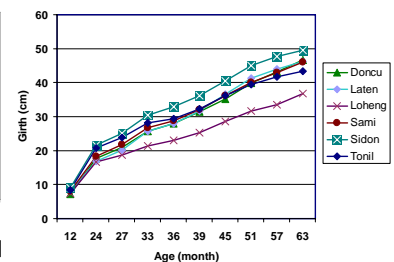


Figure 5. Rubber growth at different sites

Result summary

- Inter-plot variability in rubber tree growth is high; this reflects differences in soil fertility and management.
- 2-metre strip weeding along rubber rows once in 3-4 month for the first 2 years significantly reduced maintenance cost without affecting rubber tree growth.
- Control of woody vegetation between rubber rows is necessary. No plants should be allowed to grow above rubber.
- Where LCC was used to suppress natural weeds, LCC itself needs to be managed to avoid affecting rubber trees.
- Rubber trees reached tappable size (45 cm girth) in 5-6 years, similar to that in monocultures.
- Weeding guidelines were followed by few farmers in first year of planting. In general farmers weeded less frequently.
- Farmers in Jambi perceived visibility in clean-weeded plots increases pig damage to young rubber plants.
- Clonal rubber produced 3 times more latex than seedling rubber.
- *Imperata cylindrica* (Alang-alang) is a serious weed in rubber plantations in Indonesia.
- White Root Disease (*Rigidoporus microporus*) is a serious problem in rubber cultivation in Jambi and West Kalimantan.