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Studies on the Characteristics of the Indonesian Timber Markets and Governmental Policies to Promote a High Export of Forest Resources

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Abstract: To finance the beginning of Indonesian development plans, Indonesia, which has a large natural forest, promoted forestry sector for generating national income. To realize this goal, Indonesian government issued some policies with economic instrument such as tax holiday for domestic investment, restriction and ban of logs export, a high tax and a minimum price on exported sawntimber, and export promot ion. As a consequence, forest concession and then sawntimber and plywood industries grew rapidly, both on number and capacity.

Success on developing timber-based industries has not been followed by the successful management of forest resources. A Selective cutting (TPTI), which was introduced at the beginning of the implementation of forest concession, caused natural forest degradation on a large area. A high installed production capacity of timber-based industries needs logs, which are in short supply because natural forest has declined considerably as a result of unsustainable forest practices. Some new government policies must be set up to ensure the Indonesian timber-based industries as well as natural forest resources.

Key words: forest concessions, log export ban, governmental policies, timber-based industries, Indonesia

Introduction

At the beginning of the governmental development plans, Indonesia was confronted with a serious shortage of capital and with a lack of funds for development. The only way to get capital was the extraction and the export of raw material from some possible natural resources with which the country has been endowed richly. Among those available natural resources, the tropical forests were the most appropriate to be rapidly used. To attract foreign, as well as domestic investors, the Indonesian government issued a decree on Foreign Capital Investment in 1967 and, another one on Domestic Capital Investment in 1968. Since then, the forestry business, in the form of forest concessions was growing rapidly in Indonesia. The big progress in the forestry sector made a large contribution to the national income. The foreign currency inflow from wood exports increased by 21.08 % per year and the value of timber and wood-based products rose from US$ 26 million in 1969 to about US $ 3.5 billion in the year 1992 (MoF, some issues and Gunarso, 1993). The partially over-pronounced incentives brought about some disadvantages, which are indicated by an increasing exploitation rate, and no incentive was present for improving forestry professionalism. These points affect the sustainability of the forest resources and the forestry development itself.

Of course, during the 25 yearly development plans (five PELITA's) the development objectives were changing. Whereas in the first planning periods the increase of the national income and the creation of employment opportunities dominated all other aims, actually a more equal distribution of income and employment, and a sustainable development through sustaining the natural resources, improving the human resource and maintaining the environmental capacity of the nature is emphasized.

Were the economic policies in the forestry sector successful to achieve these objectives? This research paper will try to find the answer by looking what happened in the past. It also will try to make some judgments as references for future policies. Therefore this research will try to identify governmental policies and economic factors having significant impact on wood production and exports in Indonesia.

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Table 1. Growth of number and area of Indonesian concessions 1969-2001.

Year	Forest Concession (Unit)	Forest Area (mio.ha)	Year	Forest Concession (Unit)	Forest Area (mio.ha)
1969	34	3.947	1986	533	55.132
1970	66	8.652	1987	538	55.468
1971	102	11.741	1988	542	55.966
1972	149	15.329	1989	565	57.656
1973	229	21.709	1990	557	58.880
1974	237	24.163	1991	567	60.480
1975	267	26.204	1992	580	61.380
1976	296	28.189	1993	575	61.700
1977	324	30.476	1994	540	61.030
1978	382	32.887	1995	487	56.170
1979	462	44.930	1996	447	54.090
1980	503	44.407	1997	427	52.280
1981	510	50.789	1998	420	51.580
1982	519	52.632	1999	387	41.840
1983	521	52.892	2000	362	39.160
1984	526	53.121	2001	351	36.420
1985	532	53.347			

Source: CIC (Study on plywood industry and market in Indonesia 1993), MOF (Forestry statistic of Indonesia, some issues).

Characteristics of the Indonesian Timber Markets

1. *Forest concessions and the log market.*

Logs mostly were produced under forest concessions (HPH=*Hak Pengusahaan Hutan*). Until 1992, in Indonesia there were 579 forest concessions with a working area 60.345 million (mio.) ha, equivalent to 94.29 % of the country's total production forest. Forest concessions grown rapidly in the period of 1969 to 1980, in which the number of concessions increased by 27.8% per year (from 34 to 503) or, concerning the acreage by about 26.7% (from 3.947 mio. ha to 44.407 mio. ha). In the twelve years period between 1981 and 1992 the growth was sharply reduced with a 1% increase in the number of forest concessions and a growth of area under concession of 1.6%. During 1993-2001, the number and areas of concessions reduced 5.95% and 6.22% per year, respectively. Presently in Indonesia there are 351 forest concessions with a working area 36.42 mio. ha (Table 1).

Before 1980, when the Indonesian government banned the exports of logs, the Indonesian log production was mostly exported and only a small share was used by the domestic industry. This utilization pattern changed in 1985, when the total ban on log exports became effective (Table 4). From then on, the total log production was used by domestic firms, with an average distribution of the log input of 63% used by sawmills and 37% used by the wood-based panel industry (Kir, Adnan 1989).

Concerning the marketing, a big part of the harvested logs were not traded on the market but directly used by forest industry which either holds the concession or is owned by the concessionaire. Here, the strong vertical integration of Indonesian forestry industry becomes obvious. The majority of the remaining logs were sold through auctions. The market partners were, once again, the forest industries. Sometimes intermediary traders also took part in the log market.

On the average, there was a significant difference between the log price of domestic sales and exports. The log export prices run about 46% higher than the domestic price which could be substantiated by the transportation costs which were considerably higher for exports than for domestically sold logs. During the period between 1969 and 1992 the annual price growth of exported logs was 13.8%. The domestic price of logs rose 17 % per year in the period from 1969 to 1980; even after the export restrictions and the following ban of log exports the price increase was about 9%. It seems as if that slower growth of the domestic log price was affected by not only the log export ban but also the reduced competition in demand for logs on a regional scale which arises in part from the very developed vertical integration of the Indonesian forestry sector (Constantino, 1990).

Table 2. Sawmilling industries in indonesia.

Year	HPH Units	Capacity (1000 m³/year)	Non-HPH Units	Capacity (1000 m³/year)	Total Units	Capacity (1000 m³/year)
1979	145	4,100	1,510	3,800	1,655	7,900
1980	188	5,500	1,639	4,300	1,827	9,800
1981	239	7,100	1,788	4,800	2,027	11,900
1982	257	7,600	1,957	5,400	2,214	13,000
1983	286	8,500	2,205	5,900	2,491	14,400
1984	294	8,700	2,245	6,300	2,539	15,000
1985	297	9,600	2,285	6,700	2,582	16,300
1986	331	10,500	2,344	7,100	2,675	17,600
1987	364	11,400	2,344	7,100	2,708	18,500
1988	364	11,400	2,344	7,100	2,708	18,500
1989	364	11,800	2,344	7,100	2,708	18,900
1990	364	11,800	2,344	7,100	2,708	18,900
1991	*287	*7,655	-	-	-	-
1992	*287	*7,655	-	-	-	-
-	-	-	-	-	-	-
2000	*125	*3,662	*1,493	*7,387	*1,618	*11,049

Source: ICSA (Musyawarah Nasional Ke-1 Perhimpunan Pengusaha Kilang Kayn Terpadu Indonesia, 1985), ISA (1991) and MoF (Forestry statistic, some issues(*)).

2. *Sawmilling and the sawntimber market.*

Sawmilling is the largest forestry industry in Indonesia. In 1992, there were some 2,708 sawmills operating throughout the country. This amount in comparison with the number of mills (1,655 units) in 1979 indicates an increase of sawmilling unit number of 64% during the past decades. From Table 2, it can be seen that the sawmilling industry has distinctive characteristics. Thus the sawmills connected with HPH are less in number than the non-HPH sawmills, and their average size, using installed capacity as an index, is greater than the average non-HPH mills, by a factor of over ten times. In 1990, the installed output capacity of the industry amounts to 18.5 mio. m^3 of sawntimber, 64% of the capacity i.e. 11.8 mio. m^3 was represented by 364 HPH sawmills where almost all the production of export-quality sawntimber took place. The remaining majorities were non-HPH sawmills, which were generally small in their operating facilities, and uses old machinery and equipment producing low quality products mainly for the domestic market. After the restrictive policy imposed on sawntimber exports, starting in 1989 with a ban of unprocessed sawntimber exports, the imposition of a sawntimber export tax and of a minimal export price, the number of HPH's sawmilling decreased (Table 2). Concerning the non-HPH's sawmills no data were available, but it can be expected that the number of non-HPH's sawmills decreased, too, as they were also affected by the above-mentioned measures. Currently there are some 1,618 sawmills operating throughout the country with installed capacity is about 11 mio. m^3/year.

Before the seventies, only a small part of the sawntimber production went to the export markets and almost all the sawntimber output was used locally. From that decade on, both production and exports increased. The share of sawntimber devoted to exports amounted to 30% of the total production. The sawntimber exports were mostly done by HPH-sawmills, which produced the commodity in a better quality and grade. Even the largest non-HPH-sawmills were not able to reach export quality and primarily produced for local markets. After the imposition of the export tax and the minimum price on the exports of sawntimber in 1989, production and exports of sawntimber dropped sharply and only high-priced sawntimber and semi-processed commodities were to be supplied on the world market (Table 4).

Sawntimber export prices run about 16% to 200% higher than the domestic price. This is explained by the fact that the domestic market consumes almost entirely low grade or non-exportable quality. The domestic price of sawntimber varies throughout the country in relation to locality, species, and grade, as well as according to local demand and the availability of the product. Before the regulations on the sawntimber market took place, i.e. the imposition of an export tax and of a minimum price in 1989, the sawntimber export price grew only about 7.3%, but after that time, the growth of the export price increased 44.1% per year because of an increased quality of the processed products.

3. *Plymills and the plywood Market.*

In Indonesia, the establishment of a modern plywood industry started in 1973. Two plants with a combined

Table 3. The plywood industry in Indonesia.

Year	Units	Installed Capacity (m^3)	Year	Units	Installed Capacity (m^3)
1973	2	28,000	1984	95	5,327,600
1974	5	103,000	1985	101	6,228,100
1975	8	305,000	1986	103	6,500,000
1976	14	405,000	1987	108	8,130,000
1977	17	535,000	1988	113	9,013,000
1978	19	799,000	1989	114	9,085,800
1979	21	1,809,000	1990	116	-
1980	29	1,949,000	1991	*115	*8,277,300
1981	40	2,601,500	1992	*114	*8,119,450
1982	61	3,292,400	-	-	-
1983	79	4,477,100	2000	107	9,433,095

Source: APKINDO and MoF, Forestry statistic of Indonesia, some issues(*Connected with HPH).

capacity of 28,000 m^3 per year were established during 1973. The governmental regulations from 1980 required every forest concession holder to build a wood-processing industry. At the same time, the beginning of the export restrictions for logs formed the basis for the rapid development of plywood industry. The number of plymills and the capacity development during the period 1973 -2000 is shown in Table 3.

The plywood industry in Indonesia is mainly producing general-purpose plywood for the world market. As the latest available statistics (MoF, 2001) indicate, 107 mills were in work with an installed production capacity of 9,433,095 m^3 per year in Indonesia in 2000. Plywood production has shown a continuous increase both in the number of mills and the capacities until 1990. In the initial stage of development the production increased at an average of 26% per year. The development of the production capacity and the number of mills is shown in Table 3. The increase in capacity and production shows a steady trend throughout the period from 1973 to 1979. There is an appreciable increase in capacity and production during the period 1980 to 1996. This indicates the positive effect of the export ban on logs experienced by the wood-processing industry. The export of plywood started in 1980, and grew rapidly during the period 1982 - 1996. It is also evident that Indonesian plymill production was highly export oriented, with an amount up to more than 75% of total production (Table 4).

There were also significant differences between the plywood price of domestic sales and exports, on the average. The plywood export prices exceed the domestic prices by more than 27%. This is explained by the fact that the domestic market consumes almost entirely low-grade plywood. The plywood prices fluctuated heavily on the world market before JMB was set up. After the imposition of the Joint Marketing Body, the price was stabilized with an annual growth of 7 % per year. The same holds for the domestic market with a quite stable yearly increase of 7.5%.

Governmental Influence on the Market for Timber and Forest Products

Some important of the economic policy instruments imposed on Indonesian forestry and timber-based industry can be characterized as follows (MoF, various volumes):

1. *Economic rent of forest resources.*

In the following it will describe which instruments the Indonesian government uses to capture the economic rent of the Indonesian forest resources.

Licence Fee (IHPH=*Iuran Hak Pengusahaan Hutan*). The concession license fee was established for the first time by Governmental Regulation No 22/1967. Under this regulation the license fee is to be paid by the forest concession holders based on the total area of the concession. The fee is paid once when the forest concession is granted and before timber extraction begins. The amount of the license fee has changed 4 times and the failure to pay the fee after three notices results in the cancellation of the allocation of forest area to the concessionaire or in the cancellation of the approval for a renewal of the forest concession.

Forest Product Royalty (IHH=*Iuran Hasil Hutan*). The forest product royalty is paid on volume (m^3) of the forest product (on extraction from 1968, on processed wood product i.e. sawntimber, plywood etc. from 1984). The charged rate amounts to 6% of the domestic log price and is issued by the government every six months.

Reforestation Fund (DR=*Dana Reboisasi*). Starting in June 1980, concessionaires who fail to regenerate the

Table 4. Production and export of log, sawntimber and plywood of Indonesia.

Year	Round wood			Sawn Timber			Plywood		
	Production (m^3)	Export ($1000m^3$)	% export	Production (m^3)	Export ($1000m^3$)	% export	Production (m^3)	Export ($1000m^3$)	% export
1966	1,511,000	278	18	nd	nd				
1967	2,379,000	517	22	nd	nd				
1968	3,355,000	1,304	39	nd	nd				
1969	5,299,000	nd	nd	nd	nd				
1970	15,899,000	nd	nd	nd	nd				
1971	13,706,000	10,686	78	nd	167				
1972	17,703,000	13,759	78	nd	167				
1973	24,319,499	19,095	79	nd	338				
1974	21,753,000	nd	nd	892,060	nd	nd	17,010	nd	nd
1975	16,296,000	nd	nd	1,708,025	nd	nd	24,990	nd	nd
1976	21,428,000	nd	nd	634,841	nd	nd	25,720	nd	nd
1977	22,939,000	nd	nd	604,803	nd	nd	168,080	nd	nd
1978	26,256,000	nd	nd	1,512,743	nd	nd	945,500	nd	nd
1979	25,313,638	nd	nd	1,636,950	nd	nd	385,614	nd	nd
1980	28,926,000	14,583	50	5,322,000	1,203.00	23	1,015,000	507.00	50
1981	23,334,000	6,391	27	5,440,000	1,263.00	23	1,720,000	722.40	45
1982	22,448,000	3,103	14	5,750,000	1,462.00	25	2,480,000	1,232.30	50
1983	26,390,000	2,595	10	6,302,000	1,793.00	28	3,300,000	2,106.10	64
1984	30,900,000	1,567	5	6,750,000	2,198.00	33	4,500,000	3,046.00	68
1985	14,551,451	0	0	4,144,617	2,166.00	52	4,322,443	3,784.00	88
1986	19,758,294	0	0	7,442,000	2,353.00	32	5,302,000	4,618.00	87
1987	27,565,919	0	0	9,750,080	2,833.00	29	6,385,350	5,951.00	93
1988	27,760,196	0	0	10,237,500	2,874.00	28	6,026,678	6,951.00	115
1989	24,409,000	0	0	3,919,249	2,692.00	69	8,843,000	8,047.00	91
1990	25,312,000	0	0	3,117,000	25.00	1	9,415,000	8,513.00	90
1991	23,892,000	0	0	3,006,046	939.00	31	9,123,500	9,003.00	99
1992	28,267,000	0	0	3,534,356	9.45	0	9,874,000	9,761.00	99
1993	26,848,010	0	0	2,244,000	5.04	0	9,924,000	9,626.00	97
1994	24,027,277	0	0	1,729,839	2.37	0	8,066,400	7,333.09	91
1995	24,850,061	0	0	2,014,193	0.80	0	9,122,401	8,338.82	91
1996	26,069,282	0	0	3,426,740	0.06	0	10,947,633	9,366.57	86
1997	29,520,322	0	0	2,613,452	0.03	0	6,709,836	4,800.74	72
1998	19,026,944	0	0	2,707,221	15.90	1	7,154,729	4,863.38	68
1999	20,619,942	0	0	2,060,163	20.50	1	4,611,878	3,372.88	73
2000	13,798,240	0	0	2,789,543	9.87	0	4,442,735	3,096.24	70
2001	10,051,481	0	0	674,868	12.31	2	2,101,485	930.50	44

Source: Ministry of Forestry Statistic of Indonesia (various issues).
1985: Totally ban export log was imposed by the government.
1990: Government imposed by the government.
1997: Economic crisis.
nd: no data.

extracted forests have to pay "*Dana Jaminan Reboisasi dan Permudaan Hutan*" (DJR = Reforestation and Forest Regeneration Guarantee Deposit Fund). The DR fee is used to improve the quality of the residual stands within the forest concessions and to establish "*Hutan Tanaman Industri*" (HTI = Industrial Timber Plantation). In 1989 DJR was cancelled and was changed to "*Dana Reboisasi*" (DR = Reforestation Fund). The DR is a compulsory contribution to be paid by forest concessionaire, holders of forest product collection rights, or holders of other permits to extract timber from the forest. However, payment of the DR fee does not eliminate the obligation of concessionaires to tend to regenerate residual stands within their respective concession areas. The DR fund is to be used to finance reforestation activities outside concession areas, and to maintain established HTI on unproductive areas.

Scaling and Grading Fee (GF). Forest concessionaires are required to pay a scaling and grading fee, and the amount has been revised from time to time. In 1979, the fee was Rp 250/m^3 (roundwood, sawnwood) or per tone (other forest product). In 1985, the fee was raised to Rp 400/m^3 for processed wood and per tone rattan and resin. The collected fund is allocated for scaling and grading activities, guidance and supervision by the respective provincial forestry service, and for the management and development of scaling and grading done by the Department of Forestry.

2. *Governmental policy to enforce the development of timber-based industries.*

To promote the development of a domestic wood industry, the Indonesian government tried to guarantee a continuous supply of logs. This was necessary as the domestic concessionaires in the absence of a competitive domestic wood processing industry primarily produced and supplied logs for export purposes. To change the situation, the government in 1974 issued Decree No. 138/Kpts/DJ/74, which obligated HPH-concessions to allocate 10% of the log production target for domestic uses. Then by Presidential decree No. 48/1977 the President required all concessionaires and roundwood exporters to set aside Rp 415/m^3 = US \$ 1/m^3 of exported logs as a "com pulsory saving fund" which was to be used to finance a national fleet for log transportation and to provide a financial base for the promotion of the development of a domestic wood processing industry. Since 1980, government started to restrict the log exports, with export allowances only for HPH-concessions supplying logs on the domestic markets or for those running an own plymill. Finally, in 1985, the log export was banned totally and the government adjusted its measures with the expectation of an increasing domestic supply of raw material for the wood processing industry.

3. *Governmental influence on the plywood marketing.*

As a result of the total ban of log exports in 1985 and the instruction for the concession holders to build domestic processing facilities, the wood industry, especially the plywood industry, grew rapidly (Table 4). The increase of the plywood supply (from 1 mio. m^3 in 1980 to 5.3 mio. m^3 in 1986) which - for the biggest part - was devoted to exports market-creating problems and developed to a serious challenge to industry and government.

In this respect, the Indonesian government approved the formation of 4 export clubs in 1982 for the following markets: (i) the US market; (ii) the European market; (iii) the Middle East market; and (iv) the Far East market. The plywood marketing club's concept, which was not soaring far away from the idea of regional export cartels acting as monopolists on the regional markets, failed because the clubs did not have neither the power nor the influence to stop the competition among their members. The Indonesian government and Indonesian Wood Producers Association (APKINDO) reorganized the export clubs´ concept away from the idea of forming an export trust to the concept of an export-promoting agency. APKINDO set up 7 Joint Marketing Bodies (JMB) and this action was officially regularized by the Trade Ministers decree in October 1984. The structure of the new system of joint marketing bodies was based on the fact that an exporter must get an approval from JMB before they conclude sales contacts with overseas buyers.

To stabilize the price for different export regions, the government set up quota systems for regular importing countries. The export quota system decides the maximum volume of plywood a manufacturer can export during a year. The quota is determined by the government based on the past performance of the exporters and their capability to penetrate new markets. Every 3 months, APKINDO/Price Stabilization Team (PST) evaluates the implementation of exports by each exporter and report the findings to the Directorate General of Foreign Trade.

4. *Governmental influence on the sawntimber marketing.*

The Indonesian government introduced an export tax and a minimum price on exported sawntimber in March 1989 and increased them successively till October 1989. Government imposed the export tax with the following objectives in mind: (i) to increase the export of finished products; (ii) to increase the governmental revenues; (iii) to achieve forest conservation; (iv) to provide a stable wood supply to downstream industry; (v) to expand employment in the wood industry sector.

The sawntimber export tax actually amounts to US\$ 250/m^3 for most species of semi-processed sawntimber, and US\$ 500/m^3 for rough sawntimber. While, more valuable species carry higher export taxes of e.g. US\$ 500/m^3 to US\$ 2,400/m^3. Moreover, a minimum export price of US\$ 250/m^3 is applied. It is depending on the success of the governmental promotion efforts in those domestic industries which use sawntimber as an input whether the aims of increasing the export earnings from finished wood-based products, supplying additional raw material for down-streams industries and increase the employment opportunities in this sector will be achieved. It remains also unclear whether the dynamic incentives of the export tax are strong enough to induce the sawmillers to use a more efficient production technology leading to a more careful utilization of the forest resource and helps to use the forests in a more sustainable way.

From the data, it can be seen that the sawntimber producers decreased their production as expected. Another short-run consequence is the loss of export earnings from trading sawntimber starting in 1989, which was not (over-) compensated by an increase in returns from finished wood-based product exports until 1992. The success of the policy in the long-run depends on how much the domestic down-stream industries, such as furniture industry, moulding industry etc. react and develop their international competitiveness.

Present Condition and New Governmental Policies

Unfortunately, rapid development in the industry sector has not been balanced by an improvement in regeneration capacity of the forest resource. MOFEC (2000) stated that the sustainable production capacity of the natural forests was only 25.36 mio. m^3 per year, resulting in a deficit of some 38.88 mio. m^3 between supply and demand. The large discrepancy between demand for logs and the capacity of the forest has brought about illegal logging and illegal trade, which results in the increasing the total degraded forest area to about 30 mio. ha by 2000.

A selective cutting system (TPI/TPTI=*Tebang Pilih Indonesia/Tebang Pilih Tanam Indonesia*) was introduced at the beginning of the implementation of forest concession in order to ensure the sustainable production of timber. Formal procedures for implementing TPI/TPTI to encourage sustainable practices in natural forests were established such as (i) forest inventory before logging to decide amount of forest potency and stand which can be harvested according to limit diameter of commercial timber stand ($\geq$ 50 cm); (ii) forest inventory after logging to determine enrichment planting on logged over area; (iii) maintaining the residual stand; etc.

Criteria and indicator for Sustainable Forest Management (SFM) were also introduced to ensure that the HPH system could be carried out in a sustainable manner. However, a lack of law enforcement, monitoring and evaluation, and an absence of any incentive scheme for good performance are among the underlying driving factors currently faced by the forestry sector.

Over the past decades, tropical rain forest in Indonesia has declined considerably as a result of unsustainable forest practices. Illegal logging, forest fire, and improper implementation of forest land use change the causes for the current problems faced by the forestry sector. As revealed by MoF data (2001), the continuation of unsustainable practices for more than twenty years under the HPH era has been the major contributor to the rapid rate of deforestation in Indonesia. Degraded forests distribute across six major islands with total area is about 23.9 mio. ha of roughly 60 % is production forest areas where HPH permits were granted.

In the following years, forest policy in Indonesia will be focused to ensure the tropical rain forest through rehabilitation of the degraded forest land and the conservation of the remaining forests. The following five issues are identified as the central focus of MoF programs and activities during the period 2001-2004 are (i) illegal logging; (ii) forest fire; (iii) timber-based industry restructuring; (iv) timber plantation development; and (v) decentralization in forest management.

Illegal logging and the following illegal trading have become serious problems for Indonesian forestry, especially in recent years. Based on timber supply and demand data in 1997 and 1998, roundwood consumption (domestic use and export) was found to be 32.6 mio m^3 (approximately 51 %) higher than supply derived from legal production plus import (Scotland, 2000). On this condition, the problem solving for illegal logging must be set up in line with restructuring of the timber-based industries. Restructuring of the timber-based industries is deemed necessary to ensure the sustainability of forest resources, by controlling the demand of logs from legal cutting. Due to high capacity of timber-based industries, the consumption of logs, with the majority originating from natural forest, cannot be balanced by production within the remaining forest. Of course, to fulfill roundwood consumption on realistic bases, other programs must be implemented such as commercial timber plantation. Basically, commercial timber plantation under the HTI program was begun in the early 1980s. At that time, the total HTI area was set to reach 6.2 mio. ha by the 2000. However, several factors such as lack of land suitability assessment, limited availability of genetically improved seed, insufficient technical knowledge as well as other experiences of commercial timber plantation development have together contributed to the low success of the HTI program.

By all descriptions above, it can be summarized that the Indonesian timber-based industries, which produce processed timber products will still exist depend on the success of those programs.

Conclusions

At the beginning of the governmental plans, Indonesian has succeeded to attract foreign, as well as domestic investment, in forestry sector. The forest concession grown rapidly in the period of 1969 to 1980, in which the number and working concession area increased by 27.8% and 26.7 % per year, respectively. They extracted natural production forest to produce and export the log with high foreign income earning.

Indonesian government was also successful to promote timber-based industries by restriction and ban of log export policies in 1980s. The Timber-based Industries, especially plywood industries has grown rapidly in number and installed production capacity started in 1984 when log export was totally banned. Currently, there are 107 unit plymills with installed capacity of 9.4 mio. m^3 per year. With a high number and installed capacity, plywood industries has produced a big amount of plywood with heavily export oriented and sold more than 75% of production abroad.

Unfortunately, rapid development in the wood-base industries has not been balanced by an improvement in regeneration capacity of the forest resource. During the past decades, tropical rain forest in Indonesia has declined considerably as a result of unsustainable forest practices. A selective cutting system (TPT/TPTI) was introduced to manage natural production forest, but unsuccessfully implemented by forest concession. In consequence, there is a big gap between supply and demand of timber, which will drive a high illegal logging and timber trading from the remaining natural forest. To overcome this problem, some new policies must be carried out such as restructuring timber-based industries, plantation forest, and rehabilitation of degraded forest programs.

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インドネシアの林産物輸出拡大政策と木材市場の特徴に関する研究

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要　約

インドネシア開発計画の初期投資において大面積の天然林を有する同国は，国の収入を生み出すため，林業部門を振興した．この目標を実現するために，同国政府は国内投資促進のための税の優遇措置，丸太輸出の規制および禁止，輸出用製材品への高い税と最低価格の設定，輸出促進といった経済手段を伴う政策を打ち出した．その結果，森林伐採権と製材・合板業は数と生産能力の両面で急速に増加した．

発展を続ける木材産業の成功は持続可能な森林資源経営によってもたらされているのではない．森林伐採権の履行初めに導入されたインドネシア択伐法は大面積の天然林の劣化をもたらしている．木材産業は高い生産能力を有しており，短期間で供給できる丸太を求めているが，しかし天然林は持続的でない森林施業の結果，かなり減少している．新しい政府の政策によって天然林資源と同様に木材産業も安定的に育成されるにちがいない．