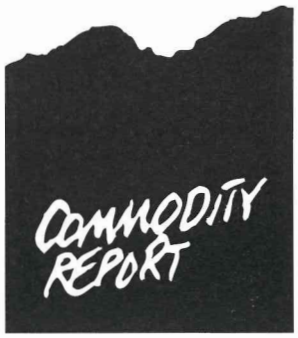

Indonesia's wood resource: Trends and policies

by Herb Thompson

Until the 1960s, the rainforests of Indonesia remained principally unexploited, but from 1965 onwards the use of Indonesia's forests for economic benefit began with the start of extensive logging. To assist the process, the government of President Soeharto sought a massive infusion of foreign investment to fund this economic transformation, taken over by Indonesian entrepreneurs in the 1980s . The primary market was the Japanese. This demand has been the key factor for the subsequent export boom.

Tropical deforestation continues apace to the detriment of future generations. "Sustainability", with reference to tropical rainforests, is non-existent by any definition. Government policies continue to undervalue the tropical rainforest economically and ecologically.

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Exploitation of tropical rainforests in Indonesia is distinguished geographically between Java and the Outer Islands (Sumatra, Kalimantan, Sulawesi, Maluku and Irian Jaya). Timber on Java is produced from the 1.4 million hectares (Mha) of plantations which consist mainly of teak, pine, mahogany and Agathis; sustained through scientific silvicultural techniques. Exploitation in the Outer Islands is mainly the extraction and direct marketing of natural wood. Silvicultural development techniques on these islands have been virtually non-existent.

Economic pressures are also different on the outer islands as compared with Java. The outer islands are the repository of most of Indonesia's forest and land resources, and therefore, offer one of the more obvious routes to economic development (See Table 1). They account for close to 60 per cent of all forested area in Southeast Asia, and more than 98 per cent of all forests in Indonesia. The closed canopy forests, under increasing pressure, are of value from both a productive and protective point of view. Largely since 1980 government-sponsored programs in the outer islands have put nearly 2 Mha into production and there has been a rapid growth in local land use and in the exploitation of timber and other forest products. Large-scale industries, especially pulp and paper are rapidly locating on the outer islands. These factors have led to a sharp increase in the rate of deforestation and an uneven pattern of land use. Primary forests are now esbmated to be disappearing at a rate of at least 1 Mha per year.[1]

Until the 1960s, the rainforests of Indonesia remained principally unexploited. However, from 1965 onwards the use of Indonesia's forests for economic benefit began with the start of extensive logging. To assist the process, the "New Order" government of President Soeharto sought a massive infusion of foreign investment to fund this economic transformation. The primary market being pursued was that based on the Japanese demand for tropical hardwoods. This demand has been the key factor for the subsequent log export boom, the growth of the plywood industry, and the expected expansion of the pulp and paper trade.

This paper reviews the trends and policies of the Indonesian wood sector, which continues to depend upon the natural timber resource of the nation's tropical rainforests. The following section situates the importance of the tropical rainforest to the Indonesian people and emphasizes the dangerous trend of deforestation that continues unabated. This is followed by a section identifying of the costs and benefits of deforestation with special focus on wood products, including logging, the plywood sector and the pulp and paper industry. It is concluded that in simple economic terms major policy changes are required if the semblance of "sustainability", by any definition, is to be achieved.

Having raised the concept of "sustainability", a short definitional diversion is necessary. There are four different concepts of sustainability often referred to in the literature, being distinguished as biological, economic, ecological and socio cultural.[2] For purposes of this paper the discussion is limited to biological and economic sustainability.

Biological sustainability simply refers to the ability of the forest to regenerate timber at least as rapidly as it is being cut. Given the official figure provided below of an average natural stock growth of 0. 8 m^3/hectare/year, and the "production forest" being limited to about 40 Mha, the "sustainable" yearly production should never exceed 32 Mm^3 annually. This amount is regularly exceeded with little reforestation.

The economic approach to sustainability is based on the maximum flow of income that could be generated while maintaining the stock of assets (or capital) which yield these benefits. Problems of interpretation arise in identifying the kinds of capital to be main-

Table 1. Projected total forest land in the Outer islands (Million hectares)

Region	1990	1995	2000	2005	2010	2015	2020	2025	2030
Sumatra	20 382	19 380	18 662	17 987	17 506	16 992	16 559	16 084	15 664
Nusa Tenggara	2 536	2 308	2 271	2 237	2 212	2 186	2 165	2 141	2 120
Kalimantan	34 732	33 129	31 866	30 661	29 682	28 676	27 687	26 912	26 114
Sulawesi	10 330	9 978	9 707	9 448	9 267	9 069	8 920	8 716	8 550
Maluku	6 029	5 687	5 415	5 159	4 951	4 740	4 568	4 370	4 203
Irian Jaya	33 649	32 539	31 642	30 773	30 055	29 306	28 710	27 990	27 392
Outer Islands	107 478	103 021	99 562	96 264	93 672	90 969	88 830	86 212	84 044

Source: Ministry of Forestry. 1991. Indonesia's Tropical Forestry Action Plan, Volume 2, "Country Brief", Jakarta: Government of Indonesia.

tained and their substitutability, as well as in valuing assets.[3] Development options, such as the use of the forest for commercial timber exploitation and of the converted forest land and resources for agriculture, mining and hydroelectricity, are sacrificed if preservation is chosen. Such costs are easily identifiable as they often comprise marketable outputs and income sacrificed (e.g., timber revenue, agricultural outputs, mineral wealth, hydroelectricity, etc).[4] Governments usually consider both the direct costs plus the foregone development benefits of preservation.

Ecologically sustainable management focuses on biophysical systems and refers to that management which ensures that the level of genetic diversity and the evolutionary potential of all species communities and ecosystems are maintained. Threshold values exist for the diversity of species within an ecosystem. If any one population in an ecosystem falls below its critical threshold level, the self-organization of the whole is altered.

The sociocultural notion of sustainability seeks to maintain the stability of social and cultural systems, including the reduction of destructive conflicts. Cultural extinction is now recognised as a problem among those cultures that have, in the past, been able to thrive in rainforests, deserts and other isolated environments.

Indonesian tropical rainforest

At least 73 per cent of forest formation in Indonesia is evergreen tropical rainforest, located mainly in Kalimantan, Sumatra and Irian Jaya.[5] Officially, the area of Indonesia's rainforests is 143 Mha, of which 110 Mha remain as closed canopy forest. Of this approximate 110 Mha about 49 Mha is located in parks, reserves and protected areas and 65 Mha is

designated as conversion or production forests .[6]

Article 33 of Indonesia's Constitution (1945) provides for state control of forest lands and the harvesting of their resources. Acting on this authority, the Government of Indonesia controls, manages and administers the nation's forests under the provisions of the Basic Forestry Law (Act 5 of 1967) and the supporting rules and regulations. Artlcle 5 of the Basic Forestry Law amplifies the two guiding principles of the Kaliurang Declaration of 1966, viz. " . . . the principle of sustained yield and the right of present and future generations to benefit from the nation's forest resources". The new law on Cbnservation of Living Resources and Their Ecosystems (Act 5 of 1990) was put in place to strengthen conservation measures.[7]

Regulation No. 33/1970 on forest planning establishes the guidelines for determining which land shall be state forest and the purpose for which it shall be used. The authority for implementation is vested in the central government. Five categories of forest are recognized: *conservation forest* – designated for nature and genetic conservation in which no exploitation is permitted; *protection forest* – designated for water and soil conservation in which no exploitation is permitted; *limited production forest* – designated for erosion prevention and timber production in which selective felling is permitted; *regular production forest* – designated for timber production in which selective felling or clear felling are permitted; and *conversion forest* – designated for conversion to agriculture or other uses in which clear felling is permitted.

Most timber concessions from the limited and regular production forests are about 100 000 hectares and have a duration of 20 years. In return, the concessionaires have an obligation to harvest logs according to a selective logging system which stipulates a 35 year harvesting cycle, limit output to an annual allowable cut, and select only large stems with diameter of 50 centimetres or more. As well, the concessionaire must pay a licence fee which, however, only reflects a very small portion of the value of the concession.

Presently, the Indonesian government allocates concessions between applicants in an arbitrary fashion. This discretionary allocation of concessions has always invited corruption and elicited charges of "cronyism".[8] It is sometimes the case that logging rights are awarded to friends or relatives of government officials who themselves have no knowledge of the forest industry. They simply sub-contract to other firms and gather economic rent for no effort whatsoever. Although the Ministry appears to be tightening up if recent pronouncements can be believed, in the past little effort has been made to enforce regulations to be followed by concessionaires. In sum, the overly generous incentives for domestic processing have resulted in both economic losses and a waste of forest resources.[9]

Therefore, irrespective of the Constitution, laws or regulations, it is expected that by 2030AD, a further 25 per cent of the present forest cover will be lost, including the ecologically rich and productive lowlands.[10] The two most commonly cited estimates of deforestation in Indonesia are 1.3 Mha per year and 0.9 Mha per year.[11] One of the most consistent implications of all the estimates is that programs sponsored or encouraged by the Government of Indonesia (e.g., transmigration, timber licenses, and plantation estates) account for about two thirds of all deforestation.

The effects of deforestation on the land are trenchant.[12] The Indonesian Ministry of Forestry itself has classified 8.6 Mha as "critical", defined as that land which is generally unable to fulfil any normal soil functions including water absorption or the production of even a meagre subsistence crop. "Alang-alang" (Imperata cylindrica), a tall grass which grows on deforested land making the land incapable of productive use, covers more than 20 Mha. A further 12 Mha of land is classified as having "serious" erosion problems.[13]

Consequently, with limited financial and administrative resources, it is necessary that the establishment of priorities should be based on a careful assessment of the costs and benefits involved in this "loss" .

Economic costs and benefits

Log output from the natural forest resource is believed to be in excess of 40 Mm^3 per annum, irrespective of the fact that the Ministry of Forestry itself estimates that a harvest of 22 Mm^3 per annum would be the sustainable yield.[14] Indonesia depends heavily on the wood products sector as a source of foreign exchange, employment and income growth. Exports from the plywood sector alone in 1994 equalled 4 billion USD; and forest products exports, as a group, made up around 20 per cent of the value of all exports in 1994.[15] Direct formal employment in the sector is 700 000 (63 per cent in processing and the remainder in resource management and extraction).

It is also a fact that the forests of Indonesia provide significant direct income to several million people living in and around the forest;[16] and millions more depend heavily on the soil and water quality benefits, which are provided by forests in the major watersheds. Logging generates losses for these groups. From the viewpoint of the global community Indonesia represents one of the most species rich ecosystems on earth as well as a massive carbon sink. The value of these global benefits is also reduced by logging. It is not surprising then that where the line between permanent forest and conversion forest is drawn, and by whom it is drawn, remains a major source of contention at a national, regional and global level.

Indonesia's immediate future remains heavily dependent on exports of both solid wood products (substantially based on

Table 2. Government's revenue stream produced in scenario

	Present situation	1995[1]	1998 new fee	2000 new fee
Extraction/Transport (USD/m^3)	40	40	40	40
International price (USD/m^3)	145	145	145	145
Implied rent/(USD/m^3)	110	110	110	110
Standing timber fees (USD/m^3)	22	33	60.5	82.5
Rent collection (per cent)	20	30	55	75
Volume involved (Mm^3)	25	22	22	22
Revenue (MUSD)	550	726	1331	1815

Note: 1. Following fee increase and volume reduction.
Sources: Original Data World Bank. 1993. Indonesia Production Forestry: Achieving Sustainability and Competitiveness, Draft Report: 11758–IND, Washington, D.C.: IBRD, October, pp. 87–88; and (WALHI) Indonesian Environmental Forum Economic Team. 1991. "Sustainability and Economic Rent in the Forestry Sector", Restricted Internal Memorandum, Jakarta, October 19, p. 18.

natural forests), and pulp and paper products (which are envisioned in the future as being largely plantation based). Indonesia no longer sells sawntimber on the international market (except for a small volume of very high priced timbers) due to the high sawn timber export taxes applied by the Government in 1989. Plywood has been the main export since the mid-1980s and this industry will be joined by the pulp and paper industry by the turn of the century.

The most serious issue for immediate resolution is that argued by both non-government organizations and international aid bodies; i.e., that the low domestic price for logs and minimal taxes and royalties leads to waste, inefficiencies and exceptional economic rents gained by wood producers.

The main element in the government' s collection of fees at present is the reforestation levy (DR), which was introduced via presidential decree in 1980, at 4 USD/m^3, and has since been raised to 7 USD/m^3 (1989), 10 USD/m^3 (1990), 15 USD/m^3 (1993) and 22 USD/m^3 in 1995. Funds from collection of the DR are accumulated in a Reforestation Fund, managed by the Ministry of Forestry and used to finance the timber estates and other works as sanctioned by the Minister.

The forest products royalty (IHH) approximating 6 per cent of the delivered price of logs, is transferred to the Ministry of Finance, which then distributes it to provincial governments (40 per cent), local governments (20 per cent), national rehabilitation of forest areas (25 per cent), and regional forestry (15 per cent). Other charges include a forest concession license fee, land and building taxes, and scaling and grading fees, but together these amount only to some 3–4 per cent of total government fee collections. On the basis of official statistics, log removals average about 25 Mm^3 annually, with an average government fee collection of 22 USD/m^3. This makes wood products the second largest (after oil and gas) natural resource revenue source for the Indonesian Government. From 1985 to 1993, the wholesale price index for the log extraction and processing sector as a whole rose by 150 per cent. Had government fees for standing timber risen by the same proportion over this period, they would have reached an average of about 33 USD/m^3 rather than the 22 USD aforementioned. And if the Indonesian Government were able to collect for illegally removed timber, revenues would likely double.

Table 2, (adapted from World Bank and WALHI data) is provided to elicit a scenario to show the potential benefits of policy change. First, in constructing the database, let's accept the government's official log removal figure of 25 Mm^3 annually (a figure questioned by independent observers as being about five eighths of the actual figure). Second, assume an immediate enforceable reduction in the annual allowable cut (both legal and illegal) to 22 Mm^3/annum (which is the acceptable figure for maximum sustainability as viewed both by disinterested observers and the Ministry of Forestry). Third, assume that fees for standing timber are increased immediately to 33 USD/m^3 based on the logic of the wholesale price index mentioned above. Fourth, logging costs (inclusive of a normal profit margin) are about 40 USD/m^3. Fifth, assume the international log prices are equivalent to the FOB price of Sabah's logs at the time of this calculation, or 145 USD/m^3. Finally, set the target for collection of 75 per cent of the economic rent by year 2000 and phase in levy increases which are sufficient to achieve this target over the period. Given these conservative assumptions the implication of the data in Table 2 is clear. Revenues from forestry under this scenario increase by more than three times from 550 M to 1 815 MUSD. And it is to be emphasized that the increased governmental revenues are gained with a reduction of logging from the present excessive cut to a "sustainable" level.

As argued further below, economic rents and excessive profits are being appropriated by private timber companies and individuals. According to the governments own consultants, in the late 1980s, the government captured no more than one-quarter, and perhaps as little as one-tenth, of the potential rents generated by logging.[17] One could easily develop a value-laden argument about the det-

rimental skew of income distribution towards inefficient monopoly power. However, it would be more difficult to argue that the Indonesian people, in general, would be better off if the government captured the rents instead of the industry. This would be to optimistically presume benevolence on the part of agents for the government. The important point under consideration here is more simply made by arguing that tropical rainforests and all the beneficial raw materials therein are being lost to future generations largely because of government policies which provide incentives to the owners of capital for inefficiency and waste.

Logging

The Indonesian Environmental Forum asserts that, given a straight-line linear projection based on the current level of deforestation, Indonesia's forests will disappear in 30 years. Assuming that capacity utilization of Indonesia's wood-based industries is 80 per cent, and given a real effective demand for tropical logs of 44 Mm^3 (a figure, according to WALHI, which is not much higher than the World Bank pessimistic estimate of 40 Mm^3), the wood resource is being drawn down each year by 12.5 Mm^3. If the total area of production forest is to remain constant, then using the official figure of natural stock growth of 0.8 m^3/hectare/year, the "sustainable" yearly production should never exceed 31.4 Mm^3 without intense reforestation.

It is clearly the case, given the most charitable scenario that present logging practices are not economically sustainable. The Food and Agriculture Organization forestry studies estimate that current logging operations leave unutilized in the forest volumes of 23 Mm^3 per annum (of which 8 Mm^3 is estimated to be sawlog or plylog quality). Damage to trees left standing in the selective logging operations amounts to a further 13 Mm^3 per annum. Jaakko Poyry consultants estimate that, with proper management and control of logging operations, and some relatively minor inputs into post logging silviculture, regeneration on natural forest areas might grow at 2.0 – 2.5 m^3 per hectare per annum, as opposed to the 0.8 m^3 currently assumed.[18] The obvious conclusion is that substantial wood output would be possible from the natural forests in Indonesia, through application of known technologies for the improvement of logging, and a realistic improvement in the utilization of standing volumes. This does not occur, partially because the current system of pricing does not reflect the scarcity, much less the externality values of tropical logs.

Table 3. Estimated production of plywood in ASEAN countries

Country	1980 (km^3)	Share in region %	1990 (km^3)	Share in region %
Indonesia	1 011	7.0	9 250	43.7
Japan	8 000	55.3	6 417	30.3
Korea	1 575	10.9	1 124	5–3
Malaysia	601	4.2	1 090	5.2
Philippines	553	3.8	397	1.9
Singapore	579	4.0	399	1.9
Other Asia	2 140	14.8	2 485	11.7
Total	**14 459**	**100**	**21 162**	**100**

Source: FAO Food and Agriculture Organization Forest Products Yearbook, 1990.

The Government has also failed to take even the most simple measures to enforce the nominal logging rules. Between 1980 and 1988, just over 10 per cent of all timber concessions complied with the logging regulations. Observation in the field suggests that in practice, most logging operations damage residual stands to the extent where 35–50 per cent of trees die (eventually); and mortality is higher than this on hilly sites (where much current logging is taking place).[19]

Based on current practices, in order to produce 1 m^3 of plywood, 2.3 m^3 of logs are required. In comparison to more efficient practices in other countries, this figure is quite high.[20] Further, the return on investment and economic rent collected in the wood processing industries is abnormally high because the price of the log input is kept artificially low compared to the international prices of output. Over-investment in production capacity is the result of an incorrect signal from the input price of logs. For instance, in 1990, there were 2 843 plywood and sawnwood mills in Indonesia, which required, at full capacity, a total log input of 54.9 Mm^3per year.[21]

If the price of logs were to be raised it would induce extensive efficiency increases in wood processing industries. It would also provide incentives for timber estate (HTI) investments. At present, many foresters invest in HTI ventures in order to gain equity and cheap credit from the Government, not because they are interested in developing economically viable industrial plantations. As government advisers have consistently argued: "Whatever work is done to improve processing efficiencies and economy at the wood processing unit...will be rendered null and void if logging and concession management practices are not radically improved...".[22]

Simultaneously, it should not be assumed that drastically reducing or eliminating logging (even if this were politically and economically possible) would in itself reduce deforestation. In fact,

Table 4. Timber export, 1984/85 – 1992/93 (MUSD)

	1984 1985	1985 1986	1986 1987	1987 1988	1988 1989	1989 1990	1990 1991	1991 1992	1992 1993	1993	1994
Timber	1 167	1 217	1 586	2 461	2 884	3 454	3 414	3 699	4 315		
Log	135	2	0	0	0	0	0	0	0	0	0
Plywood	697	848	1 160	1 851	2 095	2 437	2 764	n.a.	n.a.	4 590	4 070
Sawn timber	320	349	321	483	592	600	90	n.a.	n.a.		
Other	16	18	105	127	197	416	561	n.a.	n.a.		

Source: World Bank. 1994. Indonesia Stability, Growth and Equity in Repelita Vl, Washington, D.C.: IBRD, Table 3.2.
Note: n.a. not available.

Source: The Jakarta Post, 21 March,1995, p. 5.

quite the reverse may be expected, since the value of regenerating forest in such circumstances would be zero, whereas the value of the land under alternative uses could be considerable. Regaining control of, but not preventing, production forestry is a necessary condition for conservation and preservation. Furthermore, if the government attempted to recapture the economic rent too rapidly by precipitously raising taxes, then careless logging practices and log theft would most likely increase as concessionaires sought to maintain profit levels.

Plywood

Among countries in Asia and the Pacific, Indonesia was a late starter in the production of plywood. Investment in plywood mills started to expand dramatically in Indonesia during the late 1970s; and between 1975 and 1979 plywood production increased six-fold. In 1991, plywood production in Indonesia reached 9.3 Mm^3, 80 per cent higher than in 1985. Indonesia is now the largest producer of plywood in Asia, accounting for 43.7 per cent of the region's output, and the largest producer in the world among those using tropical hardwood for inputs(See Tables 3 and 4).[23]

Penetration of the Japanese plywood market, as well as those of Korea and Taiwan, has been spearheaded by the industry association, APKINDO. The association is able to exercise considerable influence in the sector, via compulsory membership, control over export licensing, and control over marketing outlets in Japan. Some processors claim that APKINDO has obliged processors to sell part of their output at prices as low as two thirds of the international price in pursuit of market share.[24]

Another scenario for unsustainable processes in plywood production can be framed in the following manner. Log output is allowed to continue at a level of 40 Mm^3/annum for several more years. Because log supply will progressively decline, it is assumed that the industry will eventually respond by raising efficiency levels, although not as quickly. Therefore, extensive deforestation will have taken place over the next decade. Presently, a large proportion of profit generated in the plywood sector simply arises from a flow of economic rent to plymills due to their corporate ownership of logging concessions, rather than from any efficient and competitive value added in processing. Furthermore, it is known that if a discount rate more in keeping with private sector expectations in Indonesia is used (say 30 per cent per annum) then the present value of the private sector share of output is greater under non-sustainable options than under identifiable sustainable scenarios. The private sector, therefore, can be expected to choose a non-sustainable scenario under existing conditions, given the higher discount rate, whenever offered the option.[25]

It could be argued that by shifting the property rights (ownership over the timber resource) to private enterprise that corporations would then act rationally by setting a discount rate to preserve both the biological and economic sustainability of the forests. This argument is not pursued because it would change the context of both the existing situation in Indonesia, and of the paper, by raising the different issues of ecological and sociocultural sustainability. Vital forest outputs (e.g., biodiversity) are not exchanged in markets. Standard economic analysis of the firm would prescribe a harvest of trees provided the expected present value of private benefits from harvesting exceeded the expected present value of private costs. Clearly this would not include the value of biodiversity loss, since it reflects social interests. There are other serious shortcomings of the economics of the firm including distribution and equity issues, difficulties in measuring non-marketed costs and benefits, the choice of an appropriate discount rate to reflect externalities and the social welfare of future generations, etc. The point is that attempts to solve problems raised in this paper by shifting property rights would simply create different problems of "sustainability" (e.g., ecological).

If plywood manufacturers in Indonesia were compelled to pay prices nearer the

Rain forest (left) and logs on the Mahakam River in Samarinda, Kalimantan, Indonesia where logs are sent downriver to the plywood and sawnwood factories.

international norms for logs, the efficiency of log harvesting and utilization would undoubtedly rise. In Japan, where raw material for plywood manufacturing is expensive, recovery from the raw log to a processed form is 68 per cent by volume whereas in Indonesia it is closer to 55 per cent. In that sense the processing sector in Indonesia acts as a proxy for log exporting. The motivation for what is meant to be a value-added processing industry becomes not much more than raw material rent capture.[26] Ultimately, this non-sustainable scenario produces negative net exports as domestic demand exceeds the total raw material supply.

One means of generating competitive pressure would be to re open the log market to exports. Although most likely politically unpopular, the local processors would be forced to pay international prices for their log supplies. The next best solution would be to implement a schedule of domestic log price rises so that, over a more politically opportune time frame, local processors are paying something close to international parity prices. The plywood industry holds a favored position in the forestry sector of Indonesia, largely through the strong linkage between forestry concessions and plywood operations. This linkage is a deliberate act of Government policy. Given that large rents accrue to the private sector in logging operations, whereas the margins in processing are decidedly more risky, the effect of this nexus appears to have been to encourage a view of the plywood industry as a means of legitimizing access to excess rents in logging, rather than as a profit-maximizing processing sector in its own right.

Table 5. Projected production, consumption and exports pulp and paper (kt/y)

	1990	2000	2010	2020	2030
Production	1 298	2 721	4 431	637	9 072
Consumption	947	1 756	2 983	4 276	5 602
Exports	351	965	1 448	2 361	3 470

Source: (FAO) Food and Agriculture Organization. 1989. Pulp and Paper Industry in Indonesia: Prospects for Development, UTF/INS/065/INS: Forestry Studies Field Document No. IV–3, Jakarta: Government of Indonesia, December.

Pulp and paper

The development of the Indonesian paper industry was rapid from 1970–90. The average annual growth rate through the 1980s was 19 per cent annually; and the year 1987 marked one turning point when Indonesia achieved self-sufficiency and became a net exporter.[27]

Although notoriously unstable, projections of global growth for pulp and paper is estimated at a rate of approximately 70 per cent in the 1990's.[28] And this growth is predicted despite increasing opposition over the last decade from groups and individuals concerned about the industry' s highly environmentally degrading production processes. Indonesia will become highly competitive as a supplier in the international pulp market with one projection attesting that Indonesia may have a 20 per cent share of the global market for short fibre kraft pulp by the year 2005[29] (See Table 5). Paper consumption forecast during the 1990s is 2 per cent per annum for the world, but twice this for Asia. From 1986 to 2001, Asian consumption will go from 5 per cent of the total world consumption to 10 per cent.[30]

Recently, there has occurred a crisis in the newspaper publishing industry in Indonesia and throughout Asia in general due to a shortage of paper.[31] Following a demand by President Soeharto to set up more pulp mills in recognition of the crisis, the Forestry Ministry has thrown open the industrial plantation forest (HTI) sector once more to investment for pulp production.[32] Investment licenses for pulp timber estates have been frozen for two years while the Government searched for sufficient quantities of empty land and re-examined its forest management policies. Industry Minister, Tunky Ariwibowo, confirmed the worst fears of environmentalists when he said, in agreement with the President, that because Indonesia "has extensive and fertile forests, Indonesia can still provide for its needs".[33] This provided the clear message that in general, particularly when crises occur, the Government remains more than prepared to increase logging of tropical rainforest for the wood products industry.

The pulp and paper sector in Indonesia is presently strongly linked to the natural forest resource. It is argued that this linkage must weaken as the sub-sector becomes more reliant on plantation resources on lands already committed to that purpose. The fact is that the national Timber Estate Development Programme is far behind schedule.[34] Should estate development catch up with the rapidly growing demand for pulp and paper, the economic and environmental issues involved will become more closely related to the generic ones of industry growth in Indonesia: industry, trade, and protection policies; competitiveness; the role of government and public enterprises; and pollution abatement. However, at least until the turn of the century the pulp and paper industry will continue to use tropical wood resources, principally on the outer islands of Maluku, Kalimantan and Irian Jaya. The land available for conversion is prioritised by the Ministry: first priority is given to land which is deforested, coarse grass, 'wilderness' and swamp forest; and second, to less productive forest (with timber potential less than 20 m^3 per hectare). However, license holders have been increasingly criticised for harvesting old growth forests first and then establishing their plantation estates on the cleared land. "Companies are not interested in barren land when they can maximise profits by logging natural forest and then replant(ing) them with timber estates".[35] Further, the government may, in certain cases, actually be leasing out old growth forest for clearing which is only then followed up by Estates.

Conclusion

Indonesia has utilized restrictions on log exports since the early 1980s, as the major instrument to create a large wood products export sector, based primarily on plywood. More recently, it has employed high export taxes on sawn timber, in an attempt to force more log volume into the secondary wood processing domestic sector. Consequently, plywood output and exports have grown dramatically, as will pulp and paper.

Measured by standards of efficiency and sustainability, these policies have created a sector which has become totally dependent on highly subsidized log prices. In effect, the sector has substituted logs, which should be regarded as the scarce input, for other factors. This has contributed to the unnecessary decline in the tropical rainforests, now treated as a low value resource by both the private sector, and government agencies. While the existing processing sector has been extensively subsidized and protected by Government policies, other groups – notably communities living in or near forests, with a high degree of historical dependence on them – have been disadvantaged.

The longer that non-sustainable and wasteful practices persist in the sector, the more costly and traumatic will be the eventual adjustment to the developing resource constraint. Under present usage trends, the contribution of the forest sector to output, growth and exports will begin to decline soon after year 2000. Presently, the wood producers face strong disincentives which prevent them from acting in accordance with what should be a national priority – sustainability of an important national resource. These disincentives include:[36]

- Very high log export taxes, which effectively prevent external competition for logs, coupled with very low administered Government log fees, result in standing log prices which are only 25–30 per cent of international parity value. This not only causes the resource to be wasted – it also acts as a disincentive to investment in plantations of longer rotation

hardwoods that could eventually be substitutes for natural forest material;

- Existing forest products exporters are further protected by high export taxes on sawn timber which eliminate it as a prospective competitor to plywood as a resource user;
- Sale of logs under the current system of individual log measure exposes junior staff to undue influence in the field;
- Short (20 year) leases and no rights of transferability discourage private sector loggers from a commitment to sustaining forests; and
- Communities living in or near forests are excluded from title or any active role in forest management.

Following the logic presented in Table 2, an immediate rise in average standing timber fees to 33 USD/m^3, progressively rising to something like 82.5 USD/m^3 by the turn of the century, is essential in the short run. Furthermore, an "effective royalty" is that which incorporates volume loss and waste associated with logging. Waste should be included as timber removal but these losses are not considered. A middle range estimate of timber waste and damage is 45 per cent of the total log equivalent.[37] Although counter-intuitive in terms of protecting the tropical rainforest, the Government should also end the export taxes on logs which would immediately force domestic producers to pay the international price for logs.

The forestry sector of Indonesia is now situated at a major point of change. Ahead lies a situation where limits to easily accessible natural resources can be foreseen. There is continuing evidence of concession damage, overexploitation, illegal logging, underreporting of cut, failure to reforest, and dissatisfaction among forest communities. The general policy and incentive mix of the Indonesian Government, and its field implementation, has not avoided the prevalence of wasteful techniques and gross inefficiencies in exploiting a once plentiful, now undervalued and increasingly scarce, matrix of tropical forest resources.

Economically, the wood products industry is not sustainable because one of the world's scarcest resources is arbitrarily priced as if it is plentiful. Biologically, this fiat price leads to trees being harvested faster than they can re-grow and little attention is paid to reforestation. This causes further degradation of land and waterways. Ecologically, one of the world's most important sequesters of carbon and the major source of earth's biodiversity is being depleted. By any criteria, a crisis exists in Indonesia and trends and policies need changing.

Notes

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8. Muhammad "Bob" Hasan is one of the most important individuals in the Indonesian political economy. He heads a private business empire, the Pasopati Group, which he founded in 1960. The centre of the Group's activities is logging and plywood, with a net worth estimated to be more than 1 trillion Rp. The Group also operates in pulp and paper and is one of the major producers of draft paper and newsprint. Hasan is also a partner in several "military-owned" businesses; state companies such as the oil company PT Pertamina and steel company PT Krakatau Steel; and big private groups like the Bimantara Group and Humpuss Group. Not only does he run Indonesia's controversial plywood marketing cartel, with a total turnover of 3.5 billion USD annually, but he has also emerged as a major figure in banking and financial services. He was recently named a new director and president commissioner of PT Bank Duta in July, 1995 for his "managerial abilities". It need not be emphasized that he is a close personal friend of the President and a number of Cabinet ministers. (See lndonesia Business Weekly, July 10, 1995, p. 38; and Economic and Business Review Indonesia, July 8, 1995, pp. 18–19).

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31. The Indonesian press, beleaguered not only by the problem of freedom of expression but also a severe crisis in newsprint supply, faced demands by President Soeharto ordering them to cut the number of publication pages. In West Java, the chief editor of Bandung Pos and Pikiran Rakyat, the two biggest newspapers in the region, cut the number of its pages from 16 to 12. The Mitra Desa tabloid has been reduced from 40 to 24 pages.

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