



CHAPTER FOUR

Profits on Paper: The Political-Economy of Fiber and Finance in Indonesia's Pulp and Paper Industries

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CHAPTER FOUR

Profits on Paper: The Political-Economy of Fiber and Finance in Indonesia's Pulp and Paper Industries¹

Since the late 1980s, Indonesia's pulp and paper industries have expanded rapidly to push the country into the ranks of the world's top 10 producers. Indonesia's pulp production capacity grew from 606,000 to 4.9 million metric tonnes per year between 1988 and 2000, while the paper industry's processing capacity rose from 1.2 million to 8.3 million tonnes per year (Spek 2000b). Last year, pulp and paper products generated US\$2.9 billion in export earnings, accounting for over 50 percent of the country's forest-related exports (Bank Indonesia 2001).

The meteoric growth that has occurred in both industries, however, has proceeded far more rapidly than efforts to secure a sustainable supply of raw materials through the development of pulpwood plantations (Cossalter 1998). Of the 120 million m³ of wood estimated to have been consumed by the pulp industry during 1988-2000, only 10 percent was harvested from plantations.² To date, Indonesia's pulp mills have relied heavily on unsustainable and, in many cases, illegal sources of fiber, much of which is obtained through the clear-cutting of natural forests. During this period, demand for pulpwood is estimated to have caused the loss of over 900,000 ha of natural forest. Although the industry's largest producers are now taking steps to bring online industrial pulpwood plantations (*hutan tanaman industri*, or HTIs), it is projected that most of the country's pulp mills will face sizeable deficits of sustainably harvested fiber for at least the next seven years, and quite possibly well beyond.

The growth of Indonesia's pulp and paper industries over the past decade has involved an aggregate capital investment of at least US\$12 billion, and perhaps as much as US\$ 15 billion. In both industries, there has been a trend toward the development of processing facilities with very large production capacities, which have generally entailed high fixed costs – in several cases, exceeding US\$1 billion per mill (Bell 1997; Spek 2000a). These large investments have often been justified as enabling Indonesian producers to remain profitable in highly cyclical pulp and paper markets by producing large volumes of product at low cost (Spencer and Choi 1999). The fact that Indonesian companies have made investments on this scale without first securing a legal and sustainable raw material supply, however, suggests that many of these projects carry a substantial degree of financial risk.

¹ The paper on which this chapter is based was initially released on CIFOR's web site in November 2000, with the title "Profits on Paper: the Political-Economy of Fiber, Finance, and Debt in Indonesia's Pulp and Paper Sector." For the purposes of this book, the issue of corporate debt has been placed in Chapter Five. Since the first version of this paper was circulated, some revisions have also been made to the sections on the fiber supply strategies of PT Indah Kiat Pulp & Paper and PT Riau Andalan Pulp & Paper, based on information provided by the companies.

² These figures are derived from APKI (1997), Jaakko Poyry (1998), and Spek (2000b).

To a significant degree, Indonesian pulp and paper companies have been motivated to invest such large sums in high-risk projects because their owners have been able to avoid much of the financial risk involved. Three factors have enabled them to do so: First, the Indonesian government has provided substantial capital subsidies to pulp and paper producers, including the provision of pulpwood fiber at costs well below its stumpage value. Second, the government's weak regulation of the nation's financial system has enabled pulp and paper companies to employ a variety of illegal practices to obtain discounted finance. Third, international financial institutions have helped Indonesian producers to borrow billions of dollars from offshore investors without rigorously assessing either the long-term viability of those firms' fiber supplies or the legality of their financial practices.

In spite of the considerable structural pressures that Indonesia's pulp and paper industries have placed on natural forests, they have been largely overlooked by the World Bank and other agencies involved in the post-1997 forestry adjustment process, due mostly to the Bank's absence from Indonesia's forestry sector during the years immediately prior to the financial crisis. Indeed, it was during these years that the pulp and paper industries underwent accelerated growth, while the country's plywood industry began its slow decline. The Bank's policy interventions have generally focused on timber concession management, rather than pulpwood fiber supply, because the HPH system dominated Indonesia's forestry sector when the Bank was involved in the early 1990s.

Given the amount of capital invested in Indonesia's pulp and paper industries, it is also striking that the World Bank and the IMF have until now failed to address the real financial risks associated with unsustainable fiber supplies. Arguably, this reflects the limitations of sectorally focused policymaking. The agencies involved in reforming Indonesia's financial sector and restoring macroeconomic growth clearly recognize the significant exchange earnings made by pulp and paper producers. However, they have shown little recognition that the financial viability of Indonesia's pulp mills is ultimately dependent on their ability to secure long-term supplies of fiber from pulpwood plantations.

Pulp and Paper Capacity Expansion During the 1990s

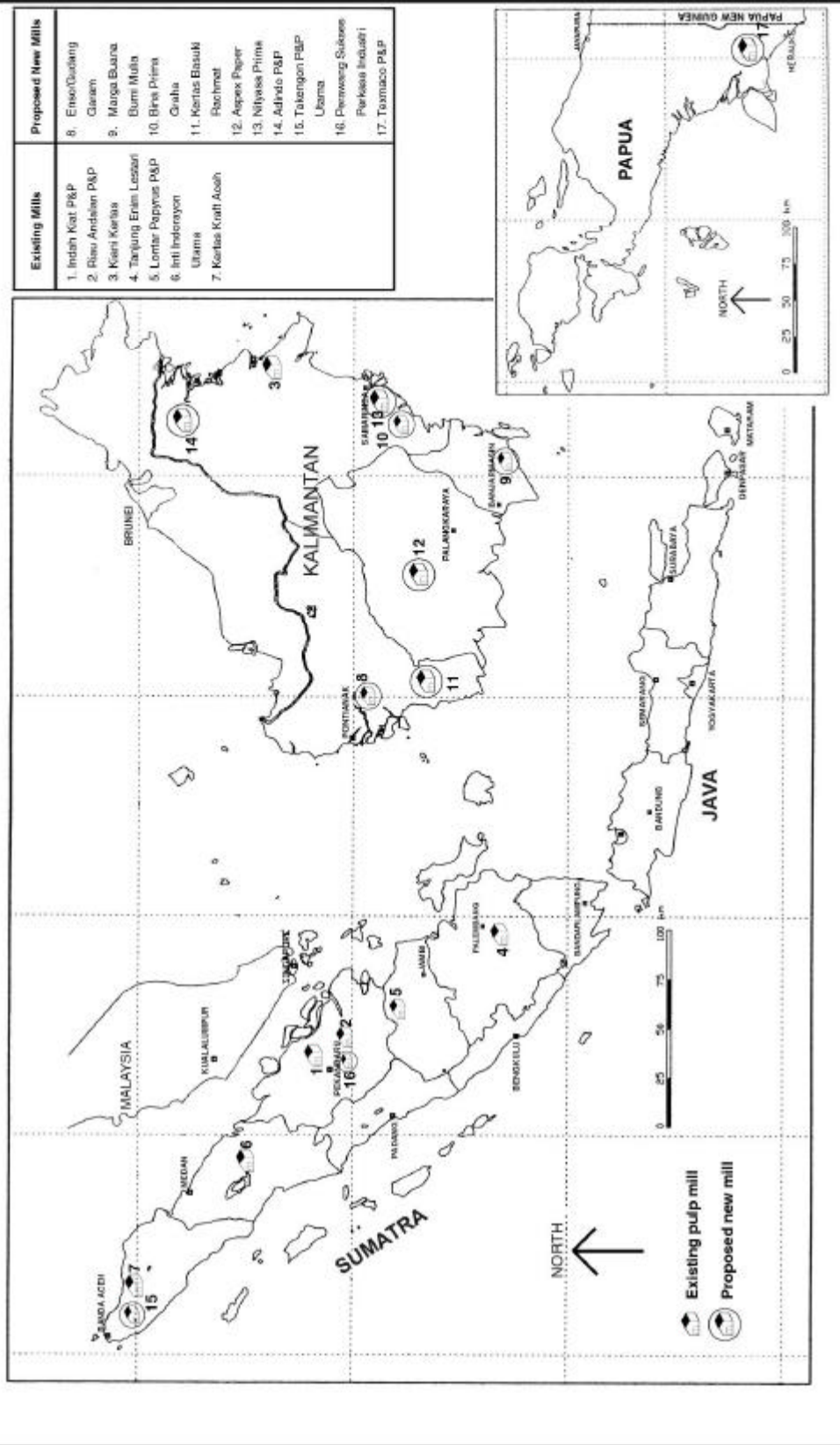
Four large conglomerates have accounted for virtually all of the growth that has occurred in Indonesia's pulp industry over the past decade. For analytical purposes, these groups can be divided into two categories: integrated producers and producers of market pulp. Integrated producers include the Sinar Mas and Raja Garuda Mas groups, each of which has sought to establish large-scale pulp processing operations that are directly linked to affiliated paper production facilities. Both groups have been active in Indonesia's pulp and paper sector since at least the mid-1980s, and for the last several years, each has coordinated its operations through a Singapore-incorporated holding company. The Sinar Mas Group has financed much of its expansion through Singapore-based Asia Pulp & Paper (APP), while the Raja Garuda Mas Group has used Asia Pacific Resources International Ltd. (APRIL), a Singapore-based holding company, to coordinate its activities in the sector.

The Sinar Mas/APP Group is by far the dominant player in Indonesian pulp processing as well as paper and board production. The group owns two of the nation's largest pulp mills: Indah Kiat and Lontar Papyrus, located respectively in the east Sumatran provinces of Riau and Jambi (see Figure 4.1). Between 1991 and 1999, the group's pulp processing capacity grew from 410,000 tonnes to 2.3 million tonnes per year (Ausnewz 1999). During the same period, Sinar Mas/APP mounted an aggressive series of expansions and acquisitions to raise the group's paper and board production capacity in Indonesia from 383,000 to 3.8 million tonnes per year (Ausnewz 1999). Since the mid-1990s, APP has also initiated investments in five paper and board facilities in China, which currently have an aggregate production capacity of 1.8 million tonnes per year (APP 2000). Following these massive capacity expansions, APP has emerged as the world's eighth largest paper and board producer and the largest in non-Japan Asia (James, et al 2000).

The Raja Garuda Mas/APRIL Group has pursued a similarly aggressive expansion strategy over the past decade, albeit on a much smaller scale. Like Sinar Mas/APP, the group controls two Indonesian pulp processing facilities: Riau Andalan Pulp & Paper (RAPP) and Indorayon, located respectively in Riau and North Sumatra (see Figure 4.1). These mills have a combined production capacity of 1.1 million tonnes per year (APRIL 2000). Since the mid-1990s, Raja Garuda Mas/APRIL has taken steps to integrate its pulp mills with paper production facilities. The group brought online its first paper production at RAPP in 1998, and output was scheduled to reach 300,000 tonnes by the year 2000. Through a strategic partnership with the Finnish-based multinational UPM-Kymmene, APRIL has also taken steps to develop a paper and board mill in southern China that will produce 300,000 tonnes per year (APRIL 2000).

During the late 1990s, two of Indonesia's largest timber sector conglomerates entered the pulp industry with the aim of producing bleached hardwood kraft pulp (BHKP) that would be sold rather than processed internally. Kiani Kertas, a fully owned subsidiary of the Bob Hasan Group, developed a pulp mill in East Kalimantan that has the capacity to produce 525,000 tonnes per year (Kenny 1997). When the mill came online in early 1998, the company's stated aim was to export up to 95 percent of its product to Asian, North American, and European markets. In early 2000, PT Tanjung Enim Lestari -- a joint venture among the Indonesia's Barito Pacific Group, a consortium of Japanese investors, and a holding company owned by former President Suharto's eldest daughter -- completed construction on a pulp processing facility in South Sumatra that has the capacity to produce 450,000 tonnes per year (Bell 1997). Under the terms of the partnership, Tanjung Enim Lestari's mill is operated by Nippon Paper Industries, while Japan's Marubeni Corporation and Cellmark of Sweden have agreed to purchase the pulp produced for the first 10 years of the mill's operation.

Figure 4.1: Existing and Proposed Pulp Mills in Indonesia, as of 1997



Growing Demand for Pulpwood Fiber

The pulp industry's ten-fold increase in output between 1988 and 2000 entailed a rise in annual pulpwood consumption from 1.8 million m³ to 20.3 million m³ (see Table 4.1). Aggregate wood consumption by Indonesia's pulp industry during this period amounted to 120 million m³.³ Prior to the crisis, industry analysts projected that Indonesia's pulp production capacity would climb further to 6.4 million tonnes per year by 2005 and to 7.2 million tonnes per year by 2010 (Jaakko Poyry 1998). These projections imply that the volume of roundwood that the industry is capable of processing on an annual basis would rise from 24.0 million m³ in 2000 to 31.4 million m³ in 2005 and to 35.3 million m³ in 2010. Assuming that the industry were to operate with a capacity utilization rate of 90 percent or higher through this period, the consumption of pulpwood by Indonesian producers has been projected to reach 28.9 million m³ in 2005 and 33.6 million m³ at decade's end (Jaakko Poyry 1998).

Table 4.1: Annual Pulp Production and Roundwood Consumption of Indonesia's Pulp Industry, 1987-2000, with Projections for 2005 and 2010.

<i>Year</i>	<i>Pulp Production Capacity (^{'000 tpa})</i>	<i>Roundwood Processing Capacity (^{'000 m3 sob/yr})</i>	<i>Pulp Production (^{'000 tpa})</i>	<i>Roundwood Consumption (^{'000 m3 sob})</i>
1987	515	2,524	325	1,593
1988	606	2,969	368	1,805
1989	706	3,459	461	2,261
1990	1,000	4,900	697	3,415
1991	1,100	5,390	850	4,165
1992	1,100	5,390	870	4,263
1993	1,335	6,540	900	4,410
1994	2,055	10,068	1,314	6,439
1995	2,629	12,880	2,022	9,908
1996	2,741	13,431	2,561	12,549
1997	3,900	19,110	3,048	14,984
1998	4,300	21,070	3,430	16,807
1999	4,600	22,540	3,400	16,660
2000	4,900	24,010	4,140	20,286
2005	6,400	31,360	5,790	28,945
2010	7,200	35,280	6,715	33,605

sob- stripped of bark
tpa-tonnes per annum

Sources: APKI 1997 and Spek 2000b for 1987-2000 figures; Jaakko Poyry (1998) for 2005 and 2010 projections

³ These figures are based on the assumption that 4.9 m³ of roundwood (green wood over bark) are needed, on average, to produce each air-dried metric tonne (Adt) of pulp. This figure is derived from Jaakko Poyry (1998), which calculates conversion rates for mixed tropical hardwoods (MTH) of 4.84 m³ per Adt of pulp in the mill and 5.36 m³ per Adt pulp, standing volume in the forest. Likewise, Jaakko Poyry calculates a conversion rate for plantation-grown *Acacia mangium* of 5.01 m³ per Adt pulp in the mill, and 5.38 m³ per Adt pulp, standing volume in the forest. The figure of 4.9 m³ per Adt has been derived by averaging the in-mill conversion rates of MTH and *Acacia*.

Development of Pulpwood Plantations

Since the late 1980s, the Indonesian government has promoted the development of HTI plantations with the stated aim of establishing a sustainable source of fiber for the nation's rapidly growing pulp industry (Groome Poyry 1993). As detailed in chapter 2, the government has done so by allocating large tracts of conversion forest to each of the country's major producers, as well as to several prospective investors in the pulp and paper subsector. HTI license-holders are permitted to clear-cut their concession areas, and to use the wood generated from such harvests until the plantations are fully online. To date, the Forestry Department has distributed 23 pulpwood plantation licenses covering an aggregate area of 4.3 million ha (see Table 4.2). Thirteen of these, accounting for 2.9 million ha, have been designated as "priority" HTIs, making them eligible for an expedited approval process and access to subsidized financing from the government's Reforestation Fund.

Table 4.2: Location, Affiliation, and Area of Priority Pulpwood Plantations, January 1999

Province	Company Name	Group	Total Area (ha)	Area Planted (ha) ⁴
Aceh	Tusam Hutan Lestari Aceh Nusa Indrapuri	Bob Hasan	175,000	23,706
		Takengon	166,500	29,946
North Sumatra	Inti Indorayon Utama	Raja Garuda Mas/APRIL	269,060	48,553
Jambi	Wirakarya Sakti	Sinar Mas/APP	269,580	60,923
Riau	Arara Abadi Riau Andalan	Sinar Mas/APP	300,000	160,209
		Raja Garuda Mas/APRIL	280,500	83,759
South Sumatra	Musi Hutan Persada	Barito	300,000	200,155
South Kalimantan	Menara Hutan Buana	Mercu Buana	186,300	79,452
East Kalimantan	ITCI Hutani Manunggal Surya Hutani Jaya Tanjung Redeb Hutani Adindo Hutani Lestari	ITCI	191,800	87,294
		Astra	198,000	110,283
		Bob Hasan	180,900	68,569
		Adindo	201,000	27,097
West Kalimantan	Finnantara Intiga	Enso/Gudang Garam	200,700	29,189
<i>Total 13 Priority HTI-Pulp Projects</i>			<i>2,919,340</i>	<i>1,009,135</i>
<i>Total 10 Non-Priority HTI-Pulp Projects</i>			<i>1,405,186</i>	<i>35,236</i>
Cumulative Total			4,324,526	1,044,371

Source: MOFEC 1999.

In developing their HTIs, Indonesian plantation companies have utilized a number of fast-growing pulpwood species. The most promising have been *Acacia mangium*, *Acacia crassicaarpa*, and to lesser extent *Gmelina arborea* and *Eucalyptus deglupta*. Of these, the dominant species utilized has been *A. mangium*, which accounts for approximately 80 percent of the total area planted thus far (Jaakko Poyry 1998). Pulpwood producers have chosen *A.*

⁴ In publishing these figures, the Ministry of Forestry and Estate Crops provides no indication of the current condition of the areas planted at each HTI site. It would appear, for instance, that they have not been adjusted to account for the 100,000 ha of planted area that are estimated to have been heavily damaged or destroyed by the fires of 1997-1998 (Grahame Applegate, CIFOR, personal communication).

mangium for its rapid growth, high pulp yields, and ability to thrive in a wide range of ecological conditions, including degraded and heavily leached soils.

Over the past decade, the productivity of *A. mangium* has increased steadily, as Indonesian plantation companies have used improved planting stock and employed better management practices at their HTI sites. Areas planted in the late 1980s and early 1990s, for instance, generated a mean annual increment of only 15 to 20 m³/ha/year, well below the levels initially anticipated by the industry (Jaakko Poyry 1998). With a rotation period of seven to eight years, the average volumes harvested from the sites generally have been in the range of 112 to 150 m³/ha. These low yields were largely caused by the planting of poor genetic material; inappropriate site preparation; planting in areas with compacted soils; lack of diligence in weed control; and less than optimal plantation management once the trees were planted.

Following improvements in each of these areas, most plantations of *A. mangium* initiated since the mid-1990s have reportedly generated estimated mean annual increments (MAI) of 20 to 25 m³/ha/year, which should provide an average yield at harvest of 150 to 190 m³/ha (Jaakko Poyry 1998). The ability to obtain such yields every seven to eight years represents a critical element in Indonesian producers' competitive advantage over their counterparts in the North American and Scandinavian (Norscan) pulp-producing countries. Most Norscan producers rely on pulpwood species such as birch, spruce, and pine, which generally require at least 20 to 25 years per harvesting cycle (PT Indah Kiat 1999). Indonesia's major producers claim that, in fact, they have already raised their mean annual increments to 25 to 30 m³/ha/year through further improvements in both the genetic materials and silvicultural practices, and are now expecting average per hectare yields to 190 to 225 m³/ha for new areas planted. Their ability to generate such yields on a large scale, however, remains to be seen.

Reliance on Unsustainable and Illegal Fiber Supplies

In spite of the technical improvements in plantation management that have occurred over the past decade, the development of HTI pulpwood plantations in Indonesia has lagged far behind the expansion of processing capacity in the nation's pulp and paper industries (Cossalter 1998). All of Indonesia's pulp mills have been installed several years before supporting plantations have come online, with the single exception of PT Tanjung Enim Lestari's pulp plant in South Sumatra.⁵ Of the 100 million m³ of wood that pulp producers consumed between 1988 and 1999, less than 8 million m³ was sourced from plantations.⁶

Because the increases in processing capacity have far outpaced HTI development, all of Indonesia's pulp producers have until now been highly dependent on mixed tropical hardwoods (MTH) obtained through clearing of natural forest. In 1988, MTH made up all of the 1.8 million m³ of wood consumed by the industry.⁷ The volume of unsustainably harvested wood grew

⁵ Tanjung Enim Lestari's distinction in this regard probably had less to do with the company's concern for establishing a sustainable fiber supply before initiating processing operations than it did with the timing of the mill's financing. Initially scheduled for construction in the early 1990s, Tanjung Enim Lestari encountered several delays in securing offshore financing for the project, and the mill did not come online until late 1999.

⁶ These figures, as well as those in the following paragraph, are derived from the pulpwood consumption figures presented in Table 4.1 and estimates of HTI yields presented in Jaakko Poyry (1998).

⁷ See fn 5.

steadily over the ensuing decade, reaching 9.7 million m³ in 1995 and 12.5 million m³ in 1999.⁸ The aggregate volume of MTH consumed by the pulp industry during 1988-1999 totaled 92 million m³. If it is assumed that, on average, producers are able to obtain 110 m³ of pulpable wood from each hectare they clear, then consumption of MTH on this scale implies that Indonesia's pulp industry has accounted for approximately 835,000 ha of deforestation over the past 12 years. It is notable that virtually all of this area was cleared to supply wood to four large mills; and that a single mill – Indah Kiat Pulp & Paper owned by Sinar Mas/APP – accounted for over one-third of the total area deforested.

A major factor encouraging pulp and paper producers to invest in new processing capacity without first bringing plantations online has been the Indonesian government's readiness to make large tracts of forest available for clear-cutting. Since the Ministry of Forestry initiated the HTI program in the 1980s, it has allowed license-holders to use at minimal cost the trees cleared from their plantation sites, under a wood utilization permit (*Izin Pemanfaatan Kayu*, IPK) (Departemen Kehutanan and PT Herzal Agrokarya Pratama 1991). Through the 1990s, the Ministry has also made available IPK permits for the clearing of large forested areas slated for conversion to oil palm and other estate crops. The government's stated rationale for doing so has been to provide a temporary "bridging supply" of wood to pulp producers until their plantations are fully operational (Manurung and Kusumaningtyas 1999).⁹

A point that has generally been overlooked, however, is that the 4.3 million ha (gross) that the Ministry has allocated for pulpwood plantations vastly exceeds the area that Indonesia's pulp industry would actually need if it were to be run sustainably. If it is conservatively assumed that HTIs will generate average yields of 150 m³/ha/year, then it can be estimated that 133,000 ha per year would need to be harvested to provide the 20 million m³ of wood that the pulp industry consumes annually at its current production level of 4.1 million tonnes per year. An eight-year harvesting cycle would imply that just under 1.1 million ha would need to be planted for this volume of fiber to be supplied on a sustainable basis. The fact that the Indonesian government has allocated roughly four times this area to pulpwood plantation companies suggests that the HTI program is motivated by a desire to make large volumes of MTH available to pulp producers, regardless of whether the areas cleared are ever actually replanted.¹⁰

Although the pulp industry's major producers are now actively engaged in developing plantations on a considerable scale, there are compelling reasons to believe that they will continue to rely on large volumes of mixed tropical hardwoods for as long as they are able to do

⁸ These figures are obtained by subtracting the estimated harvest volumes of plantation-grown pulpwood cited in Jaakko Poyry (1998) from the overall volumes of pulpwood consumed by the industry during these years (see Table 4.1).

⁹ It bears mentioning that the author does not view clear-cutting natural forest to provide a 'bridging supply' of fiber to Indonesia's emerging pulp industry to be, a priori, a negative development. Indeed, many would argue that the conversion of natural forest to pulpwood plantations is a legitimate strategy to provide a launching pad for a competitive industry. What is important to recognize, however, is that the Indonesian government has allocated to the pulp industry an aggregate area of natural forest that well exceeds the industry's fiber needs if it were to pursue an efficient plantation development program. Moreover, a handful of very large-scale actors have until now enjoyed the vast majority of the benefits that have derived from the government's forest conversion policy.

¹⁰ It should be acknowledged that in many HTI concession sites, the net plantable area is limited to 60 to 70 percent of the total area allocated. If this ratio is applied to the 4.3 million ha that the government has assigned to pulpwood plantation companies, it implies that between 2.6 and 3.0 million ha are plantable. These areas are still considerably greater than the 1.1 million ha that are presumably needed to meet existing industry demand on a sustainable basis.

so. MTH is, by any measure, an extremely low-cost source of fiber under Indonesia's current forest royalty regime, which requires the payment of a reforestation fee of US\$2 per m³ (payable in rupiah at a rate of 5,000 to the US dollar) and a royalty of Rp 2,000 per tonne (Spek 2000a). MTH is particularly cheap when pulp producers are able to obtain their wood from concession areas under the control of affiliated companies. Both Indah Kiat and Riau Andalan Pulp & Paper, for instance, have been able to secure the bulk of their raw materials from affiliated HTI license-holders at a price that is equal to the actual cost of harvesting and delivering the wood to the mill, along with the payment of government royalty fees (Ausnewz 1999).

Some industry officials have suggested that Indonesia's two largest pulp producers see substantial capital investments in plantations, by comparison, as being financially burdensome: not only do they place constraints on the group's liquidity over the seven to eight year rotation period, but they also entail a considerable degree of risk. A financial officer at one of these groups summed up his company's wood supply strategy as follows:

Of course we are bringing our plantations online. But we're in no rush to switch our mill to *acacia* if there are still cheap supplies of mixed tropical hardwoods (*kayu campuran*) available. Why should we be? As it stands, we have access to a very low-cost supply of raw materials. Developing good plantations not only involves higher costs, but also a good deal of risk – the trees have to be there for harvest seven years from now. Right now, our HTIs are essentially an insurance policy, and we will cash it in when the MTH is no longer available.¹¹

In addition to the large volumes of legal but unsustainably harvested wood that have been cut by IPK license-holders, a substantial volume of fiber consumed by Indonesia's pulp industry has come from undocumented sources. Industry statistics indicate that the country's pulp mills processed approximately 50 million m³ of wood during the period between 1994 and 1999 to produce 10 million tonnes of pulp. According to Indonesian government figures, 28 million m³ of this originated from areas covered by IPK licenses, just under 1.3 million came from HTIs, and a small amount was imported in the form of wood chips (see Figure 4.2).¹² While these figures are far from conclusive, they suggest that Indonesian pulp producers may have obtained as much as 20 million m³ – or 40 percent of the wood they consumed during this period – from illegal sources.

In interviews, several industry executives acknowledged that the use of illegally harvested wood is common practice among the nation's pulp producers. Some indicated that their mills regularly purchase a substantial portion of the wood they process without knowing its provenance. According to one company's wood supply manager, "Our concern is to keep our mill running. When we buy wood, why should we care where it comes from as long as the price is reasonable? Whether or not it was harvested illegally, that is the Forestry Department's responsibility [to monitor]."¹³ In some cases, pulp producers are reported to purchase wood from harvesting teams

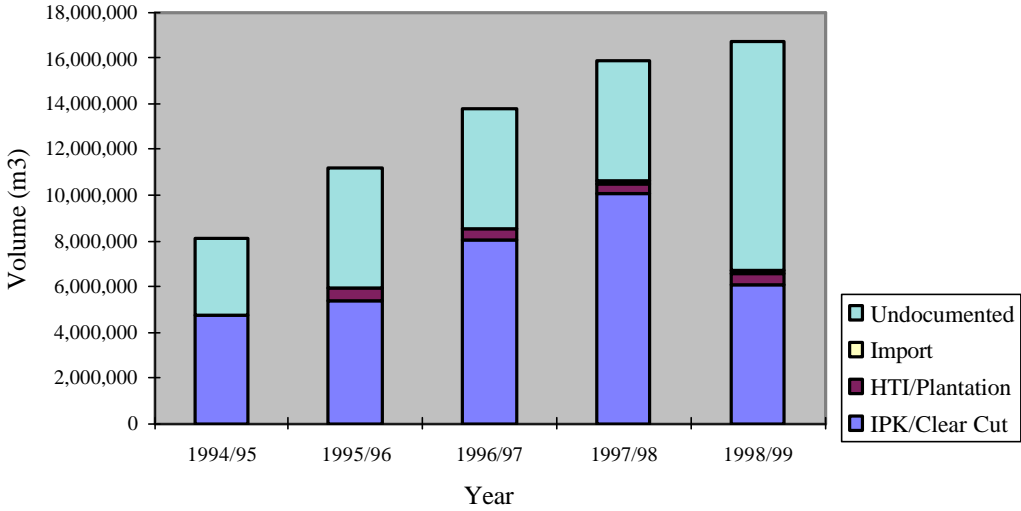
¹¹ Confidential interview, Jakarta, December 8, 1999.

¹² It should be noted that these figures are, in fact, quite conservative. They do not take into account the fact that at least a portion of the wood harvested under IPK licenses was processed for lumber or wood panels. Typically, IPK holders will send logs that are 30 cm and up to sawmills or plywood mills, while the smaller diameter wood is utilized for pulp fiber.

¹³ Confidential interview, Jakarta, December 8, 1999.

that are illegally logging within those companies' own concession sites.¹⁴ These companies reportedly finance such illegal logging operations not only to circumvent the payment of royalty fees on the wood harvested, but also to secure use of the wood before it is cut by other actors seeking to establish control over the land.

Figure 4.2: Sources of Wood Consumed by Indonesia's Pulp Industry, 1994-1999



Source: Departemen Kehutanan (1999). Data for 1998/99 are preliminary.

Projected HTI Yields and Potential Shortfalls

In spite of the slow pace of HTI development thus far, many industry analysts anticipate that the volumes of pulpwood produced in plantations will expand exponentially over the next several years. International forestry consulting firm Jaakko Poyry, for instance, has projected that by 2003, aggregate yields from HTIs would quadruple from 1999 levels to reach 17 million m³, or approximately 70 percent of the industry's anticipated fiber demand for that year (Jaakko Poyry 1998). HTI yields are thereafter projected to rise to 32 million m³ in 2009, when they are expected to provide 95 percent of the pulp industry's raw material supply. Formulated in 1998, these projections were apparently based on the aggressive planting schedules that the industry's two largest producers, the Sinar Mas and Raja Garuda Mas conglomerates, had followed through the previous year. In 1997, the two groups' annual planting programs are reported to have

¹⁴ The wood supply manager for one of Indonesia's major pulp producers explained in an interview that his company regularly purchased 40 percent of the wood that its mill consumes. He said that the mill often finds it cheaper to buy wood from locals illegally harvesting wood within the company's concession area than from the firm's own contractor because the former do not require payment of government royalties. To facilitate such harvesting, the company reportedly provides illegal logging teams with chainsaws. Much of this harvesting is done at night, while the contractor's formal logging operations are carried out during the day. When asked what his company would do when MTH stocks at its concession site were depleted, the informant expressed little concern, explaining that "There's still lots of protected forest [*Hutan Lindung*] available!" Confidential interview, Jakarta, December 8, 1999.

planted 27,000 and 28,000 ha, respectively, at their Riau plantation sites (PT Indah Kiat 1999; APRIL 2000).

However compelling these projections may seem, there are at least four significant reasons to believe that they could prove to be overly optimistic. First, there are widespread allegations within the industry that Indonesian plantation companies have regularly overstated the size of the areas planted and anticipated growth rates in order to inflate their projected yields. As will be discussed below, recipients of plantation subsidies from the government's Reforestation Fund have frequently been motivated to do so in order to obtain higher grant allocations and discounted financing than they would otherwise be entitled to (Ernst & Young 1999). While neither the Sinar Mas/APP nor the Raja Garuda Mas/APRIL groups has drawn on DR funds to support its plantation development efforts, both groups have nonetheless had strong incentives to maintain the image that they are solidly on schedule in meeting what are, by any measure, ambitious planting targets. Indeed, both groups obtain much of their investment and working capital through equity and bond issues, and therefore each relies heavily on investor confidence in the company's ability to generate low-cost fiber on a sustainable basis. Perhaps for this reason, both groups are extremely cautious about divulging the details of their annual planting programs and the relative growth of each year's tree stock as it moves through its rotation.¹⁵ This makes it extremely difficult for industry observers to estimate with confidence actual areas planted at these companies' concession sites and what volumes of wood these areas can be expected to yield. The critical point is that for Indonesia's HTI plantation program to generate the volumes of pulpwood fiber that have been projected, an adequate number of hectares will need to be planted seven to eight years before the expected harvest; these planted areas will need to be fully stocked; and the trees planted will need to be available for harvest when the rotation is complete.¹⁶

The fact that plantations of fast-growing tree species are potentially vulnerable to a range of technical problems represents a second reason that the abovementioned HTI projections may prove to overestimate actual yields.¹⁷ A critical challenge facing many HTIs is that they are being developed on areas with fragile soil structures (e.g., peat or impoverished mineral soils),

¹⁵ In their annual reports and Form 20-F filings with the US Security and Exchange Commission, neither Sinar Mas/APP nor Raja Garuda Mas/APRIL reports annual areas planted on a year-by-year basis. Nor do they identify seedling densities in specific planting blocks or areas where planted trees have failed. Instead, they generally limit their reporting to aggregate figures of total planted area at their plantation sites.

¹⁶ Since the onset of the financial crisis, for instance, there have been dramatic cuts in planting at most HTI sites. The areas planted at the Sinar Mas/APP group's main plantation in 1998 and 1999 are reported to have fallen by over 50 percent from pre-crisis levels, while those for Raja Garuda Mas are believed to have dropped even further still (Spek 2000). These apparent slowdowns in the pace of planting will clearly have a significant impact on the raw materials available to the industry's major producers in the coming years. Because pulpwood plantations operate on a seven to eight year rotation, failure to plant an adequate number of hectares in 1998 and 1999 will lead to deficits in 2005 and 2006.

¹⁷ A point of particular concern is that none of Indonesia's pulp producers has yet grown *A. mangium*, or the other species currently being used, through a full second rotation. Indeed, the country's first pulpwood plantations were established in 1987, which means that their second harvest will not take place until 2001. At most HTI sites, initial planting did not occur until the early 1990s. Plantation companies, therefore, have little empirical data to indicate how these species will perform when they are grown intensively across multiple rotations.

which can degrade rapidly under the high-frequency logging regime that a seven to eight year harvesting rotation implies (Ausnewz 1999). To maintain yields across several rotations, companies will need to utilize harvesting methods that minimize soil loss and compaction. At some sites, pests, fungus, and disease have already emerged as problems after the second planting, and there is reason to believe that these will become even more serious during subsequent rotations.¹⁸ This is particularly the case for *Acacia mangium*, which does not coppice like most *Eucalyptus* species and, therefore, requires harvesting and replanting operations to be carefully timed. Many industry sources are confident that new silvicultural technologies will be adapted to address each of these problems as it arises. Some, however, have quietly speculated that Indonesia's plantation companies may only be able to maintain yields beyond the second rotation by developing new HTI sites and/or by adopting new genotypes over time.

Fires are a third factor that could keep Indonesia's pulpwood plantations from generating the yields that have been projected. Indeed, the catastrophic fires of 1997-1998 are estimated to have destroyed approximately 100,000 ha of planted HTIs in Kalimantan and Sumatra (ADB 1998).¹⁹ *Acacia* and *Eucalyptus* plantations are particularly susceptible to fire as their leaves have a high oil content. Trees that are three years of age and younger are the most vulnerable, as their thin bark is not yet fire-resistant.²⁰ Moreover, the proliferation of low-level branches often helps to carry fire from grassy understory to the crowns of the trees. This frequently gives added intensity to a fire, turning what may start as a low-level burn into a high-intensity blaze once it enters a plantation site. It should also be noted that most Indonesian plantation companies have poor fire prevention and suppression systems in place.

The prevalence of social conflict linked to pulpwood plantations presents a fourth reason that HTI yields may fall short of the projections outlined above. Such conflicts have frequently arisen because HTI concessions have been located on areas traditionally owned and/or managed by local people (Fried 1995). In the case of PT Musi Hutani Persada's 300,000 ha pulpwood plantation in South Sumatra, for instance, members of surrounding communities have demanded compensation payments of Rp 25 million (US\$3,000) per hectare for areas that they claim have been unjustly occupied by the company since 1991 (Nadiar 2000). Because HTI development is generally structured to provide the plantation company with exclusive control over the land within the concession area for an extended period of time, many communities have responded to the establishment of HTIs even more vociferously than to the allocation of logging concessions on *adat* lands. In numerous cases, villagers have taken action to disrupt HTI operations, including the use of arson and pulling up trees after they are planted.²¹

¹⁸ Christian Cossalter, CIFOR, personal communication, August 14, 2000.

¹⁹ This figure is based on an estimation of HTI areas burned with trees that are three years of age and under. Trees over three years are believed to have been able to survive fires of moderate intensity.

²⁰ Grahame Applegate, CIFOR, personal communication, August 28, 2000.

²¹ As will be discussed later in the chapter, the threats to HTIs posed by conflicts with local communities appear to have increased significantly since the fall of the Suharto regime. During the New Order period, forestry conglomerates were rarely hindered by local communities' opposition to their projects because the government was willing to take harsh measures to guarantee social control (Fried 1995). Under the current administration, however, the central government is substantially weaker and considerably less willing to use force to resolve resource conflicts between local communities and large business interests in favor of the latter.

In some areas, local communities also have been actively competing with plantation companies for access to land in order to plant their own cash crops. Industry analysts familiar with the large Sumatran plantation programs have indicated, for instance, that growing numbers of smallholders have sought to establish oil palm estates within the formal boundaries of the HTI concessions over the last few years.²² Such practices threaten to undermine the companies' access to raw materials both by reducing the total volume of MTH that can be extracted from these sites and by restricting the net planting area available for pulpwood species. Recognizing this, both companies have taken steps to consolidate control over the land in the concession allocated to them. At this point, however, it is not at all clear that either group will be able to secure the full area of land needed to meet its long-term HTI planting targets.

Fiber Deficits at the Mill Level

Figures 4.3 and 4.4, in the sections below, provide graphic illustrations of how the projected industry-wide deficits of sustainably harvested pulpwood fiber are likely to play out at the micro-level. Based on projections of fiber supplies from pulpwood plantations and from IPK forest clearing, these figures show the volumes of wood that the country's two largest pulp mills – Indah Kiat and Riau Andalan Pulp & Paper – are expected to obtain from existing legal sources during the period 1998 to 2007. The two mills are located less than 100 km from one another in the east Sumatran province of Riau. Together, they account for roughly 60 percent of Indonesia's total pulp production.

To date, both mills have relied heavily on the use of mixed tropical hardwoods, much of which is obtained through the clearing of natural forest. However, each is now facing a sharp decline in the availability of MTH as stocks are dwindling at their own concession sites and increasingly small areas of forest are available for conversion within a commercial distance of the two mills. Both companies are actively bringing pulpwood plantations online with the aim of supplying their mills' fiber needs on a sustainable basis. Neither firm's plantations, however, will be sufficient to supply the volume of wood needed for its mill to run at or near capacity at any point during the next several years. Indeed, both mills face sizeable fiber deficits over the coming decade. There is growing evidence to suggest that each will continue to rely on unsustainably harvested wood and will be forced to purchase an increasing portion of its raw materials from sources outside of Sumatra.

Indah Kiat Pulp & Paper

Indah Kiat is the largest subsidiary of Asia Pulp & Paper, the Sinar Mas Group's Singapore-based holding company. Since 1989, Indah Kiat has expanded its pulp production capacity from 120,000 tonnes to 1.8 million tonnes per year (APP 2001). It currently accounts for 77 percent of APP's pulp production capacity and approximately 35 percent of Indonesia's overall pulp output. In 2000, the mill consumed an estimated 8 million cubic meters (m³) of wood – or roughly one-third of Indonesia's legal wood supply (APP 2001).

Thus far, Indah Kiat has sourced the bulk of its raw materials from an affiliated company, Arara Abadi, which holds a 300,000 ha plantation concession permit (PT Indah Kiat 1999). Arara

²² Confidential communication, January 23, 2000.

Abadi's concession area is disbursed among several blocks that are located 60 to 120 km from Indah Kiat's Perawang mill site. Under a 15-year supply contract signed in 1994, Indah Kiat purchases mixed tropical hardwoods harvested by Arara Abadi, at prices that amount to the cost of harvesting and delivering the wood to the mill (inclusive of government royalties). Such at-cost purchases from Arara Abadi have accounted for roughly 70 percent of the wood consumed by Indah Kiat over the past decade. The company purchases whatever remaining wood it needs from a range of third-party suppliers, which include IPK license holders that are clearing forested areas for oil palm and other estate crops, as well as various units of the state forestry enterprise, Inhutani IV. Typically, such external wood purchases entail costs that are substantially greater than those associated with obtaining MTH from Arara Abadi.

Since the mid-1980s, Arara Abadi has taken steps to develop a pulpwood plantation that can supply Indah Kiat's fiber needs on a sustainable basis over the long term. The net plantable area of the company's various concession blocks is 217,000 ha (PT Indah Kiat 1999). Arara Abadi carried out its first substantial annual planting of *A. mangium* in 1987, and through 2000, the cumulative area planted had reached approximately 180,000 ha. Annual area planted has varied considerably over the past several years, ranging from a low of 10,000 ha in 1993 to a high of just under 27,000 ha in 1997 (Spek 2000a). Planting is believed to have slowed considerably in 1998 and 1999, dropping to 18,000 ha and 11,000 ha, respectively. However, during these years Arara Abadi also made its first substantial harvests from the plantation, obtaining 390,000 m³ in 1998 and 900,000 m³ in 1999 (Spek 2000a). The *acacia* wood harvested in 1999 accounted for 20 percent of the fiber consumed by Indah Kiat that year.

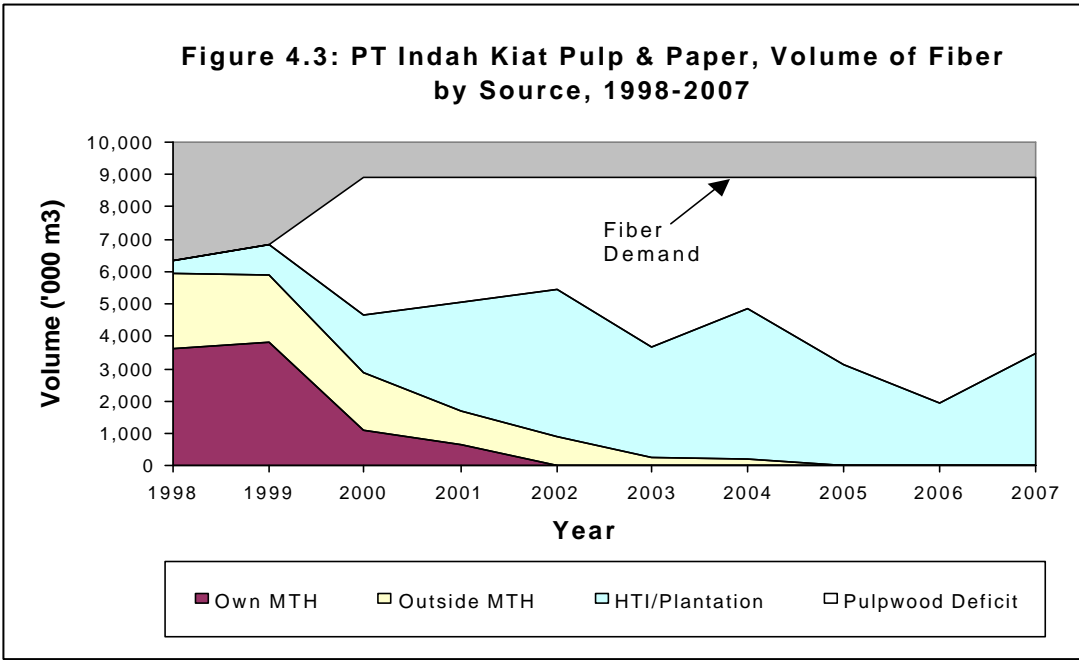
Through the 1990s, Indah Kiat regularly stated in its annual reports that the Arara Abadi plantation would supply "substantially all" of the mill's wood requirements by 2004 (PT Indah Kiat 1999). This implies that the company expected the plantation, by then, to generate upwards of 9.0 million m³ of pulpwood on an annual basis to keep the mill running at its current capacity.²³ A simple estimation of the area actually planted at Arara Abadi and the anticipated volume yields suggests that Indah Kiat's sustainability target has been extremely optimistic. Using a seven to eight year growing cycle, the trees to be harvested in 2004 would have had to be planted in 1996 or 1997. In fact, Arara Abadi planted nearly 20,000 ha in 1996 (Spek 2000a). However, for this area to generate 9.0 million m³ of wood, it would have to produce a yield of 450 m³/ha (or a mean annual increment of 64.3 m³/ha/yr). Many industry analysts conservatively estimate that Arara Abadi's maximal yields for areas planted in 1996 will be closer to 175-200 m³/ha, assuming a mean annual increment of 25 m³/ha/yr.

Recognizing that its 2004 sustainability target is no longer tenable, Indah Kiat recently revised its projection to 2007 (APP 2001). A detailed financial analysis prepared by Singapore-based brokerage house GK Goh suggests that even this revised target is extremely optimistic (Spek 2000a). With the areas that the company is believed to have planted thus far, the annual volume harvested from Arara Abadi's plantation can be expected to grow to 1.7 million m³ in 2000 and to 4.6 million m³ in 2004. As Figure 4.3 shows, this latter volume amounts to roughly 50 percent of the mill's fiber needs at that point. In 2005 and 2006, the volume of wood coming from the

²³ It should be noted that this figure does not include the additional 800,000 m³ to 1.0 million m³ that will be needed if the company succeeds in raising the mill's pulp processing capacity to 2.0 million tonnes per year. Company officials have indicated that Indah Kiat intends to achieve this increase in capacity through debottlenecking (APP 2001).

plantation is expected to drop, being that the areas planted in 1998 and 1999 had declined from previous years.

The GK Goh study points out that with a net plantable area of 217,000 ha, Arara Abadi can plant at most 27,125 ha if it manages the site on an eight-year rotation (Spek 2000a). To fully meet Indah Kiat’s current fiber needs on a sustainable basis, the plantation would have to obtain a mean annual increment of at least 41 m³/ha/yr for all planted areas. If Arara Abadi seeks to reduce the rotation period to six years, as Indah Kiat has at times suggested, the company would need to plant over 36,000 ha annually, while also achieving these ambitious growth rates, in order to fulfill the mill’s current fiber needs.



Note: Assumes mean annual increment = 25 m³/ha/year and 7-year rotation. Area planted in 2000 assumed to be 20,000 ha.

Sources: HTI figures and 1998-1999 MTH figures based on projections from data provided in Spek (2000a) and Jaakko Poyry (1998) for MTH figures.

In facing such substantial fiber shortfalls from Arara Abadi’s plantation, Indah Kiat has increasingly few options for filling the deficit with cheap supplies of mixed tropical hardwoods. As Figure 4.3 shows, MTH supplies at Arara Abadi and the affiliated concession areas nearby are expected to be exhausted within the next couple of years (Jaakko Poyry 1998). Moreover, analysts expect that there will be a marked decline in the volumes of legally harvested MTH that are available within a commercial distance of the mill, and that Riau’s supplies of such wood will be exhausted by 2005.²⁴ This implies that Indah Kiat will be facing substantially higher

²⁴ These projections are supported by the World Bank’s recent assessment that Sumatra’s lowland forests will be exhausted by 2005 (World Bank 2001).

wood costs in the near future, as it may be forced to purchase a growing portion of its fiber from other parts of Indonesia or possibly from overseas.

Indah Kiat officials have recently admitted that the Arara Abadi plantation does not have adequate plantable area to meet the mill's overall fiber needs.²⁵ However, they deny that the mill is facing a fiber shortfall. They claim that the company has recently secured access to 180,000 ha of degraded forests in Riau, which it will manage through joint venture contracts with 'cooperatives' (APP 2001). These officials report that Indah Kiat will clear the remaining standing forests to harvest the MTH and immediately replant these areas with *Acacia mangium*. As of October 2001, however, Indah Kiat has provided no details regarding where these areas are located; what volumes of wood they contain; who has managed these forests until now; what licenses have been issued to the company to allow them to convert these sites to plantations; at what pace they will be planted; and the likely wood costs involved for the mill.

Riau Andalan Pulp & Paper

Riau Andalan Pulp & Paper (RAPP), a subsidiary of the Raja Garuda Mas group's APRIL holding company, began operating in 1995 and has recently passed Indah Kiat to become Indonesia's single largest pulp mill. The mill's effective production capacity rose to 850,000 tonnes per year in 1999 to 2.0 million tonnes in 2001, when the company completed a two-phase installation of a second production line (*Paperloop.com*, June 1 2001).

Until now, virtually all of the mill's fiber has been mixed tropical hardwoods obtained through the clearing of natural forest (APRIL 2000). Roughly 80 percent of this has come from the company's 280,500 ha HTI concession site, which is located near the mill in Riau. Much of the remainder has come from an affiliated company's plantation development project 400 km to the north of the mill.

Like Sinar Mas/APP, the Raja Garuda Mas/APRIL group has been moving aggressively to bring large-scale pulpwood plantations online. RAPP reportedly has access to 195,000 ha of net plantable area at its HTI site; 85,000 ha at plantation sites held by associated and joint venture companies; and 20,000 ha managed by nearby communities as part of an out-grower scheme (RAPP 2001). The company claims that through the end of 2000, 151,000 ha had been planted on all sites (RAPP 2001). In its 1999 annual report, APRIL projected that the company's then-pulp capacity of 850,000 tonnes would be fully supplied with plantation wood by year 2004. Following the mill's recent expansion to 2.0 million tonnes, the company claims that it will supply all of its fiber needs from sustainably managed plantations from 2008 onwards (RAPP 2001). The company claims that until the plantations are fully online, it will bridge the mill's fiber needs with low-cost MTH obtained from areas cleared for timber and oil palm plantation development and from sawmill and plymill residues.

²⁵ Mark Werren, Director APP Forestry Audit, personal communication, July 22, 2001.

APRIL apparently bases these projections on the assumption that in 2004, it will be able to harvest 27,800 ha of *acacia* plantations that were reportedly planted in 1997.²⁶ To generate the 4.3 million m³ of wood that would be needed to produce 850,000 tonnes of pulp, these areas would need to show an average growth rate of 22 m³/ha/year over a seven-year rotation. Industry analysts familiar with the company's plantation program have confirmed that a mean annual increment on this order is a reasonable estimation of average growth rates for areas planted at RAPP's HTI site over the past several years. This would suggest, then, that the company's ability to meet its plantation target for 2004 will largely depend on whether the company actually planted the total area reported, whether the areas planted are fully stocked, and whether these areas are available to the company when it is time for harvest.

APRIL's longer-term plantation projections are far more difficult to reconcile. The company claims that its plantation program will generate 9 million m³ per year by 2008 (RAPP 2001). It further maintains that this volume of fiber would be more than sufficient to meet RAPP's raw material needs at the mill's current capacity of 2.0 million tonnes per year.²⁷ APRIL's strategy for achieving such a sharp rise in the volume of plantation wood harvested involves a massive increase in the annual area planted at both its own and affiliated HTI sites. The company currently projects that the annual area planted at all sites will climb from 18,730 ha in 2000 to 37,000 ha in 2001 and to 48,000 in 2002 (RAPP 2001).²⁸ Thereafter, the total area planted at all sites is projected to remain above 45,000 ha per year at least through 2020.

Industry analysts who are familiar with RAPP's plantation program vigorously question the feasibility of these projections. There is considerable skepticism within the industry that APRIL has the capacity to orchestrate the planting of 48,000 ha as early as 2001 and to maintain annual planting rates at 45,000 ha each year thereafter. Expansion on this scale would effectively amount to a 150 percent increase in the annual areas planted at both RAPP's own HTI and affiliated sites, as compared to 2000 levels. The sheer logistics of planting such a large area on an annual basis are complicated by the fact that planting must follow land clearing in close sequence in order to avoid the invasion of *imperata* grass. Moreover, some analysts have expressed concerns regarding the fact that APRIL's projections are based on an assumed mean annual increment of 30 m³/ha/year, claiming that growth rates across such a large area are likely

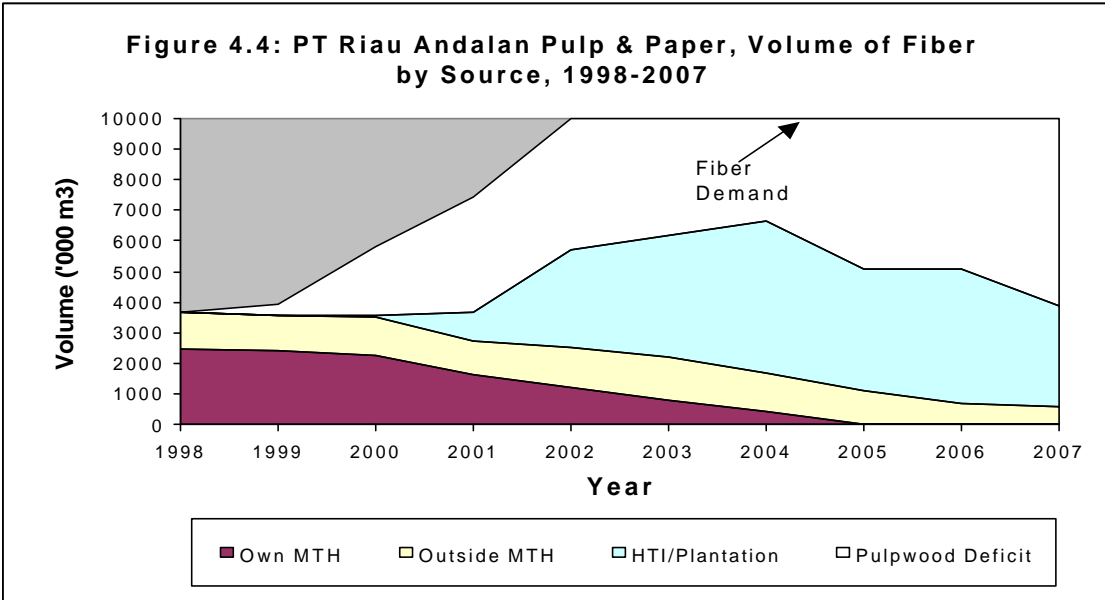
²⁶ APRIL's 1999 annual report indicates that RAPP planted approximately 18,000 ha in 1997 at its own HTI site, and that affiliated companies and joint ventures planted roughly 10,000 ha. An additional 1,000 ha was reportedly planted by community out-growers. In 2001, the company reduced its estimation of the total area planted in 1997 to 27,800.

²⁷ It should be noted that APRIL assumes that 4.5 m³ of wood will be needed to produce each tonne of pulp. Other sources (e.g., Jaakko Poyry 1998) have placed the conversion ratio at 4.9-5.1 m³ of roundwood (greenwood over bark) per tonne of pulp, depending on whether plantation *acacia* or MTH is used. If this higher conversion ratio is used, it would imply that RAPP will need approximately 10 million m³ of wood to run its mill at 2.0 million tonnes per year.

²⁸ In its 1999 annual report, the company projected that the annual area planted would climb from 27,000 ha in 1998 to 58,000 ha in 2001 (APRIL 2000). Thereafter, the annual area planted at all sites was projected to average 50,000 ha through at least 2012. If it is assumed that the net plantable area at all plantation sites is 300,000 ha, then planting at this pace would also imply that these sites are going to be managed on a six-year rotation. While RAPP and some other companies have reported being able to obtain adequate yields on limited areas of *acacia* plots when harvested at six years, this is well below the industry average of seven to eight years. Plantation experts interviewed for this study generally agree that it is highly unlikely that an area as large as 300,000 ha can successfully be managed under such an abbreviated rotation within the next several years. To plant at a rate of 50,000 ha per year over a seven to eight year cycle, RAPP would need a net area of 350,000 – 400,000 ha, or 17 to 33 percent more land than it currently claims to have access to.

to be closer to 25 m³/ha/year for areas now being planted.²⁹ APRIL’s mean annual increment projections would appear to be particularly optimistic for areas that are to be managed through joint ventures and out-grower schemes, and will not therefore be under the company’s direct management.

Figure 4.4 presents an alternative scenario for Riau Andalan Pulp & Paper’s fiber sourcing for the period 1998-2007, based on a more conservative set of assumptions than those used by APRIL. Specifically, the data presented assume that RAPP manages its plantation areas according to a seven-year harvesting cycle and that the average growth rate across all planted areas is 25 m³/ha/year for a yield of 175 m³/ha. It is assumed that APRIL planted 27,800 ha in 1997; 22,400 ha in 1998; 24,700 ha in 1999; and 18,700 ha in 2000, as it claimed, and that all of these areas will be available for harvest at the end of the rotation. Moreover, it is assumed that legally available sources of mixed tropical hardwood will be exhausted at RAPP’s concession and site by 2005.



Note: Assumes MAI = 25 m³/ha/year and seven-year rotation.
 Sources: HTI and fiber demand figures derived from data provided by APRIL (2001); MTH figures from Jaakko Poyry (1998).

Based on the assumptions described, the volume of fiber that RAPP obtains from plantation-grown pulpwood is projected to rise from 944,000 m³ in 2001 to just under 5.0 million in 2004. At that point, plantation-grown *acacia* will supply roughly 50 percent of the mill’s total fiber needs. In the years that follow, however, the portion of the mill’s fiber that comes from HTIs is projected to decline. By 2007, it is anticipated that the company’s plantations will supply roughly 32 percent of the 10 million m³ of fiber then expected to be consumed by the mill. Although the company has claimed that it would rely on bridging supplies of MTH to supply the mill with

²⁹ One reason for this is that much of the areas now being planted by RAPP are on peat soils, which are unlikely to produce 30 m³/year over multiple rotations (confidential communication with plantation industry expert, August 28, 2000).

whatever volumes of fiber cannot be sourced from plantations, there are strong indications that legal supplies of MTH within a commercial distance from the mill will be substantially diminished, if not exhausted, by 2005 (Jaakko Poyry 1998). This suggests that APRIL will increasingly be forced to obtain wood from outside of Sumatra, which will entail considerably higher raw material costs than it has paid until now.

Large Capital Investments and High Levels of Financial Risk

The exponential growth of Indonesia's pulp and paper industries over the past decade has been led by the development of a relatively small number of mills with very large processing capacities. Whereas most paper machines installed through the late 1980s were generally capable of producing no more than 50,000 tonnes per year, several of those purchased by Indonesian companies since the mid-1990s have production capacities of 300,000 tonnes or more (Spencer and Choi 1999). Likewise, the country's four major pulp producers had brought online processing facilities that were able to generate at least 450,000 tonnes per year. Each of these ranks among the largest processing facilities of its kind in the Asia/Pacific region.

The most commonly stated rationale for this emphasis on mega-projects has been that pulp and paper investors are eager to take full advantage of the low production costs available in Indonesia (Hill 1998). Historically, pulp and paper have both been highly cyclical commodities, with heavy shifts in world demand leading to sharp upswings and downturns in market prices. By investing in large-scale processing facilities, Indonesian producers have sought to establish economies of scale that would allow them to remain profitable even during protracted market down cycles.

The development of pulp and paper mills on the scale that has occurred in Indonesia has required very substantial allocations of investment capital. Greenfield mill projects typically require investments of between US\$1,000 and US\$2,000 per tonne of processing capacity (Spencer and Choi 1999). As such, Indonesia's largest pulp and paper projects have cost between US\$600 million and US\$1.3 billion apiece, while new production lines at existing mills have cost one-quarter to one-third of this. It is estimated that the increase in Indonesia's pulp and paper processing capacity since the late 1980s has involved total investments of at least US\$12 billion.³⁰

The high fixed costs associated with pulp and paper projects generally means that mills are only economical if they are run continuously at or near capacity. In Indonesia and elsewhere, most pulp and paper producers seek to keep their mills running 24 hours per day for 51 weeks out of the year, with the remaining week scheduled for general maintenance and debottlenecking.³¹ Heavily leveraged mills that are unable to operate near capacity often have difficulty staying current on their outstanding financial obligations. In this context, it is clear that Indonesian pulp and paper producers have assumed a high degree of financial risk by developing large-scale processing facilities without first securing a legal and sustainable fiber supply. The substantial

³⁰ This is based on the conservative assumption that the average cost per tonne of processing capacity (new mills and additional lines) in both the pulp and paper industries was US\$1,100.

³¹ The term "debottlenecking" refers to the process of making technical changes in a mill's production process so as to remove inefficiencies that might keep the mill from operating at full capacity.

risks associated with heavy investments in processing expansion, given raw material uncertainties, are highlighted in a 1999 industry study:

In opting for such headlong expansion in capacity, the companies appear to have subscribed (or over-subscribed) to the continual extrapolation of the consultants' proposition that the only safe way to invest in pulp capacity is to build the mill so big that it is always on the lowest part of the capital and operating cost/tonne curve. This is an enviable situation to be in, provided the funds continue to flow to support such massive expansions. Prodigious volumes of wood are, however, required and there would be few locations on earth capable of supporting such massive capacity without extensive and successful prior planting... In Indonesia at the present time, the folly of proceeding with large pulping developments without a pre-established wood supply is being demonstrated by the very large amount of wood that is having to be brought in from increasingly distant locations over roads that are rapidly deteriorating, with little prospect of adequate repair (Ausnewz 1999).

The large mills run by Sinar Mas/APP and Raja Garuda Mas/APRIL may seek to ship in pulpwood fiber from outside Sumatra once MTH supplies in Riau and surrounding provinces are exhausted. By boat, wood chips can often be transported economically over great distances. Japanese pulp producers, for instance, import nearly 25 million tonnes of pulpwood chips per year from 16 countries, including such distant locales as Chile and the southern United States (*International Woodfiber Report* 1998; Jaakko Poyry 1997). This raises important questions about where, and at what cost, Indonesian pulp producers might be able to obtain fiber when natural forests within commercial distance from the large mills can no longer supply their needs.

To the extent that Indah Kiat and RAPP seek to purchase chips from outside Sumatra, there is a strong likelihood that they would source this fiber, at least initially, from Kalimantan and West Papua. From an environmental perspective, such purchases would likely extend to those islands the pressures that these large mills have until now exerted on the natural forests of Riau. Financially, the transport of pulpwood chips over several hundred kilometers would raise the mills' operating costs quite considerably from their present levels. Indeed, some industry analysts have argued that both mills would face logistical difficulties bringing in large volumes of wood being that they are located approximately 50 km upriver, and the rivers are shallow.³² As discussed in subsequent sections, such cost increases would pose serious concerns for investors due to the fact that these mills are now carrying heavy debt loads and will soon be facing higher-than-normal tax burdens (Spek 2000a).

It is also possible that Indonesia's largest mills would seek to obtain plantation-grown fiber from Australia, Thailand, Malaysia, or other countries in the region. However, in addition to the distances involved, importing chips would force these companies to pay world market prices for

³² Confidential interview with an Australian wood chip exporter, November 20, 2000. According to this exporter, it is not possible to get a full-size chip boat up the Siak or Kampar rivers to Indah Kiat or RAPP, so the chips would have to be transferred to smaller barges -- which would still have a challenge getting up to the mills. In the case of RAPP, the mill is located some distance from the river, so the chips would have to be transported by truck from wherever they are landed. He noted that this is all in sharp contrast to the Japanese chip importers, which have their mills located right along the coast so as to minimize transfer costs.

their wood, which are several times higher than domestic rates. An Australian wood chip exporter, for instance, recently estimated that at November 2000 prices, the anticipated cost for the Sumatran mills to import plantation-grown eucalyptus chips from Tasmania would run as follows: 1) US\$75-80 FOB³³ per bone dry tonne; 2) US\$30 per bone dry tonne for freight; 3) 25 to 30 percent of freight charges in discharging fees (depending on the port). Added up, this suggests that APP and APRIL would need to pay approximately US\$120 per bone dry tonne, which is equivalent to about US\$60 per green tonne of chips – or roughly three to four times what the mills are currently paying to source MTH from their own concessions in Sumatra. Moreover, imports would require Indonesian producers to use hard currency to secure a substantial portion of their raw materials, thereby undermining a significant cost advantage that they have enjoyed until now. With growing demand among Northeast Asian pulp producers, some analysts have also projected that the Pacific Rim wood chip trade is likely to become sharply more competitive in the coming years, leading to stepped-up prices over the medium to long term (*International Woodfiber Report 1998; International Woodfiber Report 1996*).³⁴

Government Subsidies and Weak Financial Regulations

To a significant degree, Indonesian pulp and paper producers have been motivated to invest large amounts of capital in high-risk projects because much of the costs involved have been borne by others. In particular, the Indonesian government has provided substantial capital subsidies for pulp and paper projects, which have enabled producers to sharply discount their investment and production costs.³⁵ These subsidies have included the provision of cheap raw material supplies, discounted loans from state-owned banks, allocations from off-budget pools of finance, as well as generous tax deductions. During the New Order period, senior officials often disbursed these subsidies in a discretionary manner, providing firms linked to state elites with benefits well beyond those allocated to producers without such ties.

In addition to providing direct capital subsidies to pulp and paper producers, the Indonesian government has indirectly subsidized investments in each of these industries through the weak regulation of the nation's financial system. Most of Indonesia's major pulp and paper companies are owned by large conglomerates with investments in a range of other sectors, several of which control their own banks. In the years leading up to the financial crisis, the government regularly failed to enforce its own laws in the commercial banking sector, particularly when they threatened to constrain the lending practices of banks owned by groups with ties to state elites. Indonesia's largest pulp and paper producers have taken advantage of this weak regulatory

³³ FOB refers to 'freight on board'.

³⁴ The Australian chip exporter interviewed indicated that it would be a few years before that country's chip market could absorb the anticipated demand for chips from Indah Kiat and RAPP. Currently the Australian chip industry generates 1.5 - 2.0 million green tonnes of hardwood chips. He said that it would be 2007 or 2008 before the industry could easily absorb an additional demand of 4 million tonnes or so (Indah Kiat's projected shortfall). His sense was that the companies would be looking to bring wood in from Kalimantan if they were able to do so. Confidential interview, November 20, 2000.

³⁵ It should be noted that subsidies are not intrinsically perverse. Indeed, governments in most countries routinely use subsidies to encourage investment in strategic industries or sectors that provide socially-desirable goods or services, such as transportation or education. The critical point in the sections that follow is not to condemn subsidies to Indonesia's pulp and paper industries as such, but rather to emphasize the role that government subsidies have played in encouraging the country's pulp and paper producers to engage in high-risk practices.

environment to obtain large sums of finance well below commercial lending rates. They have done so most significantly through the allocation of related-party loans above the government's legal lending limits, the misappropriation of central bank liquidity credits, and the use of financial mark-up schemes.

Cheap Raw Material Supplies

Access to cheap supplies of pulpwood fiber is arguably the most significant factor motivating the heavy investments made in Indonesia's pulp and paper industries since the late 1980s. Pulp producers have benefited heavily from the government's policy of making available large volumes of mixed tropical hardwoods, coupled with relatively minimal royalty payments (currently less than US\$2.50 per m³). Through clearing of natural forest at affiliated HTI concession sites, Indonesian pulp producers have obtained the bulk of their fiber at prices that are only slightly above the cost of harvesting the wood and transporting it to the mill. They have also been able to purchase large volumes of pulpwood from IPK license-holders and illegal harvesters at prices that are well below the wood's actual stumpage value. While the cost of producing a tonne of pulp fluctuates widely according to market cycles and monetary conditions, access to such cheap fiber has often allowed Indonesian mills to enjoy pulp production costs that range as low as 20 to 30 percent of those faced by North American and European producers.³⁶

Since the early 1990s, the Ministry of Forestry has also provided firms establishing pulpwood plantations with heavily discounted finance and equity capital through allocations from the government's Reforestation Fund (Groome Poyry 1993). As outlined in chapter 2, the Forestry Department subsidizes HTI projects by providing 14 percent of the project's total cost in the form of equity capital and 32.5 percent in the form of a no-interest loan with a repayment period of 10 years. In addition, the plantation company is permitted to draw on loans from the DR fund at commercial rates to finance 32.5 percent of the project's expenses. This arrangement effectively allows the firm establishing the plantation to commit only 21 percent of the overall investment from its own funds. A recent audit of the DR fund carried out by the international accounting firm Ernst & Young determined that through the end of the 1997-1998 fiscal year, the government had allocated over Rp 1 trillion in DR monies to subsidize the development of 10 pulpwood plantation projects (Ernst & Young 1999). Conservatively converted at the mid-1997 exchange rate of Rp 2400 per US\$, this amounts to disbursements of roughly US\$417 million, exclusive of foregone interest earnings.

The Ernst & Young audit found that, in fact, many recipients of the plantation subsidy have been able to manipulate the process through which the DR monies are allocated so as to further reduce

³⁶ One analyst (Hill 1998) summarized the significance of subsidized wood costs for Asia Pulp & Paper and other Indonesian producers as follows: "APP's access to low-cost timber is key to its competitive advantage. According to a regional analyst, APP's imputed cost of wood to produce one tonne of pulp is Rp 280,000 (US\$35). These costs include government royalties, taxes, labor, and transport. By comparison, a confidential industry survey says, the imputed wood costs for a North American producer to produce one tonne of pulp are US\$130 and for European producers about US\$170. As of mid-November [1998], say the analysts, the taxes and royalties that APP and other Indonesian producers paid to the government for the wood needed for one tonne of pulp was just US\$10. 'Compared to producers elsewhere, they get the wood for free,' says one analyst. Judging the changes in APP's US dollar costs of labor and transport is more difficult, since some gains from depreciation have been offset by Indonesia's high inflation rate."

the portion of such projects that is funded by their own capital (Ernst & Young 1999). Most commonly, plantation companies have overstated the net area to be planted at their HTI sites when they apply for the DR funds. In the case of a plantation company that realizes only 90 percent of the planted area stated in its application for DR support, without adjusting the distribution of funds, the portion of the project's total cost covered by DR monies rises from 46.5 percent to 51.7 percent. The Ernst & Young audit concludes that overestimation of HTI planted areas and similar irregularities resulted in the loss of US\$223 million from the DR fund between 1993 and 1998.

Table 4.3: Summary of Reforestation Fund Allocations to Pulpwood Plantation Companies, as of March 1998.

Company	Affiliated Pulp Mill	Gov't Grant (Rp '000 bn)	0-Interest Loan (Rp '000 bn)	Commercial Loan (Rp '000 bn)	Total (Rp '000 bn)
Musi Hutani Persada	PT TEL	51.9	127.4	164.6	343.9
Surya Hutani Jaya		36.6	90.5	61.7	188.8
Menara Hutan Buana		43.5	100.9	0.0	144.4
ITCI Hutani		28.0	88.9	0.0	116.9
Tanjung Redeb Hutani	Kiani Kertas	25.0	58.1	0.0	83.2
Acehnusa Indrapuri		13.0	30.2	0.0	43.2
Adindo Hutani Lestari		12.4	28.8	0.0	41.2
Fendi Hutani Lestari		20.1	11.9	0.0	31.9
Tusam Hutani Lestari		7.5	17.4	0.0	24.9
Finantara Intiga		11.6	11.6	0.0	23.1
Total		249.6	565.7	226.3	1,041.6

Source: Ernst & Young 1999

Soft Loans from State Banks and Off-Budget Financial Allocations

In addition to providing pulp producers with underpriced raw materials, the Indonesian government has subsidized the development of some pulp and paper mills through the allocation of discounted finance. Under Suharto's New Order regime, Indonesia's seven state-owned banks regularly provided loans to investors with ties to elite government officials, regardless of whether the projects being funded were likely to be profitable (Delhaise 1998). Such loans were frequently based on political directive rather than prudential calculations of risk, and often involved the provision of little or no collateral on the part of the borrowing firms. Moreover, interest rates and the specific terms of repayment were generally negotiated on a borrower-by-borrower basis, with companies tied to state elites often receiving terms far more favorable than those available from commercial lending institutions (Winters 1992). It was not uncommon for credits from state banks to be "repeatedly renewed with interest obligations capitalized into the loan rather than paid to the banks" (Cole and Slade 1996). Loans of this sort essentially functioned as "capital subscriptions from which the banks received no cash returns."

Investors with particularly close ties to senior officials were also able to obtain capital subsidies through allocations from a variety of off-budget funds maintained by the New Order government (Ascher 1998). The state's leadership kept these funds separate from the government's official budget to allow them to exert a high degree of discretion in channeling them to favored projects or clients. One of the largest sources of off-budget finance was the DR reforestation fund, which had total receipts of just under US\$2.5 billion between fiscal years 1993-1994 and 1997-1998 (Ernst & Young 1999). During the five-year period covered by the Ernst & Young audit, the DR fund incurred losses of US\$670 million as a result of disbursements made by presidential decree for projects that were not related to reforestation (Ernst & Young 1999).

Under the New Order regime, none of Indonesia's major pulp and paper investors was better placed to access these discretionary funds than Kiani Kertas. Owned by Hasan, the company secured much of the financing for its 525,000 tonne greenfield pulp mill in East Kalimantan from the Indonesian government. When the mill was constructed in 1997, the company received at least US\$300 million in loans from four state banks, as well as a US\$100 million allocation from the DR reforestation fund (*Kompas* 1999a; Borsuk 1997). The government further subsidized the mill by providing Kiani a 10-year holiday on corporate tax, including customs duties that would normally be charged on imported and exported goods.³⁷ In addition, Kiani has had access to low-cost wood from over 2.7 million ha of timber concessions and plantation licenses then controlled by Hasan's Kalimanis group (Brown 1999).

Conglomerate-Owned Banks and Related-Party Lending

Since 1988 when the Indonesian government liberalized the country's commercial banking sector, most of Indonesia's largest conglomerates have owned their own banks. As Table 4.4 shows, each of the major pulp and paper producers was also involved in the banking industry before the onset of the 1997 financial crisis.

Table 4.4: Indonesian Banks Controlled by Pulp and Paper Conglomerates Prior to the 1997 Financial Crisis

Conglomerate	Major Pulp/Paper Asset	Bank
Sinar Mas	Asia Pulp & Paper	Bank Internasional Indonesia
Raja Garuda Mas	APRIL	Unibank
Barito Pacific	Tanjung Enim Lestari	Bank Andromeda
Bob Hasan	Kiani Kertas	Bank Umum Nasional
Bob Hasan/Apkindo		Bank Bukopin
Bob Hasan		Bank Muamat
Astra	Surya Hutani Jaya	Bank Universal

³⁷ One of Kiani's special privileges has included the placement of a government customs office at the mill site. With its customs holiday, Kiani has been able to import capital goods directly to its mill and to export pulp without paying import-export duties, which are often on the order of 30 percent of the value of the goods themselves. It bears noting that as of November 2000, the Indonesian government continues to allow Kiani to enjoy this duty holiday.

Under Indonesia's commercial banking law, these and other private sector banks have been required to follow a fairly extensive set of regulations designed to ensure prudential management of commercial lending institutions. In particular, these laws have placed numerous controls on lending practices in order to maintain arm's length transactions between banks and the firms to which they loan money. Through the decade preceding the current crisis, however, the government's financial regulatory agencies enforced these rules only sporadically. Moreover, on more than one occasion, the New Order government took steps to bail out failing private sector banks belonging to groups with strong political connections when their financial mismanagement threatened them with insolvency.

In this weak regulatory environment, Indonesian conglomerates frequently used banks under their control – often illegally – to access much higher levels of finance than they would be able to secure from outside lending institutions (Deyang 1997). As one banking industry executive explained, “It was not unusual for a group to buy a bank that no one had ever heard of for US\$5 million or so, and to use this bank as the vehicle for financing its major projects. In many cases, this proved to be cheaper than borrowing capital at market rates from banks with which the group was not affiliated.”³⁸ Two fundamental banking laws that the government regularly failed to enforce were those stipulating the capital adequacy ratio (CAR) that private sector banks were required to maintain and those governing limits on lending to affiliated companies.

Since 1992, privately owned banks have been required to keep on hand capital stocks equivalent to at least 8 percent of the bank's total assets (Cole and Slade 1996). This regulation was intended to ensure that the banks would be able to maintain at least a minimum amount of liquidity in the event that they failed to recoup outstanding loans on schedule or that a substantial portion of the bank's depositors chose to withdraw their funds suddenly or unexpectedly. In the years preceding the financial crisis, several of the banks owned by conglomerates with major investments in pulp and paper regularly violated the government's capital adequacy ratio regulations, in some cases loaning out far greater sums of capital than Indonesian law allowed. In practice, this meant that those banks' assets, including outstanding loans, were often considerably smaller than their outstanding liabilities.

Violations of the government's capital adequacy regulations were particularly problematic in that conglomerate-owned banks frequently loaned far greater sums of capital to affiliated companies than Indonesia's banking law allowed. Formally, the government prohibited banks from extending more than 20 percent of their credit to firms with which the bank was affiliated through ties of ownership or management (Deyang, et al 1997). Related-party lending above this limit is generally believed to expose a bank's depositors to an excessive degree of risk. On the one hand, banks loaning money to affiliated companies presumably have an incentive to provide these funds at rates that do not adequately reflect the financial risks involved. On the other hand, banks are often loath to collect outstanding loans to affiliated companies if the borrower is unable or unwilling to repay.

Bob Hasan's Kiani Kertas pulp project is believed to have benefited substantially from the weak regulatory environment in Indonesia's commercial banking sector. Through 1997, Bank Umum Nasional, in which Hasan was the majority shareholder, reportedly channeled 79 percent of its

³⁸ Confidential interview, Jakarta February 20, 1999.

loans to sister companies (*Indonesian Commercial Newsletter* 1998). It is speculated that much of this was channeled to Kiani while the mill was under construction, including a portion of Rp 6.8 trillion in liquidity credits that the bank received from Indonesia's central bank in the early weeks of the crisis to keep the bank solvent (*Jakarta Post* 1998). Through 1997, Bank Umum Nasional reported operational income of only Rp 1.5 trillion while posting losses of Rp 4.4 trillion – much of this apparently being incurred through loan defaults on the part of Hasan-affiliated companies (*Indonesian Commercial Newsletter* 1998). At that point, the bank's assets amounted to only 62 percent of its outstanding liabilities.

Financial Mark-Up Schemes

In establishing new mills and adding production lines, Indonesian pulp and paper companies have frequently secured lines of credit that well exceed the real costs of their investments.³⁹ They have done so by employing a variety of financial mark-up schemes, in which they report to investors and lending institutions a set of inflated investment costs for projects for which they are seeking financing. By obtaining funds from banks and investors at the marked-up level, the owners of an expanding pulp or paper company are able to reduce the amount of capital that they, themselves, must commit to the project, typically on the order of 30 percent of the total cost of the investment. In cases where the mark-up is particularly high, companies are sometimes able to avoid committing any of their own funds and, instead, to emerge from the investment process with financing to spare. Such excess funds are frequently injected into the new mills in the form of working capital to generate what is known in the industry as “profit before operating.”

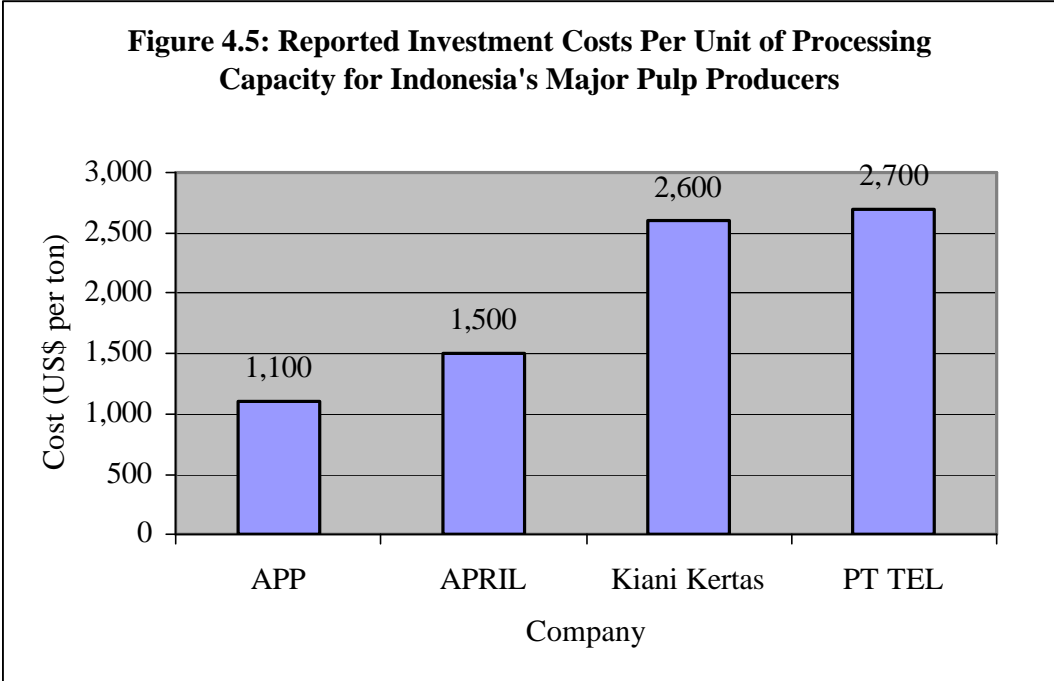
As Figure 4.5 shows, the per unit costs of investments in Indonesia's pulp industry have varied quite considerably. The Sinar Mas/APP group, which is often said to have among the lowest investment costs in the world, has reported spending approximately US\$1,100 per tonne of capacity in developing its Indah Kiat and Lontar Papyrus pulp mills (APP 2000).⁴⁰ By comparison, the Raja Garuda Mas/APRIL group spent US\$1,500 per tonne at its Riau Andalan Pulp & Paper facility. At the upper end of the spectrum, the Bob Hasan group reportedly built its Kiani Kertas pulp mill at a cost of US\$2,600 per tonne (Spencer and Choi 1999). Similarly, a partnership between Indonesia's Barito Pacific group and the Japanese trading company Marubeni claims to have spent US\$2,700 per tonne in developing the Tanjung Enim Lestari pulp plant (Bell, 1997).

There has been strong speculation among financial analysts and industry sources that the relatively high costs of the Kiani Kertas and Tanjung Enim Lestari mills — each of which was roughly 75 percent above the industry's intermediate costs of US\$1,500 per tonne of capacity —

³⁹ Confidential interviews with pulp industry executive, Jakarta, February 18, 1999, and with finance industry executive, Jakarta, February 20, 1999.

⁴⁰ Although Sinar Mas/APP has a reputation for having among the lowest pulp and paper investment costs in the region, some analysts have questioned whether the group may also be inflating the costs of its expansion projects. For instance, Singapore's GK Goh brokerage house noted that “Indah Kiat's recent capacity expansions have been costly. Based on investment costs reported in APP's bond prospectuses, we have seen 25 to 30 percent investment cost increases for identical projects between October 1996 and April 1997, resulting in a long-term depressing effect on investment returns” (GK Goh 2000).

reflect substantial mark-ups during the investment process (*Pulp & Paper Online* 1998).⁴¹ If these reports are true, it suggests that these mills involved mark-ups that may have been as high as US\$ 577 million and US\$540 million, respectively. The owners of these mills would then have been able to use these funds however they wished, with few strings attached.



Sources: Spencer and Choi 1999; Bell 1997

The use of financial mark-up schemes to generate capital above a project’s real cost is hardly unique to Indonesia’s pulp and paper industries. On the contrary, such practices were reportedly a common feature of high-cost investments throughout the Indonesian economy during the New Order period. According to one pulp industry executive,

All of Indonesia’s major conglomerates used mark-up strategies in one form or another. In fact, some of them lived off mark-ups – they would use the mark-up from one project to finance the next. In some cases, the mark-up they got up front was the whole point of the project, not the profits those projects would produce down the road.⁴²

This emphasis on generating profits through the diversion of funds during the investment process would appear to have played a significant role in encouraging Indonesian producers to develop large-capacity mills in spite of the financial risks involved. By maximizing the price tag on a new mill (or a new production line), the company could ensure that its investment would turn a profit even if the project ran into financial difficulties or collapsed later on.

⁴¹ Confidential interviews with pulp industry executive, Jakarta, February 18, 1999; with finance executive, Jakarta, February 20, 1999; and with finance executive, Singapore, April 8, 1999.

⁴² Confidential interview with pulp industry executive, Jakarta, February 18, 1999.

Mark-up schemes in Indonesia's pulp and paper industries have been structured in a variety of ways to circumvent both international and domestic financial regulations. They have commonly involved the artificial inflation of costs for equipment and other capital goods when new mills and production lines are being installed. In some cases, the purchasing company makes an explicit arrangement with the vendors of the equipment to work with two different sets of invoices.⁴³ One of these is based on the real prices of the materials purchased, and the other is based on inflated prices. While the purchasing company and the vendor use the first of these invoices for their actual transactions, the purchaser uses the latter invoice to support its marked-up credit applications with banks and investors.⁴⁴

In some cases, too, Indonesian pulp or paper firms use affiliated offshore holding companies to serve as intermediaries between themselves and foreign vendors.⁴⁵ The offshore holding company – which essentially serves as a fictitious retailer -- will purchase the capital goods from the vendor at their real price, and will then “resell” these goods to the pulp or paper producer, issuing an invoice that records an artificially high price. The goods themselves, however, are generally shipped from the vendor straight to the producer, and never pass through the hands of the holding company.

Financial mark-up schemes are also reportedly common in the construction phase for new mills and related infrastructure.⁴⁶ In some cases, such projects involve networks of fictitious contractors and subcontractors, which are purported to be suppliers of necessary services. The mill owner typically works with a legitimate engineering firm to mark up the cost of the construction process – at times by as much as 50 percent – and much of the excess finance obtained is then channeled through these fictitious companies.

Favorable Tax Laws and Accounting Procedures

Indonesia's favorable tax laws have provided yet another means for the country's pulp and paper companies to discount their capital costs. In particular, producers have benefited from government regulations that allow firms to accelerate depreciation on fixed capital assets for tax purposes. Generally accepted accounting procedures (GAAP) in both Indonesia and the United States allow companies to record commercial depreciation charges over the life of a fixed asset, such as a piece of machinery or a mill. In practice, this means that some portion of an asset's total value can be charged as an expense and deducted from the company's gross profits each year that the asset is in use. In the case of a US\$250 million paper machine that is expected to operate for 25 years, commercial depreciation on a straight-line basis would result in charges of US\$10 million per year for two-and-a-half decades after the machine is installed. At a corporate tax rate of 30 percent, commercial depreciation on this level would allow the company to avoid paying US\$3 million per year in taxes for 25 years, at which point the machine would be fully depreciated.

⁴³ Confidential interview with pulp industry executive, Jakarta, April 16, 1999 and April 27, 1999.

⁴⁴ One variation of this arrangement that has reportedly been common not only in the pulp and paper industries, but also in other parts of Indonesia's forestry sector, has been for the purchasing firm to report that it is buying new equipment when, in fact, it is purchasing used equipment at a discounted price.

⁴⁵ Confidential interview with pulp industry executive, Jakarta, April 27, 1999.

⁴⁶ Confidential interview with pulp industry executive, Jakarta, December 8, 1999.

Whereas commercial depreciation is a standard accounting procedure practiced in most countries of the world, Indonesian tax law permits companies to enjoy the added benefit of fiscal depreciation. The government's fiscal depreciation regulations allow firms to depreciate for tax purposes the cost of an asset over the first half of the asset's life. This allows companies to further reduce their tax liabilities during the years immediately following large capital investments. As a recent financial report on Indonesia's pulp and paper industry explains, the tax benefit deriving from fiscal depreciation is a timing benefit only:

Once the relevant piece of equipment has been fully depreciated for fiscal purposes, commercial depreciation is no longer an allowable deductible. Without such deductibles, taxable income will first turn positive and, as tax credits run out, the pretax income for fiscal purposes will be higher than that calculated on a commercial basis, resulting in tax payments that, compared to the pretax commercial income exceed the top rate (Spek 2000a).

In the case of the US\$250 million paper machine mentioned above, for instance, fiscal depreciation would allow the company to deduct US\$20 million per annum from pretax earnings for the first twelve and a half years after the machine was installed. Thereafter, the company would be entitled to no further deductions on the machine, and the firm's annual tax burden would be higher than if it had recorded depreciation charges on a commercial basis.

An important effect of Indonesia's fiscal depreciation regulations is that they encourage pulp and paper companies to engage in a process of perpetual expansion. As long as a producer is purchasing new equipment or installing new processing capacity, it is able to enjoy the considerable tax benefits associated with accelerated depreciation.⁴⁷ This, in turn, can have a very positive effect on a company's real cash flow. Some financial analysts have argued that the tax benefits associated with Indonesia's fiscal depreciation rules have played a central role in driving the aggressive expansion strategies carried out by the APP and APRIL groups during the 1990s (Spek 2000a; Ausnewz 1999). By making large capital purchases on a regular basis, these groups have been able to avoid a substantial portion of the tax obligations that would otherwise consume up to 30 percent of their corporate earnings.

The case of Indah Kiat illustrates the cost benefits that pulp and paper producers have derived from Indonesia's favorable tax laws. Between 1989 and 1996, the company expanded at a rapid pace, raising its pulp production capacity from 120,000 to 925,000 tonnes per year and installing capacity to produce 624,000 tonnes per year of paper and board (Speka 2000). Indah Kiat's expenditures on machinery during these years grew from Rp 450 billion to Rp 4.2 trillion. Through this period (excluding 1995), the company incurred depreciation charges of Rp 448 billion while recording aggregate fiscal depreciation of Rp 1.19 trillion (Spek 2000a). In real terms, this means that Indah Kiat took advantage of Indonesia's accelerated depreciation regulations to avoid paying some US\$90 million in taxes over a period of seven years. Table 4.5

⁴⁷ Indonesian GAAP provides pulp and paper producers with an additional incentive to expand their operations in that firms are allowed to capitalize interest on work in progress. Although producers generally pay interest charges on their debt while their operations are expanding, they are not required to record such payments on their balance sheets. This, in turn, enables them to publish higher profits than would be allowed if they were required to follow more conservative US GAAP reporting requirements. Inflation of profits in this manner often functions to boost a company's share price, as well as making its bond offerings more attractive to investors.

shows the amounts in nominal dollars that Indah Kiat depreciated for tax purposes during this period. It is likely that the total sum of Indah Kiat's foregone tax payments would be considerably higher than this if the company's fiscal depreciation for the period from 1997 onward were also calculated.

Table 4.5: Indah Kiat's Accelerated Depreciation: FY1989 – FY1996, excluding FY1995 (US\$m)

Year	Cumulative Machinery Expenditures	Commercial Depreciation	Fiscal Depreciation	Taxable Income	Future Tax Liability
1989	250.6	3.4	(54.3)	(16.2)	50.9
1990	465.4	13.9	(86.8)	(39.7)	72.9
1991	466.7	19.9	(58.8)	(22.4)	38.9
1992	671.1	22.5	(94.1)	(36.9)	71.7
1993	687.1	40.0	(61.5)	(24.2)	27.5
1994	710.0	35.7	(54.9)	(15.8)	19.2
1995	1,473.2	71.1	n.a.	n.a.	n.a.
1996	1,768.7	75.2	(151.9)	(47.9)	76.7

Source: Derived from Spek 2000a

To put Indah Kiat's fiscal depreciation strategy in perspective, it is helpful to recognize that since 1989 the company has generated over seven million tonnes of paper and board products and just under eight million tonnes of pulp -- accounting for roughly 287,000 ha of natural forest loss. By 1999, the company's annual sales exceeded US\$1.3 billion and operating profits were US\$429 million. Yet, through the 1990s, Indah Kiat paid no corporate income tax to the Indonesian government.

In fact, the company has not been able to avoid Indonesian taxes altogether – rather, much of its tax burden has simply been deferred. During the period 1989-1996 when Indah Kiat avoided paying US\$90 million through accelerated depreciation of its fixed assets, the company also incurred some US\$358 million in future tax liabilities. Now that the firm has reached a point where it can no longer expand its processing facilities in any significant way, analysts expect that Indah Kiat's tax credits will rapidly run out and the company will soon pay taxes at or above the statutory rate of 30 percent. A substantial tax bill is likely to cut sharply into Indah Kiat's profits, and in doing so, to reduce earnings margins at Asia Pulp & Paper, which currently derives 50 percent of its profits from Indah Kiat.

Access to International Finance

It would be misleading to suggest that Indonesian pulp and paper producers have made large-scale investments in high-risk projects solely, or even primarily, because domestic government subsidies and weak financial regulations have enabled them to discount their capital costs. International financial institutions have also played a critical role in facilitating the rapid expansion that has occurred in these industries. Since the early 1990s, international investment banks have channeled over US\$12 billion into Indonesian-based pulp and paper projects through

direct capital loans or by orchestrating bond offerings that tap into North American and European debt markets. Some of the industry's largest producers have also obtained funds by offering equity shares on international stock exchanges, establishing joint ventures with offshore partners, and entering into vendor financing arrangements.

Among Indonesia's pulp and paper producers, the Sinar Mas Group has been, by far, the most successful at securing international finance to carry out massive expansions in processing capacity. In 1994, the group placed its pulp and paper assets under the control of the Singapore-incorporated holding company, Asia Pulp & Paper. It did so to present itself to investors as a bonafide multinational, and to circumvent much of the sovereign risk premiums associated with investments in Indonesia (Hill 1998). In 1995, the group listed APP on the New York Stock Exchange, and obtained US\$311 million through its initial equity offering (*Asiamoney* 1996). Far more importantly, the group's New York listing enabled it to enter the US bond market, which allowed it to secure much larger amounts of capital than were possible through bank borrowing.

Impressed by APP's access to low-cost fiber, US investors and international investment banks enthusiastically supported an aggressive series of capacity expansions at the company's subsidiaries through the mid-1990s (Hill 1998). APP took advantage of these circumstances to borrow nearly US\$7 billion in the space of five years. APP's total debt grew from US\$2.4 billion in 1994 to US\$9.1 billion in 1998, while the group's assets rose from US\$4.1 billion to US\$15.7 billion (Ausnewz 1999).⁴⁸ One analyst described this exponential growth by noting that "in only six years (1992-1998), the Sinar Mas Group built APP from insignificance to a point that it vied for a spot among the world's top 10 pulp and paper producers" (Hill 1998).

The Raja Garuda Mas Group, Indonesia's second largest pulp producer, carried out a financial strategy that in some ways was remarkably similar to that of Sinar Mas, though on a much smaller scale. Like its competitor, Raja Garuda Mas consolidated its pulp and paper assets under APRIL, a Singapore-based holding company, in 1994. The following year, the group listed APRIL on the New York Stock Exchange to generate US\$280 million in equity capital (*Asiamoney* 1996). With its New York listing, APRIL also borrowed heavily to finance capacity expansions at its Riau Andalan Pulp & Paper facility. Through 1998, APRIL's total debt had reached US\$2.0 billion, versus total assets worth US\$3.3 billion (Ausnewz 1999).

The relative ease with which APP and APRIL have been able to obtain offshore financing underscores the fact that the international investment community has regularly underestimated or ignored the substantial risks associated with large-scale pulp and paper projects in Indonesia. This underestimation of financial risk can be attributed to two components of the process through which investment capital is channeled to high-growth industries in much of the developing world. First, it reflects a general weakness in the due diligence practices used by banks and other financial institutions to evaluate the risks associated with loans or bond offerings, particularly when these institutions stand to make large short-term profits from such transactions. Second, loan guarantees provided by industrial-country export credit agencies have substantially reduced the risk exposure of investment banks, often motivating them to loan large sums to much riskier

⁴⁸ The bulk of APP's long-term debt came in the form of bonds and notes payable, which grew from US\$1.5 billion in 1995 to US\$5.6 billion in 1998. By comparison, the group's long-term bank debt rose from US\$1.4 to US\$2.5 billion during the same period (Ausnewz 1999).

ventures than they might otherwise. The combined effect of these practices has been to place undue structural pressures on Indonesia's forests by directing capital into pulp and paper capacity expansions at costs that do not fully reflect the financial risks involved.

Weak Due Diligence Practices

In raising funds through bond issues, pulp and paper companies work with international investment banks. The bank is responsible for evaluating the project that will be supported by the funds generated from the bond, and for providing investors with a prospectus that offers the bank's assessment of the likelihood that the bond will be repaid with interest when it comes due. The information presented in a bank's due diligence report plays a critical role in shaping investor decisions regarding whether or not to subscribe to a particular company's bond offering.

Interviews with investment bankers involved in financing Indonesian pulp and paper projects suggest that the due diligence process has rarely involved rigorous analysis of the large mills' raw material supplies. According to one bank officer who has played an active role in organizing bond offerings for Asia Pulp & Paper, "Back in 1994-95, we finance people didn't really discuss wood supply because there was plenty of it. It's only now that we've started talking about it – because suddenly wood is a problem."⁴⁹ Even as the Sumatra mills face looming fiber deficits, however, the major banks that underwrote APP and APRIL's rapid expansion continue to base their due diligence reports largely on information provided by the companies themselves. A senior financial analyst at a Singapore-based investment bank described this process as follows:

Generally, I look at the information the company provides and see if it sounds plausible. This normally includes the documents and reports that the company is required to disclose to the SEC [US Securities and Exchange Commission]. When I see that the company has had an audit by [forestry consulting firm] Jaakko Poyry, then I'm more confident in the information they're providing. But I've never actually seen a Jaakko Poyry audit. The companies treat this as highly proprietary and don't like to release it. And [the bank] is not in a position to do our own audits like [international accounting firm] Arthur Andersen. So we have to get information wherever we can ... and try to verify it through cross-checking.⁵⁰

The fundamental lack of rigor involved in the due diligence process would seem to be particularly negligent to the extent that Indonesian pulp and paper producers are engaged in illegal practices. As discussed above, there are strong indications that the pulp industry relies heavily on illegally harvested wood and that several of the sector's large producers have employed a variety of illicit financial practices in funding their mills and plantations. Investment bankers interviewed for this study generally indicated that pulp producers' use of illegal wood was not of direct concern to their banks unless it threatened to affect those companies' profit margins. As one bank officer put it:

⁴⁹ Confidential interview, Singapore, February 1, 2000.

⁵⁰ Confidential interview, Singapore, February 1, 2000. This same financial analyst said that he generally visits these companies' pulpwood plantations once a year "to assess whether their claims regarding fiber supply are justifiable." He noted, however, that he has no training in forest management and "would not know if [he] was seeing 50,000 ha or 100,000." When asked if his bank had ever considered commissioning an independent audit of these plantation areas, he claimed that this would not be possible because the companies operate behind "a corporate veil."

[A client's use of illegally-obtained fiber] would be a concern to the extent that there was a possibility that that wood wasn't going to be there in the future. If the company was going to get its license revoked or face heavy fines, or if the government was going to stop the illegal cutting, then this would be an additional burden on those companies' operating costs. Clearly, we'd be concerned if their operating costs were going to go up significantly.⁵¹

International investment banks, in fact, have strong incentives not to look too closely at the projects they fund. With bond offerings in particular, these banks make substantial profits on commissions, which are generally based on the number of notes or shares that investors purchase and the total value of the capital raised.⁵² The bank normally receives an added bonus when a large-scale bond issue is fully subscribed. Moreover, the banks, themselves, often have at least short-term risk exposure with most initial public offerings in that they commit to purchasing a predefined portion of an offering's shares. If the bond is undersubscribed, then the banks are generally forced to sell the shares they are holding at a marked-down rate.

Export Credit Guarantees and Project Finance

Loan guarantees provided by export credit agencies (ECAs) from northern countries have also played a significant role in encouraging the flow of international investment capital to high-risk projects in Indonesia's pulp and paper sector (Fried and Soentoro 1999). Industrial country export credit agencies are parastatal financial institutions which have a mandate to facilitate capital investment projects involving the export of goods by their own country's vendors. North American and European export credit agencies, for instance, have actively supported overseas pulp and paper projects in order to promote exports of paper machines and other capital goods by home-country manufacturers. They typically play this role by providing noncollateralized guarantees for loans made by commercial banks to finance projects in countries, like Indonesia, involving high degrees of sovereign risk (Stephens 1999). In practice, this means that the export credit agency agrees to repay the banks if the importer is, for any reason, unable or unwilling to repay the loan when it comes due. In some cases, export credit agencies themselves provide investment capital through direct loans (Fried and Soentoro 1999).

Export credit agency loan guarantees have often played a critical role in securing project financing for high-cost investments, such as pulp and paper mills (Stephens 1999). On the one

⁵¹ Confidential interview, Singapore, February 1, 2000. When asked how his bank would respond if confronted with evidence that a client was running its mill with illegally obtained wood, but there were no indications that the government was going to take action against the company, this informant offered a more semantic response: "There's a definitional issue involved. What do we mean by illegal? If all the companies are getting wood from these kind of sources and the government's not enforcing its own laws, then how can we say its illegal?" Only when pressed further on the issue did he acknowledge that his bank would not want to be associated with illegal activities simply because they are illegal. As he explained, "This is bad for the bank's reputation among investors. Like Bank of New York having links to the Russian mob. If we knew a company was behaving illegally, sure, we would distance ourselves."

⁵² One Singapore-based financial analyst estimated the profits that investment banks have made through facilitating bond issues for Indonesian pulp and paper projects, as follows: "Banks get a straight commission of approximately 1.25 percent for bond origination and underwriting fees. They get an additional 0.5 percent in selling fees, depending on the bond's syndicate structure. All banks together, therefore, would have made – at a bare minimum – 1.75 percent on all of APP's bond debt, at least through originating, underwriting and placing the bonds. This is before advisory fees, swaps, and trading transactions are taken into account." Confidential interview, Jakarta, August 24, 2000.

hand, they encourage commercial banks to support such projects with capital loans, by reducing or eliminating the banks' risk exposure. On the other hand, the export credit agency guarantees reduce the financing costs associated with capital-intensive projects, which is frequently essential for attracting investors.⁵³ In both respects, the loan guarantees effectively promote investments in financially risky projects. In short, the export credit agency agrees to bear the cost if the project fails. Many export credit agencies, however, routinely pass on the risks associated with such investments to the government of the importing country. They do so by requiring the government to sign a counter-guarantee before the export credit agency will provide the initial loan guarantees that are often required for large investment projects to move forward. With such counter-guarantees in place, the risks associated with private investments are ultimately borne by public institutions.

A recent study of 33 large investment projects in Indonesia during the period 1994-1997 found that the country's pulp and paper sector has been a prime beneficiary of export credit agency loan guarantees (Fried and Soentoro 1999). Surpassed only by the country's power sector, large-scale pulp and paper projects received US\$4.2 billion in loans during this period that were covered by export credit guarantees. Mills known to have benefited from export credit agency support include Tanjung Enim Lestari, Indah Kiat, and Riau Andalan Pulp & Paper. As Fried and Soentoro (1999) explain export credit agency guarantees often covered only a portion of the loans made for these projects, but they functioned in part to leverage much higher levels of investment funds:

The finance packages for the larger ECA-supported projects typically involve a number of tranches, including long-term commercial loans (some covered by private or public guarantees or insurance), equity, revolving credit, and often an "ECA tranche" which may be a commercially syndicated loan covered by ECA guarantees... A 1997 US\$1.3 billion loan to Tanjung Enim Lestari for the construction of a controversial pulp mill in South Sumatra, for example, involved 6 tranches ... The provision of ECA guarantees in one tranche of the loan – [totaling US\$650 million] -- leveraged total project finance of over US\$1.3 billion.

Impact of the Financial Crisis and *Reformasi*

Prior to the onset of the financial crisis in July 1997, Indonesian companies had plans to double the processing capacity of the country's pulp industry by the year 2005 (Jaakko Poyry 1998). This capacity expansion included the installation of new production lines at Indah Kiat and Riau Andalan, as well as the construction of several new mills by companies not previously active in the sector. With the international investment community then giving strong signals that it would continue to support the development of large-scale pulp facilities in Indonesia, several of the country's largest conglomerates were eager to participate in the seemingly endless flow of profits that such projects offered.

⁵³ As one financial analyst explained in an interview, "When investors calculate the return on an investment, finance costs are the key. Export credit agencies give low costs for finance. If low finance costs are absent, the cost of a project goes way up. Sometimes investors won't commit [to an investment project] unless an export credit agency is involved. In this way, export credit agencies incentivize expansion by providing low-cost capital. And the significance of this cannot be overestimated – a lot of mills have been built because the finance costs have been so low." Confidential interview, Singapore, February 1, 2000.

These new mill projects came to a sudden halt following the collapse of Indonesia's monetary system in late 1997. With the rupiah losing 80 percent of its value between July of that year and January 1998, the country's private sector was thrown into a severe liquidity crisis that made new capital investment virtually impossible. Domestic lending dried up as large numbers of private and state-owned banks became insolvent. As significantly, offshore financial institutions pulled back from Indonesia as the economic crisis and subsequent political transformation pushed the country's sovereign risk ratings sharply upward.

For pulp and paper producers operating in the sector before the crisis hit, the country's economic and political turmoil has had three significant, and in some respects contradictory, effects. First, the crisis has put added financial pressure on Indonesia's heavily-indebted producers by curtailing their access to capital markets and by pushing some companies into receivership. Second, the depreciation of the rupiah has substantially reduced domestic pulp production costs, thereby providing Indonesian producers with windfall profits in many export markets, as their products are sold in US dollars. Third, the weakening of the Indonesian state since the fall of the Suharto regime has substantially raised the financial risks associated with the country's large-scale mills and pulpwood plantations.

Corporate Debt

The fact that Indonesian pulp and paper producers had borrowed heavily to fund their capacity expansions through the 1990s meant that many of these companies were particularly vulnerable when the financial crisis hit the region. This was especially the case for companies carrying substantial loads of dollar-denominated debt, which included each of the industry's major producers. As Table 4.6 shows, the country's five largest producer groups held pulp and paper-related debts totaling just under US\$13 billion to offshore creditors through the end of 1998.⁵⁴ The largest portion of this, by far, was held by the Sinar Mas group's holding company, Asia Pulp & Paper.

⁵⁴ This figure includes US\$2.7 billion that APP borrowed to finance its paper and board mill projects in China.

Table 4.6: Corporate Debt Owed by Indonesian Pulp and Paper Producers to Offshore Creditors and to IBRA, January 1999

Group	Offshore Pulp/Paper Debt (US\$m)	IBRA Pulp/Paper Debt (Rp bn)	IBRA Debt Other Sectors (Rp bn)	Total IBRA Debt (Rp bn)
Sinar Mas /APP	9,075	n.a.	423	423
Raja Garuda Mas/APRIL	2,010	484	433	917
Kiani Kertas/Bob Hasan	670	2,480	1,997	4,477
PT TEL/Barito Pacific	911	n.a.	6,395	6,395
Surya Agung	250	n.a.	n.a.	n.a
Basuki Rachmat	n.a	1,634	n.a.	1,634
Kertas Lece	n.a	308	n.a.	308
Total	12,916	4,906	9,248	14,154

Sources: Offshore debt figures extracted from Ausnewz (1999); domestic debt figures from IBRA (June 1999). [January 2000 exchange rate = Rp 6,700/US\$]

In addition to their large offshore obligations, Indonesia's pulp and paper groups are responsible for over Rp 14 trillion in nonperforming loans that had been transferred to the Indonesian Bank Restructuring Agency (IBRA) through January 1999. Converted at the January 2000 exchange rate of Rp 6,700/US\$, this sum amounts to US\$2.1 billion. Just over one-third of this total – US\$728 million -- is owed to IBRA by four companies operating specifically in the pulp and paper sector. The largest of these is Bob Hasan's Kiani Kertas mill, which owes IBRA US\$370 million to rank ninth on the agency's list of over 4,000 corporate debtors. Kertas Basuki Rachmat, an integrated pulp and paper producer located in East Java, ranks eleventh on IBRA's list, owing the bank restructuring agency US\$244 million.

It is significant that the Barito Pacific and Bob Hasan groups also account for over US\$1.2 billion in nonperforming loans owed to IBRA that are associated with investments in industries other than pulp and paper (Barr, et al., forthcoming). In the case of Barito Pacific, it is possible that failure to resolve these debts could lead the bank restructuring agency to place in receivership the group's equity interests in the Tanjung Enim Lestari pulp mill and its affiliated Musi Hutan Persada plantation.

Windfall Profits

If the financial crisis has put added pressure on Indonesia's heavily leveraged pulp and paper companies, it has also created conditions that have allowed them to earn windfall profits on much of their output. This has occurred because 60 to 70 percent of the costs involved in pulp production are rupiah-based, while the remainder are linked to the US dollar. When the rupiah lost 80 percent of its value in the first six months of the crisis, Indonesian companies' pulp production costs tumbled from US\$290 to less than US\$100 per tonne (Thoenes 1998; Goldman Sachs 1998).

These low cash costs have sharply increased the competitiveness of Indonesian pulp in international markets, and at times have made it possible for Indonesian producers to deliver pulp to the European and North American markets at prices that are still below those of the importing regions' own producers (Thoenes 1998; Spencer and Choi 1999). Through 1998 and 1999, for instance, the pulp production costs of most European and North American producers rarely dropped as low as US\$400 per tonne. For integrated pulp and paper producers such as APP, the drop in pulp costs has also allowed the group's paper producers to remain profitable when international paper prices have been low (Goldman Sachs 1998).

Increased Financial Risk

The changes in Indonesia's political landscape since President Suharto's forced resignation in May 1998 have significantly raised the degree of financial risk associated with the country's large-scale pulp and paper mills, as well as pulpwood plantations. In particular, the considerable weakening of the state apparatus vis-à-vis Indonesian society has left many of these projects vulnerable to conflicts with surrounding communities. Whereas the New Order government regularly used the nation's military and police forces to keep local communities from threatening the interests of private sector investment projects, the post-Suharto state has shown itself increasingly unwilling and unable to do so. In many provinces, violent land and resource conflicts between rural communities and extractive industries have become endemic.

The financial risks that such conflicts pose are magnified for Indonesia's major pulp and paper projects for two reasons. First, the high levels of capital investment in large mills means that they incur substantial costs if their operations are, for any reason, disrupted. Such costs become particularly problematic for heavily leveraged companies, which need to maintain a substantial cash flow to stay current on their interest payments. The financial vulnerability of large mills has become readily apparent in the case of Inti Indorayon, the Raja Garuda Mas group's US\$600 million pulp and rayon facility in North Sumatra. For much of the period since November 1998, communities located near the mill have halted Indorayon's operations to protest the company's negative impact on the surrounding environment.⁵⁵

A second factor that magnifies the financial risks of social conflict for pulp and paper producers is their need to secure long-term control over large plantation areas. To establish a sustainable fiber supply for its mill, a pulp producer must not only be able to plant a sufficiently large area on an annual basis, but also to harvest each area planted when the trees mature seven to eight years later. In many parts of Sumatra and Kalimantan, efforts on the part of HTI companies, first, to clear large tracts of forested land, and then, to place these areas under long-term management regimes have triggered intense disputes with both indigenous and settler communities (Potter and Badcock 2000). In several reported cases, local peoples have allegedly pulled up trees planted by HTI companies and, at times, burnt plantation estates. In an ongoing dispute involving the Musi Hutan Persada plantation in South Sumatra, villagers have reportedly blocked company trucks from carrying wood from the HTI site to the Tanjung Enim Lestari pulp mill..

⁵⁵ The financial costs of Indorayon's conflict with the communities is discussed in Box 5.3 in chapter 5.

Conclusion and Policy Options

This paper has argued that the rapid expansion that has occurred in Indonesia's pulp and paper industries over the past decade has far outpaced efforts to develop sustainably managed pulpwood plantations. As such, the country's largest pulp mills – APP's Indah Kiat and APRIL's Riau Andalan – are facing looming fiber supply deficits over at least the next five to seven years. Given the high fixed costs involved in pulp and paper production, Indonesian producers' failure to secure a legal and sustainable fiber supply implies that these projects carry a significant degree of financial risk. At the very least, these mills' production costs are likely to increase sharply in the coming years as supplies of mixed tropical hardwoods available in Riau and surrounding provinces are exhausted.

To a significant degree, owners of Indonesia's major pulp and paper mills have carried out high-cost capacity expansions because they have been able to avoid the financial risks involved. Pulp conglomerates until now have had access to large volumes of pulpwood fiber from natural forests at prices that are well below the wood's actual stumpage value. They have also received both direct and indirect capital subsidies through soft loans from government banks and the Reforestation Fund; favorable tax laws that allow for accelerated depreciation of fixed assets; and weak enforcement of Indonesia's financial regulations, which has enabled companies to mark-up the cost of their investments and to borrow money from affiliated banks.

As significantly, Indonesia's pulp and paper producers have enjoyed relatively easy access to international finance, borrowing approximately US\$12 billion to support their expansion efforts during the 1990s. Weak codes of due diligence and loan guarantees from industrial-country export credit agencies have led international investment banks to fund high-cost capacity expansion projects without adequately evaluating the financial risks involved. The use of public monies to relieve the debt burdens of Indonesia's pulp conglomerates, as will be discussed in chapter 5, suggests that their debt-driven expansion strategies have been characterized by a high degree of moral hazard. Indeed, just as these producers built their mills with money that did not belong to them, there are now indications that at least a portion of their debts will be paid off by funds coming initially from industrial country taxpayers and ultimately from the people of Indonesia.

By any account, the high capital costs associated with pulp and paper processing suggests that it will be difficult to alleviate the structural pressures that Indonesia's existing mills place on the country's remaining natural forests. However, there are steps that can be taken to enforce the adoption of more sustainable forest management practices on the part of the industry. Options that government policymakers and financial institutions might consider include:

1. A moratorium on new pulp and paper processing capacity expansions in Indonesia until full and public audits of the companies' pulp wood supply plans are carried out.
2. Elimination of the wood supply subsidy to Indonesia's pulp industry, by raising royalties and fees to reflect the full stumpage value of the wood.

3. Enforcement of the Indonesian government's 1998 moratorium on the allocation of new forest conversion licenses, in accordance with the government's existing commitments to the IMF and the Consultative Group on Indonesia. This moratorium could be extended to include restrictions on new harvesting permits for existing forest concessions slated for conversion.
4. Introduction of a credible independent monitoring program of plantation development (including the use of aerial or satellite images) and sanctions provided for companies that fail to meet agreed-upon sustainability targets.
5. Enforcement of improved due diligence practices on the part of financial institutions funding pulp and paper projects, so as to ensure that the financial risks associated with these projects are fully assessed and that financing is not being allocated to projects involved in illegal practices, including use of illegally obtained raw materials.

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