



A Value Chain Assessment of the Rubber Industry in Indonesia

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“Helping Indonesia to Grow”

A VALUE CHAIN ASSESSMENT OF THE RUBBER INDUSTRY IN INDONESIA

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For the

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT

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Acronyms

APBI	Indonesian Tire Manufacturers Association
APRISINDO	Indonesian Shoe Manufacturers Association
AVUBINDO	Indonesian Tire Retreaders Assn
DRC	Dry Rubber Content
GAPKINDO	Rubber Producers Association of Indonesia
ICRAF	World Agroforestry Centre
IRRI	Indonesian Rubber Research Institute
MDF	Medium Density Fibre
NR	Natural Rubber
RSS	Ribbed Smoked Sheets
SIR	Standard Indonesian Rubber
SNI	Indonesian National Standard
TSR	Technically Specified Rubber

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I. Executive Summary

Indonesia is the second largest producer of natural rubber (NR) in the world and has the highest acreage under rubber cultivation. Over 84% of cultivation is in smallholdings. However, low productivity levels have kept rubber cultivation vulnerable to over exploitation, when prices are high, and abandonment, when prices are low. In 2005 the average yield was 862 kg per ha per annum compared to 1,875 kg in Thailand; 1,727 kg in India; 1,483kg in Vietnam; and 1,330 kg in Malaysia. Although prima facie it appears that the main cause for low national rubber productivity is the high percentage of smallholders this is also the case for other countries with higher productivity experiences. Rubber is grown on smallholder lines in Thailand, 90% of the extent; and India, 89% of the extent and 91% of total production. What is seen in contrast is the careful management of smallholder cultivation by the State - recognizing and providing for appropriate institutional support to help smallholders. Smallholder support focuses on help to obtain the right planting material; continuously educating and monitoring smallholders in correct planting, maintenance and tapping practices; and creating support for marketing activities.

The value chain assessment showed that in Indonesia the failure of an appropriate and working technical support and monitoring system has resulted in:

- a) Low spread of clonal planting material
- b) Failure to halt spread of low yielding local seedlings and unselected clonal seedlings
- c) Poor cultivation practices which result in 50% - 70% less productivity in both jungle rubber and in intensive rubber smallholdings.
- d) Proliferation of poor tapping practices which reduce the tapping lifespan by around 10 years, i.e. 50%.
- e) Very limited recognition of the environmental benefits of rubber agro forestry in designing replanting programs.

Poor productivity led quality issues costs Indonesia up to 30% more in processing costs as producers try to augment the economics of poor production by introducing contaminants. Experiences of smallholder development programs have shown that more profitable and well informed farmers were also more likely to supply better quality raw material and invest in timely replanting ensuring a regular supply.

Another drawback is the absence of village or even district level financing mechanisms for smallholders. This has resulted in smallholders' inability to obtain a better share of price. On average although processors pay around 80 to 85% of FOB for raw material less than 50%, often as little as 30% goes down to the actual producer.

The report contains a detailed analysis of the value chain and potential intervention strategies within the scope of the AMARTA project. *The assessment concludes that the rubber industry would be an appropriate sector for AMARTA to include in its scope of activities.*

The following invention program areas are recommended for AMARTA:

1. Setting up certified nurseries at local level and support of technical information sharing system
2. Training of key farmers and setting up farmer groups/supporting already established farmer groups
3. Provision of technical support service and strengthening local extension services
4. Training of producers and tappers (crop share workers)
5. Setting up micro credit systems/linkages for producers

Some potential measurable outcomes of this exercise for AMARTA will be, at micro-level, the number of new certified nurseries, hectarage of new rubber planting with certified material – new technology, number of farmers and tappers trained, percentage cost reduction and increase in availability of planting material by setting up local nurseries, scope of extension service, number of districts supported through extension programs; and at macro-level, linkage creation between private and public sector institutions for rubber development. Potential implementation partners have been identified to increase the speed and out reach of the interventions. An outline of the possible intervention, expected outcomes and potential implementation partners for each intervention are discussed in the report within the scope of this rapid assessment.

Potential geographical distribution of intervention programs are Jambi, Linggau and Sembawa in South Sumatra, Medan, Samggau in West Kalimantan, and Imban in South Kalimantan.

AMARTA needs to start immediate work on designing the implementation programs – specifics, outreach areas, selecting farmer groups and working on budgets while developing details of linkages with supporting organizations identified in the study. To do this appropriate staff and consultants need to be assigned. Other steps would be gathering the baseline data for the target groups; designing and putting in place a monitoring/evaluation system; setting up and running the intervention programs.

2. Overview: The Indonesian Rubber Industry in the Context of the World Rubber Industry

Indonesia is the second largest producer of rubber in the world and supplies approximately 2 million MT of rubber annually primarily to the global tyre industry via traders in Singapore. Table 1 below shows the country's position in world production of rubber.

Table 1: World Production of NR from 2000 to 2005 (in thousand tons)

Country	2000	2001	2002	2003	2004	2005	Growth Rate
Thailand	2346	2320	2615	2876	2984	2937	4.8%
Indonesia	1501	1607	1630	1792	2066	2271	8.7%
Malaysia	928	882	890	986	1169	1126	4.5%
India	629	632	641	707	743	772	4.2%
Vietnam	291	313	331	364	403	509	12.1%
China	445	464	468	480	486	428	-0.6%
Others	624	1024	728	771	788	778	5.5%
World	6764	7242	7303	7976	8639	8821	5.5%

Source: IRSG

Indonesia has the highest area under rubber cultivation, over 3 million ha and of this 80.3% is in tapping. An estimated 87% of the cultivation is in smallholder blocks averaging 2 ha. It is estimated that 15-20 hectares have been planted annually in the last two years. Comparatively rubber cultivation in other major rubber growing countries at the end of 2005 is as in Table 2 below:

Table 2 Rubber Cultivation in Major Rubber Growing Countries, 2005

Country	Total Area in hectares	% in Tapping	% smallholder area	Area Replanted and New Plantings in 2005 – ha
Thailand	2133	79.4%	90.4% ¹	106
Malaysia	1250	92.4%	90.8%	21
China	600	NA	NA	NA
India	583	76.7%	88.7%	11
Vietnam	465	74.0%	36.8%	20

Source: IRSG

Low yields have kept production in Indonesia below Thailand. In 2005 the average yield was 862kg per ha per annum compared to 1,875 kg in Thailand; 1,727 kg in India; 1,483 kg in Vietnam; and 1,330 kg in Malaysia. Currently although attempts are being made to increase yields other competing countries are also targeting higher productivity per ha. In Vietnam for instance average yields are expected to grow to 2,000 kg per ha per annum by 2010. It should be noted that Thailand, Malaysia and India all have a very high intensity of smallholder cultivation and still maintain far higher average yields than Indonesia. This translates into higher incomes for smallholders (which make it worthwhile for farmers to devote time to their rubber cultivation) and is derived from much better institutional support for smallholders, promotion and use of better clonal planting material, field level follow-up on agricultural practices, good agricultural marketing systems and achieving a connection between smallholder extension services and the work of research organizations.

3. Assessment of Indonesian Rubber Value Chain

3.1. Primary Stakeholders & Their Roles and Relationships

Producers

Producers are owners of the rubber land either in smallholdings or estates of various sizes. On average smallholders cultivate less than 2 ha blocks. Smallholder producers tap the rubber trees themselves but frequently enlist non-family labour on a crop sharing basis. The tappers are paid between 50% - 70% of the revenue when the crop is sold. The crop share is determined mainly based on the age of the trees, a higher crop share on older stands. As a rule of thumb the daily income for the tappers should be equal to around 2 to 2.5 kg of average quality rice.

¹ Estimated smallholdings in Thailand are for 2004

Progressive producers may also operate small nurseries. Producers usually have several crops and may subsist with poultry and animal husbandry. They frequently finance their consumption expenses through loans from collectors. To this extent some element of contractual relationship exists between the two.

Collectors and Traders

A number of levels of collectors and traders exist along the value chain. The main role of the collector is financing producers and other collectors down the chain and providing transport. At village level a collector may be a progressive farmer and may also be processing wet coagulate blocks and/or produce and sell planting material.

Processors

Processors maintain semi contractual and also open market relationships with collectors and farmer groups. Prices for raw material sourcing are determined based on contracts in hand, estimated dry rubber content (DRC) of the material and dirt content. When material is in short supply to meet contractual obligations for export of finished products processors frequently buy any and all available raw material and are less circumspect about quality. In general reverse economies of scale occur and those who need higher quantities pay more. Many large scale processors have several factories for locational advantage in raw material sourcing.

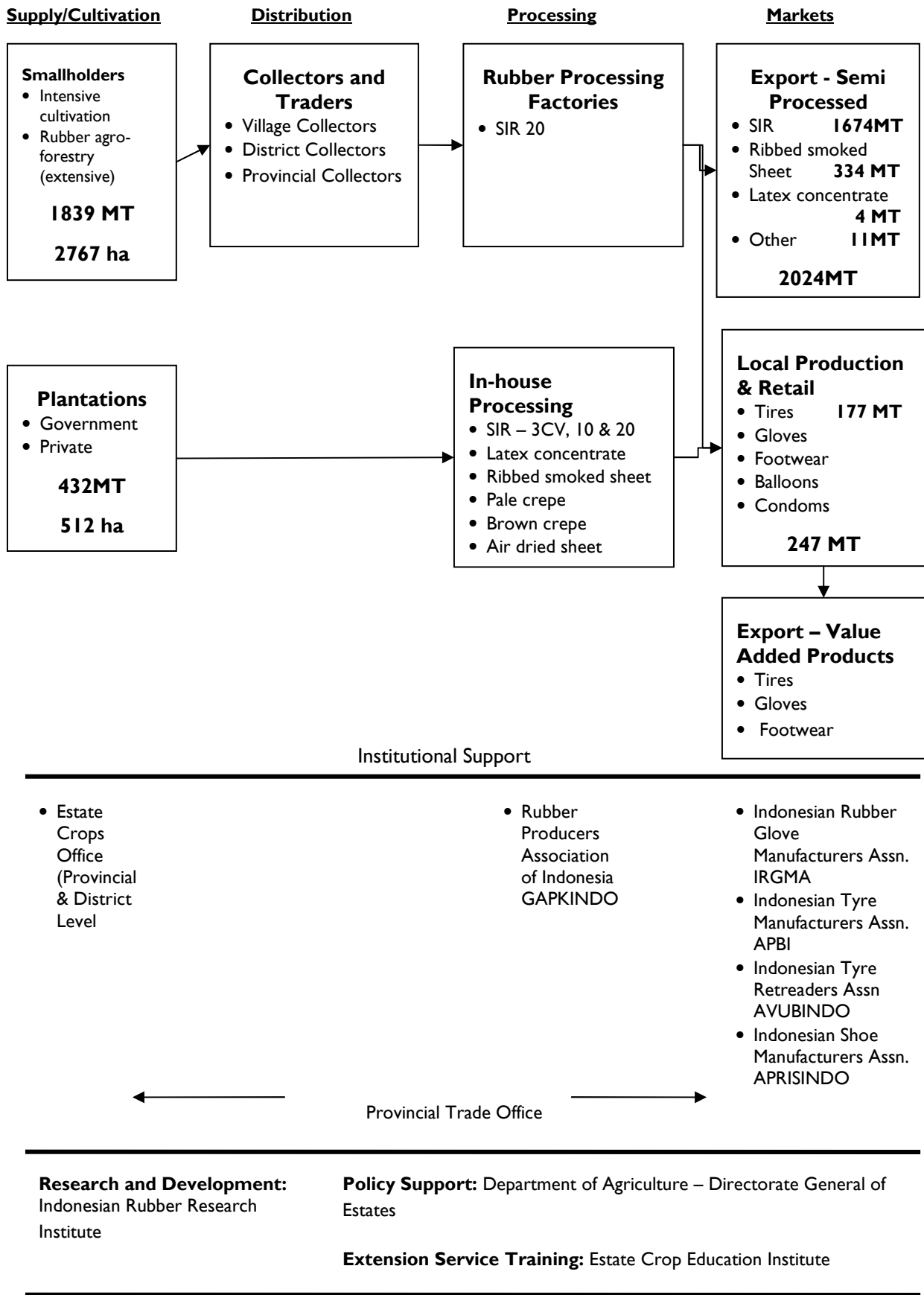
Most large plantations are also processors and may buy more from smallholders than they produce themselves.

Brokers

Brokers operate from Singapore and put together sourcing needs from all over the world. Global rubber products manufacturers deal through Singaporean brokers rather than directly with Indonesian processors. Indonesia has the advantage of wider and more sophisticated market access via Singapore. Most large scale processors have their own marketing offices in Singapore.

Manufacturers

Indonesia supplies its rubber mainly to overseas tyre manufacturing industries. Local industries play a minor role in the value chain. Of these locally produced tires are the main consumers. Local markets are accessed directly through contractual supply or quite often through local traders.



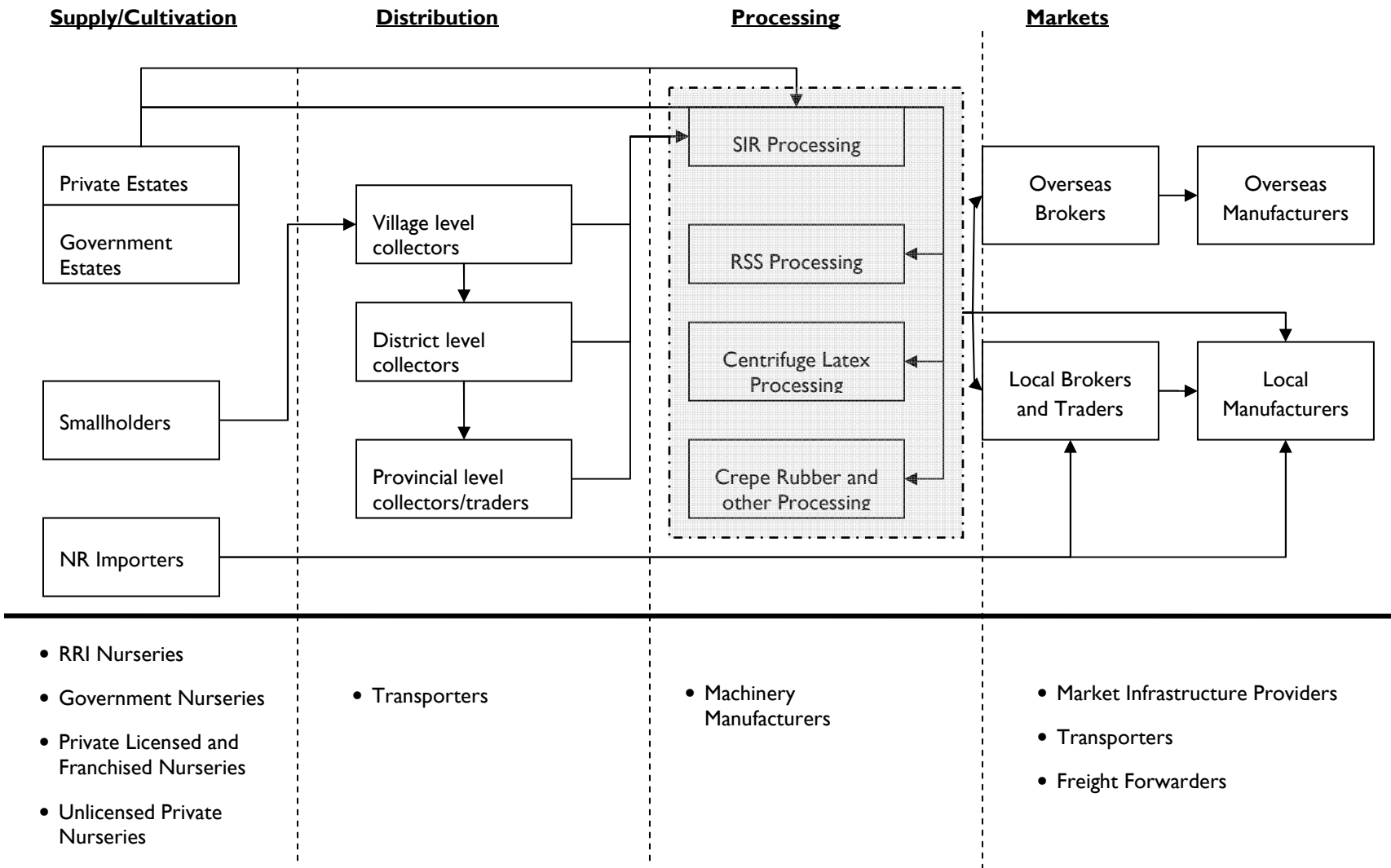


Figure 1 Indonesian Rubber Industry Supply Chain

3.2. Rubber Cultivation

Rubber cultivation and production in Indonesia contributes 4% to total foreign exchange earnings. Rubber is grown on government run estates nationalized from the Dutch, in privately owned estates (some owned by multinationals) and by smallholders. Of the 3.3 million hectares in cultivation 2.8 million hectares (84%) was reported to be in the hands of smallholders. Field estimates indicate this figure could be as high as 87%. Smallholder yields are said to range widely from 200kg – 1000kg per ha per annum. Cultivation, production and yields from 2000 to 2005 based on data prepared by the Department of Agriculture and reported in the Gapkindo Annual Report for 2006 are shown in Table 3 & 4 below.

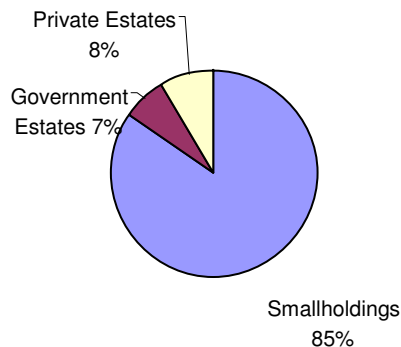
Table 3 Area under cultivation (in thousand hectares)

	2000	2001	2002	2003	2004	2005
Smallholders	2883	2855	2828	2800	2769	2767
Government Estates	213	213	213	213	221	237
Private Estates	276	277	277	277	272	275
Total	3372	3345	3318	3290	3262	3279

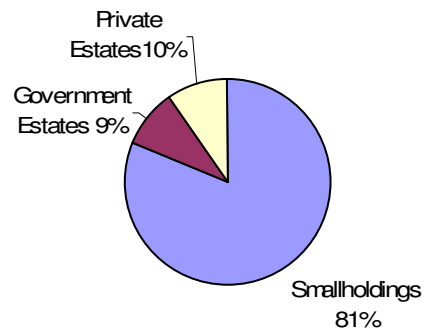
Table 4 Rubber Production (in thousand tons)

	2000	2001	2002	2003	2004	2005
Smallholders	1215	1210	1223	1365	1662	1839
Government Estates	170	181	189	195	196	210
Private Estates	206	216	218	232	208	222
Total	1591	1607	1630	1792	2066	2271

Share of Area Under Cultivation 2005



Share of Rubber Production 2005



Accordingly in average yields, i.e. productivity, over the five year period can be calculated as in Table 5.

Table 5 Average Yields in Mature Holdings (kg/ha/year)

	2000	2001	2002	2003	2004	2005
Smallholders	562	565	577	650	795	828
Government Estates	1064	1133	1183	1221	1175	1103
Private Estates	995	1040	1049	1117	1013	1005
Total	629	641	655	726	839	863
Based on Estimated Mature Holdings	75%	75%	75%	75%	76%	80%

Smallholder yields appear to have increased over the five year period. This may be attributed to more clonal stands coming into tapping as well as over exploitation by smallholders to take advantage of higher market prices. However field observations show that it may be unlikely that many smallholders are achieving an average of over 800 kg.

Areas Under Cultivation

Sumatra and Kalimantan are the major rubber producing areas in Indonesia. It is estimated that around 7 million people make their living from rubber cultivation in these two areas. 84% of smallholder rubber comes from North Sumatra, Riau, Jambi, South Sumatra, West Kalimantan, Central Kalimantan. Table 6 below gives a breakdown of smallholder rubber cultivation by province in 2004.

Table 6 Smallholder Rubber Planting by Province (2004 data)

Province	Acreage ('000 ha)	Production ('000 MT)	% Production
Aceh	71	44	2.6%
North Sumatra	293	244	14.9%
West Sumatra	98	67	4.2%
Riau	366	223	13.5%
Jambi	412	205	12.5%
South Sumatra	595	349	21.4%
Bangka-Belitung	29	19	1.1%
Bengkulu	58	32	1.9%
Lampung	50	27	1.6%
West Kalimantan	354	194	11.8%
Central Kalimantan	240	164	9.9%
South Kalimantan	109	57	3.5%
East Kalimantan	34	19	1.1%
Total	2709	1644	100%

Types of Cultivation

Rubber is cultivated intensively in plantations and some smallholdings and extensively in rubber agro-forests, also known as rubber gardens. In intensive plantations &



Figure 2 Intensive smallholder rubber cultivation

smallholdings a stand of rubber will contain around 400 trees per hectare at maturity. In well maintained privately owned estates it can be as high as 500 trees per hectare. Around 60% of smallholder rubber cultivation is said to be in rubber agro-forests or 'jungle rubber'. Field sampling showed that rubber agro-forestry was higher in some areas like Jambi compared to South Kalimantan. In rubber agro forests rubber trees are grown in parallel with fruit trees and timber crops. The number of plants per hectare can vary widely to a higher intensity than in intensive cultivation, i.e. more than 700 trees per hectare, to as few as 200 trees per hectare. Yields vary widely from 200 kg to 1,000 kg per ha per annum in smallholdings and from 800 kg to around 2,000 kg per ha per annum in plantations.

Rubber agro forests are mainly planted with local seedlings and some are maintained using the sisipan system of cultivation.² Other smallholder rubber cultivation used a variety of clonal and also local planting material. GT clones appeared to be popular with smallholders who had used clonal material before. In a state-sponsored planting program in South Kalimantan GT clonal plants are still being distributed to farmers. Although these are considered old clones the farmers are used to them. They are also easier to maintain and less susceptible to over exploitation. According to IRRI PB260 and IRR clones are becoming more wide spread now although they need better care and management. Well managed plantations use much higher yielding clonal planting material from their own budwood nurseries.



Figure 3 Extensive or 'jungle rubber' cultivation

Land Preparation

Land preparation is done either through slash-and-burn or slash-and-clear. Felled rubber trees must be treated with 72 hours. Rubber timber is used for the manufacture of furniture and for production of plywood and medium density fibre (MDF) boards. In some areas where access to transport is very limited the old rubber trees are either used for firewood or burnt. Even where the timber is sold the land is cleared by burning to get rid of under growth. The ash also forms a means of soil fertilization. Field observations showed that in smallholdings of less than 2 ha that were surrounded by other cultivated fields farmers tended to clear rather than burn due to potential fire damage to neighboring crops.



Figure 4 Plantation nursery with good irrigation system. Green budding is now commonly used by plantations.

Planting Material

While large plantations produce their own planting material smallholders obtain planting material from local and government run nurseries. Planting material is also produced by farmers

² Sisipan is a planting system where the tapping cycle is prolonged for as long as possible by simultaneously maintaining mature and immature plantings. This is done by gradually replacing mature trees, first by ring barking the old trees and then planting new saplings in the clearing created by the loss of canopy.

using local seedlings. Field observations show that a few skilled farmers also use direct grafting of clonal material onto local seedlings. Plants are sold either as budded stumps or in polybags. In some areas farmers prefer stumps from local seedlings which are grown to a height of about 3 feet prior to planting. These bigger plants are less susceptible to damage by wildpigs.

The quality of the budwood nurseries is critical to obtaining good clonal plants. Very few nurseries appear to be licensed to produce genuine clonal material. Many nurseries are said to be using seeds from clonal trees which are passed off as good clonal plants. Rubber nurseries are not mandated to obtain licensing from IRRI. However some nurseries are licensed by IRRI and produce good clonal planting material. In the Jambi Province the Estates Crop Office estimated that around 20% of plant requirements came from IRRI certified nurseries. These plants are sold at approximated 2,100Rp per budded stump compared to 1,500Rp for plants from unlicensed nurseries.



Figure 5 Tall stumps of seedling rubber prepared for areas susceptible to wild pig menace



Figure 6 Smallholder 'clonal' budwood garden & nursery supported by ICRAF project in Muara Bungo

Approximately 200Rp per plant is paid back to the IRRI in terms of licensing fees. The Jambi Estates Crop Office also claims to certify nurseries but in reality this is merely a trade license.

In South Kalimantan the Estates Crop Office said that around 50% of the nurseries are licensed to produce clonal planting material. Licensing and quality checking is done by the Estates Crop extension service with support by IRRI. Field observations also confirmed a higher incidence of smallholdings using clonal planting material in South Kalimantan. The Estates Crop Office itself had 50 ha of budwood nursery with support from IRRI. In South Kalimantan clonal poly bag plants were being sold at around 3,500Rp by the licensed nurseries and at between 1,500 – 2,000Rp by the unlicensed ones. In Central and East Kalimantan it was said that good planting material fetched prices of

around 4,000 – 6,000Rp per plant depending on the distance. Kalimantan appears to supply planting material to neighbouring areas.

In the supported nursery projects the main observed drawback was the lack of reinvestment by farmers (sustainability). In these projects it appeared that there was very little reinvestment by the nurserymen to make the nursery a self-sustaining, in fact thriving, business.

Cultivation Management

Smallholdings close to large plantations were generally found to be better managed than those in outlying areas. The smallholders either were family members of plantation workers, former plantation workers or also received direct advice from the plantation management. In any event they seemed to have a comparator which spurred them to want to improve. Indonesian rubber smallholders ability and willingness to learn in formal ‘training sessions’ seemed far less successful than in a demonstrational learning environment.

The main drawback for smallholder rubber cultivation in Indonesia appeared to be the lack of a good extension/advisory service. Although an extension service for estate crops in general was provided by the provincial and district government with support by central government the services were not well managed and in many areas non-existent. In some areas the role of the extension officers appeared to be promotion of planting material from own nurseries.

Intercropping

Smallholders generally intercrop with upland rice, maize, soybean, mungbean and fruit trees such as banana and pineapple during the first two – three years. In jungle rubber the young rubber plants are managed alongside other fruit and timber trees in a ‘wild’ state.³ A high diversity of trees was observed in jungle rubber gardens not just during the first 2-3 years.

Tapping and Collection

Tapping practices in Indonesian rubber cultivation vary widely and may be characterized as one of the weakest links in the value chain even superseding the availability of good planting material. Field observations found that tapping practices in smallholdings were very weak with a high incidence of bark damage reducing overall plant yield. Highly intensive tapping along with a too deep cut exposing the cambium to cancerous growth were some of the wasteful practices observed. An estimated



Figure 7 Tapping jungle rubber

³ Jungle rubber appears to be highly rated in forest conservation efforts. At plot level species richness of plants is said to be about half that of natural forests while supporting a variety of bird and animal life threatened by vanishing natural forest areas in Indonesia. (Joshi et al, 2002)

10 years, i.e. approximately 50%, of the productive life of the rubber tree, is lost due to harmful tapping practices. In such instances the provision of good planting material becomes less significant and even counter-productive due to mismanaged latex exploitation as clonal planting material is more susceptible to tapping intensity. Examples of bark damage seen during the field visits are pictured below.



Figure 8 Damaged Rubber Tree Bark

During the field visits it was observed that one farmer who had replanted using clonal planting material provided by the local government to a farmer group had:

- a) commenced tapping too early
- b) started tapping using the wrong panel



Figure 9 Explaining the use of rain guards to protect latex yield. Rain guards are used successfully in India and Sri Lanka

A discussion with the farmer showed that he was tapping using crop sharing labour. Although he had noticed that the tapping cut was wrong he had not corrected it, not fully understanding the implications. The farmer group said that some element of extension services were earlier provided by Central government but after decentralization there was no such service for their area in Barabai.

The virtual absence of tapper training, and re-training, and follow-up (extension services) was the main cause for weak tapping practices. In well

managed rubber cultivations, especially in the PT Bridgestone plantation and the PT Lonsum Plantation in Medan, and also in the Bridgestone Plantation in South Kalimantan tappers were re-trained regularly, every two years, as tapping practices were said to become slack with time. In smallholdings close to plantations tapping practices appeared to be markedly better. The Bridgestone plantation in Medan was providing tapper training and advisory services to other smallholders and small plantations, mainly those who supplied raw material to their processing plant. Based on discussions with the management of Bridgestone Plantations the experienced outcomes of the training and advisory efforts were 300% - 400% improvement in yields and therefore significantly higher profitability. More profitable and well informed farmers were also more likely to supply better quality raw material and invest in timely replanting ensuring a regular supply.

Replanting

According to the Director General of Estate Crops the national plan is to replant or open up 300,000 ha of rubber cultivation between 2006 - 2010. The estimated requirement of planting material will be then around 165 to 180 million plants for the period, or approximately 30 - 50 million plants per year. Presently IRRI produces 2 million plants per year.

Based on discussions with the Estates Crops Office in Jambi 136,000 ha of the above is to be in the Jambi province. They estimate planting material requirement of around 23 million plants per year whereas actual production in Jambi less than 10 million.

3.3. Assessment of Small Holder Rubber Cultivation

a) Covers over 80% of total rubber cultivation – of which 60% is estimated to be ‘jungle rubber’.

b) Highly susceptible to damage of young rubber plants by pests such as wild boar and monkeys (to a lesser extent).

c) Shortage of labor for tapping. Hired labour is paid on crop sharing basis of between 50% - 70% of the crop value. Therefore there is a high tendency towards over-exploitation and tree damage by crop sharing labour.

d) Inability (choice?) to collect latex on the same day but collect cup lumps a day or two later. Field observations showed that the main cause for this is poor productivity that -

i) makes it not worthwhile coming back to the trees for latex collection as they are heavily dependent on other agricultural crops for sustenance.

ii) gives insufficient latex for daily collection. In many cases the farmer had to wait 2-4 days to get a full cup of produce.



Figure 10 Demonstrating evidence of contaminated cup lumps to AMARTA COP David Anderson

e) Tendency to added impurities such as bark shavings to the latex to hasten coagulation and increase water retention.

f) In the preparation of wet coagulate cleanliness is less important and contaminants such as sand are intentionally added to increase weight. Farmers are much less circumspect about using the recommended coagulant, formic acid, and use instead sulfuric acid (from batteries) which is much cheaper and easily obtained. Other popular coagulants are alum and kaolin (mainly in Kalimantan where it is easily available).

g) Farmers are paid on wet weight basis (although actual price determination by collector is based on his estimate of the dry rubber content). Therefore farmers;

- Keep coagulate moist, even soaking in water puddles, until collection.
- Use damaging coagulants such as alum and kaolin which retain a higher water content.
- Add water retaining contaminants.

h) Smallholders are said to be highly individualistic and do not trust each other much. There appears to be very little real cooperation among farmers. Field observations showed that some farmer groups operate merely to qualify for the replanting subsidy from the government.

i) Lack of capital for replanting.

3.4. Rubber Processing

Rubber processing in Indonesia is mainly in form of Technically Specified Rubber (TSR) known here as Standard Indonesian Rubber (SIR) for the global tyre manufacturing industry. The process of producing SIR block rubber involves granulating/crumbing and thus the processing factories are called crumb rubber factories. SIR20 is the main requirement for tyre manufacturing industries.

Large estates mainly produce field latex which is converted to 60% DRC centrifuge latex used for gloves, balloons and condoms. Latex grade TSR such as SIR 3L, SIR 3CV and SIR 3; TSR grades SIR 10 and 20 and Ribbed Smoked Sheets (RSS) are also produced by estates.

Indonesian rubber exports by type and grade for 2000 to 2005 is shown in Table 7 below.

Table 7 Indonesian Rubber Export by Type and Grade (000 MT)

Type and Grade	2000	2001	2002	2003	2004	2005
Latex Concentrate	9	10	9	12	12	4
Ribbed Smoked Sheet	42	33	44	46	146	334
Standard Indonesian Rubber	1322	1404	1437	1589	1685	1675
- TSR 20	1211	1273	1319	1332	1524	1606
- Others	111	130	118	257	160	69
Other Types of Natural Rubber	5	6	7	13	32	11
Total	1380	1453	1497	1661	1874	2024
Value (USD millions)	889	782	1039	1493	2180	2582

Field-level Processing

Raw material is prepared by smallholders in the form of wet coagulate and smoked and unsmoked sheets, the latter two to a lesser extent. The wet coagulate blocks measure roughly two feet by one foot with a depth of around one foot mainly to facilitate easy transportation on motor bikes and discourage theft. The recommended depth of the wet coagulate blocks is 2"- 3" to facilitate faster drying. The following coagulants are used –

- Natural coagulation
- Formic Acid - recommended
- Sulfuric Acid - not recommended
- Alum - contaminating and harmful to the final product
- Kaolin - contaminating and harmful to the final product
- Other acidic substances

Figures 11 and 12 below show wet coagulate preparation by smallholders.



Figure 12 Preparation of wet coagulate to recommended specifications in ICRAF experimental smallholder garden



Figure 11 These traditionally used coagulation pits are found in almost all smallholdings

Factory Processing

The processing of wet coagulate into Ribbed Smoked Sheet and mainly Block Rubber is done in approximately 123 rubber processing factories in Indonesia. Some factories are supported by their own plantations but also access raw material from smaller plantations and smallholders. Most rubber processing factories however are exclusively processing smallholder rubber into SIR20, the bulk of Indonesian rubber exports.



Figure 13 Block rubber processing for production of SIR20

Raw Material Sourcing

Raw materials are sourced mainly through traders/collectors who transport the accumulated wet coagulate to the factories. Prices were determined based on current market rates and estimated DRC. In some areas partial sourcing is done through local auction places. Farmer groups and lead farmers may also bring in produce, however to a lesser extent. One Company visited in the field level assessment said that it sourced around 20% of its material from farmer groups. In this Company farmer groups were encouraged to sign a MOU with the company for the supply of minimum quantities of raw material for which pricing was guaranteed of approximately 80%-85% of FOB prices quoted in the Singapore exchange based on the estimated DRC. There appeared to be no contractual relationship between companies and collectors. Although companies worked with some traders over a long period of time to a great extent open market trading was observed.



Figure 14 Raw material loading in some factories is still done manually



Figure 15 Collectors and Farmer Groups queue up for weighing in raw material

Quality Assessment

Incoming Material

Incoming material inspection was done by slicing the block of wet coagulate and inspecting for purity. Varying levels of circumspection were observed. In the Bridgestone Factory in Medan materials were graded and the unsuitable quality was rejected. Also in some companies inspectors were seen rejecting latex coagulated with alum and kaolin which could be observed by the high porosity of the wet coagulate. However, many companies accept even poor quality material. Collectors and farmers continue to produce and bring in material of various qualities, offering them first to the more circumspect companies and then later to other companies at lower prices. In many instances the high competition for raw material influenced processors to overlook material quality.

Dry rubber content (DRC) was tested in the factory and compared with the estimated DRC content at the point of purchase. This was to ensure procurement efficiency.



Figure 16 Field latex and cup lumps from plantations



Figure 20 Clean wet coagulate from smallholders



Figure 17 Acceptable wet coagulate from smallholders (includes tree lace and some debris)



Figure 18 Poor quality which should be rejected but may be accepted by some processors



Figure 19 These cup lumps collected in bamboo were seen in South Kalimantan and were less contaminated

Finished Product

Process and product controls are carried out in factories through Statistical Process Control. Companies have their own laboratories for raw material, in process and finished product testing. Testing is carried out for dirt content, ash content, nitrogen content, volatile matter, initial wallace plasticity value and plasticity retention index.

Systems Certification

Rubber industries in Indonesia are required to obtain quality systems certification in accordance with the Indonesian National Standard (SNI). This has been mandatory since 1997 and companies have either adopted ISO 9001 (year 2000 version) or at least Module I quality management system.



Figure 21 Observing raw material cleaning and blending in Medan

Processing

The block rubber manufacturing process converts wet coagulate, cup lumps, latex sheets and tree lace into granular form first by chopping and washing and later in processes that involve blending and granulating (crumbing). The resultant wet blankets are air dried for 10 to 14 days in large drying sheds, see Figure 20, before oven drying at elevated temperatures. This process allows intensive blending of raw material from different sources to obtain a consistent product quality. The final crumbed rubber is compacted into blocks of solid rubber of a consistent weight and size, packed in polyethylene and shipped in mainly metal crates.



Figure 22 Preparation of wet blankets



Figure 23 Air drying wet blankets

Use and Availability of Processing Technology

NR processing has conventionally used simple methods of tapping, collecting, coagulating, sheeting, drying/smoking, grading and packing. Introduction of block rubber manufacture has involved newer and more sophisticated technologies and processes and resulting in more consistent technical properties.

Rubber processing technology & machinery for Indonesia comes from Malaysia. Machinery is also lately produced in Indonesia by a Malaysian company in Medan. Indonesian rubber production appears to have little or no investment in R&D and makes use of technological developments and research which are intensively carried out in Malaysia.

Waste Water Treatment and Recycling

Indonesian processing plants have received technological assistance from the Japanese government, through NEDO, ICETT and JETRO to introduce



Figure 24 Activated sludge treatment process and experimental beds at PT Jambi Waras Jujuhan

activated sludge plants for waste water treatment. Field visits showed that companies have introduced the waste water treatment systems at various levels. One company, Jambi Waras Jujuhan, said that up to 50% of the waster water was recycled and used back in the process. The company was also experimenting with fish culture in the recycling tanks, food crop culture such as kankun and use of the by-product of the activated sludge process,

fertilizer. In many plants the volume of fertilizer produced through this process was not of commercial significance and may be used in its own environs. The large plants may have some potential to provide fertilizer to nearby cultivation.

3.5. Value-Added Products Manufacture

Manufacture of value added product within Indonesia is reported to consume approximately 15% - 20% of production. Of the total block rubber production approximately 90% is exported while 10% comes into local tyre factories. Multinational firms, Bridgestone, Goodyear, Pirelli, Vredestein and a local tyre company Gajah Tunggal are the main local consumers. In 2005 the local tyre industry consumed 176,780 MT of NR becoming the largest domestic consumer of NR.

Latex concentrate from plantations goes into the manufacture of gloves and accounts for around 5% of the total NR production. Around 13 glove manufacturers operate in Indonesia mainly producing examination gloves in joint ventures with Malaysian

investors. Production capacity in 2005 was estimated at around 10 billion pieces per annum.

NR is also consumed to a lesser extent in footwear manufacture, mainly sports shoes; and tire re-treading industries.

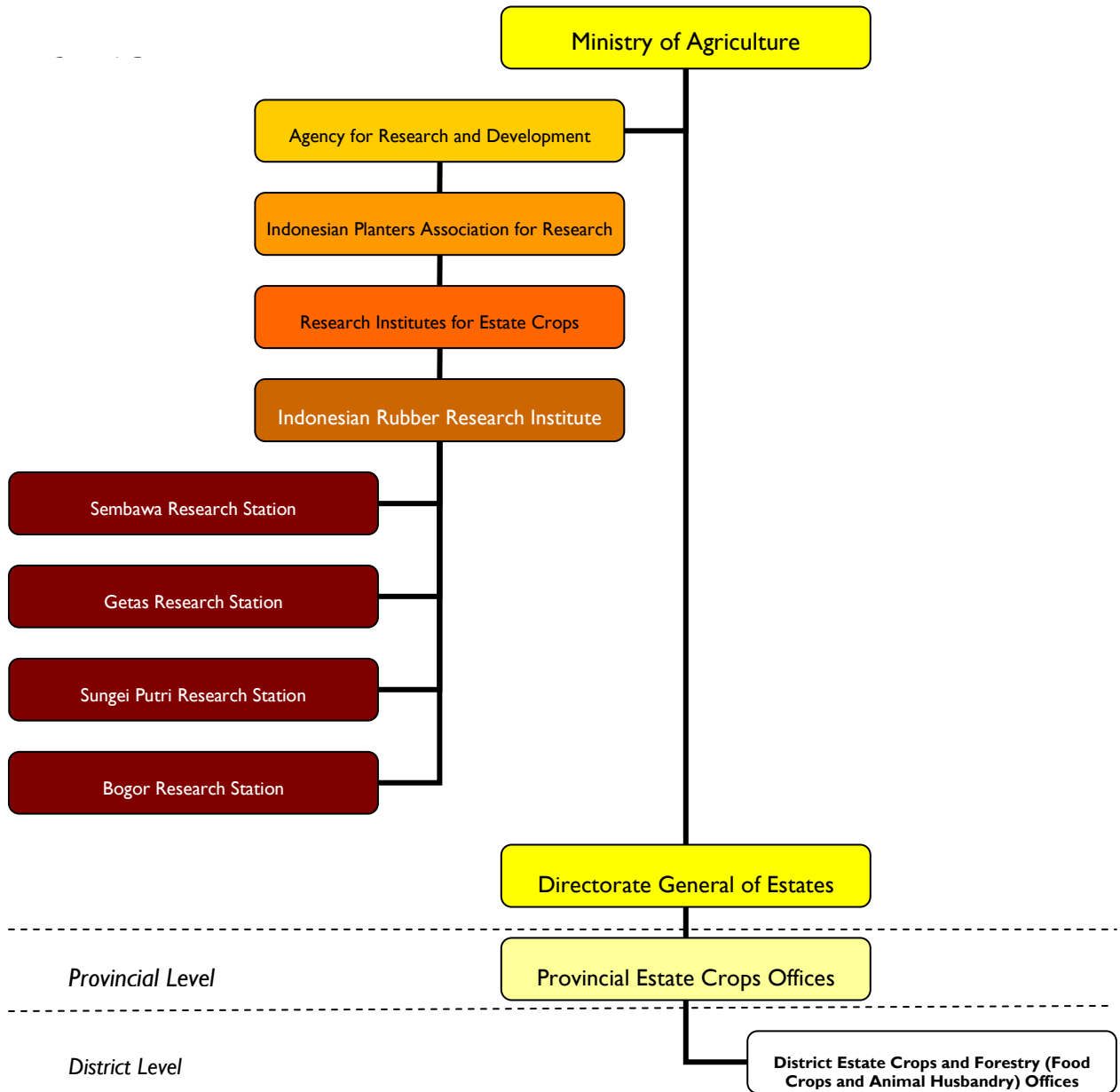
4. Assessment of Institutional & Financial Support

At policy level the rubber industry in Indonesia comes under the Estates Crop Directorate of the Ministry of Agriculture. Under the purview of the Directorate General of Estate Crops come 18 estate crops. These are, in order of importance:

- I. Oil Palm
6. Rubber
7. Coconut
8. Coffee
9. Cinnamon

Figure 25 shows the structure of institutional support coming under the Ministry of Agriculture.

Figure 25 Institutional Support for Rubber Cultivation



Advisory Support

Advisory services (extension services) are offered to smallholders from provincial and district level Estates Crop Offices depending on budgetary allocation. Field observations showed that extension services were very limited, if it existed at all, and were mainly confined to the provision of planting material. Field visits to the Estates Crop Offices at Jambi and South Kalimantan revealed the two provinces had between 400-500 extension officers each. Jambi had 600,000 ha under rubber cultivation and South Kalimantan 173,000 ha.

Discussions with the Director General of Estates revealed that a plan was in place to recruit around 10,000 extension officers (4,000 of them on contract basis) of which around 30% will be allocated to estate crops. These extension officers are to work administratively under the provincial governments.

Research and Development

Research and development activities are carried out by the Indonesian Rubber Research Institute (IRRI) one of the research agencies under the Ministry of Agriculture. IRRI has four research stations. See Figure 1 above. The research stations have budwood gardens, nurseries and experimental plantations. IRRI also partners with NGOs undertaking research projects on improving smallholder rubber cultivation.

IRRI claimed that it had to support 80% of its costs through its own funding efforts. The funding efforts were made through sale of budwood and plants from IRRI nurseries; licensing of commercial nurseries; production of NR from experimental estates; and training and research activities/support for NGO projects. Producers were unable to pay for IRRI services and these were channeled through Dinas and through projects.

Market Infrastructure



Figure 26 Meeting with Dinas Perindag Provinsi Jambi

Trading activities comes under the purview of the Ministry of Trade and the Ministry of Industry. Trade offices (Dinas Perindag Provinsi) are established provincially. 14 Auction Centers have been established to facilitate trading of wet coagulate at provincial level. In South Kalimantan the Officer heading the Trade Office informed us that his attempt at introducing a laboratory facility at the auction centre to facilitate accurate DRC measurement and a fair payment to producers had failed. Although the producers were happy with the system the traders refused to accept the accuracy of the laboratories measurement as

they claimed that when they took the product to the processing factories the DRC content differed. The processing factories did not accept the Dinas laboratory certification of DRC content and so the trader lost out.

In Jambi, the auction was organized every two days. The producers (or village collectors) would bring the produce in and have it labeled at the auction house. They would then have to wait for two days until the wet coagulate blocks dried. Producers would take it in turn to wait or assign someone to the task. Here processing factories and traders were the buyers.

A possible outcome of the pilot done at the South Kalimantan auction would be for GAPKINDO to organize and manage testing facilities at the auction place which would issue a certificate acceptable to its members. The success of the scheme would however be dependent on processors' ability (depending on proximity) to buy directly from the auction.



Figure 27 Field visit to rubber auction in Bungo

Skills Development

Although Indonesia has the highest area under rubber cultivation and is the second largest NR producer in the world it has not invested in skills development neither for cultivation nor for processing. It does not have a single institution, neither government nor private, for rubber cultivation and/or technology training. Technical training for rubber processing comes from Malaysia which has a well developed program for training rubber technologists.

Large, mainly foreign owned plantations such as PT London Sumatra had their own plantation and technology training schools where young graduates were trained. Regular tapper training was also conducted by the plantations for their own staff. Newly recruited government extension officers were trained at the Estate Crop Education Institute. On the cultivation side training programs for producers, smallholders and small estates did not exist; and they could not afford to avail of cultivation management training in neighbouring Malaysia.

Smallholders were dependent on extension services and ad-hoc projects to receive training. As discussed above extension services were very poor and were mainly channeled towards distribution of planting material. Smallholdings closer to plantations showed far better productivity, cultivation management and tapping practices. They received know how, both formally and informally, from plantations.

4.2. Policy Support

Policy support for the rubber industry comes from policy formulation at the Ministry of Agriculture and the Ministry of Industry and Trade. There did not appear to be a

government body to manage policy and implementation of rubber development activities.⁴

GAPKINDO, see industry associations below, formed a strong lobby group to promote relevant policy for rubber processing industries. Among these are importantly enactment of mandatory quality systems certification of processing factories and development of Indonesian National Standard. The activities of GAPKINDO in channeling industry and trade policy appropriately have helped the Indonesian rubber processing industry in securing better export markets.

Policy support and mainly implementation responsibility in rubber cultivation was weak and especially necessary to support the very high share of smallholder cultivation.

4.3. Financial Support

Presently available

The main source of financial support for smallholders comes from advances paid by collectors. Interest charged on these loans is nearly 2-3 times commercial bank rates and are based on the perceived risk and financial needs of the smallholders. These are mainly consumption loans.

Financial support for replanting and new planting for smallholders was available in the form of subsidies. Subsidies are provided to farmers who are selected based on:

I. Income level

I0. Land ownership (must own the land)

I1. May not be a civil servant (government worker)

The subsidies provided for new planting were packaged as follows:

- Total subsidy allocation per ha : 3 million IDR
- Cash allocation for land clearing: 720,000 IDR
- In kind:

Planting material: 500 trees per ha (*producers may need to buy more trees to supplement for mortality rate; may result in < 400 trees/ha at tapping*)

Fertilizer : 20 kg - for 1st year only

Herbicide : 40 lt - do-

Extent per farmer: 1-2 ha (depending on provincial budget)

⁴ The Rubber Development Board in India, GERUCO in Vietnam, Office of the Rubber Replanting Aid Fund in Thailand, Rubber Development Department in Sri Lanka.

The success of the subsidy scheme depended on the commitment of Provincial governments and Estates Crop administrators. In South Kalimantan it appeared that the subsidy scheme was working fairly well. In 2006 4,600 ha had been cultivated with subsidy support. In Jambi the subsidy scheme appeared to be having some issues with the selection of farmers and especially the development and distribution of planting material.⁵

Planned

To support the government replanting program of 300,000 ha between 2006 and 2010 existing subsidy schemes are to be supplemented by a soft loan scheme worked out through the local banking system.

The soft loan profile is as follows:

Total Allocation per ha: up to 21 million IDR (depending on location) including the purchase of land.

Allocation for planting per ha: between 10 – 15 million IDR (depending on location cost of planting material and inputs differ)

Loan conditions:

Interest Rate – to producer 10%, to government at 16%

Grace period – 7 years

Repayment – 15 years

Maximum allocation per producer: 4 ha

The brief viability of the soft loan scheme from the farmers' perspective is examined in Table 8 below.

⁵ The Jambi Estates Crop Administration was under scrutiny by the Attorney General for alleged malpractices in subsidy administration during our field visit in Jan 2007.

Table 8 Impact of Soft Loan Scheme on Producers – Scenario I

Impact of Soft Loan Scheme on Producers				
Scenario I: Maximum Loan, High Average Productivity, Farmgate Price 50% FOB				
Loan/ha	IDR 21,000,000			
Total ha	4			
Interest	10%			
Grace period	7			
Payback	15			
Avg FOB price/kg	\$1.50			
% to Actual Producer	50%			
Avg Farmgate price/kg	\$0.75	8800		IDR 6,600
Average yield/ha	800			
Producer Avg Annual Revenue/ha				IDR 5,280,000
Annual Loan Instalment/ha				
Loan Value at end of Grace Period				IDR 40,922,700
Annual Payment Due				IDR 5,380,262
% of Annual Revenue				102%

Obviously in the above scenario with the inclusion of the land cost the farmers will find it virtually impossible to pay off the loan based on current yields.

Table 9 Impact of Soft Loan Scheme on Producers - Scenario 2

Impact of Soft Loan Scheme on Producers				
Scenario 2: Average Loan, High Average Productivity, Farmgate Price 50% FOB				
Loan/ha	IDR 12,000,000			
Total ha	4			
Interest	10%			
Grace period	7			
Payback	15			
Avg FOB price/kg	\$1.50			
% to Actual Producer	50%			
Avg Farmgate price/kg	\$0.75	8800		IDR 6,600
Average yield/ha	800			
Producer Avg Annual Revenue/ha				IDR 5,280,000
Annual Loan Instalment/ha				
Loan Value at end of Grace Period				IDR 23,384,400
Annual Payment Due				IDR 3,074,435
% of Annual Revenue				58%

With an average loan of 12 million the farmer will end up only IDR 6,000 per day after loan payments which is not sufficient to maintain his consumption needs. (average IDR10,000 per day for 2 kg of rice).

Table 10 Impact of Soft Loan Scheme on Producers - Scenario 3

Impact of Soft Loan Scheme on Producers			
Scenario 3: Minimum Loan (Planting only), High Average Productivity, Farmgate Price 50% FOB			
Loan/ha	IDR 8,000,000		
Total ha	4		
Interest	10%		
Grace period	7		
Payback	15		
Avg FOB price/kg	\$1.50		
% to Actual Producer	50%		
Avg Farmgate price/kg	\$0.75	8800	IDR 6,600
Average yield/ha	800		
Producer Avg Annual Revenue/ha			IDR 5,280,000
Annual Loan Instalment/ha			
Loan Value at end of Grace Period			IDR 15,589,600
Annual Payment Due			IDR 2,049,623
% of Annual Revenue			39%

If the loan is utilized only for planting at the rate of IDR 8 million per ha (on own land) then the farmer will spend less than 40% of his earnings on repaying the loan but still have less than the IDR 3.5 million required for his annual consumption. However this scenario supported by better market infrastructure which will enable the farmer to see a higher share of the price will work though making the farmer not much better off than he is now. The task would be to increase both the yields, to the range of 900-1,000kg, and market access to obtain about 80% of FOB by selling directly to factories through farmer groups.

One of the main issues is the lack of micro credit financing for smallholders which makes them vulnerable to exploitation by middlemen.

4.4. Associations and Organizations

Producer Associations

Producer associations exist sporadically and are not well developed. Some farmers



Figure 28 Some farmers have grouped to bring their produce to factories. This group in Jambi has 50 members, owns a 1 MT truck & brings wet cup lumps daily.

groups have been formed to qualify for planting material subsidies and do not serve any other purpose. Technical know-how for farmers is not channeled through the groups. Other farmer groups are formed for joint marketing. In some instances this may be no more than combining for transportation. One group which we met during the field trip had been working on joint marketing for 10 years and had 50 members. Discussions with farmers showed that where the lead farmer understands that everyone's product quality affects his price then there is greater control on quality at source. Much of the success of these producer

marketing organizations depend on the level of understanding of the lead farmer, his experiences of interaction with the processor, and the level of trust in the group.⁶

Processor Associations

Processor organizations are much more organized and successful as lobby groups.

GAPKINDO

The organization represents nearly all of the rubber processors and traders including plantation companies. It is a well organized association with its headquarters and secretariat in Jakarta and branches in the rubber producing provinces. The main focus of GAPKINDO has been the development of rubber processing industries and they have achieved much in terms of quality certification systems, waste water treatment, packaging, shipping, and arbitration services for their members. It also serves to network among members including traders. The association forms a strong lobby group with the government and also helps put together foreign funded technical assistance for members.

⁶ The ICRAF project had some experiences in setting up Farmer Groups but not many appear to have been sustainable.

GAPKINDO now has plans of helping members strengthen the supply side and will put forward plans to have a two hectare nursery in each GAPKINDO branch. Each branch can then support at least 100 ha of new planting annually.

Other industry associations are manufacturers associations and include

- a) Indonesian Rubber Glove Manufacturers Association
- b) Indonesian Tire Manufacturers Association
- c) Indonesian Tire Retreaders Association
- d) Indonesian Shoe Manufacturers Association

5. Markets and Marketing:

5.1. Internal Marketing & Distribution Channels

Due to the high demand for NR producers were able to sell all production. Prices received by the producer varied depending on distance from processing factories, the number of collectors in the supply chain (a function of dispersion and organization), and availability of transportation. The final price to the producers is approximately 30% - 50% of FOB price. Crop sharing tappers will receive between 50%-70% of this income.

Field visits showed that on average producers received 3,000 – 4,000 IDR per kg of DRC (50%-70%), while the processors paid the traders between 80-85% of FOB, i.e. around 11,000-13,000 IDR. The flow of pricing down the value chain is shown below.



A very small quantity of produce goes to the auction and trading here occurs at about the level of the village collector. If the producer brings his production to the auction or further up the chain to the trader or processor he can get a better price. However he will need a sufficient quantity to cover the cost of transport.



Figure 29 Farmers and Village collectors bring wet coagulate to an auction place in Jambi on motorcycles.

Low productivity also increases dependence on collectors. Field observations showed that some smallholders did not have sufficient production even for daily collection of cup lumps. Occasionally processors said they deferred payment to traders for two-three days depending on cash flow needs. Processors claimed to have tried providing advances to producers but said that recovery was difficult. Village level collectors on the other hand had a better connection

for this reason some producers combine for joint marketing (at least to transport to the factory). Low productivity also increases dependence on collectors. Field observations showed that some smallholders did not have sufficient production even for daily collection of cup lumps.

Trading Practices

Producers and in turn traders/collectors supply wet coagulate on cash-and-carry basis. Occasionally processors said they

with the farmer and could make recoveries and have become the regular source of working capital financing for producers.

5.2. External Marketing

Marketing of SIR block rubber is done through brokers in Singapore and shipped directly to rubber products manufacturers overseas. Most large scale processors have marketing offices in Singapore.

Market Segments

Markets for Indonesian rubber are shown in Table II below.

Table II Global Markets for Indonesian Rubber 2003 - 2005 (in MT)

Destination	2003	2004	2005
USA	598,260	627,868	669,120
Japan	228,899	225,214	260,604
China	107,725	197,538	249,791
Korea	76,893	76,794	74,813
Canada	61,200	70,566	71,769
Germany	73,292	71,808	61,974
Brazil	52,598	58,836	55,016
Belgium and Luxemburg	49,208	44,992	34,939
France	27,019	30,969	32,144
South Africa	21,148	27,907	30,813
Netherlands	9,837	24,519	28,308
Poland	28,179	30,234	27,676
Mexico	22,708	31,911	27,134
Spain	24,040	23,867	24,041
Colombia	13,523	18,344	21,252
Argentina	15,200	17,485	20,310
Italy	21,339	22,040	18,058
UK	18,775	17,563	17,093
Taiwan	13,740	15,455	16,602
Slovenia	9,211	12,488	15,792
Australia	12,963	14,816	15,016
Chile	10,007	11,562	8,935
Rest of the World	165,156	201,485	242,581
Total	1,660,920	1,874,261	2,023,781

Source: Central Bureau of Statistics and compiled by Gapkindo 2006

6. Distribution & Logistics Issues

The main distribution and logistics bottlenecks were seen in provision of planting material and in marketing at farmgate.

a) Insufficient nurseries at local level. Plants had to be transported from central locations incurring high cost and mortality. In Kalimantan nurseries in South Kalimantan were supplying plants to West Kalimantan. The cost of planting material in West Kalimantan was 25% to 30% higher as a result. In North Sumatra it is reported that planting material from the IRRI research station at Sembawa costs 0.35 USD/plant compared to 0.075 USD/plant when produced locally.⁷

b) The farm gate price received by producers was factored by the availability of road infrastructure. Field observation showed that farmers closer to roadways and in better developed areas received higher prices for their produce due to lower transport costs to collectors and access to more markets.

Setting up of good clonal planting material nurseries at village level will make good material less costly. However these must also be augmented by simple instructional guides on planting technique and maintenance and must extend to training on proper tapping of clonal trees.

⁷ Rubber based farming systems developing for increasing smallholder' income in Indonesia, IRRI.

7. Conclusions: Required Support & Potential Invention Strategies for AMARTA

7.1. Mapping of Potential Intervention Areas

The value chain assessment showed the need for supply chain strengthening in the following areas:

- I. Increase the spread of clonal planting material
 12. Training and technical support of smallholder farmers and crop sharing tappers to cultivate and exploit clonal material
 13. Extension services at local level (village level).
 14. Linkages between research and extension work.
 15. An appropriate rubber development authority to channel appropriate policy for improvement of rubber cultivation.
 16. Management of integrated crop systems within the rubber revitalization program
 17. Farmer marketing assistance to increase real farm gate prices
 18. Micro credit system

These areas are mapped (in red) on the value chain in Figure 30 below. The red arrows show where connections between stakeholders are either weak or totally absent. Processing technology and market support are available from Malaysia and Singapore respectively.

Based on the scope and duration of the AMARTA program the following invention areas are recommended:

- I. Setting up certified nurseries at local level and support of technical information sharing system
 19. Training of key farmers and setting up farmer groups/supporting already established farmer groups
 20. Provision of technical support service and strengthening local extension services
 21. Training of producers and tappers including crop share workers
 22. Setting up micro credit systems/linkages for producers

These are numerically referenced in Figure 30 and show how they will support the value chain activities.

Potential geographical distribution of intervention programs are Jambi, South Sumatra – Sembawa – Linggau, Medan, Samggau in West Kalimantan, and Imban in South Kalimantan.

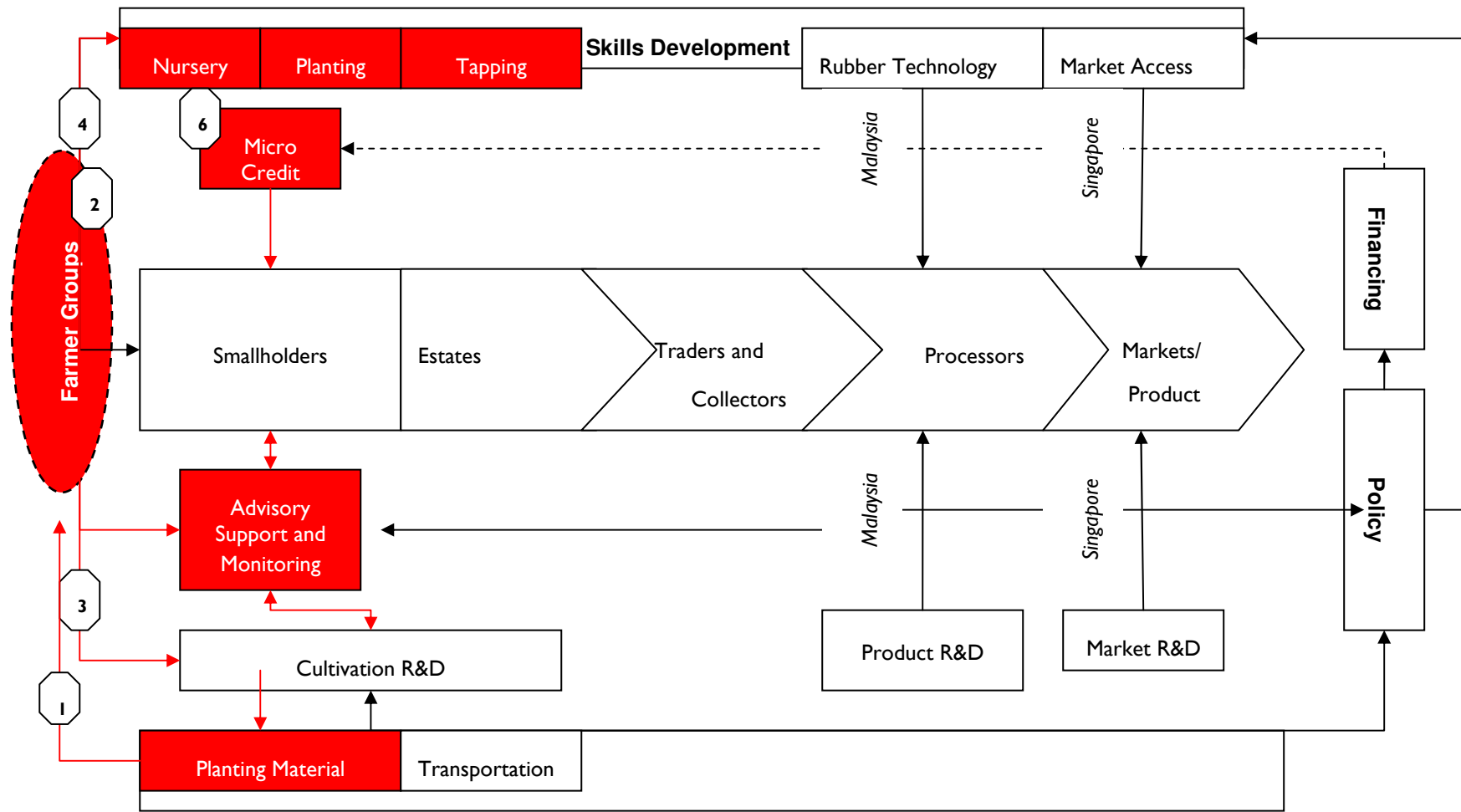


Figure 30 Intervention Strategy Map

7.2. Outline of Possible Intervention Programs

An outline of possible intervention programs and their potential outcomes is discussed below. This is intended to be used for initial decisions on priority areas. Detailed intervention programs must be worked out for each area covering scope, geographical areas, detailed roles of partnering organizations, budgets for technical assistance and grants and enumerating the value of partnerships.

Setting Up Certified Nurseries at Local Level and Support of Technical Information Sharing System

Outline of Possible Invention

- Establishment of certified budwood gardens and rootstock nurseries for farmer groups.
- Training of farmers in preparation of nurseries, budgrafting and transplanting.
- Training of key farmers to provide extension services to new plantings of clonal material.
- Technical information dissemination through publishing an easily understood planting practices leaflet.

Potential Partnerships

- IRRI for clonal certification and training of nursery establishment, bud grafting
- ICRAF for monitoring and advisory services
- PT Bridgestone for nursery management training

Measurable Outcomes

- Number of new nurseries – increase in annual plant stock availability at local level
- Percentage reduction in cost of planting material – savings to farmers
- No. of ha of new clonal rubber plantings (new technology)
- Transfer of technology to farmers

Estimation of Cost – per nursery

- 0.5 ha rootstock nursery – 25 million IDR

- 0.1 ha budwood garden - 5 million IDR

20,000 plants per year – 20 to 25 ha of cultivation per year.

Training of Key Farmers and Setting Up Farmer Groups/Supporting Already Established Farmer Groups

Outline of Possible Invention

- Training and exposure for established and new farmer groups (key farmers) in managing farmer groups and potential benefits from cooperation
- Providing infrastructure support such as small truck (1 to 1.5 MT) to farmer groups
- Training farmer groups to improve quality of production
- Linking with processors

Potential Partnerships

- AMARTA to coordinate and facilitate exposure visits and learning outcomes – possibly with GERUCO Vietnam – Daklak Smallholder Rubber Project and Rubber Board of India – Farmer cooperatives in Kerala
- ICRAF/ IRRI/ Bridgestone for training on quality expectations
- GAPKINDO for direct linkage to processors

Measurable Outcomes

- Number of new farmer groups established
- Increase in range of activities undertaken by already established farmer groups
- Increase in price to farmer

Provision of Technical Support Service & Strengthening Local Extension Services

Outline of Possible Invention

- Establishment of project based technical support centers
- Provision of monitoring and supervision
- Providing feedback to IRRI
- Possible linkage with district/provincial extension service
- Exposure for extension service providers, IRRI and key farmers to technical support and extension service linkage in other rubber producing countries and

formulation of own strategies for developing local and district level extension support systems.

Potential Partnerships

- ICRAF for implementation of project based technical support centers
- AMARTA to organize and facilitate outside exposure and learning outcomes

Measurable Outcomes

- Extension service coverage – ha
- Number of farmer groups supported
- Scope of technical service provided

Training of Producers and Tappers (Crop Share Workers)

Outline of Possible Invention

- Field level training program for producers and tappers
- Exposure of tappers from outlying areas to progressive smallholders.
- Provision of tapping tools for clonal rubber tapping
- Setting up training/ refresher centers at local level – TOT to key farmers

Potential Partnerships

- Medan – PT Bridgestone
- Kalimantan – PT Bridgestone (with trainers from Medan)
- Jambi – ICRAF project sites
- Other Areas – IRRI

Measurable Outcomes

- Number of tappers trained
- Tree bark conservation – economic (increase in tapping life) and ecological

- Number of training centre farmer groups

Setting Up Micro Credit Systems/Linkages for Producers

Outline of Possible Invention

- Study of micro credit system and potential formal approaches through Financial Services Volunteer Corps
- Setting up micro credit system under USAID micro credit support

Potential Partnerships

- GAPKINDO
- Banking system

Measurable Outcomes

- Number of loans taken and repayment

7.3. Next Steps

The next steps for the rubber sector in AMARTA are:

- I. Designing the intervention programs and preparation of budgets
 23. Selecting farmer groups and areas
 24. Selecting partnering organizations & mechanisms
 25. Gathering the baseline data for the target groups
 26. Designing and putting in place a monitoring/evaluation system
 27. Setting up and running the intervention programs

Appropriate technical and staff allocation are required to start up the intervention planning.

Appendix I: Field Visit Notes

I. Location: Jambi and Muara Bungo

Dates: 7th – 9th January 2007

Summary of Meetings:

I. PT Djambi Waras – Mr. Albert Irwanto

- a) Part of a group of 9 rubber processing companies – Kirana Group – Group has about 15% market share (No. 1 Rubber Exporter in Indonesia) and produces around 300,000 MT of TSR annually.
- b) Claims to pay 80% - 85% of Saigon closing price for raw material.
- c) There is little cooperation among GAPKINDO to stabilize price.
- d) Quality of smallholder production is an issue.
- e) Payment: cash-on-delivery
- f) During low latex production periods companies are hard pressed to meet commitments to buyers and so have to purchase whatever is in the market – irrespective of quality.
- g) High commercial interest rates inhibit stocking
- h) Cost of cleaning wet coagulate is 30% of processing cost. – Can pay at least 15% to farmer to get better quality.
- i) Approx. 90% is purchased from traders - The company has no direct contact with farmers to improve quality of cup lumps

2. Estates Crop Provincial Office – Mr. Sutrisno Anwar & Mr. Zulfadli Mansoer (field officers)

- a) The office is responsible for 18 estate crop – the 5 major crops are rubber, oil palm, cocoa, coffee and cinnamon. Rubber is the highest area – 600,000 ha.
- b) Issue with checking quality of planting material as clones have been issued a long time ago. Govt. certified nurseries are issued a trading license but there is no check on plant quality.
- c) Around 20% of the planting material comes from IRRI franchised nurseries. These nurseries sell clonal planting material at 2,100 Rp per budded stump compared to 1,500 – 1,600Rp by unlicensed nurseries.

d) Plan to rehabilitate 136,000 ha between 2006 – 2010. 60 bn Rp was allocated for this purpose in 2006 for 17,500 ha. (During the time of our visit the Estate Crop Office in Jambi was under scrutiny by the Attorney general's office for mismanagement of budgetary allocation of funds for planting material in 2006.)

e) For 2007 the plan is to rehabilitate 25,000 ha. The funding allocation is only sufficient for 10,000 ha, The balance 15,000 ha will have to be financed by the districts.

f) Subsidy: 3.2 million Rp per ha – 1 ha per family. Planting material + fertilizer and pesticide (for 1st year only). Most subsidies are provided in kind. Some districts pay cash.

g) Criteria for farmer selection: low income farmers (not sure how this was established), should own the land, should not be a civil servant. – Around 380 extension workers were also rubber farmers but did not qualify for the subsidy as they were civil servants. Many had own nurseries and could serve as lead farmers.

h) Requirement of planting material – 23 million plants vs. availability 7-9 million plants.

3. Trade Office – Drs. Dadan Danuraswo – Kadis Perindag Provinsi Jambi, Ir. Hasbumar -UPTD Balai Pengujian Dan Sertifikasi Mutu Barang, & senior officials

a) Role of traders is highly dominant. Farmers are indebted to traders.

b) GAPKINDO must agree on quality specifications and reject poor quality material. The Trade Office is trying to effect a MOU with GAPKINDO to agree on quality verification.

c) Approx. 50% - 60% of the TSR factory gate price goes down to the farmer.

d) 14 auction markets at district level to help farmers to get a better price.

e) Jambi factories require approximately 280,000 MT of wet coagulate.

4. ICRAF field office in Muara Bungo – Ms. Ratna Akiefnawati and field team

a) Discussed scope of ICRAF project in rubber and extent of realization after 10 years.

b) Sisipan agro forestry and demonstration rubber gardens

c) Success of intensive monitoring and training.

5. Field visit to ICRAF project sites

a) Mukholik – Rubber nursery

- impact and extent of wild pig damage on young planting and nurseries

- sells polybag plants at 5,000 Rp

- challenge to find labour for nurseries
- produces approx. 40,000 – 50,000 plants per year
- sells in Muara Bungo, Tebo, Sarolangun (Jambi province), Rengat (Riau province)
- received assistance from ICRAF and from government
- depends on govt subsidy to continue nursery.

b) Roni – Demonstration rubber garden

- used for tapper and smallholder training
- clonal and seedling rubber is cultivated to study and demonstrate differences in growth and yields
- ICRAF has supported the smallholder to demonstrate:
 - Management of rubber plantation with low intensity
 - Comparison of clones – PB260, RRIC100, RRIM 600 & BPM I with local seedling
 - Treatment of white root disease using chemical and biological treatment
 - Enrichment of rubber garden by planting Meranti
 - Management of tapping technique

c) Lukman – Sisipan farmer

- old (non functioning) rubber garden replanted with sisipan technique using local seedlings
- direct grafting with clonal material
- observed low yield
- many trees were insufficiently developed due to canopy

6. Rubber Auction – Pasar Lelang Karet

- Farmers and collectors (mainly) bring their produce to the auction. The blocks are sliced down the centre for inspection. Codes are allocated to the sellers.
- Farmers have to stay or keep the wet coagulate under custody of another farmer or auction place worker for 2 days (for drying) until auction day.
- The auction takes place twice a week.

- d) The main buyers are Djambi Waras Jujuhan (the largest TSR factory in the area) and traders
- e) Price is based on quality and DRC and determined by visual inspection.
- f) Auction trading is based on closed envelope system and displayed on the notice board after selection.

7. PT Djambi Waras Jujuhan – TSR Factory – Mr. Herry

- a) Two grades of wet coagulate are purchased. Quality is determined by visual inspection.
- b) Buying pricing is determined by purity and DRC based on purchasing officers assessment. Accuracy is verified for internal control by testing subsequently.
- c) Sources of material : 20% from Auction
 - 20% from farmer groups
 - 60% from traders
- d) Quantity based contracts are encouraged with farmer groups. Base price is guaranteed at 85% of FOB but determined on purity and DRC.
- e) Farmer groups:
 - between 10 – 100 farmers
 - lead farmer negotiates prices with company
 - may own or hire a 1 – 1.5 MT truck
 - may supply daily or weekly depending on strength of group
 - farmers groups do not work when farmers need advances (co. does not give advances)
 - middlemen have higher capacity to hold if there is speculation that prices are going up
- f) Factory visit to observe raw material purchase, handling, cleaning, and TSR processing
- g) Waste water treatment: plant set up with technical assistance received from JETRO

8. Farmer Group – lead farmer

- a) Group has 50 members and was formed 10 years ago.
- b) Owns 1.5 MT truck and transports wet coagulate daily.
- c) Fresh cup lumps so lower DRC – however farmers get paid daily.

- d) Price received was 7,000 Rp per kg (wet) compared to price paid to traders 8,000 Rp
- e) If actual DRC was around 40% then farmer group received higher payment than traders with average DRC of 50%.

II. Location: Medan

Dates: 10th to 12th January 2007

Summary of Meetings:

1. Debriefing with David Anderson and Rafael Jabba on Jambi and Muara Bungo field trip and findings

2. Informal Meeting at US Consulate: Representing Rubber Industry – Mr. Andrew Hamilton, Estates Director, PT PP London Sumatra & Mr. Fauzi Hasballah, President Director, PT Gotong Royong Jaya.

Mr. Andrew Hamilton - Skills development: Lonsum does own skills development at training school. Recently passed out graduates are recruited and trained in-house. Indonesia has no skills development institution for rubber (cultivation nor processing). Other processors recruit Malaysian qualified technicians or train on the job.

Mr. Fauzi Hasballah – interest in developing Aceh. Rubber lands have been converted to oil palm during low prices. Potential to develop rubber producing areas. Infrastructure is required for Aceh.

3. Meeting at IRRI Headquarters – Medan – Dr. Chairil Anwar, Director & Dr. M. Supriadi, Deputy Director for Research and Development

a) Discussed structure and role of IRRI and other supporting institutions coming under Ministry of Agriculture

b) Contribution of rubber to foreign exchange earnings – 4% - 2.6 billion in 2005 & over 3 billion in 2006

c) 72% of production comes from five provinces: South Sumatra, Jambi, Riau, North Sumatra, west Kalimantan and south Kalimantan.

d) Decentralization in 2000 affected extension services as: supporting budget in district offices is less.

e) Prior govt. rubber development programs: Nucleus Estate Project (NEST) – World Bank funded; Smallholder Rubber Development Project – Govt. funded; Tree Crop Smallholder Development Project – ADB funded

f) Revitalization Program for Estate Crop Development - 300,000 ha by 2010

Soft loan @ 10% for maximum 4 ha

25 trillion Rp for rubber

12 million Rp per ha – estimated cost of planting

22 million estimated cost including land

g) National requirement is 50 million plants per year for above program

h) IRRI produces approx 2 million plants

i) Need to certify clonal purity of other nurseries: IRRI has only 5 clone certification experts: Sembawa 2, Sungei Putih 2, Central Jawa 1.

j) Criteria for establishing nurseries: climate, availability of bud grafting skills, budwood, rootstock and water

k) Cost: Budwood nursery – 50 – 60 million Rp per ha, can be used for 10-15 years. 1/5 to 1/7 ha is required per 1 ha of rootstock nursery.

Rootstock nursery – 1 ha costs approx. 50 million Rp. every 1.5 years. 1 ha can produce about 40,000 plants per annum and support 40 – 50 ha cultivation

4. Brief meeting with IRRI – Sungei Putih – Dr. Karyudi

a) Discussed market of rubber timber and problems of jungle rubber: unselected seedlings, over exploitation, extensive plantations

b) IRRI has to be around 60-70% of own costs. *Therefore efforts of IRRI are directed towards profit making. Smallholders cannot pay for IRRI services.*

c) No connection between IRRI and extension services

d) Planned rapid assessment exposure visit for AMARTA COP David Anderson and Rafael Jabba - USAID

5. PT Bridgestone Plantation Medan – Plantation and TSR Factory

G.L. Igot – Managing Director, James Bugansky – General Manager/Director

a) Formerly Goodyear plantation. Processes around 70,000 MT annually – 20,000 from own plantation and 50,000 from small plantations and smallholders

b) Discussed plantation operations vs. smallholder operations.

c) Co offers guidance to smallholders and small plantations wishing to improve productivity and quality. Discussed experience had working with improving smallholder quality and productivity. Positive experiences of smallholders increase in productivity leads to better quality.

d) Quality checking is done based on set criteria and payment is based on actual DRC after lab results – 5 days after delivery.

- e) Around 200 Rp/kg spread on traders.
- f) Tapper school for own tappers – all tappers are trained & re-trained regularly. (2 wk course)
- g) Avg. yield 2 MT/ha/pa
- h) Observed raw material inspection and selection and nursery.
- i) Discussed potential for PT Bridgestone Medan to provide cultivation management, nursery management & tapper training for smallholders through AMARTA project.

6. Field Trip with DA and RJ

- a) IRRI – Sungei Putih – observed and discussed – bud grafting, clonal selection and development, spread of clonal planting material, certification.
- b) smallholder rubber cultivation – 2 farmers
 - i) Farmer 1: clonal planting material, relatively well kept, intercropping with cocoa, some damage due to poor tapping, no rain protection.
 - ii) Farmer 2: unselected seedlings, poor tapping practice, badly damaged trees, low placement of tapping cups and latex wastage, poor yield (takes 2-3 days for tapping cup to fill), contamination of latex.

Discussed tapper training, use of rain guards & replanting with clonal material.

- c) Collector: preparation of wet coagulate is done by this collector, he has also started a root stock nursery. Pays 3,300 – 3,700 Rp/kg to farmers based on quality.
- d) TSR Factory – observed cleaning, processing & quality checking

Observation: Factories have already invested in washing and cleaning equipment (sunk cost) and unless all farmers can guarantee ‘clean’ material the factories will not be able to by-pass the pre-cleaning step.

III. Location: Banjarmasin

Dates: 14th to 18th January

Summary of Meetings:

I. GAPKINDO members – Mr. Jimmy Welianto, President South Kalimantan Branch & other board members

Discussed issues faced by processors. 2 issues are a priority:

- a) Issue of licenses to new processors without concern for raw material availability will increase pressure on supply chain.

b) Quality of raw material supply.

2. Estates Crops Office – Ir. Harry Ono

a) Total area under cultivation in South Kalimantan – 173,000 ha – 20-30% jungle rubber
smallholders 85% - 148,644 ha, of which 22,025 ha is old plantings – annual
production 85,907 MT

state plantation - 11,386 ha – 6,702 MT

private plantation - 13,226 ha – 8,141 MT

b) Annual planting material distribution plan for subsidy program

2007 – 7.6 million plants – 13,800 ha

2008 – 8.5 -do- - 15,500 ha

2009 - 9.3 –do- - 16,900 ha

2010 – 9.4 – do- - 17,100 ha

c) 50% of the planting material is expected from licensed nurseries at 3,500 Rp per plant. Nurseries are licensed by the Dinas Perkebunan in a joint program with IRRI for clonal certification. Unlicensed nurseries sell plants at 1,500 – 2,000 Rp.

d) Current avg. yields – smallholders : 893kg/ha
 state plantations: 1,035kg/ha
 private Plantations: 1,142kg/ha

e) Subsidy allocation: 3 million Rp/ha – 720,000Rp/ha for land clearing, 500 plants, 20kg fertilizer & 40lt herbicide.

f) Extension officers are funded by central govt. presently 400-500 officers.

3. Trade Office – Drs. H. Subardjo

a) Discussed experiences with setting up rubber auctions. The main concern was correct estimation of DRC so that farmers get a fair price. Set up auction with testing facilities, however traders did not accept lab certificate and pay on own estimation of DRC. Processors do not buy from auction.

b) Of the view that processors do not implement quality based purchasing.

4. PT Insan Bonafide – TSR Processor – Mr. Goh No, Director

- a) 3 factories – 2nd or 3rd largest processor; approx. 200,000 MT annually. 10% of total production goes to local market through middlemen.
- b) Sourcing 100% from smallholders through mainly through traders and collectors. The main issue is the unsuitable coagulant used – sulfuric acid, kaolin.
- c) Farmer groups supply smoked and unsmoked sheets as well.
- d) Pays approx. 13,500 – 14,500 Rp per kg dry weight. – i.e. 7,000 Rp per kg wet (40%-60% DRC)
- e) Viewpoint: new plantings in smallholdings are better managed than earlier
- f) Trades through own marketing office in Singapore
- g) Processing cost estimated at 2,000/kg of which 30% is fuel and electricity
- h) Observed quality inspection of raw materials and processing.

5. PT Bana Limasejurus – Private Plantation and TSR Factory - Mr. Suhandi Ledong, Director; Mr. Firman Abubakar, General Manager, Mr. Alibaderun, Operations Manager

- a) 2,000 ha plantation, 75% mature
- b) Own plantations: 300 MT/month, TSR factory requires 3,300 MT/month. Balance is supplied by collectors.
- c) Processes approx. 4,000 MT/pa smoked sheets from PTP in Sulawesi at conversion rate.
- d) Own marketing office in Singapore
- e) Observed incoming material inspection and processing. Material collected in bamboo was less contaminated.

6. PT Karias Tabing Kencana – TSR Factory – Mr. Jimmy Welianto, Director

- a) Installed capacity 2,000MT/month, actual utilization 50% due to raw material shortage.
- b) Sourcing – 90% collectors; 10% farmers (individuals), also purchases cup lumps from estates which operate centrifuge plants.
- c) issues with raw material : contaminants – bark shavings & improper coagulants – alum and sulfuric acid – affects final product quality
- d) Marketing – local only – Bridgestone, Goodyear and GT Tyres – direct sales through long term contracts.
- e) Machinery purchased from Malaysian co. in Medan. Discussed availability of technology for Indonesian rubber industry

- f) Processing cost 800Rp/kg, raw material approx. 13,000 Rp/kg dry.
- g) Estimated transport cost to collector 150 Rp/kg for a distance of 40-60km.

7. PT Darma Kalimantan Jaya – TSR Factory

- a) Capacity 2500 MT/month, realized 2000 MT due to raw material shortage.
- b) Sourcing 95% from collectors; 5% directly from farmers
- c) Tried helping to start a farmer group – not much success. Discussed issues.
- d) Raw material at 13,500/kg dry
- e) Material is sourced from Amuntai and East Kalimantan and others in a radius of about 80 km.
- f) Discussed reverse economies of scale in raw material purchasing.

8. Smallholder farmers - Haruyan

New plantings and mature holding planted under subsidy scheme. Discussed. Observations and findings:

- some farmer groups are formed merely to qualify for subsidy and serve no other purpose
- technical assistance is not provided to farmers with subsidy
- farmers have started to tap too early
- one farmer observed has started on the wrong tapping panel (which will damage the tree)
- even small farmers use crop sharing labor while they engage in other economic activities.

9. PT Perkebunan Nusantara XIII (PESERO) Tambarangan – Govt Estate and TSR Factory under Nucleus Estates program - Mr. Rusbandi Daud

- a) Raw material sourcing: 10% from own estate
 - 10% from other PTP
 - 80% smallholders

- b) Farmer groups which partner with PTP receive informal extension services – training on nucleus estates. Viewpoint: Smallholders who receive training do better than tappers on govt. estates.
- c) Observations showed that smallholders close to PTP were better organized vis cultivation and tapping.
- d) Viewpoint: GAPKINDO should agree to implement quality based purchasing
- e) Improve yields:
 - supply of good clonal material
 - training in proper cultivation, maintenance and tapping
 - extension services
- f) Observed Nucleus Estate and Plasma; Certified budwood nursery.
- g) Estates on the NEST program (1980's) now must be replanted.

10. PT Bridgestone Kalimantan Plantation – Mr. Toshikazu Mitsui, President Director & Ir. Effendi Sinaga, Field General Manager

- a) Previously privately owned estate purchased by Bridgestone prior to its purchase of Goodyear Plantations in Medan.
- b) Aggressive replanting program with assistance from PT Bridgestone Medan
- c) Tapper training school
- d) Discussed evaluation of tapper training in the context of developing measurable outcomes for AMARTA

IV. Location: Jakarta

Dates: 5th January 2007, 19th - 22nd January 2007

Summary of Meetings:

I. GAPKINDO – Dr. Suharto Honggokusumo, Executive Director & Dr. Sultoni Arifin Assistant Executive Director

- a) GAPKINDO comprises processors, exporters and traders of rubber. Not producers.
- b) Represents rubber industry in Chamber of Commerce - Rubber Working Group & Ministry of Agriculture - Committee on NR.
- c) Discussed objectives of GAPKINDO and its work.
- d) Projects include promotion of quality and systems certification scheme for processors, help to obtain technical assistance for waste water treatment facilities.

- e) Discussed govt. replanting program and soft loan scheme.
- f) Discussed success and issues with NEST program

2. Teleconference with ICRAF Office in Bogor - Dr. Meine Van Noordwijk, Dr. Laxman Joshi and Dr. Gede Wibawa

- a) Discussed outcomes of ICRAF project: best performance in Kalimantan and Jambi; West Sumatra insufficient follow up. Training of trainers programs, demonstration plots and technical support to Dinas. Efforts to educate farmers on conserving the tapping panel.
- b) Discussed experiences with setting up farmer groups, not all favorable. Farmer groups need support through extension services – may be supported to act as grassroots extension workers.

3. Ministry of Agriculture Directorate General of Estates– Mr. Achmad Mangga Barani, Director General

- a) Concerned that improper tapping practices result in loss of 10 years tapping life.
- b) 10,000 new extension officers will be put into service from 2007. 6,000 permanent and 4,000 on contract. They will receive training from Estates Crop Education Institute. Their work will cover oil palm, rubber and cocoa.
- c) Replanting program 300,000 ha within 5 years.
- d) supported by soft loan

Total Allocation per ha: up to 21 million IDR (depending on location) including the purchase of land.

Allocation for planting per ha: between 10 – 15 million IDR (depending on location cost of planting material and inputs differ)

Loan conditions:

Interest Rate – to producer 10%, to government at 16%

Grace period – 7 years

Repayment – 15 years

Maximum allocation per producer : 4 ha

4. GAPKINDO - Ir. H. Daud Husni Bastari, Chairman with Mr. David Anderson, COP

a) Presented field level findings and discussed areas where AMARTA could set up interventions.

Viewpoint: Agreed with findings and suggested implementation and recommended that AMARTA work should start at district level in small manageable projects providing support to committed Bupati.

b) Discussed: intercropping, quality, lack of certification of traders, lack of infrastructure for estates crops.

c) Discussed impact of the lack of private-public partnership in rubber industry development work – need for a policy implementing body. Can AMARTA help to link up public and private sector work?

d) GAPKINDO branches to set up clonal seedling nurseries.