CHAPTER NINE

Timber Concession Reform: Questioning the "Sustainable Logging" Paradigm

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Since the mid-1980s, policy discussions aimed at promoting sustainable forest management in Indonesia have focused almost exclusively on reforming the *Hak Pengusahaan Hutan* ([HPH] Forest Concession, Forest Exploitation Rights) timber concession system.[1] This emphasis on HPH reform is hardly surprising given the pressures that Indonesia's commercial logging industry has put on the nation's forests over the last three decades. Since 1967, when the New Order regime opened the rich Dipterocarp forests of the Outer Islands to large-scale timber extraction, the Government of Indonesia (GOI) has allocated a total of 585 HPHs, covering 62 million ha, to private and state-owned logging companies (Brown 1999). According to official figures, HPH holders generated 612 million m^3 of roundwood between 1970 and 1999, or 20.4 million m^3 annually for 30

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years. Some industry analysts have argued that actual timber removals by HPH holders during this period were, in fact, approximately twice this volume (Kartodihardjo 1999a; see Chapter 7 of this book).

Policy analysts advocating reform of the HPH system as a means to achieve sustainable forest management have generally prioritized three objectives. First, they have sought to increase the government's capacity to enforce the technical aspects of sustainable concession management (MoF 1995; The World Bank 1993; Gray and Hadi 1989). In practice, such efforts have largely been oriented toward designing more effective mechanisms for monitoring concessionaires' harvesting practices to ensure that they adhere to the selective cutting guidelines stipulated in the HPH contract.[2]

Second, forest economists have advocated a sharp increase in the government's timber royalties and fees to halt the flow of resource rents—that is, revenues above a "normal" rate of return—to concession holders (Brown 1999; Scotland and Whiteman 1997; The World Bank 1993; Ingram 1989; Gillis 1988). From a fiscal perspective, they maintain that the government's failure to fully capture timber rents implies the loss of funds that might otherwise be used by the state for formal budgetary allocations. In terms of sustainability, they argue that access to excessive profits leads concession holders to undervalue the resources under their control, which effectively undermines their incentive to manage their HPHs sustainably over the long term.

Third, policy analysts have long called on the Indonesian government to lift the prohibitive restrictions on log exports that it has maintained since the early-1980s (Manurung and Buongiorno 1997; The World Bank 1995; Vincent 1992; Lindsay 1989). They emphasize that these restrictions have led concession holders to sell virtually all of the timber they produce to Indonesia's wood-processing industries at prices that are well below international market rates. Underpricing of this sort is believed to promote inefficiency both at the point of log harvesting and during processing operations.

Taken together, these three sets of prescriptions—selective cutting, full rent capture, and market-based efficiency—represent the essential pillars of what can be called the "sustainable logging" paradigm. Although the policy prescriptions associated with this paradigm have been proposed, in some form, for practically every timber-producing country in the world, they have been advocated especially loudly in the case of Indonesia. This approach to sustainability has been articulated most recently and most comprehensively by the World Bank following the onset of the current economic crisis in late 1997. In the early months of the crisis, the World Bank took steps to ensure that conditions aimed at reforming the country's timber concession system were pointedly included in the International Monetary Fund's US$43 billion bail-out loan agreement with the Indonesian government. Key elements of the reform proposals included the following policy interventions:

- strengthening HPH contracts by extending them to 35 years and making them transferable;
- enforcing improved concession management by introducing performance bonds and independent monitoring;
- removing market-distorting practices by lifting restrictions on logs, sawnwood, and wood panels; and
- increasing the state's rent capture by raising timber royalties and introducing area-based fees for logging concessions (The World Bank 1998).

Five basic assumptions have supported efforts by the World Bank and others to achieve sustainable management of Indonesia's forests by reforming the HPH system.

1. Controlling log supply, without taking any direct steps to reduce demand for industrial timber, is an effective strategy for sustaining the nation's natural forest resource base.
2. The most effective means of reducing Indonesia's log harvests to a sustainable level is by reforming the HPH system.
3. Increased efficiency will promote the conservation of natural forests.
4. Sustainable concession management is profitable.
5. The GOI has the institutional capacity to enforce the proposed changes in the HPH system and the forest products trade.

In this chapter, I examine each of these assumption and the policy prescriptions that emerge from them. Based on this analysis, I argue that the "sustainable logging" reform agenda is quite unlikely to succeed in reducing Indonesia's timber harvests to the government's own widely cited sustainability threshold of 25 million m^3 per year.[3] I maintain that for structural reasons this may, in fact, be an unachievable goal. Reform of the HPH system alone fails to address key factors that are encouraging unsustainable rates of log removals—most notably, effective demand for timber on the part of the nation's wood-processing industries and new technologies that have made previously marginal areas and species commercially viable (see Chapter 16).

The reforms of the HPH system proposed by the World Bank and others have also failed to address significant qualitative changes that have occurred in the sources of timber supply over the past decade. These include a marked decline in the volume of logs generated by concession holders, as well as a corresponding rise in large-scale forest conversion and other unsustainable harvesting practices. Moreover, in assuming that sustainable concession management is profitable, proponents of the "sustainable logging" paradigm erroneously conclude that most private timber operators will be willing—over both the short and long term—to employ environmentally sustainable logging practices if required to do so. Finally, advocates of HPH reform as a strategy for achieving sustainability generally overestimate the GOI's political

will to impose a substantial reduction in the nation's timber supply, as well as its institutional capacity to carry out such a policy.

Assumption #1: Controlling Log Supply, without Taking Any Direct Steps to Reduce Demand for Industrial Timber, Is an Effective Strategy for Sustaining the Nation's Natural Forest Resource Base

A central objective for advocates of the "sustainable logging" paradigm has been to establish tighter controls over Indonesia's timber supply to reduce log removals to the supposedly sustainable level of 25 million m^3 per year. Since the late 1980s, the World Bank has sought to accomplish this by persuading the Indonesian government to enforce improved HPH management practices through the implementation of performance bonds and an independent monitoring system (The World Bank 1993, 1998). Moreover, to give logging companies an economic incentive to adhere to the government's selective cutting guidelines and to reduce damage to the forests under their control, the World Bank has called for the GOI to extend the HPH contract from 20 to 35 years and to make concessions transferable.

Collectively, these policy interventions have been intended to introduce more effective mechanisms for restricting the volumes of logs that are harvested from areas managed by timber concession holders. To the extent that the World Bank and proponents of HPH reform have addressed the issue of demand for logs on the part of wood-processing industries, they have done so only indirectly. Their attention to industrial timber demand has generally been limited to advocating policies designed to push Indonesia's wood processors to invest in efficiency, which will presumably lead these processors to reduce the overall volume of wood they consume. In seeking to remove restrictions on log exports and to raise timber royalties, for example, the bank has sought to bring Indonesia's domestic log prices up to international parity levels. Its primary aim in doing so has been to force the country's plywood factories and sawmills to use fewer logs in generating their processed wood outputs.

By focusing almost exclusively on controlling timber supply rather than reducing effective demand for logs, advocates of the "sustainable logging" paradigm have essentially failed to recognize the degree to which overcapacity exists within Indonesia's wood-based industries and the structural problems that it poses. In fact, the installed production capacities of the nation's sawnwood, plywood, and pulp industries have created a demand for logs and fiber that substantially exceeds the supply capacity of Indonesia's formal timber production apparatus. Table 9–1 shows the installed production and wood utilization capacities of these three industries in 1997.

While aggregate roundwood consumption capacity for the three industries

Table 9–1: Production Capacity and Roundwood Consumption of Indonesia's Major Wood-Based Industries, 1997

Industry	Units	Production capacity	Estimated real production	Estimated roundwood consumption
Sawnwood and molding	2,345	18,975,000 m^3	13,300,000 m^3	24,180,000 m^3
Plywood	115	12,600,000 m^3	10,080,000 m^3	20,160,000 m^3
Pulp	15	3,900,000 t	3,400,000 t	16,660,000 m^3
Total				61,000,000 m^3

Sources: APKI 1997, APKINDO 1999, and ISA 1999.

Notes: t = metric tons. Production capacity figures included in this table are based on statistics provided by the respective industries' producers associations. Yet several assumptions are made to estimate real production levels and roundwood consumption. In the aggregate, sawnwood and molding producers are estimated to have operated at 70% of their installed production capacity and to have had an average recovery rate of 55% for the roundwood they consume. Plywood producers are estimated to have operated at 80% of their installed capacity and to have had an average recovery rate of 50%. Pulp producers are estimated to have operated at 87% of installed capacity, with 4.9 m^3 of roundwood needed to produce each metric ton of pulp.

stood at approximately 78 million m^3 during 1997, it is conservatively estimated that these three industries consumed 61 million m^3 of raw materials.[4] This figure is 36 million m^3 higher than the volume of timber removals that the Ministry of Forestry and Estate Crops (MoFEC) claims is sustainable as an annual harvest.

The existence of such a substantial "structural timber deficit" poses fundamental problems for the "sustainable logging" reform agenda in terms of both the policy formulation and implementation. On the one hand, the very existence of these industries promotes an expectation among policymakers that processors should have access to raw materials—that is, that they are literally machines that need to be fed. As a plywood officer at the Barito Pacific Group explained in an interview,

> The government won't let the industry collapse from lack of raw materials because plywood is too important for the economy. The Forestry Department will always find a way to make more timber available, as long as the demand exists. In fact, this is what they have done over the last several years in opening large areas of *izin pemanfaatan kayu* ([IPK] permission to use the timber in conversion forest), carrying out the *Proyek Lahan Gambut* ([PLG] Peat Lands Project) Million Hectare Sawah Project, and so forth. (Soedibyo 1999)

Policymakers are likely to feel particularly strong pressure to ensure a continuous supply of raw materials to industries, such as pulp and paper, in which processing facilities entail extremely high fixed costs or in which processors have close ties to state elites.

The structural demand for substantial volumes of timber above and be-

yond those generated by the official log supply is a central factor driving Indonesia's illegal timber trade. Estimates of illegal log removals in recent years have ranged from 12 to 32 million m^3 per year (ITFMP 1999). There is anecdotal evidence suggesting that illegal logging may have expanded dramatically in many parts of the country since the financial crisis began. Undocumented harvesting is often carried out by licensed concession holders who extract logs above their annual allowable cut or by logging in areas that have not been approved by the MoF[5] (Kartodihardjo 1999a). At times, this includes forests located outside their concessions. Moreover, organized syndicates of illegal loggers are known to be active in most timber-producing provinces (Telapak Indonesia and EIA 1999). While these groups are often financed by local businesspeople—in some cases HPH holders—they are said to almost always involve some degree of collusion with members of the armed forces, the local forestry bureaucracy, and other elements of the government's law enforcement apparatus (see Chapters 7 and 16). In parts of Kalimantan and Sumatra, whole units of the armed forces and national police are known to run rogue timber operations as a means of supplementing their official budgets (Asnawie 2000; WWF and DFID 1998; Sacerdoti 1979).

The pervasiveness of illegal logging and the Indonesian government's relatively weak capacity to enforce its own forest boundaries suggest that any efforts to control timber supply without reducing effective demand on the part of the nation's wood-based industries are likely to be futile. Indeed, there is widespread sentiment within the industry that the establishment of an effective log monitoring and regulatory system would take several years to implement, even under the most favorable of circumstances. Continued demand for illegal timber on the scale that currently exists in Indonesia is likely to seriously undermine this process and to keep log removals well above the government's own sustainability targets. In this way, it would appear that any serious attempt to cut harvest levels substantially must, at some point, involve proactive steps to reduce production capacity on the part of Indonesia's wood-processing industries.

Assumption #2: The Most Effective Means of Restricting Indonesia's Log Harvests to a Sustainable Level Is by Reforming the HPH System.

A majority of the forestry sector policy interventions put forth by the World Bank and other proponents of the "sustainable logging" paradigm have focused on reforming the HPH system to bring about a sharp reduction in timber production levels. Proposed interventions to the HPH system have included enforcing concession management practices better through the introduction of performance bonds and independent monitoring, extending

the HPH contract and making it transferable, de-linking HPHs and processing facilities, and raising the state's rent capture by increasing timber royalties and introducing area-based fees. By contrast, proposed reforms have directed scant attention toward reducing log output levels from other (i.e., non-HPH) legal sources of timber production or toward controlling illegal log removals outside of HPH areas.

This emphasis on reforming the HPH system made a fair amount of sense in the late-1980s when Indonesia's timber concessions formally generated 26–27 million m^3 of logs per year, accounting for approximately 90% of the country's official timber supply (Departemen Kehutanan 1994). Over the last decade, however, Indonesia's legal timber supply has experienced significant changes, which recent policy proposals aimed at promoting sustainable logging have largely failed to address. Specifically, there has been a steady decline in the volume of logs officially produced within the HPH system since 1990. According to MoF statistics, timber production levels realized under concessionaires' *Rencana Karya Tahunan* ([RKT] approved Annual Work Plans), in effect, the cumulative legal output for all HPH holders—dropped from just under 24 million m^3 in 1990–1991 to 15 million m^3 in 1996–1997 (Direktorat Bina Pengusahaan Hutan 1999a). This 37.5% drop in RKT output at the national level was, in fact, surpassed by the declines recorded for many of Indonesia's major timber-producing provinces. RKT levels during this period dropped by 48% (from 6.0 million to 3.2 million m^3) in East Kalimantan and by 79% (from 2.9 million to 600,000 m^3) in Riau.

This sharp decline in RKT production levels stems from the fact that large numbers of HPHs were taken out of production during the 1990s. Indeed, by the time President Soeharto was forced to step down in mid-1998, only 389 of the 652 concessions that had been distributed during the New Order period remained in operation.[6] Seventy-seven HPHs covering 5.5 million ha were either returned to the state or revoked by the MoF before the concessionaire's initial 20-year contract had ended. More significantly, the MoF chose not to renew the license for 186 HPHs covering 15.7 million ha after their initial contract period had expired. Unfortunately, detailed information on why these HPHs were revoked or not extended is not publicly available, so it is difficult even to speculate on the extent to which these areas remain at all commercially viable. Of the 263 HPHs that reverted to the state, only 33 covering 3.3 million ha were reallocated to other concession holders. A far larger number—147 HPHs covering 9.5 million ha—were assigned to the control of the state's five Inhutani forest enterprises for "rehabilitation."

Over the past several years, the MoF has adopted a number of strategies to make new supplies of timber available to Indonesia's wood-based industries to compensate for the HPH system's declining output. Within the parameters of the HPH system, the MoF has responded to the growing scarcity of accessible

and commercially valuable logs in many parts of Kalimantan and Sumatra by opening the expansive forests of Irian Jaya (now referred to as Papua) to large-scale logging. It has done so by allocating 40 HPHs in Papua, covering an area of 9.7 million ha, between 1989 and 1997 (Direktorat Penyiapan Pengusahaan Hutan 1998). Papua's role as the timber industry's new frontier is made clear by the fact that the province's RKT output levels rose from 732,000 m^3 in 1990–1991 to 2.3 million m^3 in 1997–1998, in sharp contrast to the declines recorded in most other timber-producing provinces (Direktorat Bina Pengusahaan Hutan 1999a).

During this period, the MoF has also taken steps to broaden and deepen the nation's legal timber production system to generate significant volumes of logs from new sources. It has done so by implementing the following strategies:

- slating large areas of forest for conversion to other uses and making these available to logging companies for clear-cutting,
- allowing private timber operators to extract logs from areas under Inhutani control through ad hoc contractual arrangements, and
- weakening the HPH system's *Tebang Pilih Tanam Indonesia* ([TPTI] Indonesian Selective Planting and Cutting System) guidelines.

Although each of these strategies poses direct challenges to the sustainability of natural forests, they have thus far largely gone unaddressed by those advocating policy interventions aimed at promoting sustainable logging through HPH reform.

The Growing Reliance on Forest Conversion

The most significant strategy the MoF has used for maintaining Indonesia's formal timber supply has been to make vast tracts of conversion forest available to logging companies for clear-cutting. Since the early 1990s, this policy has been tied to the government's efforts to support the development of the nation's pulp and palm oil industries by opening up forested areas for the establishment of tree plantations (see Chapters 8 and 10). Under the MoF's forest conversion policy, a private timber operator is able to obtain an *izin pemanfaatan kayu* ([IPK] wood utilization permit) to harvest the timber from areas that have been slated for conversion. In contrast to the HPH contract, the IPK agreement allows the logging company to employ nonselective harvesting techniques and to pay minimal royalties (and no reforestation fee) on the logs that are cut. Although some of Indonesia's timber groups have made investments in oil palm plantations, it is not uncommon for IPK holders to abandon these sites once they have removed all stems of commercial value.

As Figure 9–1 shows, the aggregate volume of timber produced through IPK forest conversion rose from 4.2 million m^3 in 1994–1995 to 10.1 million m^3 in 1997–1998, compensating substantially for the sharp decline in logs

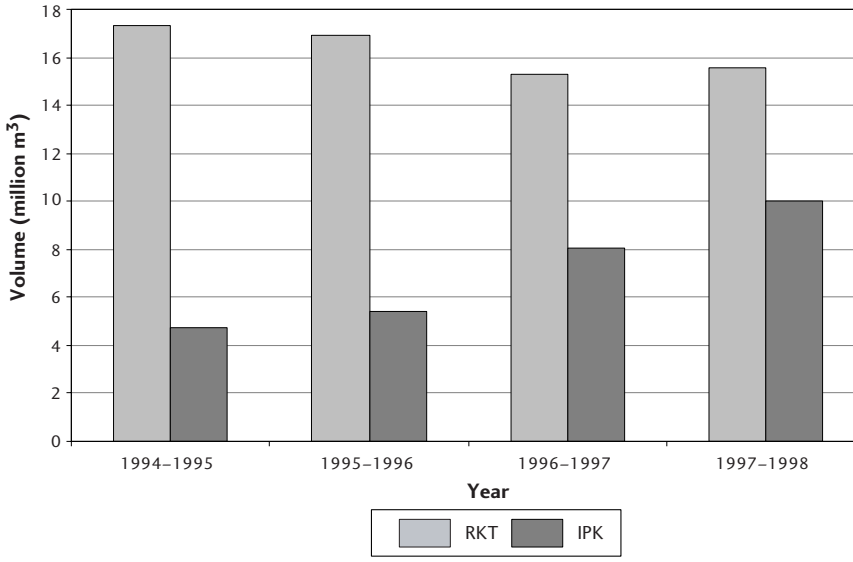

Figure 9–1. Roundwood Production from RKT versus IPK

produced under the HPH system (Direktorat Bina Pengusahaan Hutan 1999b).

In its 1998 issues paper, the World Bank acknowledges the very major threat to sustainability posed by widespread conversion of natural forests, calling it "one of the most insidious forces operating in the forests at present in Indonesia" (The World Bank 1998, 16). Significantly, however, the bank fails to recognize the degree to which the GOI's conversion policy is linked to the aggregate decline in timber yields from the HPH system over the last several years. In fact, it identifies "the most significant forces for conversion of forest" as being largely exogenous to the forestry sector per se: oil palm and cocoa projects, livelihood-based agriculture, and transmigration (The World Bank 1998, 16). This leads the World Bank to offer the astonishing conclusion that "most of the conversion pressures on the forests in recent years in Indonesia have originated from decisions made by stakeholders and interest groups outside the official Ministry of Forestry."

The World Bank's failure to appreciate the central role that forest conversion currently plays in the MoF's roundwood supply strategy leads it to grossly underestimate the pressures that exist both within the private sector and within the state to keep a large-scale conversion policy in place. Given the fact that IPK forest conversion accounts for roughly 40% of the nation's legal timber and pulpwood supply, it is difficult to imagine that the MoF will not seek to maintain current conversion levels, for as long as possible, to meet the demand for timber among Indonesia's wood-based industries. While estate crops were formally under the MoF's jurisdiction, it could even promote large-scale forest conversion without

losing administrative authority over the areas allocated for agroindustrial estates.

Exploitation of Areas Under Inhutani Control

A second strategy employed by the MoFEC was to allow select logging companies to extract timber from areas under the jurisdiction of the Inhutani state forestry enterprises, which currently total just under 10 million ha.[7] This typically occurs in one of two ways: In some cases, the MoF allocates an area with remaining stands of commercially valuable timber as an HPH that is run as a joint venture between a private timber operator and one of the Inhutanis. More often, an Inhutani will engage a private logging company—at times, an area's former concession holder—to harvest timber stocks under an informal work contract known within the industry as a *Kerja Sama Operasi* ([KSO] Operational Collaboration).

Little public information exists about the terms of these contracts, the types of areas exploited, the management practices used, or the volumes of logs produced under such arrangements. Yet many industry observers claim that KSO contracts often enable logging companies to harvest timber from degraded areas, to cut in logged-over areas before their 35-year rotation has passed, and to engage in a variety of other practices that technically would not be allowed under an HPH contract. Indeed, Titus Sarijanto, former director general of forest production, acknowledged in an interview that it is not unusual for the Inhutani enterprises to permit private timber operators to log in areas classified as rehabilitation forest. As he explained,

> This occurs for two reasons: Often an area needs to be cleared before it can be rehabilitated. Sometimes, too, the Inhutanis don't have the funds to carry out the rehabilitation, so they will allow a portion of the area to be logged to finance the rehabilitation of the rest. (Sarijanto 1999)

A senior officer at Inhutani I in East Kalimantan also stated that "To ensure security of these areas, Inhutani needs to have activity there. If we don't log in these areas, it is certain that other parties will come in and take whatever wood is left" (Inhutani I 2000).

Some industry observers suggest that one of the Inhutanis' motives for exploiting the forests under their jurisdiction is that the funds generated play an important role in supporting the MoF's formal and informal budgetary needs (Ascher 1998). Moreover, it is widely believed that the individual Inhutani enterprises have a significant degree of discretion in deciding which logging companies will have access to KSO contracts, which areas will be opened to timber operations, and what types of harvesting practices will be permitted (Kartodihardjo1999b; Ahmad 1999). Many of these decisions—which play a critical role in determining whether sustainable harvesting practices are used—are apparently made by Inhutani field officers and the contractors working with them. It is likely that the challenges to sustainability posed by such ar-

rangements would increase if the MoF moves forward with its recently announced plan to transfer all privately held HPHs to the Inhutanis and to allow existing concessionaires to function as contractors (*Reuters* 2000).

Weakening of Selective Cutting Guidelines

Finally, the MoF has sought to bolster the output from Indonesia's remaining HPHs by modifying the principles of the TPTI system. It has done so most significantly by introducing a new silvicultural system, *Tebang Pilih Tanaman Jarak* ([TPTJ] Selective Logging and Line Planting), in November 1998. The TPTJ guidelines may be applied on areas of production forest with a slope no greater than 25% and with altitudes up to 500 m above sea level.[8] Ostensibly designed as a modification of the TPTI system to make it more appropriate for logged-over areas, the TPTJ scheme may also be applied to tracts of primary forest as well.

Under the TPTJ system, the timber operator is permitted, first, to carry out selective logging of a designated block using a 40-cm maximum diameter cutting limit. This initial harvest is followed by the use of clear-cutting to open up "planting strips," which are then to be planted with high-value local species. By reducing the cutting limit from the 50-cm diameter prescribed under the TPTI guidelines and by permitting a portion of the area to be clear-cut, TPTJ will make substantially larger volumes of logs available from a given area of forest than would be possible under TPTI. Some industry observers have also speculated that the introduction of the TPTJ system may, in fact, be a first step toward MoF's opening of logged-over areas to commercial timber extraction without regard to where those forests are in the 35-year rotation originally designated under the HPH contract.

Assumption #3: Increased Efficiency Will Promote the Conservation of Natural Forests

Proponents of the "sustainable logging" paradigm have long argued that raising efficiency levels in all segments of the timber sector is a critical component in any strategy for conserving Indonesia's natural forests. The World Bank (1995, 16), for instance, argues that "sustainability should be sought through the promotion of efficiency, rather than an attempt to simply administer a reduced flow of raw materials to the sector, while leaving cost and price conditions and incentives unchanged." The bank and others calling for increased efficiency in the timber sector have generally addressed the issue in both allocative and operational terms. Whereas allocative efficiency refers to who produces and where, operational efficiency is concerned with how efficiently each producer conducts its activities.

Proponents of the "sustainable logging" paradigm seek to raise the sector's

allocative efficiency to promote the optimal distribution of the nation's timber resources in accordance with market-based calculations of cost and scarcity. To the extent that efficient producers receive a larger share of the nation's timber output, the sector's overall efficiency is expected to improve. At the same time, proponents promote an increase in operational efficiency for individual producers through a reduction of waste in timber harvesting and higher log utilization rates in processing. The rationale is that even if the same producers account for the same share of total production, any increase in efficiency will reduce pressure on forests. Most proponents of the "sustainable logging" paradigm consider the two types of efficiency to be closely linked. Policy interventions that raise allocative efficiency within the timber sector are generally deemed to be a crucial mechanism for increasing operational efficiency on the part of timber producers and wood processors.

To raise allocative efficiency in the timber sector, the World Bank has long sought to remove several of the major market-distorting policies put in place by the New Order state. Since the current economic crisis began, the bank has taken steps to lift restrictions on log and sawnwood exports, to eliminate controls over plywood marketing held by the *Asosiasi Panel Kayu Indonesia* ([APKINDO] the Indonesian Wood Panel Association), to de-link logging concessions and processing facilities, and to make HPHs transferable. The bank justifies these reforms by arguing that the government's restrictive policies have led to an uncompetitive and inefficient processing sector, "characterized by high levels of rent-seeking which has become totally dependent on highly subsidized log prices" (The World Bank 1995, 16). The World Bank maintains that the log export ban, in particular, has undermined sustainability by leading "the sector [to] substitute logs, which should be regarded as a scarce factor of production for other factors…[encouraging the forests to be] treated as a low value resource by both the private sector and government agencies" (The World Bank 1995, 16).

In calling for the removal of log export restrictions, the World Bank and others have maintained that they are seeking to enable Indonesian timber producers to obtain full market value for their logs (Manurung and Buongiorno 1997; Barbier et al. 1995; The World Bank 1995; Vincent 1992; Lindsay 1989). They claim that policies that have kept domestic timber prices below international parity levels have led processing companies to use their wood inputs carelessly. This, in turn, has kept the volume of timber being logged higher than would have been necessary if wood panel producers and sawmills were able to generate their processed wood products in a more efficient manner. These analysts argue that higher log prices will promote the sustainability of Indonesia's natural forests in two ways. First, increased profits from timber sales should lead concession holders to attach greater value to the forest resources under their control and, in doing so, to take steps to reduce the volume of waste associated with their harvesting operations. Second, substantially higher raw material costs are likely to lead Indonesia's wood-based industries

to invest in more efficient processing techniques, which will presumably generate greater levels of output with a smaller volume of logs.

In their efforts to raise domestic log prices, the World Bank and other advocates of efficiency-based sustainability have largely ignored the additional pressures that the removal of log export restrictions would place on Indonesia's forests. Nonetheless, it is probable that open access to international timber markets—where roundwood prices are often considerably higher than they are domestically—would introduce a substantially greater structural demand for Indonesian logs than currently exists.[9] Such additional demand on the part of foreign buyers can be expected to create pressures for increased levels of timber removals in both Indonesia's legal and illegal logging industries, leading to large volumes of roundwood being shipped overseas. The correlation between reduced export taxes and increased logging is, in fact, predicted by most econometric studies that have analyzed the marketing restrictions imposed in Indonesia's timber sector over the last 20 years (Manurung and Buongiorno 1997; Barbier et al. 1995). Together with the World Bank, however, these analyses generally assume that pressures for additional logging will be offset by steps taken to raise efficiency on the part of wood processors. Unfortunately, none of these studies provides compelling evidence to support this assumption.

The effects of such pressures to increase log supply will be particularly acute if Indonesia's log export restrictions are removed before effective mechanisms are installed to control timber extraction and marketing. In the absence of such controls, higher log prices are likely to support a proliferation of illegal logging above the current high levels that exist in most timber-producing provinces. A similar problem arises with the World Bank's proposal to de-link HPHs from processing facilities. The bank's rationale for trying to separate the two is that it will "weaken the official monopoly over log supplies that large-scale processing complexes have hitherto benefited from" (The World Bank 1998, 20) and, in doing so, remove a major structural factor contributing to the undervaluing of Indonesian forests. The bank envisions the development of a domestic log market in which processors would be forced to purchase the bulk of their raw materials at market rates (which would presumably be on par with international prices if log export restrictions were successfully removed). As with opening log exports, however, the Bank's efforts to de-link HPHs and mills are likely to encourage an expansion of illegal logging if they are carried out before an effective chain of custody system is put in place.

Over the past several years, many Indonesian panel producers have, in fact, purchased a growing portion of their logs from outside their own concessions. The Barito Pacific Group—Indonesia's largest panel producer—has reportedly purchased 30–40% of its logs since 1994 (Soedibyo 1999). Similarly, the Korindo

Group is reported to purchase more than one-half of the 1.3 million m^3 that its mills consume, because of the declining productivity of its own concessions and the fact that several of its own HPHs have been involuntarily revoked (Cheol 1999).

Several industry officers interviewed in the course of this study indicated that their firms often have little information on either the source of these logs or the conditions under which they are harvested. As one plywood executive, in a confidential interview in Jakarta, on February 9, 1999, put it,

> We buy logs from a broker. Sometimes they have documentation, but often they do not. We generally do not know where the logs come from. If the Forestry Department finds out that we're using logs without documentation, we point to the broker and he's the one that gets penalized.

The World Bank and others seeking to deregulate Indonesia's timber trade have done so to encourage both concession holders and wood processors to invest in measures that will improve the efficiency of their operations. Investments in harvesting efficiency might include the use of new technologies or practices that allow logging companies to extract more timber from each hectare of forest, more wood out of each stem that is cut, or larger volumes of timber harvested in shorter time frames or at reduced cost. Similarly, measures to raise processing efficiency would include the adoption of new equipment or techniques that enable wood processors to raise the volume or value of output from each unit of wood that their mills consume.

The arguments used to promote greater operational efficiency are rooted in the assumption that improvements in efficiency at both the harvesting and processing levels will relieve pressures on Indonesia's forests. Embedded in this assumption is a belief that if firms are able to obtain greater output from each cubic meter of wood (or hectare of forest) by improving the efficiency of their operations, they will thereafter demand the same or possibly a smaller volume of timber (or exploit a smaller area). Efficiency becomes associated with conservation because it is assumed that investments in efficiency will produce greater volumes of processed output without generating increased demand for raw materials. Yet there is little evidence to indicate that either logging companies or processing firms would voluntarily place a cap on their earnings by restricting the volume of timber they harvest or process if access to this timber were not otherwise constrained. On the contrary, basic economic theory would suggest that firms able to raise profits through increased efficiency would have an incentive to expand their operations, thereby increasing their demand for logs.

Moreover, technological innovations that increase efficiency in timber extraction or processing—the widespread adoption of the chain saw, for instance—have, at times, changed the nature of demand or accelerated the pace of forest destruction quite considerably.[10] The growing adoption of small-

spindle rotaries on the part of Indonesian plywood producers may be having just such an effect.[11] Introduced in the mid-1990s, the new rotaries allow panel producers to peel logs as small as 15 cm in diameter, leaving a core of 6–8 cm. The old, large-spindle rotaries, by contrast, would generally leave a 15- to 25-cm core that could not be peeled. According to several producers interviewed, the use of the new technology has had the practical effect of raising their log recovery rates—particularly when their preexisting machinery had become highly depreciated—from the 45–50% range to that of 55–60%.

The new rotaries have enabled producers both to peel logs from younger trees and to process a variety of timber species that were previously considered to be marginal. In this sense, the widespread adoption of the new rotaries is likely to increase the burden on Indonesia's forest resource base quite substantially. Indeed, several producers interviewed for this study indicated that the new rotaries had given them incentive to return to logged-over areas for a second harvest or to seek harvesting rights in areas without old-growth Dipterocarps. Most admitted that both of these processes would have been uneconomical just a few years ago, when their mills' capabilities were limited by the constraints of the large-spindle peelers that were then in place. As a timber manager with the Korindo Group explained, "The new rotaries are what has made IPK profitable, as we can cut trees with diameters of 20 cm and up and all species but *ulin* and *bengeris*. With the old technology, we would not have been able to use most of this for plywood" (Cheol 1999).

Assumption #4: Sustainable Concession Management Is Profitable

Beyond seeking to rescind Indonesia's log export restrictions, the World Bank and other proponents of the "sustainable logging" paradigm have called on the government to raise timber royalties and to introduce a system of performance bonds to ensure that logging companies manage their concessions sustainably. Implicit in these proposals is an assumption that HPH holders will be able to generate profits in spite of the additional costs that these new fees impose on their operations. That is, Indonesian-based concessionaires are assumed to be enjoying such high rents that they are able to afford the additional financial obligations that sustainability imposes. To the extent that sustainable concession management is not profitable for private timber operators, they can be expected either to withdraw from the timber sector or, more likely, to resort to increasingly unsustainable practices for as long as they are able to. Simply put, HPH holders will not play by the rules if it is not profitable for them to do so.

Through much of the New Order period, there was a general consensus that Indonesia's HPH system did, indeed, generate high rents and that a substantial portion of these accrued to private timber operators in the form of excess prof-

its. Ruzicka (1979), for instance, estimated that in the mid-1970s, medium- and large-scale concessionaires in East Kalimantan were able to capture 67–75% of the rents associated with their logging activities, yielding average annual returns of 120–150%. Similarly, Ahmad and Ramli (1991) concluded that the government allowed private concession holders to capture no less than 83% of the rents generated in the timber sector during the period 1980–1990, or roughly US$80 in rent for every cubic meter these companies harvested.

Several concessionaires contacted in the course of this study, however, indicated that the profitability of timber extraction on at least some of their HPHs had declined markedly over the past decade. Some attributed this to the fact that the most productive parts of their concessions—particularly those areas with stocks of high-value, high-diameter *meranti* (*Shorea spp.*)—have already been logged over, and they are now harvesting stands of lesser commercial value. Several also claimed that they are having to travel greater distances than in the past to obtain commercially valuable timber and that the added transport costs have cut into their profits. Although anecdotal claims of this sort should not be interpreted to mean that rents no longer exist in Indonesia's timber sector, they do suggest that some concessionaires may no longer be enjoying the high excess profits that they did in the past.

Assessment of Current Rent Levels

To better assess whether sustainable concession management is, in fact, viable for a majority of Indonesian HPH holders, it is useful to examine the concession rent studies conducted by the Indonesia–U.K. Tropical Forest Management Programme (ITFMP). These studies offer the most detailed calculations of timber sector profitability in recent years. Based on the results of a 1995 survey of 31 concessions located in five provinces, ITFMP has developed a Forest Concession Model, which estimates the economic rent that concessionaires obtain from their operations for a given log price and production costs. Using this model, Scotland (1999) estimated that before the onset of the economic crisis in July 1997, a timber operator with a 15-year old concession of 115,000 ha—characteristics purportedly selected "to represent an average concession in Indonesia"—enjoyed an internal rate of return of 19%. Total economic rent under those conditions stood at US$42.00 per m^3, corresponding to excess profits of US$3.16 per m^3 for the concessionaire, assuming a 15% discount rate.

In estimating rent levels after the monetary crisis began, Scotland assumes that most concessionaires adopted a range of cost-cutting measures to compensate for the sharp devaluation of the *rupiah*: switching to exclusive use of the *rupiah* to minimize dollar expenditures; placing a moratorium on all large capital purchases; and reducing by 50% all nonessential expenditures—that is, anything not directly related to felling operations and the sale of timber.

With these adjustments, it is estimated that timber operators were able to generate an internal rate of return of 27%, which was just slightly higher than the assumed post-crisis discount rate of 25%. In response to the precipitous drop in domestic log prices, rent levels are believed to have fallen to US$13.50 per m^3 during the months after the crisis began, leaving concessionaires to capture US$0.60 per m^3 in excess profits. From these figures, Scotland estimates that during the first year of the crisis, aggregate rents associated with Indonesia's logging industry were US$447 million, of which approximately US$16 million accrued to the private sector as excess profits. By comparison, total rents before the crisis began were on the order of US$1.1 billion per annum, of which US$84 million went to concession holders (Scotland 1999, ii).

What is striking about these numbers is the relatively small portion of the total rents generated by the HPH system that are actually collected by concession holders as excess profits—7.6% before the crisis and a mere 3.5% since the crisis began.[12] Under either set of conditions, it is not at all clear that a substantial majority of Indonesia's concession holders would be able to continue operating profitably if timber royalties were raised significantly and a performance bond equivalent to 30% of annual operating costs were imposed, as the World Bank has recommended. Unfortunately, the ITFMP model does not account for the considerable variation in operating costs or productivity—and, therefore, rent levels—that exists across geographic space and among firms with different processing capacities, investment strategies, and management objectives. As such, it does not reliably predict what portion of HPH holders would lose money if they did not manage their concessions sustainably.

As Scotland's study was based on figures derived from a hypothetical "representative" concession, its conclusions extrapolate from the assumption that all concessions are able to obtain 28 m^3 of commercial timber per hectare and that 70% of their species mix is made up of valuable *meranti*. While it is acknowledged that these figures are "undoubtedly higher than production in marginal and degraded concessions, the latter of which there are many," the study offered little sense of the ranges of productivity or profitability associated with such sites either before or after the crisis (Scotland 1999, 15). In fact, however, the rent survey on which the ITFMP Forest Concession Model was constructed found that no fewer than 10 of the 31 firms covered had productivity levels of 15 m^3 per hectare or less. The least productive of these sites reported yields of only 5 m^3 per hectare.

Moreover, anecdotal evidence from interviews conducted during the course of the present study suggests that meranti accounts for substantially less than 70% of the timber currently being harvested at many HPHs. Several industry sources indicated that there has been a marked decline in high-value, large-diameter *meranti* in most timber-producing regions over the past 10–15 years. As such, many concessionaires are now cutting smaller-diameter stems and a broader range of species than in the past. Former APKINDO chair, Bob Hasan,

described this process as follows:

> Through the 1970s and 1980s, most of what we cut was *meranti*. The trees were enormous and we could pick which ones we wanted. Generally, we chose those 60 cm and up. Now, the big *meranti* is much more scarce and harder to get. At least half of what we harvest is other species. (Hasan 1999)

To some extent, this decline in high-value meranti logs has been obscured by the fact that since the early 1990s the *Masyarakat Perhutanan Indonesia* (Indonesian Forestry Society) has encouraged its members to market a variety of species with properties similar to Shorea as "meranti group."

Scotland used the ITFMP model to estimate forest concession profitability and levels of economic rent associated with HPHs of varying sizes. He found that under the post-crisis scenario, there was a substantial economy of scale in the timber sector and that concessions only began to register a profit when they are 80,000 ha or larger (Scotland 1999, 19–20). At the assumed post-crisis discount rate of 25%, he argued that concessions smaller than this show a negative net present value and that economic rent on each cubic meter of roundwood produced falls below the log levies collected by the government. These findings, therefore, suggest that a significant portion of Indonesia's concessionaires have not been able to maintain their economic viability if they adhered to the GOI's regulations through much of the period since the crisis began.

In addition, Scotland's analysis was prepared in early 1999 when international petroleum prices were low and when domestic fuel prices were being heavily subsidized by the GOI to keep them at roughly 30% of international rates. As a result, the potentially large effect of fuel costs on profit margins is not readily apparent in the rent levels calculated. Because it is improbable that domestic fuel prices will remain at such low, subsidized rates for very long, many concessionaires—particularly those which must haul their logs overland—are likely to face substantially higher transportation costs over the medium term than those estimated.

The point of this discussion is not to critique Scotland's study—which, indeed, offers the most serious analysis of concession-holder profits since the economic crisis began. Nor is it to imply that Indonesian concession holders are no longer making profits. It is, rather, to underscore the manner in which discussions of Indonesian timber rents have often overstated the profits available to a substantial portion of the nation's concessionaires. Timber companies with the largest, most productive, and most accessible HPHs were clearly capturing sizeable rents before the crisis, and most have apparently continued to enjoy excess profits on a more modest scale since the crisis began. Yet timber companies with smaller, less productive, or remote concessions have been operating much closer to the margins of profitability. It is likely that many have resorted to illegal—and presumably unsustainable—practices to main-

tain their profit levels.

This poses an important practical challenge for the World Bank and other agencies that have sought to have the GOI raise its timber royalties and to introduce performance bonds. Together, these two fees will need to be large enough that they motivate concessionaires to employ sustainable management practices, but not so high that they inhibit timber operators from generating a reasonable profit at the prevailing discount rate. As mentioned above, concession holders cannot rationally be expected to manage their HPHs sustainably if it is not sufficiently profitable for them to do so. Given the range of rent levels that appears to exist across space, companies, and time, it is difficult to imagine how the government will be able to increase its own rent capture and impose effective performance bonds without also pushing a segment of the industry's concession holders out of business. Several industry officials interviewed indicated that to the extent these fees reduced the profitability of their own logging operations, their firms would shift toward sourcing their logs from the open market. In practical terms, this would imply a growing reliance by many wood processors on illegally and unsustainably harvested timber (De Kock, 1999).

Dwindling Prospects for Rents Over the Long Term

By definition, sustainable concession management also involves the maintenance of a site's productivity at a commercially viable level for an indefinite number of harvests beyond the first logging rotation. Such systems generally take into account the fact that second harvests are almost always lower than first harvests. At least in theory, they are designed to maintain all subsequent harvests at levels that are similar to the second cut and are profitable. Indonesia's TPTI system is based on the assumption "that a residual stand after logging will contain an adequate stocking of sound, commercial species trees of 20 cm dbh or more, which will grow into economically harvestable timber in 35 years from the original logging date" (The World Bank 1993, 38). To be successful, the TPTI system is dependent on commercial species in the logged-over forest regenerating at a rate of at least 1 cm per year, so that there is an adequate number of stems with a diameter of 50 cm and up when the second rotation begins.

With a growing number of concessions in Indonesia's Outer Islands nearing the end of their first 35-year rotation, the question of whether there will be trees of adequate size and value to make sustainable management profitable during the second harvesting cycle is emerging as a critical issue. Many of the concession holders interviewed for this study indicated that they anticipate that the second rotation may, in fact, not be profitable if the concession is managed for sustained yield. Some questioned the theory behind the TPTI system, claiming that the trees at their concession sites did not grow at a rate of 1 cm per year and, therefore, would not fully regenerate in 35 years. Others

reported that noncommercial or lesser-value species dominated the residual stand after the first rotation. Several industry studies have documented the fact that collateral damage during logging operations is often severe, with the effect that it sharply limits the site's future productivity. Post-logging surveys in the early 1990s estimated that damage and mortality in residual stands was frequently in the range of 35–50% (The World Bank 1993).

In interviews, several industry officials noted that logging companies frequently have little incentive to leave commercially valuable stems standing in residual forests, as there is often scant hope that these trees will remain in place—or that their firms will have continued access to them—until the second rotation begins. Although the World Bank has used this to justify extending the HPH contract from 20 to 35 years, there is growing evidence that, in fact, longer concession periods will hardly be adequate to counteract such pressures. With timber roads and skid trails providing easy access, logged-over areas are often highly susceptible to encroachment on the part of illegal loggers and settlers. Some companies also reported that after their initial harvest, portions of their concession areas have been reclassified by the MoF for other uses such as plantations and transmigration. Consequently, it is common practice for concession holders to re-log a regenerating stand prematurely, a practice known as *cuci mangkok* (literally, "washing the bowl"). In fact, some concessionaires are known to have intentionally logged in degraded and cut-over areas to encourage the Forestry Department to reclassify their HPH sites as conversion forest. Logged-over areas have also been particularly susceptible to the widespread forest fires of the last few years, which have further diminished the availability of second-rotation timber (Dennis and Hoffmann 2000; Hoffmann et al. 1999; see Chapters 13 and 14 of this book).

The combination of these factors raises serious doubts as to whether sustainable concession management practices will be at all profitable in areas entering their second rotation—a prospect facing concessions allocated in the late 1960s within the next five years and a rapidly growing number after that. In fact, there is growing evidence that in many parts of Sumatra and Kalimantan, timber concessions subject to repeated logging and other forms of disturbance will have no commercial volume remaining at the point that the second logging rotation is due to begin.

Assumption #5: The GOI Has the Institutional Capacity to Enforce the Proposed Changes in the HPH System and the Forest Products Trade

To be implemented effectively on any large scale, the reforms put forth by proponents of the "sustainable logging" paradigm would require a considerable degree of institutional capacity on the part of the Indonesian government. According to the reform agenda proposed by the World Bank, the government's

central task in the forestry sector is to reduce aggregate roundwood production by roughly 30 million m^3 per year. The bank argues that the GOI will be able to achieve this by regulating concession management practices more tightly and by removing restrictions on the marketing of logs and other wood products. To be even minimally successful in accomplishing these, the government would need to have the following institutional capabilities:

- mechanisms to monitor and enforce the use of sustainable practices on the part of concessionaires within their HPHs,
- the capacity to enforce concession boundaries to restrict outside actors from encroaching on HPHs,
- the ability to keep concession holders and others from logging in areas that have not been designated for commercial timber extraction, and
- an effective system of surveillance and chain-of-custody to control both the domestic timber trade and log exports.

For several reasons, it appears highly unlikely that the Indonesian government will, at any point in the near future, have the institutional capacity needed to make systemic changes in the HPH system and the nation's forest products trade (see Chapter 7). From a purely logistical perspective, the need to enforce rigid, exclusionary boundaries around areas designated as HPHs and to monitor the harvesting practices of close to 400 concession holders poses a number of formidable challenges. Indonesia's total concession area currently extends over 49 million ha, much of which is located in remote regions or covers terrain that is difficult to access. The state forestry bureaucracy—which, since 1967, has been charged with managing 75% of the nation's landmass—is understaffed, poorly trained, and ill-equipped to administer such a large area. Moreover, the vast majority of the MoF personnel are concentrated in Jakarta, Java, and provincial capitals (see Chapter 8).

Some observers anticipate that such institutional weaknesses are likely to be exacerbated by the current decentralization process, in which authority over forest administration is shifting from Jakarta to provincial and regency (*kabupaten*) level governments (see Chapter 15). Until now *kabupaten* governments have played a minimal role in administering the forests within their jurisdictions. Most have little technical capacity to assess whether timber companies are adhering to the government's regulatory guidelines for sustainable concession management. Likewise few, if any, have the enforcement capacity needed to regulate the activities of either formal concession holders or the various actors involved in informal timber harvesting. Under the decentralized system, significant responsibilities for forest sector policymaking and planning are also likely to remain with the MoF in Jakarta, while implementation responsibilities lie with the provincial and *kabupaten* governments. This implies that implementation of a coherent policy for

sustainable timber extraction will require a considerable amount of coordination across the various tiers of government, which in many cases have competing institutional interests.

Complicating matters significantly, units of the military, national police force, and other arms of the state apparatus are known to be heavily involved in illegal logging in most timber-producing provinces (McCarthy 2000; Telapak Indonesia and EIA 1999). It is likely that the involvement of such actors could become more entrenched as the state becomes weaker or more decentralized and as these agencies are less able to rely on formal budgetary allocations to support their operations.[13] While the World Bank and others have proposed the establishment of an independent monitoring system to regulate concessionaire management practices, it is difficult to imagine how such a system could function without the active support of the state's own law enforcement agencies. In any case, it would appear that reducing effective demand for logs by closing some processing mills would be an easier, and arguably more effective, strategy to implement than controlling log supply.

Conclusion

Reorienting Timber Sector Reform

Over the last 15 years, the policy dialogue in Indonesia's forestry sector has been dominated by proposals to reform the HPH timber concession system. The central aim of these reforms has been to reduce Indonesia's aggregate timber extraction rates to the supposedly sustainable level of 25 million m^3 per year. As argued in this chapter, the World Bank and others promoting environmental sustainability through improved concession management are unlikely to achieve this objective under the circumstances that currently exist in Indonesia's forestry sector. The effectiveness of the proposed policy interventions is likely to be limited in that they perform the following acts:

- seek to control timber supply without reducing effective demand on the part of Indonesia's wood-based industries;
- overlook or inadequately address roundwood extraction from large areas, including areas designated protection and conversion forest, as well as areas under Inhutani control;
- fail to provide a credible plan for reducing illegal logging;
- encourage investments in efficiency without regard for the often-damaging effects that such investments may have on natural forests;
- assume that sustainable concession management is profitable over both the short and long term, despite strong indications to the contrary; and
- assume, without evidence, that the GOI has the institutional capacity needed to make systemic changes to the HPH system and the forest products trade.

In assessing the prospects for environmental sustainability in Indonesia's forestry sector, this analysis has largely focused on policy reforms proposed by the World Bank since the mid-1980s. It is important to recognize, however, that the bank has hardly been alone in arguing that sustainability can best be achieved by modifying the HPH concession system and regulatory structures framing the nation's forest products trade. Indeed, many forest economists and policy analysts have joined the Bank in calling on the Indonesian government to better enforce its selective cutting guidelines; to increase its capture of timber resource rents; and to encourage market-based efficiency in log harvesting, processing, and trade. Moreover, proponents of the "sustainable logging" paradigm have advocated a very similar set of policies in many countries besides Indonesia. These include tropical timber-producing countries as diverse as Cameroon, Guyana, Malaysia, and Papua New Guinea.

While sustainable forest management is clearly an important goal to be pursued by the World Bank or other agencies seeking to leverage reforms on the part of the Indonesian government, it loses much of its legitimacy to the extent that it is fundamentally unachievable on any large scale. This, in turn, raises important questions about what priorities should guide the policy reform process in Indonesia's timber sector. The following sections outline three major directions in which the reform process should be reoriented.

Limiting Demand for Roundwood

The considerable logistical difficulties associated with controlling timber supply in Indonesia suggest that any serious effort to relieve pressures on the nation's remaining natural forests should involve proactive steps to limit demand for wood on the part of domestic forest-based industries. With illegal logging going virtually unchecked in most timber-producing provinces, it is probable that Indonesia's annual log harvest will greatly exceed the legal and sustainable harvesting levels as long as a substantial "structural timber deficit" remains in place. Industrial overcapacity in Indonesia's wood-processing sector was identified as a critical problem facing the forestry sector at the February 2000 meeting of the Consultative Group on Indonesia, placing the issue squarely on the forestry sector policy agenda. There, both the GOI and the international donor community agreed to take immediate steps toward "closing illegal sawmills" and the "downsizing and restructuring of [Indonesia's] wood-based industry to balance supply with demand for raw materials" (Keating 2000).

To implement these commitments, it will be necessary for the Indonesian government and international donors to define practical steps that can be taken to reduce demand for wood on the part of domestic processing industries and to identify which agencies would need to carry these out. In this regard, it is significant that the Indonesian Bank Restructuring Agency (IBRA) now controls many of Indonesia's wood processors, either in whole or in part. To the

extent that IBRA chooses to call in outstanding loans held by forest sector debtors, it can exert a great deal of leverage in carrying out reductions in processing capacity at both the firm and industry levels. In playing such a role, it would clearly be necessary for IBRA to work closely with policymakers from a range of government agencies, civil society organizations, and forest industry groups.

As a first step, these actors would need to develop criteria for determining which mills should be subject to capacity reduction measures or closure. Clearly, this should not be based simply on which mills hold the largest amounts of outstanding corporate debt. Rather, it should include detailed and transparent assessments of whether they reflect the following characteristics:

- These mills have verifiable access to legal and sustainable raw material supplies.
- Their operations have a profoundly negative effect on the surrounding environment.
- Their activities have led to social conflicts with local communities that threaten either the viability of the processing enterprise or the sociopolitical stability of the region in which they are operating.
- The processing enterprise carries an inordinate degree of financial risk.

Slowing Forest Conversion

To the extent that policymakers seek to control Indonesia's wood supply, their focus will need to extend beyond restricting log output from the HPH system. Sharp reductions in roundwood harvests can only be achieved if steps are taken to significantly reduce the pace at which Indonesia's remaining natural forests are being converted to other uses. To its credit, the World Bank secured from the GOI a temporary moratorium on the allocation of forested land for conversion to oil palm and other agroindustrial crops in late 1998 (see Chapter 10). This moratorium should be maintained at least until detailed surveys have been carried out to determine whether appropriate nonforested areas are available for such projects and until existing legal claims on such lands have been resolved. Moreover, efforts should be made to ensure that subsidies in the form of underpriced IPK wood, discounted capital and loan guarantees, and corporate debt write-off do not offer perverse incentives for agroindustrial conglomerates to clear new tracts of forested land.

In addition, Indonesian government policymakers should be encouraged to seriously consider placing restrictions on the allocation of new IPK licenses to pulp mills and other wood processors. Companies seeking access to IPK wood should be required to provide verifiable documentation that they are making adequate progress in establishing plantations to ensure that their operations will eventually be sustainable over the long term.[14] Policymakers may also wish to consider requiring IPK license holders to pay higher royalties on the wood they harvest to ensure that its costs are comparable to the costs associated with obtaining wood from industrial wood plantations.

Finally, the GOI should be encouraged to restrict the use of logging in areas allocated to the Inhutani state forestry enterprises for "rehabilitation" purposes. More generally, efforts should be made to establish a clear code of accountability for the Inhutanis and mechanisms for monitoring the forest areas under their control, although such efforts would almost certainly be hindered by many of the same factors that limit monitoring of existing HPHs. This latter point is especially critical in light of the MoF's proposal in mid-2000 to transfer all of Indonesia's existing HPHs to Inhutani management.

Shifting the Agenda toward Equity

The recognition that, at this point, sustainable concession management is fundamentally unachievable on any large scale begs the question of who should have access to and control over the nation's forest resources. Through the New Order period, both the MoF and many advocates of the "sustainable logging" paradigm routinely argued that large, privately owned logging companies connected to processing facilities are the most appropriate actors for managing areas designated as production forest in Indonesia's Outer Islands. The stated rationale was that such actors would have an incentive to manage their concessions sustainably because they have both a long-term investment in processing, which relies on continued access to timber supplies, and an economy of scale that enables them to run their harvesting operations efficiently. In this way, the principle of sustainability has often been used to legitimize the extreme inequity around which the HPH system has been structured over the past three decades. In practice, it appears that some large-scale timber operators may, indeed, have adhered to the GOI's selective harvesting and replanting regulations. Yet a far larger number have employed indiscriminate logging practices to liquidate as rapidly as possible the timber resources made available to them by the state.

Recognizing sustainability of forest management by large-scale enterprises to be untenable under the current circumstances makes it impossible to justify maintaining the New Order regime's policy of categorically excluding forest-dependent communities from areas that the state has defined to be production, protection, or conversion forest. On the contrary, the demise of sustainability as an achievable policy goal suggests that equity for local communities with clear historical or customary (adat) claims to forestland should, in fact, be a central principle guiding forestry sector reform in the present context (see Chapters 5 and 6). Clearly, the legal recognition of local tenure would not, in itself, guarantee that any given tract of forest would remain standing longer than if a timber concessionaire managed it. It would, however, provide the basis for ensuring that members of forest-based communities would have legitimate authority to determine how the forest resources on which their livelihoods depend should be managed and to share equitably in the benefits of any products harvested from the areas under their jurisdiction.

Moreover, numerous studies have shown forest-dependent communities in many parts of Indonesia to consist of highly skilled resource managers who have sustained complex forest ecosystems for generations (Fried 1995; Dove 1986).

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Endnotes

1. The HPH timber concession system was established with the adoption of Indonesia's Basic Forestry Law in 1967, shortly after Soeharto's New Order regime came to power. Under this system, private logging companies and state-owned enterprises have been able to obtain concession licenses to harvest timber in areas designated as production forest and limited production forest for a period of 20 years. For details on legal and institutional aspects of the HPH system, see Gray and Hadi (1989). Barr (1999) provides a political-economic history of the HPH system during the New Order period.

2. Key elements of the *Tebang Pilih Tanam Indonesia* ([TPTI] Indonesian Selective Planting and Cutting System) guidelines include the use of a 35-year harvesting cycle; restrictions on cutting commercial species that are below 50 cm dbh (diameter at breast height); rehabilitation of skid trails and enrichment planting; and thinning of noncommercial species at 10, 15, and 20 years. Djamaludin (1989) provides a detailed account of the development and implementation of the TPTI guidelines during the 1970s and 1980s.

3. For the purposes of this chapter, I do not examine how this figure was derived, nor do I analyze whether it, in fact, represents a realistic estimate of the volume of wood that can be sustainably harvested from Indonesia's natural forests. Rather, I maintain that even if this figure is assumed to be a reasonably accurate estimation of the nation's sustainability threshold, it is doubtful that the HPH reforms advocated by proponents of the "sustainable logging" paradigm will effectively reduce timber removals to this level.

4. By comparison, Scotland et al. (1999) estimated that in 1997, total consumption of roundwood in Indonesia may have been as high as 82.3 million m^3.

5. During most of the 1990s, Indonesia had an MoF. The MoF was changed to the MoFEC during the Habibie regime, but it was changed back to the MoF in 2000.

6. The figures in this paragraph are drawn from MoF data presented in Kartodihardjo and Supriono (2000).

7. There are currently five Inhutani state-owned forestry enterprises. PT Inhutani I controls 3.9 million ha in East Kalimantan; South, Central, and North Sulawesi; and Maluku. PT Inhutani II controls 3.8 million ha in South, East, and West Kalimantan and Central Sulawesi. PT Inhutani III controls 2.9 million ha in South, Central, and West Kalimantan. PT Inhutani IV controls 500,000 ha in North Sumatra, West Sumatra, Aceh, and Riau. PT Inhutani V controls 400,000 ha in South Sumatra, Jambi, Bengkulu, and Lampung (Departemen Kehutanan 1998).

8. The TPTJ system is specified in Keputusan Menteri Kehutanan 435/Kpts-II/1997 and 338/Kpts-II/1998, and in Keputusan Menteri Kehutanan dan Perkebunanan 625/Kpts-II/1998.

A critical examination of the implications of the TPTJ system is provided by Purnama et al. (1999).

9. Industry analysts have speculated that international demand for Indonesian logs and wood products could increase substantially as a result of China's recent ban on logging and entry into the World Trade Organization. Indeed, there are indications that Chinese wood processors have imported a growing volume of logs from Malaysia and Indonesia (in some cases illegally) as domestic sources have diminished.

10. Colfer (1983), for instance, describes a rapid acceleration in timber harvesting in rural East Kalimantan following the introduction of the chain saw in the late 1970s and early 1980s.

11. The new rotaries cost between US$1 million and US$2 million, and as such they are a form of technology that is accessible (though by no means inexpensive) to plywood producers of all sizes. Indeed, 12 of the 15 firms interviewed indicated that they had either already installed or initiated the purchase of new rotaries in at least one of their mills. For many producers, the installation of the new rotary has been part of a broader restructuring process, which has often involved the purchase of new driers, kilns, and hot presses, as well as other capital investments to improve efficiency. There is general belief within the industry that all of Indonesia's plywood producers will eventually buy new rotaries, although many will now have to wait until after the economic crisis is over.

12. Clearly, it is important to recognize that most of Indonesia's timber concessions are controlled by integrated timber conglomerates, through which they are linked to plywood and sawmills. A portion of the rents associated with a concession is often transferred to these industries through the sale of roundwood to an allied processing firm at artificially low prices, a process known as transfer pricing. Moreover, by adding value to the logs they consume, these industries generate additional rents for each cubic meter of roundwood processed (Scotland and Whiteman 1997, 12). As concessions and processing operations become increasingly separated, however, timber groups will have no reason to use rents generated from processing to subsidize concessions if they are not profitable in their own right.

13. In a news interview, Minister of Defense Juwono Sudarsono stated that formal budget allocations "only account for around 25 percent of the minimum budget needed for TNI [Indonesian Army] operational costs" (*The Jakarta Post* 2000). Juwono noted that "because minimum standards to enhance professionalism are not met, there are many [military officers] who are involved in unsavory activities, including 'influencing' legal processes."

14. For large-scale plantation projects, such as those associated with Indonesia's major pulp mills, this could be accomplished at relatively low cost through the use of satellite or aerial imagery, coupled with independent third-party audits by trained forestry experts. In this way, it is conceivable that effective monitoring could occur in spite of the limited institutional capabilities of the government's forest regulatory agencies, as discussed under "Assumption 5" in this chapter.

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