# Policy Perspective on Development of Rubberwood in Indonesia

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## ABSTRACT

Most of Indonesia's rubberwood goes up in smoke when smallholders cut old rubber trees to clear land for replanting. Burning rubberwood in Indonesia releases carbon dioxide and methane, which are "greenhouse gas" linked to global warming. Each year, burning rubberwood in Indonesia releases emissions equivalent to over 10 million tons of carbon dioxide and over 190 thousand tons methane. Although these emissions from burning rubberwood are insignificant compared to greenhouse gases released by deforestation, the smoke from these fires can be a highly visible nuisance. With the increasing of the world price for rubberwood since the late 1980's, the export potential of rubberwood from Indonesia is high. Indonesia could be a big rubber world producer because it has the world's largest stock of old rubber trees. Yet Indonesia lags the other two major natural rubber producers in utilization of this resources. Thailand already used over 80% of its available rubberwood and Malaysia used more than 60%, while Indonesia was using only 27% of its potential supply. The current policy instruments, regional levy and export tax, do not support the development of rubberwood. The economic and environmental benefits continue to fall short of their potential because of local and national policies that inhibit marketing. Selling rubberwood as an alternative to burning will generate socio-economic benefits for rural areas and improve the environment. Where marketing is feasible, revenue from rubberwood sales can cover at least half of the costs of higher-yielding planting materials and other inputs that dramatically increase future income for smallholders. From an environment perspective, there are at least two important benefits from development of rubberwood, reduction in global warming, because less wood is burned after land clearing for rubber replantings, and reduced pressure on natural forest.

## INTRODUCTION

Unlike the other main producers natural rubber such as Malaysia and Thailand, rubberwood industry in of Indonesia is less developed. According to ITC (1993), the utilization of rubberwood from the available rubberwood in India, Thailand and

Malaysia is 96%, 83%, and 62% respectively, while Indonesia is using only 27% of the potential availability of rubberwood.

In terms of the share of rubberwood from the total industrial roundwood consumption, Indonesia also has the lowest share (less than 1%), compared to Thailand (71%), Sri Lanka (47%), and Malaysia (6%).

Even though the current utilization of rubberwood in Indonesia is still low, Indonesia has big potential for rubberwood production since Indonesia has the largest area of rubber in the world (3.4 million ha or around 34 percent of the total rubber area). ITC (1993) estimated the potential of rubberwood production in Indonesia as nine million $m^3$ per year. Similar to this, Anonymous (1985) estimated the potential rubberwood for sawmills was 2.24 million $m^3$ and for other use like particle board and medium density fiberboard (MDF) was 8.97 million $m^3$ per year. Sumatra has the biggest share of the potential rubberwood production (72 percent). The three top ranks of potential rubberwood production among the provinces in Indonesia are North Sumatra (20%), South Sumatra (19%), and Jambi (15%) (Table 1).

**Table 1. Area of rubberplantation and the estimation of potential rubberwood in Indonesia. 1993.**

| Province | Area (000 ha)[1] | | | | Ruberwood Potential[2] (000 $m^3$) | Type of Rubberwood Industry | |
|---|---|---|---|---|---|---|---|
| | Smallholder | Government Estate | Private Estate | Total | | Sawmill (000 $m^3$) | Other use (000 $m^3$) |
| Java | 25.1 | 76.8 | 52.2 | 154.1 | 864 | 173 | 691 |
| Sumatra | 2,081.6 | 168.3 | 199.7 | 2,449.7 | 8,043 | 1,609 | 6,434 |
| Aceh | 72.2 | 12.7 | 15.5 | 100.4 | 214 | 43 | 171 |
| North Sumatra | 340.7 | 86.1 | 116.7 | 543.5 | 2,201 | 440 | 1,761 |
| West Sumatra | 88.1 | 2.8 | 3.0 | 94.0 | 239 | 48 | 192 |
| Riau | 418.6 | 15.1 | 24.7 | 458.4 | 1,252 | 250 | 1,001 |
| South Sumatra | 489.3 | 9.2 | 6.3 | 504.8 | 1,121 | 424 | 1,697 |
| Jambi | 600.3 | 14.1 | 19.3 | 633.6 | 1,680 | 336 | 1,344 |
| Bengkulu | 51.4 | 6.6 | 4.8 | 62.9 | 147 | 29 | 118\ |
| lampung | 21.0 | 21.7 | 9.3 | 52.0 | 189 | 38 | 151 |
| Kalimantan | 742.6 | 27.8 | 22.7 | 793.0 | 2,310 | 462 | 1,848 |
| West Kalimantan | 409.9 | 5.1 | 7.5 | 422.5 | 1,365 | 273 | 1,092 |
| Central Kalimantan | 184.7 | 2.5 | 5.0 | 192.2 | 533 | 107 | 427 |
| South Kalimantan | 108.5 | 11.4 | 5.4 | 125.2 | 370 | 74 | 296 |
| East Kalimantan | 39.5 | 8.8 | 4.8 | 53.1 | 42 | 8 | 34 |
| Total Indonesia | 2,856.5 | 276.7 | 281.7 | 3,415.0 | 11,217 | 2,243 | 8,974 |

Sources: [1] Direktorat Jenderal Perkebunan
[2] Profil Pemanfaatan Kayu Karet dalam Rangka Pengembangan Ekspor Jadi Kayu Olahan

The official reason for less development of rubber wood in Indonesia is to avoid the possible negative impact on latex production and on the sustainability farmer's income from rubber production. Therefore, government imposed some policy instrument such as high export tax, high national and local levy to slow the development of the rubberwood industry. On the other hand, there are some big benefits both on socio-economic and environmental side by developing rubberwood.

This paper will discuss the advantages of developing rubberwood in Indonesia, both on socio-economic and environmental side.

## CURRENT POLICIES THAT INFLUENCE DEVELOPMENT OF RUBBERWOOD IN INDONESIA

There are at least three policy instruments that influence to the development of rubberwood, namely export policy, national levies and regional levies.

### Export Policies

Since 1989 Indonesia has imposed an export levy for rubberwood. Through the decree of Finance Minister No. 1134/1989, government set export levy on the three major groups of sawntimber to range of \$250-2400 per $m^3$, including export levy for rubberwood that is \$250 per $m^3$. Then, in 1992 the government set a new export levy for more specific product of rubberwood through the Decree of Finance Minister No. 534/KMK.013/1992. There are four kinds of rubberwood products designated by export levies (Table 2).

The reason of applying this policy is to limit rough sawn timber exports in favor of domestic processing.

Indonesia and Malaysia are only producers of rubberwood who imposed export levies of rubberwood sawtimber. The export levy of rubberwood in Indonesia is the highest, comparing to Malaysia who only has set \$50 per $m^3$ export levy since 1990.

**Table 2. The export levies of rubberwood products.**

| HS number | Description | Levy |
|---|---|---|
| 4403.99.970 | Other wood in the rough | \$1000/$m^3$ |
| 4404.20.230 | Split poles or piles | \$1200/$m^3$ |
| 4407.99.994 | Other sawn wood | \$500/$m^3$ |
| 4409.20.994 | Other worked wood (non coniferous) | \$500/$m^3$ |

Source: Ministry of Trade.

## National Levies

Most of the sources of rubberwood come from rubber plantation and only small parts come from "forest". It could not be found any national levy on utilizing of rubberwood that comes from rubber plantation. However, for utilizing of rubberwood that comes from forest, such as for other forest products, there is a levy called "iuran hasil hutan".

The imposing of "iuran hasil hutan" to rubberwood that produced from forest has been established since 1987 through Decree of Director Forest Utilization No. 338/Kpsts/IV.prog/1986 that set Rp1650 levy per meter cubic of rubberwood that produced from state forest. In 1995, this kind of levy has increased to Rp2500-4500 per $m^3$, depend on the size of the wood.

## Local Levies: Case Study in West Kalimantan, South Kalimantan, and South Sumatra

At the national level, Indonesia is government has imposed the policy of trade liberalization and deregulation. At the regional level, there are many regulations that are not in line with the spirit of the national level of trade liberalization, including the regional regulation on rubberwood.

CPIS (1993, unpublished) reported that the Governor of West Kalimantan issued the Governor's Decree No. 03/1991 dated 4 January 1991. This decree imposed levies of Rp30,000 and Rp12,000 per meter cubic on rubber sawn timber and medium density fiber wood, respectively. Similar to this, in South Sumatra, the heavy levy has also been imposed on operator of the rubberwood plants include the replanting levy set at 13.5 percent of the processed wood prices (The Jakarta Post, 6 December 1988).

Beside that, the Dinas Perkebunan West Kalimantan also issued extremely complicated guideline on the mechanism of felling and its authorization (CPIS, 1993).

The high regional levy and the bureaucratic mechanisms influenced the development of rubberwood. It is not surprising that the only rubberwood factory in West Kalimantan is now operating at only 30 percent capacity (CPIS); and several rubberwood factories in South Sumatra have stopped operation.

More recent Government decree that imposed levies for rubberwood has been issued in South Kalimantan (Governor Decree No. 0372 A Tahun 1994). This decree imposed levies of Rp4.500 per cubic meter on log and US$ 3.5 per cubic on log for replanting program.

The governors' decree on the rubberwood levy conflict with the two decrees of Ministry of Domestic Affair that are decree No. 48/1984, dated July 1984, which explicitly bans all forms of local taxes on 11 commodities including sawn timber and decree No. 20/1986, dated 27 September 1986 that bans all forms of local levies that

increase domestic costs of production, retard investments, and/or distort the flow and marketing of commodities.

## SHOULD INDONESIA DEVELOP RUBBERWOOD INDUSTRY?

As mentioned above, the rationales of imposing the policies that retard developments of rubberwood are to avoid the negative impact on latex production and farmer's income. These rationales are incorrect. Furthermore, there are at least three arguments that can support the development of rubberwood in Indonesia. The development of rubberwood will generate socio-economic benefit for rural area; improve the environment, and increase foreign exchange.

1. Development of rubberwood in Indonesia is in line with the smallholder rubber development (rubber replanting program), and it will generate socio-economic benefit for rural population.

Although Indonesia has the largest area of rubber in the world, the total production only rank as a second largest in the world. This is because Indonesia's rubber yields still rank among the lowest in the world, there are few productive trees in the total planted and a major proportion of Indonesia's rubber (84%) is on smallholding's where the stand of trees is rapidly ageing and of relatively low genetic yield potential. Among the smallholder rubber, around 85 percent or 2.6 million ha area is categorized as jungle rubber with production of less than 600 kg per ha.

The rubber replanting program with higher-yielding varieties is the key to enhancing the comparative advantage in natural rubber production since raising wages in Thailand and Malaysia has reduced these two countries' competitiveness. It is estimated that about 450,000 ha of old rubber are currently unproductive and need to be replanted (Table 3).

Since 1970's Indonesia has implemented the rubber replanting program through various projects such as NES, PRPTE, SRDP, TCSDP with already covert around 15% of smallholder rubber area. However, since the cost of those project is very high and Indonesia have the lack of government budget, the rubber replanting program is difficult to extend through those kinds of projects.

However, some studies, Gouyon (1990) and Barlow (1992), found some evidence that smallholder farmers are willing to replant by them selves and it created a development of small private nursery. Gouyon (1990) reported smallholder rubber in Musi Banyuasin District (Muba) planted or replanted around 5500 ha of rubber. Since the supply of planting material from government nursery is limited, small private nursery has been developed since 1980. In the beginning, this spontaneous development has taken place around the project, but since 1987, small private nursery started

**Table 3. Area of Rubber Crop in Indonesia**

| Year | Area (million ha) | | | |
|---|---|---|---|---|
| | Immature | Mature | Unproductive | Total |
| 1982 | 0.53 | 1.57 | 0.38 | 2.48 |
| 1983 | 0.60 | 1.62 | 0.36 | 2.58 |
| 1984 | 0.64 | 1.71 | 0.36 | 2.71 |
| 1985 | 0.69 | 1.69 | 0.39 | 2.77 |
| 1986 | 0.73 | 1.75 | 0.40 | 2.87 |
| 1987 | 0.68 | 1.77 | 0.38 | 2.84 |
| 1988 | 0.75 | 1.85 | 0.40 | 3.00 |
| 1989 | 0.76 | 1.93 | 0.41 | 3.10 |
| 1990 | 0.85 | 1.86 | 0.43 | 3.14 |
| 1991 | 0.86 | 1.86 | 0.43 | 3.15 |
| 1992 | 0.92 | 1.97 | 0.40 | 3.29 |
| 1993 | 0.88 | 2.07 | 0.45 | 3.40 |
| A) share | 25.9% | 60.7% | 13.3% | |

Source: Direktorat Jenderal Perkebunan

developing closer to the smallholder planting area. In Kabupaten Muba, Gouyon *et al.*(1990) estimated there are 330 small private nurseries, producing around 4 million plants per year, and it traded to the whole province of South Sumatra.

Similar evidence also could be found in Labuhan Batu district, North Sumatra province. There are hundreds of tiny units of rubber nurseries who produced planting material and sold it both to smallholder and estate operation in surrounding area, as well as in faraway regions (Barlow, 1993).

The development of spontaneous rubber replanting is very important, and it need to be supported by providing the proper information and improved planting materials. The development of rubberwood will increase the spontaneous rubber replanting. Money from selling the rubberwood, will give more incentive for farmers to replant the old rubber. Therefore, the benefit comes from both development rubberwood and rubber replanting program. The development of rubberwood will create a new job by the various phases of the production chain, especially in rural area. Similarly, the rubber replanting will increase the productivity and will generate higher income and employment. This will help inhibit migration to Java.

The anxiety that with the developing of rubberwood, smallholder farmers will cut their young trees is not reasonable. Rubber is very important for smallholder farmers as a source of cash income. With few purchased inputs, farmers can tap rubber trees for more than 30 years.

For refuting this anxiety, it is important to calculate NPV at different age of trees. If NPV is less than the price of rubberwood, it will be economically profitably for farmers to cut and sell the rubberwood. Since the majority of rubber smallholders are the traditional farmers who use unselected seedling, the analysis will be focused on this group of farmer.

Table 4 shows the value of NPV at different age of trees for the traditional smallholder farmers with using unselected seedling. The average price of rubberwood at farmgate in Lampung was Rp15.50 per kg in 1991 or equal to Rp600,000 per ha

**Table 4. Net present value (NPV) at different age of rubber trees.**

| Age of rubber trees (year) | NPV (rupiah) |
|---|---|
| 10 | 1,742,192 |
| 11 | 1,951,705 |
| 12 | 2,066,360 |
| 13 | 2,014,773 |
| 14 | 1,956,995 |
| 15 | 1,892,285 |
| 16 | 1,819,809 |
| 17 | 1,738,636 |
| 18 | 1,647,722 |
| 19 | 1,545,899 |
| 20 | 1,431,857 |
| 21 | 1,304,130 |
| 22 | 1,161,076 |
| 23 | 1,000,855 |
| 24 | 821,407 |
| 25 | 620,426 |
| 26 | 455,327 |
| 27 | 330,416 |
| 28 | 220,516 |
| 29 | 127,428 |
| 30 | 53,170 |
| 31 | 0 |

Source: Processed data
1. Indonesia Smallholder Rubber Development Project II Nurseries and Field Development, Project Department East Asia and Pacific Regional Office 1984
2. Konsepsi Pembangunan Jangka Panjang Perkaretan Indonesia (1994-2019) Forum Pengkajian Perkaretan 1994.

average (Sumana *et al.*, 1991). In other locations, the prices of rubberwood per ha at farmgate are different but it is less than Rp800,000 per ha.

NPV is less then the average price of rubberwood after the age of trees is more than 26 years. This means farmers will cut rubber trees after 26 years of the age of trees. Therefore, it can be concluded that the development of rubberwood will not encourage farmers to cut the young trees.

Sumana *et al.* (1991) reported the result of their studies in Lampung showed 84 percent of respondent cut the rubberwood at age of trees more than 20 years with the average age was 27 years, and only 16 percent of respondent cut at the age of trees less than 20 year with the average year was 19 years. The reasons why farmers cut the young trees because of the economic purpose that were the yields was low and the number of trees has decreased.

## Development of Rubberwood will Reduce Global Warming and Relieve Pressure on Natural Forest

From the environmental perspective, there are at least two important benefits from development of rubberwood, which are to reduce global warming, because some parts of wood are not burned in land clearing for rubber replanting, and to reduce pressure on natural tropical forest.

Preliminary results from Alternatives to Slash-and-Burn Project (ICRAF and Government Indonesia Project), Sumatra smallholders mainly use slash-and-burn to establish treecrops system (mainly rubber) instead of shifting cultivation of food crops. Evidently a significant share of slash and burn clearing in Sumatra involves smallholders's old rubber garden instead of forest. The development of rubberwood for economic purpose will reduce global warming from the greenhouse gas emissions, since when old gardens are cleared, most of the rubberwood is burned in situ while a portion is sold as firewood.

Table 5 shows the estimation of C-emission saved per year under utilization of rubberwood in rubber replanting. The total amount of carbon released under rubberwood burn in situ in rubber replanting activity is around 2.87 million tons of carbon. This corresponds to almost 10 million ton and 13.1 million tons $CH_4$ equivalent to radiative forcing to the atmosphere. The amount of $CH_4$ released is only 200,000 tons, but the effect on global warming is 25 times the equivalent of radiative forcing (IPCC, 1990). If the rubberwood is utilized, not burned, it will save 859,950 tons of carbon. This is equal to almost 3.0 million tons of $CO_2$ and 3.94 million tons $CH_4$ equivalent to radiative forcing.

The development of rubberwood can reduce C-emission, it also can reduce pressure on natural tropical forest since rubberwood can substitute for traded wood produced from natural forest such as Asian ramin, agathis and meranti wood. This will contribute

**Table 5. Estimation of C-emission saved per year under utilization of rubberwood at the time of rubber replanting.**

| Type of carbon | C-emission release under rubberwood burn in situ | | C-emission released under utilization of rubberwood | | C-emission saved under utilization of rubberwood | |
|---|---|---|---|---|---|---|
| | Per ha (t) | Total (Mt) | Per ha (t) | Total (Mt) | Per ha (t) | Total (Mt) |
| 1. Amount of carbon released | 110 | 2.87 | 77 | 2.01 | 33 | 0.86 |
| 2. Amount of $CO_2$ release | 384 | 9.99 | 269 | 6.99 | 115 | 3.00 |
| 3. - Amount of $CH_4$ release | 7 | 0.19 | 5 | 0.13 | 2 | 0.06 |
| - $CO_2$-equivalents in radiative forcing | 506 | 13.14 | 354 | 9.20 | 152 | 3.94 |

Assumption:
1. Amount of carbon held from jungle rubber is based on Mudiyarso study that is 245 ton/ha CDW.
2. 95% of carbon release as $CO_2$ and 5% as $CH_4$.
3. 30% of C-emission save under utilize rubber wood.
4. Area of rubber planting:3% of total area for state and private plantation and 10,000 ha for smallhoderls. That is equal to 26,000 ha/year.

to the conservation of natural forest. The conservation of natural forest is an important environmental issue. The area of natural forest in tropical countries has deceased due to conversion to others land use, shifting cultivation, fuelwood collection and logging.

## Development of Rubberwood will Increase Foreign Exchange Generated by Exports of Rubberwood Products

The rubberwood market has good prospects. Since the late 1980s, the international price of rubberwood has increased because of rapid depletion of ramin and agathis wood. The consumption of rubberwood in the major importing countries in 1991 is estimated at 238,000 $m^3$ and it is projected to increase to be 350,000 $m^3$ in 1996 (ITC, 1993).

However, the volume of export of rubberwood from Indonesia is still very low, eventhough some factories in Sumatra have already exported. There is no official data available for volume at export of rubberwood. Rubberwood, together with giam, jeunjing, sengon, and johar is categorized as "other wood" in official statistics.

By comparison, export of rubberwood from Malaysia has been developed much faster. The volume of rubberwood sawntimber increased from 17,500 $m^3$ in 1980 to 204,000 $m^3$ in 1988 (almost eleven times). The real price of rubberwood sawntimber has also increased from 257 ringgit/$m^3$ in 1980 to 315 ringgit/$m^3$ in 1988 (23 percent) (Table 6).

**Table 6. Export of rubberwood sawntimber from Peninsular Malaysia (1980-88).**

| Year | Volume ($m^3$) | Consumer price index | Average price (Ringgit per $m^3$) | Real price (Ringgit per $m^3$) |
|---|---|---|---|---|
| 1980 | 17,500 | 100.0 | 257 | 257 |
| 1981 | 26,500 | 109.7 | 264 | 241 |
| 1982 | 32,000 | 116.0 | 316 | 272 |
| 1983 | 53,500 | 120.3 | 312 | 259 |
| 1984 | 96,000 | 124.6 | 303 | 243 |
| 1985 | 121,000 | 125.1 | 314 | 251 |
| 1986 | 178,000 | 125.8 | 330 | 262 |
| 1987 | 259,000 | 126.8 | 376 | 297 |
| 1988 | 204,000 | 130.0 | 405 | 315 |

Source: MASKAYU, Volume 2, 1981-89 in FORSPA, Role of Rubberwood in Forestry: Malaysia Experience, 1993.

## CONCLUSIONS AND RECOMMENDATIONS

Anxiety about negative impact of rubberwood development on sustainability of farmers' income and rubber production is not correct. The development of rubberwood in Indonesia will give more advantages than disadvantages. The development of rubberwood will generate socio-economic benefits for rural areas, increase foreign exchange earning and improve the environment.

However, the current policy instruments imposed do not support the development of rubberwood. High export taxes and high regional levies significantly influence the rubberwood industry, which is operating below capacity and at risk of shutting down.

To achieve all of the advantages of the development of rubberwood, it would help to remove policy barriers including export taxes, national levies and regional levies.

Development of rubberwood needs to be linked with rubber replanting policy. Government should support spontaneous smallholder rubber replanting by providing useful information and improving the availability of improved planting materials.

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