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AT THE SUPPLY EDGE: THAILAND'S FOREST POLICIES, PLANTATION SECTOR, AND COMMODITY EXPORT LINKS WITH CHINA

by Keith Barney

At the Supply Edge: Thailand's Forest Policies, Plantation Sector, and Commodity Export Links with China

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AUTHOR CONTACTS

Keith Barney is a Doctoral Candidate at the Department of Geography, at York University in Toronto and a Graduate Associate at the York Centre for Asian Research (YCAR). From 2004-2006 he is undertaking field work on the political economy and ecology of fast-growing tree plantations and rural livelihoods in Lao PDR, with funding through Canada's International Development Research Centre (IDRC).

Keith can be reached at kbarney@yorku.ca, see also

<http://www.yorku.ca/geograph/GraduateProgrammes/Graduate%20Students/PHD/barney.html>

PROJECT BACKGROUND

This study on Thailand's forestry sector was commissioned by CIFOR and Forest Trends as part of a wider effort to address an information gap regarding Asia's forestry and plantation forestry industries as well as regarding the emerging trade linkages between East and Southeast Asia. This report on Thailand's forest sector is one of three studies undertaken by the author, which links forest resource production trends in Southeast Asian countries to China's rapidly expanding market for forest products, in particular woodchips and pulp and paper. The other two studies examine Cambodia's and Vietnam's forest sectors and their links with China. For some countries in Southeast Asia, such as Cambodia, the vast majority of recent trade in forest products has taken place through what are broadly illegal means and channels. This situation poses serious challenges for efforts to document regional relationships, while at the same time making it imperative that we develop innovative ways of estimating the illegal trade in forest products and forest loss as tools for political leverage. While the case of Cambodia may be the prime example, problems around poorly documented and illegal forest harvesting and trade flows exist for each of the countries studied.

In addition to continued controversies over unsustainable harvesting, forest degradation and trade in Southeast Asia, a second related source of protracted tension in Asia's forests involves conflicting, overlapping claims to lands and resources. Often, these conflicts have their source in the efforts of colonial-era forest bureaucracies to map and demarcate state-forest land from village land without adequate consideration for customary resource use systems. Land and resources held through common property forms of tenure have been particularly under-recognized in regional legislation. As many have argued, it is the poorest who are most affected by the policies which promote such displacement.¹ There remains, however, a limited capacity of Forestry Departments in the region to actually implement forest zoning on the ground, and as a result these tenure disputes have often continued unresolved to the present. In many cases this situation has contributed to contemporary conflicts between communities and forest plantation companies. Close attention to local resource tenure systems in different Southeast Asian political contexts and a fuller documentation of the nature and extent of current state-community and company-community conflicts in the region are crucial for resolving these disputes. Given the extent of overlapping claims to land and resources in the region, the emergence of a new and potentially enormous Chinese consumer and industrial demand for forest products will likely have direct implications for land, resource and livelihood security of many forest-dependent communities in Southeast Asia.

Research for this project was carried out in Thailand, Cambodia and Vietnam, over ten weeks from late June to early September 2003 and has been kept updated since then to reflect recent developments. The methodology for the research began with a search of existing literature (from available government, scholarly, NGO and corporate sources, from both libraries and internet resources) on forestry and plantation forestry developments in the region. The focus was to develop a detailed picture of national production and consumption trends and regional trading relationships, both in terms of the legal and, to the extent possible,

¹Direct displacement is here taken to include both the relocation and resettlement of communities, *and* (more often) the direct loss of local access to livelihood resources due to project or policy implementation which do not involve community resettlement. *Indirect* displacement can also be important and involves the unintended consequences of project or policy implementation, for example due to associated environmental externalities.

illegal trade. In each country a number of key state officials and forestry-sector observers (from NGOs, academics, development banks and funding agencies) were then identified for in-depth interviews. Information on the primary pulp and paper operations and woodchip mills targeting production for export were also developed for each country and officials from these firms were contacted for interviews. Efforts were made to document the capacity and actual production statistics for these industries and to match these data to information on available wood resources and company supply strategies. Where possible, efforts were also made to upgrade the documentation on resource conflicts involving states, companies and communities. The research also attempted a preliminary exploration of the wider situation with respect to the trade in forest products between China and Southeast Asia (including hardwood logs, sawn timber, veneer and panels). Throughout the research, attempts were made to identify key individuals from government, academic and NGO sectors who might contribute towards and gain further research capabilities from a wider dialogue and critical debate on the future of forests and forest-dependent communities in the region. It is hoped that this research documenting the regionalization of trade in forest and plantation forest resources in East Asia and the associated implications for both natural forests and forest-dependent communities, will contribute towards informed decision-making, by governments, companies, funding agencies, investors and social-environmental organizations, and that it will lend support for innovative policies that better integrate priorities on development, poverty, and the environment.

Keith Barney
Vientiane, March 2005

OVERVIEW OF THE THAI FORESTRY SECTOR

BACKGROUND ON THAI FOREST POLICY

A defining moment in the recent history of Thai forest policy is certainly the logging ban of 1989.² The logging ban was an immediate reaction to landslides in the south of Thailand, which killed over 300 people, but it is also a reflection of broader changes in Thai society, particularly the emergence of new, urban-based environmental movements. While leading to drastic reductions in the logging of natural forests within Thailand, the ban also led to a growing externalization of Thai forest product consumption impacts onto neighbouring countries, particularly Cambodia, Laos and Myanmar. It is important to note that while logging in natural forests declined dramatically – it dropped some 83 percent within the first year of the ban (PER 1991, cited in Lohmann 1995)³ – those areas of teak and other planted species which were designated as forest plantations continued to be made available for harvesting by the para-statal Forest Industry Organization (FIO).

The years from 1985-90 witnessed a number of political scandals which more directly impacted the emerging plantation forest industry in Thailand. Eucalyptus in particular was promoted in the National Forest Policy of 1985 as a wood fiber source for a nascent pulp and paper industry. Areas of National Reserve Forests were leased to plantation firms and farmers were encouraged to plant eucalyptus as an alternative to the low returns available from rice and cassava farming (Laemsak 2002). However, controversies over the ecological and socio-economic impacts of eucalyptus plantations accompanied its introduction into rural Thailand. Beginning approximately in the mid 1980s, local demonstrations dogged efforts to establish eucalyptus plantations in settled areas of National Reserve Forest in the northeast. The Bangkok Post (1988), for instance, noted twelve high profile incidents of eucalyptus-linked protest in Isan (northeast Thailand) between September 1985 and April 1988. Masaki (n.d.) provides further details of twenty instances of local resistance to plantation development in Isan between 1985 and 1990, including local demonstrations against forest authorities destroyed Royal Forestry Department (RFD) nursery stations and the intentional alighting of eucalypt plantations.

A series of large-scale plantation projects attracted particular media attention during this period. The first was the “Green Isan” (*khon jor kor*) project, first conceived by the Thai military in the 1980s. The project, revived by the 1991-92 military government under General Chatichai Choonhavan, would have resulted in widespread evictions of farmers from National Reserve Forests in the northeast as part of an effort to plant 5 million rai (800,000 ha) with fast growing trees.⁴ The project was withdrawn after the restoration of a democratic government in Thailand, although apparently not before many rural villagers were displaced.⁵

A second scandal involved a high ranking senator – and then director of the Soon Hua Seng group (parent company to Advance Agro) – Kitti Damnernchanvanit. In January of 1990, one hundred employees from the

² The ban did not apply to specific areas designated as plantation and mangrove forest.

³ However, occasional logging scandals, involving political-business interests in collusion with Royal Forestry Department and Forest Industry Organization (FIO) officials continued through the 1990s. See the online archives of the *Bangkok Post* for recent scandals over the auctioning of seized teak logs by the FIO.

⁴ 6.25 rai = 1 hectare

⁵ Lohmann (1995) cites estimates of 40,000 families displaced due to the *khon jor kor* project.

Suan Kitti Company were arrested for forest encroachment and illegal logging in 10,000 rai of Forest Reserve land in Chachoengsao Province in eastern Thailand. A subsequent charge was filed against Suan Kitti Reforestation for forest reserve encroachment and illegal logging in a 30,000 rai area of neighbouring Prachinburi Province (The Nation 1990). Senator Kitti was formally charged with illegal logging with the intent of establishing the areas as 'degraded' and thereby eligible for reforestation with eucalyptus. According to media reports in Prachinburi, Suan Kitti had also purchased village farmland in the area in an effort to expand their plantation holdings. Villagers had previously acquired usufruct farming rights, but since these were located within Reserve Forest they did not hold full title deeds. Allegations of the use of intimidation associated with the sale of local farmland followed Suan Kitti's plantation program in eastern Thailand through the 1990s.

The potential for this pattern of rural displacement to occur blocked a third proposal by the Royal Dutch-Shell Group to establish a 125,000 rai eucalyptus plantation in Chanthaburi province in 1989. Shell eventually withdrew the initiative partly because of the political controversy it had generated. Together, these three high profile incidents involving eucalyptus plantations, forest loss and displacement, led the democratic 1992 Leekpai Government to develop more stringent laws regarding the establishment of fast growing tree plantations in Thailand.

Land speculation involving development projects, including plantation development, represents a further source of displacement and loss of farming land. Such economic-induced displacement was a primary means of loss of land in the areas researched by the author in eastern Thailand (Barney 2004). Lohmann (1995: 214) previously characterized the process well:

“Speculators include both local- and national-level government officials, politicians and business figures who are in a position to anticipate the entry into a particular area of resort and second-home builders, plantation companies such as Soon Hua Seng or Shell, or other firms. Their tools are formidable and include fraud and legal chicanery, political and bureaucratic connections, inside information, access to credit, threats, murder, arson, beatings, co-option of village elders, lack of demarcation of commons land, villagers' indebtedness, lack of title and status consciousness... Although not as brutal, dramatic and direct a mechanism of land deprivation as government eviction programmes, land speculation is comparable in its sweep and scale.”⁶

To be sure, these problems in rural Thailand are not restricted to tree plantations. Where there is a convergence between business interests in lucrative commercial agriculture opportunities (sugar cane, shrimp), or speculative industrial development (mining, dams, tourism, golf courses); corruptible bureaucrats; a lack of local political accountability; insecure local land tenure; and rural debt (which is a situation representative of much of the Thai countryside), similar displacement episodes have been all too common. To place these problems into very contemporary perspective, the Bangkok Post (2004a) reports that since 2001, there have been 16 environmental and human rights activists killed in rural Thailand in association with local protest movements against unsustainable displacement-inducing development activity.

⁶ See also Hirsch's (1990) classic study *Development Dilemmas in Rural Thailand*.

Subsequent to the logging ban and the general increases in environmental awareness in Thailand, the rapid deforestation rates of the previous 20-30 years have generally stabilized.⁷ The controversies surrounding forests in Thailand have not subsided, however. The logging ban marked the emergence of an increasingly militarized approach to forest protection and watershed conservation, as an ideologically repositioned Royal Forestry Department adopted a hard-line stance against those settled within protected areas, particularly against upland 'indigenous' communities in the north lacking full Thai citizenship (Vandergeest 1996). Through the 1990s, therefore, conflicts in the Thai forests centered less around the economic value of the timber within them and more on the putative relationships between swidden agriculture, environmental degradation, upland deforestation and lowland water supplies. In this respect, environmental controversies in many parts of Thailand took on a decidedly 'altitudinal' character, with environmental NGOs positioned on a continuum between the "dark green" (coercive-environmentalism) and "light green" (social-environmentalism) camps.

Controversies in Thailand surrounding forest policy came to a head in the mid 1990s over the drafting of the Thai Forestry Sector Master Plan (FSMP). After much acrimonious debate, the FSMP was not adopted in any substantial form. Gilmour et al. (2000) write that the process and outcomes were severely criticized by NGOs (both inside and outside the country) on three basic counts (IUCN 1996):

- The plan did not pay sufficient attention to broader sectoral issues;
- The plan was not sufficiently attuned to changing societal interests in forest management, particularly the shift from an emphasis on exploitation to one on conservation;
- The process used to develop policy positions was too technically driven and lacked effective participation of key stakeholders.

Political camps have also collided on the issue of decentralization and local community control over forests. Competing versions of the Community Forestry Bill have languished in the Thai legislature for over ten years. The status of villagers in protected areas – particularly upland minorities – has been a primary source of the impasse.⁸ Observers sympathetic to the 'community' school have charged that it has been the intransigence of the RFD towards relinquishing complete territorial control over protected areas which has blocked the bill's progress, a position viewed by such observers as against the spirit, if not the letter, of the 1997 Thai Constitution.⁹ Plodprasop Surasawasdi, the charismatic head of the RFD from the mid-1990s, has often been

⁷ Annual deforestation has been estimated at 50,000 ha/year (Nalampoon 2003).

⁸ There have been a number of competing versions of the Community Forestry Bill tabled by NGOs and academics, the Forestry Department, preservationists and other political coalitions. Other controversial aspects include various restrictions and prohibitions on community forest users, the role of plantations – particularly fast-growing plantations – within community forests and the management structure of community forests (Vandergeest 2003).

⁹ For example, *Clause No. 46* of the Thai Constitution states: "Communities shall have the right to preserve and restore the traditional culture, knowledge and local fine arts of their local community and of the nation and participate in the management, maintenance, preservation and utilisation of natural resources and the environment in a balanced way as provided by law." *Clause No. 56* states: "The right of a person to give to the State and communities participation in the preservation and exploitation of natural resources and biological diversity and in the protection, promotion and preservation of the quality of the environment for usual and consistent survival in the environment which is not hazardous to his or her health and sanitary condition, and welfare of quality of life, shall be protected, as provided by law" (cited in Nalampoon 2003).

at the center of these debates, advocating a rather militarized approach to dealing with squatter villagers. The 2003 transition of the Royal Forestry Department into the new Ministry of Natural Resources and the Environment (MNRE) would seem to hold some promise for moving this legislation forward, as does Dr. Plodprasop's recent transfer out of the MNRE due to alleged misconduct in the exporting of tigers to China (Bangkok Post 2004b).

The new MNRE has taken over the responsibilities for forest protection, protected areas and national parks, community forests and watershed management while the remnant Royal Forestry Department continues to hold responsibility for commercial activities grouped under economic forestry, including silviculture, reforestation and forest utilization (Brown and Durst 2003; USDA 2003).¹⁰

National goals concerning reforestation and forest rehabilitation in Thailand are forwarded under the auspices of the National Economic and Social Development Board (NESDB) in the form of five-year plans. The 1985 National Forest Policy Directive was to promote 40 percent forest cover in Thailand, divided into 15 percent 'conservation' and 25 percent 'economic' forest (Vandergeest 1996). The 1992-97 NESDB plan outlined a forest policy which would continue towards the goal of 40 percent forest cover, but reversed the proportion of conservation (now to be 25 percent) and economic (15 percent) forests. These figures have since been further adjusted towards conservation goals by the NESDB in the ninth National Economic and Social Development Plan (2002-2006) with the objectives now placed at 30 percent conservation and 10 percent economic (plantation) forest. The area of forest plantations is to be increased up to a total of 16 million rai on state land and 16 million rai on private lands (Mahannop 2002), for a total of 32 million rai, which corresponds to 10 percent of Thailand's national territory.

In mid-2003, a draft National Master Plan on Forest Management was tabled by the RFD for discussion. As reported in the Bangkok Post (2003), the plan (as with the most recent NESDB plan) calls for the promotion of 16 million rai of additional planted forests in Thailand by 2013. This would be accomplished through an addition of: 5 million rai of commercial forest plantations; 6 million rai of parks, wildlife sanctuaries and class 1(A) and 1(B) watershed zones reclaimed and rehabilitated through the Department of National Parks, Wildlife and Plants and 5 million rai of community forests. The last category, community forests, involves a scheme to provide 50,000-baht loans to villagers to be used towards the establishment of 100 rai community forests of both non-commercial and commercial species, including eucalyptus and teak. The eventual form and outcome of the new Master Plan on Forest Management remains to be seen, although at this point many Thai NGOs are viewing it as another version of the 1993 Thai Forestry Sector Master Plan, arguing it promotes large areas of ecologically harmful plantations and does little to resolve issues of local land rights in protected areas.

¹⁰ USDA (2003: 4) reports: "This change has apparently created some chaos in the labour forces and the budget administration in both agencies...[However] The RTG [Royal Thai Government] agreed that the Ministry of Natural Resources would be responsible for all forestry activities by the end of 2003, by acquiring the whole office of the Royal Forestry Department."

ORGANIZATION AND CHARACTERISTICS OF THE FOREST ESTATE

Basic statistics on forest cover in Thailand are available through RFD publications and are summarized in Table 1. This table provides summary data for forest cover by region, originally derived from satellite data from a Preliminary Forest Land Use Assessment completed in 2000. It should be noted that many outside observers suggest the RFD has a strong incentive to overestimate forested areas; other observers estimate the actual extent of something resembling ‘forest cover’ in Thailand more realistically to be between 10 to 20 percent of national land area (e.g. Vandergeest 1996), whereas the official data indicates that natural forest cover accounts for 32 percent of land area. Table 2 provides further area data on RFD-regulated and protected territories in Thailand. Notable is the very large proportion of the country officially designated as National Reserve Forest – nearly 45% of its territorial land mass.

DOMESTIC FOREST HARVESTING TRENDS

There has been no allowable legal harvesting of wood from natural (non-planted) forests in Thailand since the 1989 logging ban. Periodic logging scandals do, however, make their way into the Thai and NGO media (e.g. see Lang 2003). The Bangkok Post, for instance, has carried a steady stream of reports on illegal logging activities in Forest Reserves through the 1990s and up to the present (e.g. Bangkok Post 2000a in Surat Thani). It appears that until recently, any confiscated illegal logs in Thailand, particularly valuable teak logs, were sold through auction by the FIO, a situation which has opened the FIO to allegations of corruption (Bangkok Post 2000a; Lang 2003). Table 3 provides an overview of official Royal Forestry Department data for total production of timber in Thailand from 1987-2003, which is broken down according into ‘teak’, ‘other reserved species’ (by licence and confiscations) and ‘non-reserved species.’¹¹ The official data portrays a downward trend in total production of non-reserved species and in confiscated timber with the grand totals declining steadily from 50,200 m³ in 1998, to 20,200 m³ in 2002. Dipterocarpus species and teak comprise the majority of reserved species harvest. The annual RFD survey reports do not appear to include information on the harvest of plantation eucalyptus, acacia or rubberwood, which would represent the majority of domestic log production.

Numerous authors have linked the imposition of the Thai logging ban to an externalisation of forestry impacts onto neighbouring countries (see for example Hirsch 1993 and the author’s related study on Cambodia for further information). Castren (1999) writes that from 1993-97 in Thailand, “imports have covered more than 95 percent of log supply and 70-80 percent of processed wood product supply – and even much of the domestic wood product supply is based on imported logs.” Lakanavichian (2001) also submits that after the logging ban:

¹¹ It appears that the category of ‘non-reserved species’ is not an illegal category. Both reserved and non-reserved categories should represent harvests from planted (not natural) forests. See section 2a below for explanation on ‘reserved’ and ‘non-reserved’ categories in Thai plantation policies.

“Illegal logging did not intensify only across Thailand’s borders in neighboring countries... Investigations in a number of cases show that collusion among influential people still facilitates illegal logging within Thailand. In some cases, it involves companies purportedly operating in Myanmar who actually log on Thai territory.”

No detailed estimates on illegal wood consumption or Thai exports of wood products procured illegally from neighbouring countries have been located in this research, although it can be assumed that through the 1990s these were substantial. Castren (1999; Table 6.1) submits that illegal logging in Thailand in the late 1990s represented a figure as high as 2.3 million m³ (97 percent of total commercial logging). This is an extraordinarily high and perhaps an unsupportable estimate, given that this figure approaches Castren’s same estimates for the illegal commercial harvest in anarchic Cambodia through this period (2.9- 4.0 million m³) at a time when Thailand had already moved towards a conservationist forest management paradigm.¹² There seems little doubt however that Thailand was importing substantial amounts of illegally sourced timber from neighbouring countries through the 1990s (see Table 4 for some broad estimates). Nalampoon (2003) writes:

“[During the 1990s] domestic timber was derived only from forest clearing owing to infrastructure development (e.g. roads, dams) or through the confiscation of illegal timber (about 25 000 m³/yr). Rubberwood from old plantations is another major source of timber for the furniture industry. Timber imports were comparatively high from 1990 to 1997 and decreased sharply after the economic downturn of 1997. Skeptics may doubt how Thailand, which banned timber cutting, could export timber... The explanation is that these “exports” were re-exports of high-value timber purchased from neighbouring countries by local Thai traders. In addition, a portion of the exports was in the form of sawn timber produced from imported round wood.”

In addition to RFD data, the USDA global agriculture information network (USDA 2002, 2003) also publishes a useful survey of forest product production trade and further information is available from sources such as the ITTO. Currently, the vast majority of Thailand’s log production is from plantation timber, largely rubber wood, teak and eucalyptus. Indeed ITTO (2003) reports that all new sawmilling licenses in Thailand are currently contingent on the use of plantation rubber wood as a raw material. Total (non-rubber wood) timber production in Thailand in 2002 was listed by the USDA (2003) at 33,600 m³, which represents a decline from the 2001 total of 41,330 m³ (corresponding with RFD figures for these years). The USDA outlook for Thailand’s domestic timber production for the next three to five years is suggested to be in a similar range, between 30 and 50,000 m³/year. Of particular interest, 2002 rubber wood production is listed at between 1.7-1.8 million m³, a range projected to continue for the years 2003 and 2004. Thus Waggener’s (2001) statement that in Thailand “plantations are not yet meeting expectations, nor are they currently supplying a significant volume of industrial timber” may in general be defensible, but does not appear to be applicable to the Thai rubberwood sector.

¹² Mungkorndin and Castren (1999) justify this figure according to the following: “There remains a gap of 2.4-3.3 million m³ in the demand-supply flow [for Thailand], while illegal imports have been estimated at 0.6 m³... The share of illegal domestic supply remains 1.8-2.7 million m³ or, on average, 25 percent of the total log supply including rubber wood or 56 percent of the non-rubber wood logs.” The other [perhaps more likely] possibility is that the figure for illegal imports into Thailand through the late 1990s, at 0.6 million m³, was an underestimate.

The section on “Thai Forest Products” below provides a more detailed overview of forest product import and export trade data for Thailand and its major trading partners, with particular attention given to trade with China.

STRUCTURE OF FOREST PRODUCT INDUSTRIES

The core of the Thai pulp and plantation sector is comprised of a relatively small group of vertically integrated players that are also competitive in regional export markets. The broader sector also includes a larger number of smaller, domestically-oriented paper producers. Lang (2002) drawing on Tunya (2000) lists the following companies as major players in Thailand’s plantation sector through either their demand for plantation wood or direct involvement in plantations:

Pulp and Paper Mills

Advance Agro (Prachinburi Province), Phoenix Pulp and Paper (Khon Kaen), Siam Pulp and Paper (Ratchaburi), Panjapol Pulp and Paper (Ayuthaya), Siam Cellulose (Kanchanaburi)

Borrad

Thai Plywood (Bangkok/Saraburi), Metro Fiber (Kanchanaburi), Thai Cane Board (Kanchanaburi)

Wood chips

Rung Ruang Kitti (Chachoengsao), Siam Forestry (Kanchanaburi), Thai Vivat (Surin), Kit Thawee (Surin), Siam Tree Development (Chon Buri), August Chip Woods (Chon Buri), K.M.I. Forest (Buriram)

The Thai Federation of Industries states there were 50 paper and pulp mills in Thailand in 1996, including 46 paper mills with a collective annual capacity of 2.842 million tonnes/yr. A more complete list of Thai pulp and paper manufacturing firms is shown in Table 5. Note that the data included in Table 5 appears to have been published before Advance Agro’s pulp and paper capacity expansions were brought on line in 1996.

In more general terms, in 2000, pulp and paper consumption in Thailand was reported at 2,827,342 tonnes with capacity at 4,606,010 tonnes (Laemsak 2002). Total capacity for short fiber pulp was 956,000 tonnes, total fiber consumption at 2,729,000 tonnes, a 1 percent increase from 1999. The actual domestic pulp and wastepaper consumption figures for the year 2000 can be broken down as follows:

- 655,000 tonnes of short fiber pulp (+ 254,000 tonnes exported)
- 213,000 tonnes long fiber pulp (100 percent imported)
- 1,861,000 tonnes of wastepaper (952,000 tonnes of which were imports)

Total paper production capacity in 2000 was listed by Laemsak (2002) at 3,650,010 tonnes, including:

- 2,210,500 tonnes kraft paper capacity
- 983,070 tonnes printing and writing paper capacity
- 254,000 tonnes paperboard capacity
- 80,340 tonnes household and sanitary paper capacity
- 122,000 tonnes newsprint capacity

Paper consumption in 2000 was estimated at 1,985,875 tonnes by Laemsak (2002).

Tables 6 and 7 provide capacity data for the major producers of pulp in Thailand. Kraft paper and printing and writing paper make up the majority of Thai paper and paperboard production. Correspondingly, top Thai paper makers can be separated into makers of kraft paper and makers of printing and writing (P&W) paper. Table 8 gives pulp and paper production by segment from 1985-2000 and Table 9 provides Bangkok Post estimates for kraft paper capacity, and Table 10 gives P&W capacities. Comparing production figures in Table 8 (1.412 million tonnes for Kraft paper and 548,000 tonnes for P&W in 2000) to the capacities in Tables 9 and 10 (1.590 million tonnes for Kraft paper and 802,000 tonnes for P&W in 2000) provides an indication of the scale of differences between annual capacity and annual production for these industries.

Nalampoon (2003) provides an overview of the timber product industry structure in Thailand, writing that in 2000 there were 514 small-scale sawmills, 45 larger sawmills, 5,745 small-scale woodworking and furniture factories, 607 larger scale woodworking factories and 52 pulp and paper mills.

Thailand's panel industry has experienced extraordinary growth in the past five years according to the ITTO, becoming the world's second largest tropical fiberboard exporter and its largest tropical particleboard exporter. For Thailand's important MDF (medium density fiberboard), particleboard, and hardboard industries, Laemsak (2002) has published good quality baseline information (Tables 11-13). ITTO (2003) also confirms that Thailand's Vanachai Group is Asia's largest producer of MDF and particleboard: "The Group currently has the capacity to produce 270,000 m³ of MDF per year and 300,000 m³ of particleboard per year."¹³

PLANTATION POLICY AND RESOURCES

PLANTATION POLICIES

In Thailand, the enabling legislation for the leasing of National Reserve Forest land to promote tree plantations was created in 1964 with the National Forest Reserve Act (Kongrut 2003). Article 16 of the Act allowed public and state agencies to promote activities such as agriculture, mining or tourism development in

¹³ The company 'MDF Planner' referred to by Laemsak (2002) and included in Table 12 may then correspond to the Vanachai Group.

degraded areas of National Forest Reserves in exchange for rental fees or tree planting in other areas. The renting of National Reserve Forest for plantations began in 1969 (Mahannop 2002). Eucalyptus investors were charged 10 baht/rai/year in 15-year leases with the fee for rubber and palm investors set at 50 baht/rai/yr (Kongrut 2003). The strategy of the Royal Forestry Department at the time was to lease out reserve areas to private enterprises, partly as an effort to halt forest encroachment by smallholders (ibid.).

In 1979, these policies were redefined, whereby the renting of an area larger than 10,000 rai required approval from the Director General of the RFD, support from the Board of Investment Promotion and approval of the Ministry of Agriculture and Cooperatives. The time limit for leases was extended to 30 years (Mahannop 2002). A 1985 revision to the Act revised the leasing conditions, requiring cabinet approval for contracts of over 2,000 rai.

Beginning in 1987, in part due to the growing controversies over eucalyptus plantations, the *maximum* area of Reserve Forest available for leasing by single investors was limited to 2,000 rai (Mahannop 2002). Controversies surrounding eucalyptus plantations continued, however; and in May 1990 the Thai Cabinet imposed a freeze on leases to the private sector for renting forest areas for forest plantations until a committee had been appointed by the Government to consider methods for better organizing and promoting private reforestation.

The key piece of legislation governing plantation development and activities in Reserve Forests in Thailand is currently the Re-Afforestation Act (1992). Although it was initially designed only to cover activities relating to teak and *Dipterocarpus alatus*, the list of species has since been extended. Mahannop (2002:17) states that the primary goal of the legislation was to "...support private reforestation of restricted tree species by the private sector on private land. The Act describes the types of land on which forest plantations may be registered and established."

Other important cabinet resolutions include the Classification of the National Reserve Forest Area (March 1992), which led to a full land use zoning of the National Reserve Forest area (Mahannop 2002). This zoning exercise led to 88.23 million rai of Forest Reserve being declared as conservation forest land (27.56 percent of the country's area), 51.89 million rai were declared as economic forests (16.16 percent of the country's area) and 7.2 million rai as land reform area (2.21 percent of national area). In September 1992, the Thai Cabinet passed a resolution which would re-open the leasing of degraded Reserve Forest land for plantations under the following conditions:

- Land area must not exceed 50 rai (8 hectares).
- The investor must grow tree species included in the Act of 1992 (namely teak and *Dipterocarpus alatus*, or 171 other economic tree species).
- The investor must maintain the land under plantations for longer than 5 years.
- The investor must have converted the land from agricultural production to forest plantation or an agroforestry system.

Under the seventh National Economic and Social Development (NESDB) plan (1992-97), the Thai government adopted a new forestry policy which, as mentioned, inverted the targets for conservation and economic forests to 25 percent of total land area and 15 percent respectively. Confusion concerning the Thai

plantation policy appears to have reigned, however; and by late 1992, the Forestry Department was being directed by the Thai government to focus its activities on forest conservation. Again, however, the complex issue of land tenure in reserve forests was avoided: “The remaining forests would not be protected, nor would new forests be developed without solving the problem raised by the occupation of the forest reserve by 12 million people” (Mahannop 2002).

In April 1997, a cabinet resolution was passed to reorganize the Forest Industry Organization. The resolution also directed the FIO to encourage the private sector to invest in plantations (*ibid.*), although it is unclear if this resulted in any changes to FIO policies.

In 1998, the RFD forwarded a new strategy for National Reserve Forest land to be implemented in 4 phased processes (Mahannop 2002):

- Zoning: to separate conservation and economic forests
- Demarcation: to show forest boundaries more clearly on the ground
- Land reform: to legitimize occupation by the local people of state land which has been designated for agricultural processes
- Protection and management: to prevent further encroachment on forest lands and to promote forest plantations, agroforestry and other sustainable land use practices.

Finally, in 2003 the newly formed Ministry of Natural Resources and the Environment revised the tariffs for Forest Reserve leases upwards to 100 baht/rai/year without retroactive effect (Kongrut 2003).

PLANTATION INCENTIVES AND PROMOTION PROGRAMMES

To boost the establishment of private plantations in Thailand, the RFD established the Office of Private Reforestation and Extension in 1986, which was then reorganized in 1992 into the Private Reforestation Division. The activities of this organization have been focused around providing incentives to smallholders for the establishment of plantations. Since 1992 this has involved four important programs: the Private Reforestation Extension Project, the Fast Growing Tree Reforestation Extension Project, the Private Forest Plantation Registration Programme and the Forest Cooperative Promotion program. The Private Reforestation Extension Project (PREP) has been a key promotional vehicle for establishing plantations on smallholder and private lands. Farmers were able to choose from a list of 46 approved RFD species, for planting on up to 200 rai of land at a density of 200 seedlings/rai. Participants also receive annual grants, spread over 5 years, for planting at least 100 seedlings per rai with approved species. A 1999 amendment to the program stipulated a decrease in the density of planting from the 200 trees/rai limit to 100 trees/rai in order to support agroforestry initiatives; in addition, the amendment reduced the approved species list from 46 to 38. Table 14 provides official statistics on participation in the Private Reforestation Extension project.

There is little information available as to the actual viability or success of the PREP, except indications that a large proportion of the farmers participating in the project did not choose to maintain their forested area after 5 years. RFD data indicates that in 2000, for example, 65 percent of the farmers joining the program in 1995

were no longer participating. It is unclear if this was because they had simply harvested the trees or abandoned the project due to plantation failure, although the Reforestation Division document identifies a number of problems, including inappropriate site selection, improper site preparation and planting technique, inappropriate seedling size, improper time of planting and insufficient maintenance. The USDA (2002) reports that the Private Reforestation Extension Project was in effect from 1994 to 2001 and dispersed US\$176 million in Thai Government funds. Seventy percent of this total (approximately \$123 million) was used for directly supporting farmer plantations and 30 percent was used for administration.

A second promotional scheme by the Private Reforestation Division involved the Fast Growing Tree Reforestation Extension Project (Table 15). This project was specifically aimed at identifying farmers who had failed in cassava or rice cultivation to encourage them to establish fast growing (most often eucalyptus) trees. Support was provided through the Bank of Agriculture and Cooperatives in the form loans with 5 percent interest. Farmers also received 200 seedlings and 9 kg of fertilizer per rai. Official data on the number of participants joining the program annually from 1994 to 1997 along with the areas planted each year is given in Table 15. Table 15 also indicates the number of farmers and planted areas remaining at the end of the project. Again, there is little information available with which to evaluate the success of any of the promotional exercises associated with the project. One informant, however, did suggest that in general, these programs had made little overall impact in the northeast, as influential people had usually managed to siphon off the funds. The financial incentives for the project were terminated in 1997, as the financial crisis hit the country.

An informant from a major Thai pulp firm viewed the promotional efforts of the RFD as failing to coordinate supply and demand aspects of the plantation sector and as a result exacerbating the 'boom and bust' cycles of tree crops in Thailand. In this informant's view, the money that the RFD was providing to farmers to plant eucalyptus in the 1990s resulted in *too many* farmers participating in the program, particularly in the northeast region. Then, when the financial crisis began to take effect, all the farmers began to harvest the plantations at the same time for cash income. There were widespread problems with middlemen taking advantage of their favourable position vis à vis the farmers. Long and costly line-ups of trucks were also reported at the factory gates of Phoenix in Khon Kaen. A parallel situation then developed with respect to the woodchip industry in Thailand. In the late 1990s there were wood supply surpluses. At the present time, however, shortages are developing, because the industry is not being properly coordinated. According to the informant, zoning, in addition to failure to coordinate supply and demand, is another important shortcoming of RFD plantation promotion efforts:

“Zoning is important for eucalyptus. It's not useful to promote eucalyptus up in Chiang Rai or Lamphun; there are no factories there. The RFD is looking to establish 16 million rai of plantations, but this needs to be a consistent effort; and you have to consider the type of trees you want, and the market.”

(Informant Interview July 2, 2003)

A final forest plantation promotion programme is the Overseas Economic Cooperation Fund (OECF), initiated in 1998 (Mahannop 2002). The fund established 984 million baht for loans to farmers for forest plantation activities, including land preparation, species selection and the purchase of planting materials. Importantly, this promotion fund explicitly excluded eucalyptus tree planting. The system was structured

around a rebate credit system. Interest rates were set at 1.75 percent per year, but interest did not need to be paid until the eighth year of borrowing. Payments on the principal, however, were not to surpass 12 years. Loans were available for amounts between 10,000 baht and 15 million baht, administered through the Bank for Agriculture and Agriculture Cooperatives (BAAC). The incentive scheme drew participation from 986 farmers (Mahannop 2002). No evaluation of the project, however, was located. A further loan scheme was developed through the OECF and the BAAC involving 365 million baht for plantations (with 2 percent interest rates) and 790 million baht for agroforestry (11-16.5 percent interest rates), although again there appears to be little evaluation of its impact.

For forest industry promoters, Thailand's land and plantation policies are seen as inhibiting further development of the industry. Mahannop (2002) cites a number of disabling policies. First, he notes that the Re-Afforestation Act and associated regulations are difficult to implement and do not cover all tree species. Second, there remain restrictions on the establishment of wood-based industries in the outer provinces (as opposed to the 10 central provinces where these restrictions do not exist). Lastly, the renting of Reserve Forest is onerous and is now restricted to 50 rai per investor and some species remain on a restricted export list. For many observers, the fact that until recently local people were blocked even from owning chainsaws without permission from the Forestry Department sums up the restrictive legal fields surrounding private-sector plantation development in Thailand.

However, Thailand is of particular interest for studies on plantation incentives because of the success of the promotion of a traditionally *agricultural* plantation species – rubber. Enters, Durst and Brown (2003) write:

“In Thailand, for example the Royal Forest Department provided small numbers of free seedlings (up to 500) to farmers between 1975 and 1989. Plantation establishment under this scheme was negligible. By comparison, a Rubber Replantation Aid Fund which offered generous financial grants to growers assisted in establishing an average of more than 40,000 hectares of rubber plantations per annum throughout the 1980s.”

The above authors submit that Thailand “demonstrates the effectiveness of financial grants in stimulating the planting of rubber trees, particularly because most grants are financially more attractive and provide more flexibility than free – and at times bulky – inputs (but also because there are established markets for rubber products [as compared to markets for the species for which free seedlings were distributed])... [However,] incentives for tree growing are unlikely to be effective if more attractive incentives are available in other sectors (e.g. rubber).” As described below, the Thai Pulp and Paper Industry Association has funded a study on boosting the plantation and pulp industries in Thailand. The study was completed in 2003 by a group from Chulalongkorn University who had previously developed recommendations for further promoting rubber wood. It remains to be seen how the Chulalongkorn study will be integrated into Thailand's plantation policy framework.

In terms of corporate incentives, many companies in Thailand's pulp and paper sector have historically qualified for promotional privileges under the Thai Board of Investment (BoI), including reductions in corporate income tax and waivers on import duties for machinery. It appears that recent changes by the Thaksin Shinawatra government may have removed the pulp and paper sector from those industries considered as facilitating ‘technology transfer’ into Thailand. Environmental controversies have also not

helped the industry's image in Thailand, which has likely affected government priorities towards the eucalyptus and pulp sectors in particular. In 2001, the Bangkok Post (2001) reported a realignment of the BoI towards self-reliant domestic industries and environmentally-friendly technologies. Notably, Siam Cement Group's President Chumpol Nalamliang was among those on the BoI's panel identified for replacement, according to the Board's new priorities.

STATISTICS ON EXISTING PLANTATION RESOURCES

The actual extent of plantation resources in Thailand is very difficult to establish for a number of reasons. These include a general lack of reliable data gathering; Thai government figures tend to include government-related tree planting activities only and competing jurisdictions for different tree species between government departments (unclear) (e.g. rubber or palm oil, under the Ministry of Agriculture, versus eucalyptus under the Forestry Department). The FAO (2000) reports:

“Data of forest plantations available are only for those plantations that are on government budget. The task is under the responsibility of the Reforestation Office. This office receives plantation area data reported by Regional and Provincial Forest Offices all over the country. Besides the government forest plantation area, there are other data on forest plantations areas from the Forestry Industry Organization and Thai Plywood Company Limited, which are the government organizations involved in reforestation. The Data Center then collects all these data from the responsible units and uses computers to analyze and disseminate the information in the annual forestry statistical report.”

Other researchers have reported a similar lack of reliable plantation data for Thailand. Mahannop (2002) for instance states that data regarding plantation development by large-scale investors and small-scale farmers is not comprehensively available in Thailand and that data on eucalyptus in particular is “hard to come by, as no standard reporting procedure has been established.”

There are five primary sources of plantation development in Thailand: the Royal Forest Department, the Forest Industry Organization, the Thai Plywood Company, private plantation firms and large to medium to smaller-scale private outgrower operations. The last two groups are largely outside of the purview of RFD statisticians.

The following includes a number of the broad estimates for the plantation area in Thailand:

- RFD (2001a) estimates total tree plantation area at 355,100 ha (2,219 million rai). This estimate does not include rubber and palm oil plantations and also does not include tree plantations that are not directly under the RFD.
- Bangkok Post (2002) reported an estimated total area of eucalyptus in Thailand at 3 million rai (approximately 480,000 ha).
- Laemsak (2002) also estimates the total area of eucalyptus in Thailand at 480,000 ha.

- Thairatsa (2002) estimates the area of private eucalyptus plantations in Thailand in 1997 at 438,524 ha. This data appears to be directly taken from what is the only primary study estimating eucalyptus plantation resources in Thailand, which is the study by Suthornhao et al. (1997).
- The Bangkok Post (2003) reported Thailand as holding approximately 2.5 million rai (400,000 ha) under the RFD, and 830,000 rai (132,800 ha) under FIO. The article states that the RFD would be attempting to increase the area of its plantations by 5 million rai (800,000 ha), within 10 years.¹⁴ The areas to be targeted for plantation promotion are to include degraded economic forest (Zone E), land to be reclaimed from Agriculture Land Reform Office and private farmland.
- The FAO estimates Thailand's plantation area of eucalyptus at 443,000 ha and the total plantation area (including acacia, eucalyptus, rubber, teak, other broadleaf, cassuarina and pine, but not including coconut and oil palm) at 4,920,000 ha. Table 16 summarizes FAO's estimates of plantation area by species, as well as its estimates of private versus public ownership and industrial versus non-industrial use.

From these overview statistics, there appears to be convergence around a eucalyptus resource area in Thailand of between 435,000 and 480,000 ha. The estimates for forest plantations by all species groupings differentiate between official RFD figures (e.g. 2001 RFD estimate of 355,100 ha of forest plantations and estimates that combine RFD data with estimates for tree planting on privately-owned land (e.g. FAO's recent estimate of total plantation area, including rubber, of 4.92 million ha. There are few accurate figures available for how this macro plantation resource might look, in terms of age classes, growth rates or productivities. There are some company-specific data for these questions which will be covered in the individual company profiles given later in this report.

Proceeding through more specific data for plantations, the RFD reports annually on the state of reforestation in Thailand (see Table 17). **The data in Table 17 suggests a total official reforested and afforested area of between 10,000 and 32,000 ha per year from 1998 (unclear).** However, the RFD data do not appear to adjust for the harvesting of plantation resources, or actual survival rates, and are likely of limited value.

There is no data on annual forest planting by species available from the RFD (2001a). The only data uncovered regarding plantation development by species in Thailand was from the FAO, with published estimates up to the year 2000 (Table 16). The FAO has also estimated the annual planting rate in Thailand at 225,000 ha per year, a figure which differs by a factor of about 10 from the RFD estimates of plantations established annually on public lands between 1997 and 2001 (Table 17). However, the FAO data includes substantial areas of rubber, coconut and oil palm plantations that would be managed by the Agriculture Ministry, not the RFD, which may account for the discrepancy.

Of particular interest in the FAO data is how closely the estimates for the eucalyptus plantation area in Thailand in 2000 (443,000 ha) match those of Suthornhao et al. Suthornhao et al. likely represents the best available survey data for eucalyptus resources in Thailand. They also make projections of eucalyptus supply

¹⁴ It is not completely clear in the article whether this implies the planting of an additional 5 million rai (for a presumed total of 8.3 million rai, e.g. increasing "by" 5 million) or whether it means bringing the present total of 3.3 million rai "up to" 5 million. Obviously, this points to some of the issues of using news media reports for accurate statistical information on forestry.

into 2002. The estimated total eucalyptus area in 1997 by Suthornhao et al. was 2,740,773 rai (438,524 ha), broken down by region as follows:

| | | |
|------------|-------------|----------|
| Northeast: | 207,778 ha. | (47.38%) |
| North: | 55,996 ha. | (12.77%) |
| Central: | 48,530 ha. | (11.07%) |
| East: | 125,975 ha. | (28.73%) |
| South: | 236 ha. | (0.05%) |

Table 18 summarizes the projections of Sunthornhao et al. up to 2002 for eucalyptus fiber supply in Thailand. In the data, the peak year for eucalyptus log supply in their forecast was 2000 (over 9 million green tonnes). Supply was then projected to fall sharply in the year 2002.¹⁵ The direction of Suthornhao's supply forecasts have been generally borne out by the developing shortage in eucalyptus supply suggested in interviews with key industry actors (provided later in this report).

A final estimate of the eucalyptus plantation area in Thailand comes from the Thai Tree Farmers Association (Nakarin 2001). The association estimates a total of 2.915 million rai (466,400 ha) (see Table 19). No further studies which estimate eucalyptus plantation resources in Thailand have been uncovered in this research.

Table 20 provides the best information this research uncovered regarding the plantation resources of the Thai Forest Industry Organization. The majority of FIO plantations are of eucalyptus, rubber and teak. More detailed information on the age classes or productivities of these plantations was unavailable. The 2003 ITTO Timber Outlook study briefly mentions that the Thai FIO is seeking to further promote plantation teak exports, with a goal of 10,000 m³ of exports per year. The recent withdrawal of FSC certification for two of the FIO's teak plantation areas (Lang, 2003) may not aid the realization of this objective however.

STRUCTURE AND SPATIAL DISTRIBUTION OF THE PLANTATIONS SECTOR

In general, accurate and comprehensive data regarding the relative involvement of large-scale and small-scale investors in plantations is not available in Thailand. However, some indications can be gleaned from various sources. RFD data from 1998 (Table 21) breaks down registered plantations according to subgroups (again, this represents only the small subset of plantations in Thailand that are officially registered with the RFD). Further, and somewhat contradictory, tables by Mahannop (2002) provide another breakdown of plantation areas on rented lands in National Reserve Forests, up to the year 1994 (see Table 22).

Mahannop (2002) states that by February 2002 and based on official statistics, there were only 180 individuals renting National Reserve Forest land for plantations, representing 228,187 rai (36,510 ha). Large contiguous areas represented less than 10 percent of this total (2,500 ha). These official statistics for plantation area are low, according to Mahannop (2002) for a number of reasons including: (1) the Re-Afforestation Act does not stipulate registration for species other than teak and *Dipterocarpus alatus*; (2) farmers and plantation owners are unfamiliar with the legislation requiring them to register their plantations, and if they did register their plantations they would need to seek approval from the RFD for harvesting the trees, particularly if they are

¹⁵ Projections based on 5-year rotations.

teak or *Dipterocarpus*, or they could be arrested for illegal felling; (3) there are a large amount of unprocessed forms at RFD offices. Mahannop (2002) also lists a breakdown of the relative size distribution of plantation areas in Thailand among those enterprises registered with the RFD (see Table 23).

SMALL-SCALE OUTGROWERS

Small-scale farmers represent a key portion of the plantations industry in Thailand, particularly in the case of eucalyptus. Indeed, eucalyptus from small farmers represents a critical fiber supply source for every major pulp and paper producer in Thailand and accounts for over 64 percent of the total eucalyptus area in the country. (Company profiles cited later in this report will detail individual company data and reliance on small farmers). An informant from the Thai Tree Farmers Association (personal communication) estimates the number of small-scale eucalyptus farmers at 30 to 40,000 (or 120 to 130,000 persons, including farmers and their dependents). According to this informant, however, supplies of eucalyptus from small scale farmers are also much tighter than just a few years ago:

“...the number of eucalyptus growers has gradually decreased. This is because the tree farmers have not been introduced to grow their trees properly. I have tried to encourage the small-scale tree farmers in the Northeast of Thailand to grow eucalyptus on their paddy fields embankments. This way of plantation is able to provide the tree farmers a higher capacity of eucalyptus logs compare[d] to those grown in the large scale plantation. The average capacity of eucalyptus logs grown on the embankments is about 51 tons/267 trees/4 years. Moreover, the cost of investment is less and the farmers can earn incomes from selling both rice and eucalyptus logs.”

Although the Tree Farmer Association stated that factory gate prices varied from factory to factory, the following general price trends for eucalyptus logs through the 1990s were provided:

| | |
|------|------------------|
| 1991 | 720 baht/tonne |
| 1992 | 780 baht/tonne |
| 1995 | 850 baht/tonne |
| 1999 | 1,000 baht/tonne |
| 2000 | 1,200 baht/tonne |

In more detail than Nakarin’s information (2001, Table 19) of eucalyptus supplies, Table 24 presents an additional excellent overall picture of eucalyptus log demand in Thailand, based on major company purchasers of eucalyptus, including those purchasing logs for woodchip manufacture and export, for MDF and particleboard production, and for pulping. A conference presentation by Thaiutsa (2002) provides some further overview of the chipping sector in Thailand. Table 25 shows Thaiutsa’s data for Thai woodchip supply, demand, growth rates and required plantation areas to support the industry at current production.

The key conclusion from the above data on the spatial distribution of eucalyptus plantations is that they are concentrated in the northeast of the country (almost 50 percent), with almost two thirds of the total eucalyptus plantation base in Thailand managed by smallholders. Small farmers, then, account for the

majority of eucalyptus production in Thailand and many of these farmers are growing trees outside of contract systems, although this is changing as companies become increasingly interested in securing their fiber supplies in the face of growing competition and reduced government assistance for eucalyptus growers. The fast-growing tree sector in Thailand is therefore quite fluid in terms of the supply networks. Further elaboration on this picture of the supply situation in Thailand would require more extensive interviews, farmer surveys and mapping exercises, likely in combination with the efforts of the pulp and chipping firms themselves.

LAND AND FOREST TENURE

An important aspect in understanding the nature of land and forest tenure in Thailand and Indochina is the idea that land and resource rights were not distributed on the basis of colonial-era racial identities, as they were in British Malaya, Sarawak and the Dutch East Indies (Vandergeest 2003; Peluso and Vandergeest 2001). In mainland Southeast Asia there has been no legalized enshrining of traditions resembling customary practices (*adat*) or a legal codification of the 'Native Customary Rights' tenure systems prevalent in Malaysia and Indonesia. Rather, land rights in Thailand have been more linked to inclusion and exclusion in the Thai polity (Sturgeon 2000, Vandergeest 2003). The fact that many upland minority groups in northern Thailand therefore are denied land rights is closely linked to the fact that approximately 40 percent of these minorities still lack Thai citizenship (Vandergeest 2003).

Placing the statistics regarding National Reserve Forests and Protected Areas alongside the reality of rural settlement in Thailand provides much insight into land use conflict in the country. Vast areas of the country are claimed as Forest Reserve (44.7 percent of the country according to the figures above), or as other types of areas managed under the Forestry Department, much of which are neither forested nor unoccupied.¹⁶ Vandergeest (1996) traces the process, initiated in the 1950s, by which the RFD has now come to control *de jure* just under half (48 percent) of the national territory in the form of Forest Reserves, National Parks and Wildlife Sanctuaries.¹⁷

The Land Act (1954) established the basic system of legal land title in Thailand. There are many types of land documents, but the primary ones include the Nor Sor Sii (NS-4; full title deeds), Nor Sor Sam (NS-3; transferable certificate of use) Nor Sor Song (NS-2; temporary occupation certificate) and the Sor Kor Nung (SK-1; a claim certificate unusable as collateral). In the mid 1990s, Lohmann (1995) reported estimates that only 15 percent of Thai farmers held full title deeds, while 53 percent held the intermediary NS-3 and NS-3K.

¹⁶ Vandergeest (1996) states, "The new forest territories contain millions of cultivators. Forest vegetation is as likely to be corn or cabbages as trees."

¹⁷ The RFD data cited in Table 2 suggests that this figure may be over 62 percent if one totals the territories over which the RFD claims some form of land or resource control, through Forest Reserves, National Parks, Wildlife Conservation Areas, No Hunting Areas, Botanical Gardens and so forth, although these categories would also be overlapping on the ground.

A full 32 percent of Thai farmers were then left holding less than a NS-3K, which in essence represents a legally insecure form of land ownership.

There are varying estimates of the actual number of farmers living within National Reserve Forests without full tenure rights. Most observers place the number between 5 and 10 million, although Mahannop (2002) places the number at 12 million and Lohmann (1995) places estimates as high as 15 million. Vandergeest (1996) suggests that 1 million households (5-6 million people) had moved into forest reserves by 1982, implying that between 20 and 30 percent of all Thai farmers were thus working land that was officially demarcated as forest reserve. The lack of enforcement and administrative capacity within the RFD means that in reality, little action has been taken to claim *de facto* RFD control over these large areas. Research has concluded however that this situation has increased risks of displacement for Thai farmers, has limited rural access to institutional credit, and has acted as a general disincentive for establishing productivity-enhancing improvements to farmland (Feder 1988).¹⁸ Squatter farmers are also ineligible for various rural development initiatives, marginalizing them even further from participating in more viable livelihood opportunities.

Instead of relinquishing control over territory in which there has always been very limited opportunity to actually plant and manage trees the RFD began issuing limited use rights certificates (the STK Certificate) for those living within forest reserves in 1982, which are transferable only through inheritance. By 1990, approximately 700,000 households had obtained STKs. This document provides renewable cultivation rights for five years, for up to 15 rai per household, although various conditions are attached, such as not leaving land uncultivated for more than two years, or planting RFD approved tree species (Vandergeest 1996). On the ground, these stipulations mean that those engaging in rotational swidden farming systems are ineligible to receive STK rights, even though, as Vandergeest notes, in the majority of cases swidden can be considered a more sustainable land use system than outright conversion to cash cropping or eucalyptus plantations. Lohmann (1995) holds that the STK program was a failure in improving local land security, in large part because the documents could not be used as collateral for accessing institutional credit, thus exposing farmers to another form of dispossession, namely through the accumulation of debt to informal money-lenders.

There has been a certain degree of political pressure to reform the distortions in the agricultural sector, which is obviously antithetical to the interests of rural farmers and indeed the country as a whole.¹⁹ In 1993, the RFD was directed to accelerate implementation of a land reform process, which would increase tenure security for people living within forest reserve areas. As a result, the Agriculture Land Reform Office (ALRO) now provides *Sor Por Kor* (SPK 4-01) documents to those settled within forest reserves, up to a maximum of 15 rai, although once again there remain stipulations on the amount of this land which is expected to be maintained under tree cover – usually 20 percent. Vandergeest (1996) noted that by 1994, SPK 4-01 certificates had been issued over 21 million rai (3.36 million ha, or approximately 14.6 percent of Forest Reserve territory). Dr. Bunvong Thaiutsa (personal communication) suggested that this figure has now increased to approximately 40 million rai (6.4 million ha) transferred to ALRO from the RFD. A system of

¹⁸ Feder (1988) found that farm revenues from cropping and other productive activities were 12-20 percent higher among titled farmers than non-titled farmers.

¹⁹ In a classic study on land tenure and productivity, Feder (1988) writes that “the [Thai] economy sustains a significant welfare loss from unrealized potential output” as a result of the classification of land as National Reserve Forest where legal title cannot be granted.

providing soft loans to farmers to facilitate the purchase of SPK 4-01 documents has also been initiated. The overall effectiveness of the land reform program has been limited, however, in part due to the recalcitrance of the RFD to relax the stipulations in maintaining tree cover in land reform areas,²⁰ but also due to numerous corruption scandals involving the misdirection of land reform certificates to 'locally influential people'. One such scandal in Phuket province in 1996 led to the fall of the first Chuan Leekpai government. According to some observers, the overall effects of both the RFD-STK program and the ALRO-*Sor Por Kor* land reform program have been a further concentration of land holdings in the hands of local and provincial elites through everyday commercial purchases and land foreclosures (Lohmann 1995).

Another response to the tenure situation in Thailand has been to accelerate the land titling process. The World Bank-supported land titling program, initiated in 1984, has faced its own difficulties, however. Similar to the land reform efforts, the titling program does not deal with people living in forested areas. Thus, a large group of farmers are not eligible for the program, particularly ethnic minorities living in upland zones. Second, there are no provisions for the legal recognition of village common property tenure systems in the titling program. Leonard and Ayutthaya (2003) document how in Lamphun province, the land titling process has had the perverse effect of increasing rural displacement. This displacement has followed a pattern typical to rural Thailand: individual land titling leading to rapid increases in the value of land, thus encouraging land speculation, speculative lending by banking institutions and a hoarding of land by wealthy developers. In turn, the economic crisis of 1997 led in many areas to a collapse in the value of land, which resulted in widespread defaults on agricultural loans and collateral seizures by the Thai banks. A number of questionable amendments to the 1954 Land Code appear to have facilitated the process by which land moves into the hands of wealthy developers. Of particular note is a modification that allows a NS-3 to be upgraded to a NS-4 without a field survey and a second amendment that accelerates surveying procedures. The lack of built-in safeguards to accompany the latter amendment left the titling program open to abuse; titles could be issued "even when there were no documents or either occupancy or land claim certificates and in some cases without a field survey" (Leonard and Ayutthaya). The end result has been yet more displacement, further encouragement of absentee landlordism and the removal of land from productive agricultural uses. As the authors recognize, the wider issue lies with the inequalities that result from commodification and the creation of unbalanced land markets in a national context where there is embedded corruption and unequal access to information and legal institutions. Leonard and Ayutthaya argue for the development of 'pro-poor' land policies, which recognize and strengthen community ownership over land and which view land as an important form of rural social capital to be placed within a wider framework of strengthened community-based rights and responsibilities. To some extent in this critique there are also calls for re-distributive land reform policies (e.g. Lohmann 1995).

The overall confusion and the Byzantine legal fields surrounding land tenure in Thailand also have important implications for the establishment of fast growing tree plantations. Almost any new plantation project of a

²⁰ For example, farmers are required to seek departmental permission for any tree planting or harvesting in forest reserve areas, including land reform areas, while no such permission is required for planting cash crops. Indeed, in an interview, an informant from Kasetsart University suggested that it is bureaucratically easier for the farmer living in forest reserve lands to convert degraded forest land into cash cropping areas, rather than to rehabilitate degraded forest back into productive forest. The RFD is attempting to develop incentives for farmers to plant forest tree species on Sor Por Kor land, although farmers still must register at the District Forest Office to plant trees, while they do not have to register to plant cassava.

substantial size planned for National Reserve Forests areas can be expected to impinge upon existing smallholder land uses in Thailand in some form or another. Given the strong civil society movements surrounding land, plantations and displacement in Thailand, there have been no large-scale plantation projects implemented in the 1990s. Left unresolved, these factors would pose serious constraints for future attempts to develop large contiguous areas of tree plantations in the country.

THAI FOREST PRODUCTS TRADE DATA AND LINKS WITH CHINA

THAI IMPORTS

Trade data for different categories of forest products for Thailand are available from a number of primary sources, including RFD annual reports, USDA reports and ITTO surveys. These data sets do at times diverge. For Thailand, overall figures from the RFD of log and sawnwood imports back to 1983 are provided in Table 26. The rapid rise in imports is apparent in the data after the 1989 logging ban, increasing up to an official high of nearly 4.1 million m³ in 1994. The Thai financial crisis also is evident in this table. It shows imports dropping to 1.2 million m³ in 1998, before increasing again up to over 2 million m³ in 2002 and 2003. Lakanavichian (2001) provides volume data for Thai imports of timber by leading country of origin for the years 1994-1998 (Table 27). The key exporting countries during this period are all four of Thailand's territorial neighbours: Malaysia, Cambodia, Laos and Myanmar. Table 28 provides RFD (2003) data on the import of logs and sawnwood by major exporting country for the years 1999-2002, and Table 29 lists the RFD (2003) data for the years 2002 and 2003. From 1994, the key countries exporting timber to Thailand have been Malaysia (1.091 million m³ in 2003), Laos (354,000 m³ in 2003) and Myanmar (148,000 m³ in 2003); with Cambodia dropping out of the top grouping in the late 1990s. As with much of the official data from the region, these figures should be viewed with some caution, particularly in relation to imports from neighbouring countries for which large-scale illegal movements have been documented. For instance, the Thai data states imports of an unrealistic 11 m³ from unruly Cambodia in 2003 and only 16,000 m³ in 1999, a year which matches the tail end of Cambodia's 'anarchic logging' phase and the utter breakdown of forest controls in that country.

The USDA (2003) also provides Thai import trade matrices for tropical hardwood products. Relevant USDA Thai import data for logs, hardwood lumber, veneer and plywood are listed in Tables 30-33. USDA and RFD figures match up extremely well for Thai veneer and plywood imports by country, and in general the two data sets correspond. At times, however, USDA estimates differ significantly from RFD figures. For example, the USDA lists 2001 Thai log imports at 436,048 m³, while the RFD cites 516,860 m³. The USDA lists Thai sawnwood imports in 2002 at 1,510,362 m³, while the RFD provides a higher figure of 1,924,568 m³ (a difference of over 25%). ITTO (see Table 34), provides a figure (1.806 million m³) which falls in between these two. Other ITTO data on recent log and sawnwood imports to Thailand (in Table 34) diverge in turn from RFD data (Table 29). For example, in 2003 ITTO provided log import figures of 673,000 m³, while RFD listed 380,105 m³ (a 77% differential). In general, however, the data sets are within the same range. A

steady rise in Thai wood imports from neighbouring countries with Thailand's rebounding post-crisis economy is also apparent. Malaysia stands out as the major wood exporter to Thailand

Thailand is a substantial importer of long fiber softwood pulp with the USA and Canada exporting 517,000 and 160,000 tonnes in 2003 respectively (RFD 2003). Smaller amounts of short fiber hardwood pulp are imported from countries such as Indonesia (6,000 tonnes in 2003).

In general, the relationship between Thailand and neighbouring ITTO member countries in terms of direction of forest product trade and consistency of trade data is of interest. In terms of tropical logs, for example, Myanmar emerges as a major exporter not only to China, but also to Thailand. However, there are substantial inconsistencies between Thailand's import figures and Myanmar export figures, with Thailand reporting more than double the volumes of the Myanmar government. (According to ITTO data – the 2003 data which match with RFD 2003 data – Thailand reported 385,830 m³ of tropical log imports from Myanmar in 2002, while Myanmar reported only 124,323 m³ in tropical log exports to Thailand that year).

THAI EXPORTS

For the different wood export categories, the key available data sets for Thailand are again from the USDA, the ITTO and the Thai RFD. In a number of instances, China and Hong Kong stand out as major destinations for Thai wood exports.

Of special interest is the RFD and ITTO data that detail Thailand's rapidly increasing sawnwood, particleboard and fiberboard exports, which reached 784,000m³, 383,000m³ and 596,200 m³ respectively, in 2002 (Table 35). The Bangkok Post (2005a) adds MDF to this list, stating that Thailand's wood panel industry was expected to grow at a rate of 20% in 2005 in production volume terms. In the report, the chairman of the Thai Panel Products Industry Club states that MDF production would reach 500,000 m³ in 2004 (an increase of 20% from 2003), approximately 30% of which is exported. Particleboard production for 2004 was listed at 1.5 million m³, nearly doubling from 2003, with 50% of this exported. Of note, the key policy changes argued for in the report were: increasing the rubberwood supply, a deep sea port in the south of Thailand to aid exports, and accelerating steps towards a Thailand-India free trade agreement.

RFD data (2003) (see Table 36 for 2003) (correct?) confirms that Thailand's now substantial sawnwood export industry is also dependent to a very large degree upon plantation rubberwood as a raw material. In the tropical sawnwood sector, Thailand emerges as a significant exporter to China and Hong Kong, with annual exports in 2002 reported in the range of 840,000 m³ to China and 575,000m³ to HK (Table 37). The importance of China and Hong Kong as an export destination for Thai sawnwood is apparent; according to RFD data in 2002 the two represented the end-destination for 91 percent by volume of Thailand's tropical sawnwood exports.

USDA export data for Thailand are provided in Tables 38-41 for hardwood log exports, lumber, veneer and plywood. These are consistent with RFD (2003) figures.

For furniture and semi-processed wood product exports, ITTO (2003) reports that the majority of Thai export production targeted the US, EU and Japan. In this instance, China emerges as a competitor for Thailand's furniture industry, as opposed to a large market. ITTO (2003) states that "China replaced Thailand as Japan's largest furniture supplier in 2000 and is rapidly gaining market share in other major markets."

Thai Exports of Wood in chips or particles are provided in Table 42, reaching a high of nearly 700,000 tonnes in 2003. RFD data are in broad agreement with Thaitusa's (2002) figures for wood chip production and exports from Thailand (Tables 43-44). As described below however, continued increases in Thai woodchip exports for 2004 and 2005 will likely be threatened by domestic supply changes.

The ITTO pulp export data in Table 35 can be compared against specific country data from the RFD in Table 45. Thai woodpulp exports fell from a high of nearly 350,000 tonnes in 2001 to 190,000 in 2002 before rebounding to approximately 275,000 tonnes in 2003. China has been the largest importer of Thai woodpulp by far since the start of the data series in 1999.

Indonesia and Thailand are the two key modernized pulp and paper producers in Southeast Asia. Export data by value and destination for the Thai paper sector can be gleaned from the RFD (see Table 46) and the Thai Department of Export Promotion (2003) statistics (see Tables 47-52). By volume, China and Hong Kong together accounted for 32% of Thai paper exports in 2003. For total paper exports by value (Table 47) the combination of mainland China and Hong Kong as destinations accounts for 19.24 percent of all Thai exports from January to May 2003. Between 1999 and 2002, exports of paper and paper products from Thailand to Hong Kong fell by approximately 43 percent in value. During the same period, however, exports to mainland China increased by approximately 22 percent. Hong Kong emerges as the leading export destination by value for Thai-produced printing and writing paper (Table 48) but China only ranks 11th in this category. For kraft paper (Table 49), China and Hong Kong represent the first and second leading destinations for Thai exports by value. Between January and May of 2003, these two accounted for a full 66.4 percent in value of Thai kraft paper exports. In 2002, kraft paper exports to Hong Kong and mainland China together were in the range of \$40 million/year. For paperboard exports (Table 50), Hong Kong and mainland China accounted for approximately 23 percent of Thai exports by value from January through May 2003. In 2002, Thailand's paperboard exports to these destinations was worth approximately \$US 22-23 million. Further data for household paper products and paper packaging containers are provided in Tables 51 and 52. In terms of total volume of Thai paper exports, ITTO (2003) reports a figure of 787,000 tonnes for 2002.

PROFILES OF EXISTING AND PLANNED WOOD PULP MILLS

There is better data for the trade in woodpulp than for overall domestic Thai production. Thai 1999 pulp mill capacity was estimated at 926,000 m³ by the International Woodchip and Pulplog Trade Review in 2002 (Table 7). This figure is somewhat lower than that of 958,000 m³ provided for the total capacity of top suppliers by Pitichaichan (2002; Table 6), although **this result (?)** may be based on more updated data. The ITTO (2003) reports a still higher figure, indicating that Thai pulp *production* in 2002 was 1.2 million m³. From

interviews performed with major firms, this may be overestimated. The quoted range obtained from Phoenix in 2003 for Thailand's total pulp production was approximately 1 million m³.

More detailed information on the major pulp producers in Thailand are provided below. According to latest reports, Panjapol is currently continuing with its debt restructuring process and no interviews were secured with this company to confirm plantation or production statistics.

SIAM PULP AND PAPER GROUP

Siam Pulp and Paper (SPP) is one of the two key integrated pulp and paper firms in Thailand. In the past two years, SPP has consolidated their position in the Thai industry, purchasing a majority stake in Phoenix Pulp and Paper (61.26 percent) and 100 percent of Thai Cane Paper. As a result, the Thai industry is fast moving towards dominance by two major integrated pulp and paper firms: Siam Pulp and Advance Agro. Siam Pulp has also hinted at more regional ambitions, recently purchasing a stake in United Pulp and Paper (the Philippines) as well as reportedly eyeing assets of the troubled Indonesian pulp and paper firms (Reuters 2004). The purchase of Phoenix in particular may be seen as an attempt to address the key issue of pulp supplies for the company.

SPP itself is a division of Thailand's blue-chip Siam Cement Group. SPP's subsidiary companies, in which SPP controls 10 percent or more of direct equity, are listed in Table 53. Basic capacity data for Siam PPC is given in Table 54 by product segment. Phoenix PPC (not included in Table 54), with a capacity of 230,000 tonnes of pulp per year, can now be added to SPP's original capacity of 171,000 tpy (?). Phoenix' shipments to SPP represents between 50 and 60 percent of SPP's pulp requirements (Interview: Phoenix PPC Sep. 9, 2003). It is important to note that, in agreement with the company's website data, the International Woodchip and Pulplog Trade Review 2002 Edition (Table 7) estimated SPP Group's pulp capacities at 123,000 tonnes for SPP, Ltd. (both eucalyptus and bagasse pulp) and at 55,000 tonnes for subsidiary Siam Cellulose (eucalyptus) in 1999. Box 1 presents a brief description of key companies within the SPP Group.

As with other Thai pulp firms, various companies in the SPP Group have qualified for Thai Board of Investment promotional privileges (see Table 55). The SPP (2002) Annual Report contains the following synopsis regarding the state of competition in the Thai pulp industry:

“In 2002, the local pulp industry had a total production capacity of short-fiber pulp of 956,000 tonnes, which was at the same level as in the previous year. World market prices for both short-fiber pulp and long-fiber pulp for the year 2002 had slowly increased during the second half of the year. One reason was due to the control of the production of the world scale producers in order to maintain their inventories at an appropriate level to the market demand. However, the price of pulp had dropped during the end of the year due to postponement of orders from China.”

Box 1 – Key Companies within the Siam Pulp and Paper Group

Siam Pulp and Paper is the largest producer of industrial paper and packaging materials in Thailand. The Siam Pulp and Paper Public Company Limited is the holding company in the paper and packaging business of the Siam Cement Group. The holding company consists of 17 manufacturers of pulp, paper and packaging. Established in 1979, the Company was the first manufacturer of bagasse pulp in Thailand. As of 2001, capacity for bagasse pulp was 48,000 tons/year and capacity for chemi-thermo-mechanical eucalyptus pulp was 68,000 tons/year.

Siam Kraft Industry Co., Ltd.

Siam Kraft Industry Co., Ltd. is a kraft paper manufacturer for the packaging industry. It is a part of the paper and packaging business of the Siam Cement Group and held by a holding company, the Siam Pulp and Paper Public Company, Ltd., under Siam Cement. The Siam Kraft Industry Company was established in 1984 and now has a kraft paper mill with three kraft paper machines with a total capacity of 280,000 tons/year producing kraft liner board, corrugating medium, extensible sack kraft and kraft paper for producing core paper. The Company exported kraft paper to many countries in Asia and USA, earning over US\$90 million per year.

Thai Kraft Paper Industry Co., Ltd. is kraft paper manufacturer for the packaging industry. It is a part of the paper and packaging business of the Siam Cement Group and held through Siam Pulp and Paper, Ltd., a holding company under the cement group. The Kraft Paper Industry Company was established in 1989 and has a paper mill with four kraft paper lines located in Tambon Wangsala. The company's products are kraft linerboard, corrugating medium, extensible sack kraft and kraft paper for producing core paper. Its total production capacity is 520,000 tons/year.

Source: AsiaPaperMarkets.com (2003).

Fiber Supply Strategies

The Thai Tree Farmers Association (see Table 24) has estimated SPP's subsidiary Siam Cellulose's demand for eucalyptus logs at 600,000 tonnes/year. The SPP Annual Report describes the Group's raw material supply strategies (Box 2).

Box 2 – Siam Pulp and Paper's Raw Material Supply Strategies

Pulp: Eucalyptus log, pith and bagasse are sourced from local suppliers through purchases from planters under the Company's support in eucalyptus tree plantation and planters in general.²¹

Printing and Writing Paper: Long fiber pulp is sourced from abroad; short fiber pulp is sourced domestically; waste paper is sourced both locally and from abroad.

Industrial Paper: Waste paper and short fiber pulp is sourced from domestic and foreign sources, long fiber pulp all sourced from abroad.

Packaging Business: Supplies are mainly kraft paper, from Siam Kraft Industry Co. Ltd.

Source: SPP Annual Report (2002).

²¹ "Planters in general" here refers to eucalyptus suppliers outside of formal contract relationships with the company.

More specific information on SPP's fiber supply strategies arose during interviews with a company informant on July 2, 2003. SPP directly owns 8,000 rai (1,280 ha) of plantations in Kampong Phet province with an additional 1,000 rai (160 ha) of tree development plots in Kanchanaburi. The informant stated that SPP had not been successful in gaining access to further areas of land through purchasing or long-term leasing.

Interviews with an informant from the SPP subsidiary Siam Forestry in Kanchanaburi revealed that the company currently works formally with between 2,500 and 3,000 contract farmers, averaging 50 rai (8 ha) of eucalyptus per farmer in western and central Thailand, within 150 km of the factory in Kanchanaburi. This suggests that individual farmers supplying the company currently accounted for approximately 22,000 ha (i.e. 2,750 farmers with an average of 8 ha each).²² Productivity of contract farmers, however, was low with a supply analyst at Siam Forestry estimating it between 8 and 10 tonnes/rai/4 years (about 12.5- 15.6 tonnes/ha/year), reaching up to a maximum of 18 tonnes/rai/4 years (about 28.1 tonnes/ha/year).

The Siam Forestry Company is increasingly working towards a fuller 'membership' system, which would ideally include farmers with an aggregate plantation area of between 250,000 and 300,000 rai (40,000 to 48,000 ha). The other primary field crops in Kanchanaburi (cassava, sugar cane and maize) can provide certain minimum returns annually. Assuming rotational periods of four to five years for a cycle of eucalyptus, the suggestion was made that if eucalyptus yields were below 10 tonnes per rai (62.5 tonnes per hectare per rotation), it would be difficult for outgrowing farmers to turn a profit.

Under the former strategy of Siam Forestry, farmers often simply sold their wood to the best offer (to "door-to-door" buyers). In essence, farmers did not have full price information. However, with the contract system being developed, Siam Forestry Company would provide service in the harvesting and transportation of the eucalyptus. Siam Forestry Company is thus developing "promotional teams" both to encourage farmers to grow eucalyptus and to facilitate their involvement. Included in this strategy are minimum guaranteed price offers to outgrowing farmers and the promotion of better planting material (site-adapted hybrid eucalyptus species), technical advice as well as harvesting and transportation services.

According to an interview with a Siam Forestry informant, approximately 40 percent of the company's total log supply is from their 'membership' of outgrowing farmers. The remaining 60 percent is secured through "outside" farmers (outside of their optimum 150 km perimeter), as well as from woodchips purchased in the northeast. (The informant stated all three major woodchip producers in the northeast had supplied them with chips: KMI, Kittawee and Thai Wittawat).²³ Company targets are aimed at increasing the area under membership contracts by 50,000 rai (8,000 ha) within a year with the end goal at 250,000 rai (40,000 ha) under contract arrangements.²⁴

²² Note that Laemsak (2002) provides a substantially lower amount of plantation source area under contract. He writes that Siam Cement Group maintains contract farmer suppliers on 25,600 ha as well as non-members in a 150-km radius around the factory over 40,000 ha, with an average price of eucalyptus logs in western Thailand at factory gate at US\$22.2/tonne (approx. 930 baht).

²³ Other sources suggested that Siam Pulp was also sending eucalyptus log purchasing teams as far as the northeast.

²⁴ As a quick calculation, assume an average productivity of 9 tonnes per rai per 4 years = 2.40 tonnes/rai/year. 2.40 tonnes/rai * 250,000 rai = 600,000 tonnes of raw logs per year. The figure of 600,000 tonnes/year of green logs also represents the demand figure for SPP subsidiary Siam Cellulose estimated by the Thai Tree Farmer Association (Table 22). Total capacity of Siam Pulp and Paper and Siam Cellulose for eucalyptus pulp is 125,000 tonnes per year.

According to the interviewee at Siam Forestry, the plantation company is making progress with a registration program. As of May 2003, the company was extending its registration program to include farmers who do not get seedlings from the company. Up to the end of June 2003, Siam Forestry had over 94,500 rai (15,100 ha) under registration. The target was to include 100,000 rai (16,000 ha) under registration by the end of 2003.

The rising prices for eucalyptus logs in western Thailand can likely be taken as an indication of the rationale for establishing such an incentive program with outgrowing farmers. According to an SPP informant, eucalyptus log prices had risen to 1,000 baht per tonne (factory gate price) in comparison to a price of 900 baht/tonne one year before and 700 baht/tonne three years before. The combination of limited areas for the company to expand their own plantations and limited yields in the climatic zones and soils of western Thailand (approximately 2.4 tonnes/ha, to a maximum of 2.9 tonnes/ha in their own, quite intensively managed tree development area) has made the development of a secure raw material supply chain a company priority.

The company has recently classified its registered areas into plantation age classes (2003 data):

- Less than 1 year 20,704 rai (3,313 ha)
- 1-2 years 44,285 rai (7,085 ha)
- 2-3 years 19,682 rai (3,149 ha)
- 3-4 years 6,694 rai (1,071 ha)
- more than 4 years 3,252 rai (520 ha)

The informant stated that only those farmers holding legal land titles were accepted into the program. Participating farmers held various types of land documents, including:

- Chabot – full title deed (see spelling below)
- Nor Sor Sam Kor (NS3-K)
- Nor Sor Sam (NS-3)
- Sor Por Kor (SPK 4-01) (from the Land Reform Office)
- Sor Kor Nung (SK-1)
- Sor Kor Song (SK-2)
- Sor Tor Kor (STK) – from the RFD
- Paw Ba Taw-5 (land tax receipts)

Approximately 50 percent of the participating farmers held Chanot, NS-3 Kor or NS-3. The remaining 50 percent would hold documents lower on the scale (from SPK down). The aggregate total estimate of all of Siam Forestry's existing eucalyptus source areas was 200,000 rai (32,000 ha) or about 3,000 farmers.

Following are notable points about sources:

If we assume a log: pulp conversion ratio of 4.5:1, this implies that 600,000 tonnes of raw material would provide 133,000 tonnes of pulp. The average productivity of 12 tonnes/rai/rotation for all outgrowers (estimated by the SPP informant) may then be an overestimate.

- 95 percent of fiber supply comes from farmers
- 50 percent of supplying farmers are “inside” (with contracts, or registered)
- another 50 percent of supplying farmers are “outside” (no registration or contracts)
- 5 percent of the fiber comes from company-owned plantations
- among the largest leases of land are a 10,000-rai (1,600-ha) area from a large sugar mill, and a 20,000-rai (3,200-ha) area leased from the Sahavira steel company

Siam Forestry also completed a survey of local farmers in 2002. The question asked was “Why do you not plant eucalyptus?” The responses were as follows:

| | |
|---|----|
| 1. No money | 20 |
| 2. Other cash crops better | 11 |
| 3. No time to prepare land | 11 |
| 4. Cannot prepare land on time | 8 |
| 5. Problem with land ownership | 5 |
| 6. Seedling costs | 5 |
| 7. Seedling quality | 4 |
| 8. Logistical problems (transportation, harvesting) | 1 |

Another survey in 2002 asked: “Why do you plant eucalyptus?” The answers were:

| | |
|--|--------------|
| 1. Better than nothing | 43 |
| 2. Confidence in the company promotion program | 32 |
| 3. Good selling price | 27 |
| 4. Cheaper investment compared to cash crop | 26 |
| 5. Good service | 16 |
| 6. Seedlings of good quality | 15 |
| 7. Market for wood (buyers) | 13 |
| 8. Profit | less than 13 |

Thus, as of 2003 Siam Forestry was attempting to establish a logistics team to promote a further 60,000 rai (9,600 ha) of eucalyptus with the large landholders in the area. This includes the following targets:

- Landholders with more than 500 rai (80 ha) Total Target: 25,000 rai (4,000 ha)
- Medium-small landholders 32,000 rai (5,120 ha)
- Community groups 3,000 rai (480 ha)

The company is developing a complete promotion package: from plantation promotion to monitoring of the plantations and harvesting and purchasing. For landowners, they will provide growing teams, land preparation teams, investment analysis and soil analysis. For small farmers, Siam Forestry is continuing to provide seedlings and for a fee will also provide a growing team and a monitoring team to provide plantation management advice. The minimum guaranteed price for eucalyptus logs was 900 baht per tonne at factory gate in 2003, a system begun in 2002. SPP was apparently pushing Phoenix to provide a similar minimum guaranteed factory gate price this year. It was noted, however, that harvesting and transportation usually

amount to 300 baht per tonne, so farmers would then often receive an average of 600 baht per tonne/rotation. Under company regulations, the eucalyptus must be at least 3 inches diameter or 4 years old.

The company is developing a medium-term plan for the approval of a credit system for participating farmers. A suggested possibility is to provide loans to cover 70 percent of initial investment costs for farmers.²⁵ In addition, all areas of eucalyptus are being plotted with a GIS system, along with detailed soil and rainfall charts, down to the Amphur (district) level. Longer-term plans for the company may include sourcing acacia trees from Myanmar, as there is a higher amount of rainfall across the Burmese border outside of a rain shadow effect occurring in Kanchanaburi province.

With respect to the situation of local farmers in Kanchanaburi, farmer debt was suggested to be less of a problem in western Thailand as compared to eastern and northeastern areas of the country. In western Thailand, landholdings are reported to be larger and many of the farmers plant sugar cane, which provides good returns.

To meet the stated 70,000-tpy capacity of SPP for chemi-thermo-mechanical eucalyptus pulp, Siam Forestry occasionally sources fiber from the northeast to adjust their inventory. This adjustment amount can be as much as 20 percent and comes from Isan woodchip companies. At times, however, Advance Agro was reported to be sending supply trucks in the opposite direction into SPP's own region of western Thailand from the mills at Prachinburi to buy logs from area farmers. Competition from other buyers in the area, including an MDF plant purchasing woodchips, Metro Fiber Company (with an input capacity of 80,000 tonnes of logs per year), was reported by the Siam Forestry interviewee. In addition, eucalyptus is also purchased for charcoal production and for use as construction poles. Metro Fiber has been reported as operating at 100 percent capacity. It is said to use mostly rubber wood, however, using eucalyptus largely for 'adjusting inventory'.

An interview with a head office informant at Siam Pulp and Paper also shed some light on the firm's fiber supply strategies and future outlook. The Siam Pulp Company informant suggested there were recent moves to coordinate the eucalyptus supply situation in Thailand among the major pulp and woodchip producers.²⁶ A monthly forum was initiated in January 2003 for pulp and woodchip manufacturers to discuss the supply situation for sustainable plantations in Thailand. According to the SPP informant, the major pulp firms are also attempting to convince the Thai woodchip companies to move into promoting plantations and contract arrangements.

A Pulp and Paper Industry Association-funded study on eucalyptus and fast growing trees in Thailand has also been completed by a team of economists from Chulalongkorn University. SPP stated their opinion – n which was supported by the results of the study – that the Thai government was not playing a strong enough role in promoting fast growing plantations, and even the RFD did not consider eucalyptus to be among their priorities:

²⁵ The Siam Forestry informant suggested that the Thai Bank of Agriculture and Agricultural Cooperatives (BAAC) had actually been unhelpful in supplying credit to eucalyptus growers, unlike for cassava, maize or sugar cane farmers.

²⁶ According to informants, Advance Agro is not participating in this coordination attempt.

“This relates back to the NGOs – the government does not want to get involved with eucalyptus in Thailand. But people should “face the fact” – there are good and bad aspects, but they need a neutral vision, just as with rubber for example.”

SPP Groups’ mills were stated as all running at full capacity, with Siam Cellulose even running a bit higher than the 70,000 tonnes/year capacity indicated by interviewees. In terms of longer-term fiber supply prospects, the SPP informant suggested that both SPP and Phoenix were looking for short fiber pulp from outside of the company. He indicated, however, that the market for pulp was not large and mentioned that Brazil, Indonesia and Advance Agro were all sources of pulp that could potentially be tapped. SPP had purchased pulp from Advance Agro in the recent past, for instance, due to the moderate month-to-month cycles in wood fiber supplies in the company. Of course, SPP also purchases “between 50 and 60 percent” of Phoenix’s pulp production.²⁷

Interviews indicated that the SPP subsidiary Siam Cellulose is looking to expand production, doubling its output if possible. Phoenix has had similar plans. However, since Phoenix is now a part of SPP, it may not have this opportunity as the merged company will expand on one site only. It was suggested that the northeast was likely an easier place to promote eucalyptus than western Thailand. Land costs are lower and soil and rain are sufficient. Key areas for improvement mentioned in interviews were better genetic matching of seedlings to environment, site selection and farmer training. For the moment, however, it was indicated that SPP is waiting on a particular policy that would allow companies to rent land in Forest Reserve areas. The Chulalongkorn research on eucalyptus in particular was identified as a potential stepping stone towards a revamped plantation promotion policy in Thailand.

Prospects for sourcing raw materials from outside of Thailand were also discussed with Siam Pulp, particularly the potential for the Asian Development Bank (ADB)-supported plantation program in Laos to serve as a eucalyptus log supply source for Phoenix Pulp. Myanmar was also suggested as a potential source of wood fiber that would be within economic distance from the Kanchanaburi mill. The informant, however, stated:

“SPP is not being proactive on this [securing logs or chips from Myanmar]. If someone wants to sell plantation fiber from Burma, ok they would purchase it. But we would not invest in Burma, it is too risky.”

The SPP head office informant also suggested that the notion of a “supply shortage” in Thailand was somewhat overstated; and he did not see a serious shortage on the horizon (i.e. over the next 1 to 2 years).

“Yes, we are facing some tightness of supply, but Thailand is still exporting woodchips, so they are still available in the country...supply and demand will drive the price to the point of not exporting. Continuous imports will not be a necessity; for a short period of time perhaps this may be required. For example, in the rainy season when roads are impassable, there could be some supply limitations. But this is not that serious.”

²⁷ If Phoenix’s production is taken to be 230,000 tonnes/year, this would be roughly 115,000 to 138,000 tonnes.

The interview with the SPP informant ended with the following thoughts on the Chinese market:

“China should be viewed as an opportunity, but you have to be careful in your projections; China could also face some real problems. China would have a very large capacity, but they would also use this capacity, at any cost, during difficult economic periods. This could result in big turbulence for Southeast Asia. The Thai paper market is not big, so the Chinese probably would not pay attention. But if there was a serious oversupply problem, then maybe China would bring their products into Thailand. However, only Siam Pulp is establishing market protection with services, so price is not the only issue. As far as overseas competition, it is unpredictable. The US changes their suppliers immediately if a better deal comes along. Here China could penetrate, but then Siam [Pulp] could look into other markets. So China is more “up” than “down.” As far as pulp supplies, China will need to import raw materials, but right now the volumes are small. The Chinese are also discussing with some governments in Southeast Asia, for example the Thai government, and the Malaysians [for establishing joint pulp ventures]. If these countries are willing to produce the wood, the Chinese will take it. From projections, there will not be enough wood supply within China, so they are also just trying to diversify their risk. Sure, if they can get more supply, why not?”

Recent reports published in the Bangkok Post (2004c) suggest that Siam Pulp and Paper is actively seeking expansion opportunities both in Thailand and in the region (Vietnam, Malaysia and Indonesia). SPP was suggested to currently be investing 2 billion baht (approximately US \$52.5 million) to increase capacity of their operations of 1.5 million tonnes by an additional 80,000 tonnes by 2005 (no information was available on which subsidiaries of the company this applies to). The article concluded: “The business group performed well in 2003 in the overseas market with exports accounting for 20 percent of total sales. Its major markets are China, Hong Kong and Malaysia.”

Very recent interviews with an informant from a new start-up chip mill in Prachuab Kiri Khan province (Thai Martin Group, Interview, Feb. 12, 2005) indicated that this company was accessing acacia wood in Thailand’s upper South region and selling woodchips on to both Siam Pulp and an unnamed Japanese firm (see Thai Martin section below).

ADVANCE AGRO COMPANY

No interviews were secured with Advance Agro (AA) during the research period in Thailand despite numerous attempts at contact. This portion of the report represents a review of all available literature on the company and its operations.

Similar to Phoenix (see below), Advance Agro has experienced its share of financial and socio-environmental controversy. Thai NGOs have organized in opposition to the land displacement resulting from eucalyptus farming in eastern Thailand associated with the mill, although AA has thus far largely avoided the controversies around wastewater impacts that plagued Phoenix’s operations through the 1990s. The parent

company of AA, Soon Hua Seng, also fell into serious financial difficulties in the post Asian-crisis years. Until restructuring agreements were reached in 2000-2001, Soon Hua Seng represented one of Thailand's largest non-performing loans.

Advance Agro is the other of Thailand's two major integrated pulp and paper producers and the only firm with sizeable areas of company-owned plantations. The company was established in March 1989; the period corresponding with the Suan Kittu scandal described above. Suan Kittu Reforestation remains a subsidiary company of Advance Agro. The company was successful in bringing a second pulp and paper line into production in 1997, making it the largest integrated producer in Thailand. AA was also the first pulp company in Thailand certified under the ISO 14000 system. The box below contains a company summary on Advanced Agro.

Box 3 – Advanced Agro Company Summary

Advance Agro (AA) is a fully integrated pulp and paper company with total production capacity of 427,000 tonnes of bleached eucalyptus kraft pulp and 475,000 tonnes of uncoated and coated wood free paper.

Manufacturer of AA copying paper, Advance Agro, is one of the most advanced companies in Thailand and was the first mill in Thailand to be awarded ISO 14001 and ISO 9001 certifications. The company, incorporated in 1989, is located about 120 kilometers from Bangkok and began production as the only fully integrated pulp and paper producer in Thailand in early 1996. Annual rated production capacity is 427,000 tonnes of bleached eucalyptus kraft pulp, 475,000 tonnes of uncoated paper or up to 250,000 tonnes of coated paper and 255,000 tonnes of uncoated paper.

AA sells its products in Thailand and international markets. Exports currently account for approximately 70 percent of total sales.

Main shareholders are the Soon Hua Seng Group and family members, Stora-Enso, Europe's largest pulp and paper producer, and Oji Paper of Japan, the largest Japanese paper producer, holding approximately 56 percent, 19 percent and 5.5 percent of the shares of the Company respectively.

Source: Asian Paper Markets (2003).

Table 56 includes a summary of key data from the company's annual report (2002), listing company subsidiaries, activities, finances and corporate details.

Fiber Supply Strategies

Asiapapermarkets.com provides the following summary of Advance Agro's supply strategies:

“Wood supply for the pulp mills is derived from plantation grown eucalyptus hardwood trees cultivated in the region surrounding the Tha Toom Mills and the company imports long fiber pulp as required for its paper production.”

According to the company's annual report, raw material is supplied primarily through a 12-year contract with Agro-Lines, for “...not less than 1,650,000 tonnes of eucalyptus logs per year” (2002). The purchasing price from Agro Lines represents the lowest price set at a mill of an AA related company, or 850 baht/tonne, whichever is higher. According to the report, Advance Agro also purchases eucalyptus logs from deals with

10,000 farmers and their families, as well as from other approved farmer plantations. AA Pulp Mill 2 also purchases 250,000 tonnes of wood chips per annum from fellow AA subsidiary companies.²⁸

Laemsak (2002) writes that the Kaset Rungruang Company (apparently a Thai name for Advanced Agro) has 32,000 ha of company-owned plantations and farmer contracts on a further 48,000 ha. This would represent a total plantation area of at least 80,000 ha (500,000 rai). Assuming an average productivity of 12 tonnes/rai/4 years, this equals a green log supply of 1,500,000 tonnes per year; multiplying this by a pulp conversion ratio of 4.5:1 provides 330,000 tonnes of pulp. This is substantially lower than the figure of 2.2 million green tonnes that the Thai Tree Farmer Association gives (see Table 24) for Advance Agro's demand for logs, equivalent to approximately 490,000 tonnes of pulp production. The Farmer Association estimate also suggests a higher pulp capacity than the 427,000 tonnes per year given on the AA website.

If we assume AA's demand to be approximately 1.92 million green tonnes of logs per year (427,000 tonnes pulp production multiplied by a green log: pulp conversion ratio of 4.5:1), and an average productivity of 12 tonnes/rai/4 years, a plantation resource of about 640,000 rai (102,000 ha) would be implied. However, in Table 19, Nakarin (2001) estimates Advance Agro's plantation area at 700,000 rai (112,000 ha). When combined with a demand of 1.92 million tonnes per year, the 700,000 rai figure would be congruent with an average productivity of all Advance Agro-associated plantations at approximately 11 tonnes/rai/4 years.

Advance Agro has also been involved in high profile discussions surrounding a proposed new eucalyptus pulp venture with China to be located in Thailand. This proposal has been on the discussion table since 1997, under the Chuan Leekpai Government. The last reports in the Bangkok Post (2002) state that (then) Thai Defense Minister Chavalit²⁹ was searching for 2 million rai from the military for the project, while the Chinese were offering 7 billion baht (approx. US\$165 million) to finance the project. The last report identified on this project was in the Bangkok Post (2002b), which describes the project as involving 700,000 rai (11,200 ha) of eucalyptus plantations, and 38 billion baht (\$US 905 million) of investment. The article stated that "Terms were being drafted now to hire a consultant for the study, which has been postponed for the past year". To this end, a search was underway for 250,000 rai (40,000 ha) of degraded forest and 500,000 rai (80,000 ha) from land reform areas. The planned mill would consume 3.5 million tonnes/year of eucalyptus to produce 700,000 tonnes of paper "mainly for export to China." The Bangkok Post article indicated that Advance Agro had stated that the project would increase Thailand's total pulp/paper production from 4.7 million tonnes to 5.7 million tonnes/year.

A number of interviewees commented on this expansion proposal, although most were doubtful about its potential to actually move forward.

"It is good potential, but there are just not the concessions of land available in Thailand. It is almost impossible to create large areas of plantations with the current government and political structure. If the government were to allocate land to a company, when local farmers are short of land, this would equal a fight with the local people. Land is always an issue in Thailand, therefore, it would be very difficult for the Advance Agro Chinese project. But

²⁸ This sister company may be the Bangpakong woodchip mill (see Table 24).

²⁹ From media reports, General Chavalit appears to be a strong backer of the project.

there is good potential for land utilization for plantations that could be arranged with local farmers. If the government were to actively support this, they could solve the problems.”
(Siam Pulp Interview)

Another informant held a more pessimistic view in an interview:

“The Chinese government knows there will be a huge demand for paper in China and they are closing the old mills due to pollution problems. So the Chinese are thinking about pulp resources... The Chinese government is afraid of importing a lot of paper into China; however, there are new investors. And the Chinese are looking for partners in Southeast Asia. But Advance Agro has no money; it is just not a realistic project.”

“[Advance Agro has] rescheduled their debt problems back in 2001. However, a year later they defaulted again on their debt, the agreement was breached. So now they are talking about another restructuring agreement - they just reached a new agreement recently. However, Soon Hua Seng is itself restructuring and rescheduling their debts.”

“Advance Agro is the only company in Soon Hua Seng who can generate cash, so the [Damnernchanvanit] family uses Advance Agro for generating cash. Advance Agro is a listed company, but Soon Hua Seng is sucking cash out of them – nobody would invest in the company.”

“The Chinese government says it will import pulp at the market price, but if they wanted to pay market price, there would be no need for them to risk investing in projects. The Chinese would intend any [overseas FDI] project as a simple cost center, they would have no interest in either the company or the country.”

Another industry representative from the Thai plantation sector had the following opinion on the Advance Agro-Chinese joint venture proposal:

“The Advance Agro Chinese proposal has generated lots of controversy. The Thai government wants to allocate land in central Thailand. If it were in the northeast of the country it would be OK, but central Thailand is not the right place for eucalyptus. And General Chavalit does not hold much power anymore. During the 1980s and early 90s, nobody was keen to help northeast Thailand, in terms of the ministers. But Chavalit was a Minister from Isan. Advance Agro may actually want out of the project at this point, but with Advance Agro it is difficult to know what is happening. Mr. Yothin pushes, but the company is under financial strain. They are still dynamic, however, and they could still provide the push for a new project... In Thailand, another 1 million tonnes of pulp capacity will be brought on line at some point. 0.8 million tonnes will be directed towards China, 0.2 million for the domestic market. The question is, from where? From a project? From government promotions? From Siam Pulp or Advance Agro?”

PHOENIX PULP AND PAPER

Although, as mentioned, Siam Pulp and Paper has recently acquired a 61.25 percent share in Phoenix Pulp and Paper, Phoenix, with its separate history, will be profiled here separately. The Phoenix mill established in Khon Kaen was Thailand's first pulp mill, established in 1975 through foreign investors, and pitched at bringing large-scale development to Thailand's poor northeast region. Glassman and Sneddon (2003) provide an excellent breakdown of the history of the pulp mill which has attracted much publicity, both negative and positive, for the eucalyptus industry in Thailand.

According to Glassman and Sneddon, citing OIC et al. (1975), the location of the Phoenix mill was first selected due to the abundance of farmed kenaf in the area, the water supplied by the Phong river, cheap power and available land for construction of the mill. The Thai Board of Investment accorded the following privileges to the Phoenix mill: land purchasing rights (usually not extended to foreign majority firms), allowance of non-Thai foreign labour, exempted import duties on equipment, and – as Khon Kaen was a declared zone of investment promotion – exemption from income tax on profit for the first 5 years and 50 percent reduction on profit taxes for the next 5 years. Construction of the pulp mill was completed in 1982, at which time Phoenix was eligible for Board of Investment promotions including reductions in business and corporate income taxes, and deductibles on electricity and water supply (Glassman and Sneddon 2003).

There have also been repeated controversies around wastewater impacts from the Phoenix mill site, as well as external impacts of Phoenix's "Project Green" wastewater irrigation system upon the Phong river ecosystem and on farmer rice fields and fish ponds (see Glassman and Sneddon 2003). There has been persistent conflict between NGO groups and the company around the wastewater impacts of the pulp factory; and at times these criticisms have been extended to the purported negative ecological effects of the eucalyptus trees.

Phoenix has also experienced a fascinating, turbulent financial history, marred by repeated takeover attempts by competing interests. Box 4 below summarizes key points in the history of these take-over attempts.

Box 4 – Phoenix - “The Dirtiest Take-Over in Thai Corporate History”:

- Phoenix CEO George Davison was associated with charges of financial mismanagement throughout the 1980s and 1990s. These allegations were made by the Bangkok Post, the Stock Exchange of Thailand and shipping tycoon Krish Shah from India.
- Shah made tender offer on Phoenix shares in 1994, 50 percent over market price. Davison resisted the takeover attempt, with one news article suggesting that “Shah seemed intent on sinking Davison's boat.”
- Shah enlisted the help of Indian businessman Rakesh Saxena, an advisor to Bangkok Bank of Commerce, to enlist the bank's resources behind a takeover bid.
- This takeover bid coincided with the pollution charges leveled against Phoenix by Thai fishermen and farmers, although these charges were later 'disproved.'
- 150 pollution stories ran in the Thai media against Phoenix. Davison contended that the pollution charges were concocted by Saxena and Shah to lower the share prices in anticipation of the take-over attempt.
- During this time, the Bangkok Bank of Commerce was implicated in providing loans to a number of other takeover attempts in northeast Thailand. Saxena stood accused of recruiting several government leaders to help acquire shares for takeover bid at Phoenix.

- Chuttawat Mookatamara, an Isan politician, received \$US50 million from Bangkok Bank of Commerce and Saxena to amass Phoenix shares under the Chiangsaen Country Club Company.
- Former Thai Deputy Interior Minister Suchart Tancharoen was also indicted in these activities, although the charges were withdrawn after he repaid \$60 million to government officials.
- Shah's takeover attempt, with money supplied by the Bangkok Bank of Commerce, was blocked by Davison who personally borrowed money (using collateral supplied through his own European OCD) to buy up shares. EOCD and Globex acquired 25 percent of the company each during this time – leaving both Davison and Shah saddled with overpriced shares bought with borrowed money.
- October 1994: Shah called general meeting of shareholders, a 14-hour meeting including fistfights and megaphones. Davison, however, retained CEO-ship after this meeting.
- Shah appealed to the Stock Exchange of Thailand with further allegations of financial misconduct against Davison.
- Bangkok Bank of Commerce declared bankruptcy in 1996 in a situation paralleling the collapse of Barings Bank brought on by Nick Leeson. Saxena, accused of defrauding the bank of \$2.2 billion, fled to Vancouver where he still faces extradition to Thailand.
- By 1998, the EODC had run out of cash to service \$70 million debt to the Merita bank of Finland. Globex's funds were similarly low.
- In 1998, Finnish environmental groups put pressure on Finnish government for their lending practices to Phoenix in light of environmental effects of eucalyptus species in plantations and the pollution charges. It is reported that soft loans totaling 1 billion baht were tied to the use of Finnish environmental mitigation technology at Phoenix.
- April 3, 1998, Thai newspaper *Ban Muang* published article in which Mr. Singh of the Stock Exchange of Thailand accused George Davison of Phoenix of setting up Kinnaree Industry Co., a competing firm to Phoenix Pulp and Paper (of which Mr. Davison is CEO). Trading of Phoenix shares was put on hold. Davison's rebuttal was that Kinnaree was set up in 1983 "to hold Phoenix pulp shares and land ownership only, and not to run any business."
- On April 6, 1998, George Davison filed a lawsuit for 200 million baht against the Stock Exchange of Thailand and newspaper editors, claiming false statements were made about conflict of interest charges in Phoenix with regards to Kinnaree Industry Co.
- On March 7, 1999, Phoenix Pulp and Paper forced to shut down Khon Kaen mill due to water shortages. Analysts submitted that if it were not for the continual takeover attempts, Phoenix would in fact have been profitable through the mid to late 1990s.
- On April 30, 1999, Globex, led by Krish Shah, again attempts to remove Phoenix CEO George Davison over allegations of financial mismanagement of 125 million baht, citing an audit report by PriceWaterhouseCoopers.
- On June 17, 1999, George Davison and 7 other directors of Phoenix Pulp and Paper resign in a move described as the "dirtiest takeover in Thai corporate history." Krish Shah of Globex was suggested as expected to be appointed CEO. The takeover has implications for the syndicate of Scandinavian banks that lent Phoenix \$80 million in soft loans, guaranteed by the state owned International Finance Corporation of Thailand.
- Thai Ministry of Finance sold its 3 percent stake in Phoenix in Nov. 1998.

Source: Summary of News Clippings from The Nation, Bangkok Post, Watershed and the Far Eastern Economic Review.

As is apparent from the controversies described above, Phoenix faced major constraints on its functioning due to the corporate takeover battles between Davison and Shah and the debt repayment obligations to Finnish lending agencies. Share prices have been falling over the last several years due to management problems associated with the takeover attempts. There seems to have been support within Thai regulatory bodies and the Stock Exchange of Thailand for Krish Shah versus broad Board of Director support for ousted CEO George Davison. With the new CEO, L.M. Thapur, in place, it remains to be seen how the company will be managed.

A profile of Phoenix, based on information from asiapapermarkets.com is provided in the box below.

Box 5 – Profile of Phoenix Pulp and Paper Company

“Phoenix Pulp and Paper Public Company is Thailand's leading manufacturer of quality short fiber pulp for export and domestic consumption. Principal raw materials are eucalyptus, bamboo and kenaf.

Phoenix Pulp & Paper Public Company Limited was established in 1975 with an objective to transform the agriculture-based economy of the Northeastern region of Thailand to an agro-industrial based economy. This was the first "National Project" of the Board of Investment of Thailand and the first major industrial facility in the Northeastern part of Thailand.

Phoenix started its operation in the Nampong district of Khon Kaen province in 1982. In 1994, the mill completed its major expansion project by adding the second line based on state-of-the-art-technology along with a major upgrade of Line 1. Phoenix has the distinction of being the only mill in the world that manufactures market pulp from Bamboo and Kenaf (both of which fall under the category of non-wood plants and are considered the most environmentally friendly raw materials).

The mill has a total capacity of 200,000 tons/per annum of market pulp from bamboo, eucalyptus, and kenaf.³⁰ The raw materials are procured from about 70,000 farmers' plantations and agriculture areas.”

Source: Asiapapermarkets.com. (same as Box 3 or different source?)

According to the Bangkok Post (2002c), Phoenix consumes 1 million tonnes of raw materials per year: 900,000 tonnes of eucalyptus, 100,000 of bamboo and 15,000 kenaf. These raw materials are sourced completely from area farmers. An informant from Siam Pulp and Paper suggested the following changes upon the purchase by SPP of a 61-percent share in Phoenix:

“Although the existing reserves of wooden raw materials would be adequately managed for the current output level [at Phoenix], there might be a serious problem in the case of capacity expansion.”

Indeed, the Phoenix expansion project appears to have been placed on hold for the foreseeable future. Phoenix had planned to invest up to 12 billion baht (approx. US\$286 million) in a new factory to more than double its annual capacity up to 450,000 tonnes. With the takeover by Siam Pulp, however, production at Phoenix was instead boosted at the existing lines, from 200,000 tonnes to 230,000 tonnes.

The following is a written author transcript (unclear) from an interview held with an informant from Phoenix on September 9, 2003.

³⁰ An informant from Phoenix stated that production capacity had been increased to 230,000 tonnes.

“In Indonesia, pulp expansion went ahead without plantation development. But this was also the case for the rest of Southeast Asia. In Thailand and India, there has been some deforestation [associated with the pulp sectors], but these countries have also neglected fiber supplies. There is more awareness in the last few years; however, this is more due to private industries than government support. So the government neglects this in China – yes [the plantation supply side], but other governments are also neglecting this. There is not enough effort by governments, despite industry discussions for increased support and requests for land, especially degraded land. So in India and Thailand, nothing has happened. The pulp industry keeps trying, but to little effect.

Thailand produces 1 million tonnes of pulp, using 4.5 million tonnes of logs. Other users of logs include: chip mills (5 million tonnes) – chips exported mostly to Japan; the construction industry (uses eucalyptus); the furniture industry (uses eucalyptus and is also sourcing from Laos); charcoal producers (also use eucalyptus). So the total [fast growing tree] consumption in Thailand is about 9.5-10 million tonnes of green wood.

Northeast Thailand is the main area for eucalyptus provided to the Thai market, in the south the main plantation wood is rubber wood. Central Thailand is highly fertile, but there is no space for fast growing trees.

Thailand now has 5 major pulp mills, and capacity is heading towards 2 million tonnes in the near future – although this also depends on the economic recovery. However, all the major mills are trying for expansion. They would have already expanded except for this shortage [of fiber]. So the next expansion in Thailand will probably occur in 2008. The amount of eucalyptus used by other users, including MDF producers, will also, however, continue to increase.

Phoenix’s survey of Thailand indicates a shortfall of eucalyptus logs for the next three years of 10 million tonnes. This will have to be compensated with other materials, including bamboo and kenaf for Phoenix – they will probably use a mix. The interviewee is not sure if others will have their own alternate supplies. There will also be a shortfall for the woodchip industry, however, and it is a possibility that they may not be able to keep their commitments to Japan.

This year we (both Siam and Phoenix) have a good promotional program. Advance Agro is facing a shortage, however, and they have entered into our supply areas. But the Phoenix areas are mostly secured – the distance from factory gate is an issue for Advance Agro. The interesting thing is that Phoenix has excess wood from last year! Now wood supply is also down in central Thailand. Advance Agro now has 70 collection centers in various areas. And farmers are now finding it easy to change to the highest bidder. This has resulted in the Phoenix shortage. So Phoenix has had to change their strategy a bit. Yes, wood prices will increase – this is inevitable, prices will jump. All the Thai pulp and paper groups have a meeting once per month now. Everyone has realized they need to cooperate. Two years ago, the economy was down. In 1996, paper consumption in Thailand was 37 kg per person. Five

years later it was 30 kg per person. So nobody knew what would be happening with the economy, with demand and consumption and so forth. This is why promotions were delayed. Then, late last year the situation changed. The companies decided to start promoting eucalyptus with farmers, but at this point it will be difficult to get supplies up to 2004, 2005 and 2006 demand levels. Which companies will suffer is the question.

In Northeast Thailand, the average yields are about ten tonnes per rai per four years. Yes, harvesting after 4 years – it is acceptable after four. Farmers take the seedlings, plant and come back after 4 years and cut. The problem is that farmers are not interested in management or weeding. Fifteen tonnes is definitely possible without irrigation on twelve hundred mm of rain. Nong Khai gets about 2-2,500 mm. Fifteen hundred in Khon Kaen, sometimes 1200-1300. But you can still get fifteen tonnes per rai here. And with clonal propagation, they might be able to get twenty tonnes per rai per four years. Phoenix would prefer to harvest after five years, but the farmers look for harvesting after four.

Now Advance Agro and others have started coming to their supply area. So Phoenix is also looking to develop its own land. Between 10 to 30 percent of production from their own areas would be the ideal. Will Phoenix' management allow for this? Will they allocate funds for this? This is the question. At the moment, however, new plantations will come from farmers. They will invite farmers and let them grow trees on their boundary lands and also with agroforestry systems.

Phoenix has been promoting seminars in 7 provinces. They invite the bigger farmers to these seminars. There are 19 provinces in the Northeast and they want supply from 14 of these. Each seminar attracts a lot of people. Phoenix shows the demand figures and then returns to educating attendees about plantation management. Then the soil gets tested for fertilizer needs, weeding etc. After the first crop is cut, for the second crop they allow 4 to 5 shoots. If all these are allowed to grow they will all do poorly, so they keep just one shoot. Phoenix also has a program for increasing yield, but until now these have not been concrete plans. They have also invited people from India for promoting clonal propagation to learn from Indian techniques.

Phoenix has 3 supply zones: one within a 100 km radius; one within 200 km; and one more than 200 km away. Beyond these radii, transport costs are too high. Phoenix has also attempted to rent some land; they have attempted to get land from the military, but so far have not been successful. Perhaps they will have to buy the land.

But with the seminars, there is a big potential. At the moment they only provide free seedlings. If they also provided money support, loans, this could be made better. The sugar cane industry does this; they give advances, and this has been quite successful. If they implemented something like this they might be able to get as much fiber as they want. And with the boundary idea, there is no need for farmers to plant in their main field areas. People are starting to realize this. Khon Kaen University and Kasetsart University have given seminars on this also.”

On Government Programmes:

“The FIO has their (its?) own land and plantations. They have two areas that are close to Khon Kaen: one in Kalasin and one other. These were stabilized 15 years back. At that time the FIO was receiving assistance from Thailand, New Zealand and France for Northeast Thailand’s “Green Isan” Project. There were large increases in eucalyptus at that time. However, this all finished by 1994-95. After that, there were no promotions for planting trees. The Thaksin Government has focused on rubber. The Thai pulp industry is trying to convince Thaksin; he is a businessman. The government did have a program for eucalyptus of 3,000 baht per rai, but this money largely went into the wrong hands. The program did not have a large effect on the eucalyptus supply. By 1997-98, this program had ended with no further assistance.”

On Competing Industries:

“The Thai government supports the sugar lobby, but does not support eucalyptus. Perhaps the industry did not present a unified front. Transportation is not a problem at the moment. To handle the farmers is they key.

Loans are required for farmers, but they are also a problem – they tend not to pay them back. So there is currently little support for eucalyptus. Only 10 million tonnes [of nationwide production] is still very low.”

On Phoenix:

“Phoenix produced 230,000 tonnes last year. Production is generally 50 percent for domestic sale and 50 percent for export. Last year more products were sold domestically. 40 percent of exports go to China. Transport and shipping costs are \$15/tonne. But to the EU/Middle East, transport costs are \$50-55/ tonne. China has huge demand. If Phoenix were to make another complete line, expanding to 400,000 tonnes, China could take the extra capacity, no problem. Now Siam PPC has taken over Phoenix. In the past, about 30 percent of SPP’s pulp requirements came from Phoenix. Now Phoenix supplies 50-60 percent of their pulp requirements. But now Phoenix is more geared to the export market. They want to keep their export markets alive for potential future expansion.

Siam Cement Group is taking a fresh look at the sector, they have purchased Thai Cane and also Phoenix. They are adopting a consolidated approach. They may go for a new line, either in Phoenix or Kanchanaburi or even a new line in Indonesia or Vietnam – nothing has been finalized yet. SPP is also pursuing for a Northeast Thailand supply strategy.”

On Log price Increases:

“Prices have increased 60-70 baht per tonne from last year to around 850 baht/tonne. In 2004, there will be a further increase, because this year they are not planting so much. SPP average prices paid for logs are 1,000 baht per tonne in western Thailand.”

On Laos:

“In brief, looking at Laos: The BGA Company in Laos produces furniture and has some eucalyptus plantations. It is good quality furniture; they have to condition the wood so there is no twisting. They also use it for sauna wood, benches and desks; and the quality is high. BGA Company has fifty thousand hectares in Laos, but has only planted 1,600. Of this 1,600, BGA has full ownership of one thousand hectares and holds six hundred ha in a joint venture with Stora-Enso. Stora-Enso may be planting another five hundred hectares this year. There are some options for [Phoenix] joining with BGA in Laos, but the trees are not healthy and plantation practices are poor. They [BGA] talk a lot, but their plantations are poor.

Laos has been disappointing. Phoenix has done a lot of work in Laos. Phoenix established three thousand hectares of plantation, when Dr. Davidson was CEO. Then we had to leave. We are following up in Laos, trying to promote a pulp mill. But the Lao Government is lousy. There have been other attempts to establish a pulp mill in Laos, but nobody has succeeded. It could take thousands of years.”

On Vietnam:

“As for Vietnam, maybe we will see pulp mills there in next few years. India and Thailand are both trying in Vietnam. Vietnam is growing faster than Laos. Pulp requires capital investors; Vietnam could expand in terms of foreign investment.

Asia is still a net importer of pulp, from the EU, from Russia and so forth. Surely Asia must produce its own pulp supplies? But the major expansions are in China. Number two would be Vietnam.

With the Laos-ADB plantation project, money is still being misdirected. And other projects are in bad shape on the verge of bankruptcy. Fifty percent of the funds are going into people’s pockets. World Bank projects are better than ADB projects; they are better placed. If they had a progressive government, they could do it, but nobody is there to do it in Laos.

Bamboo: Phoenix only uses this only for compensation. Eucalyptus pulp is the future. Acacia is also good, but eucalyptus has the edge in terms of quality; today at least it is still considered superior to acacia.

South Africa is now a major supplier of eucalyptus pulp. For bamboo, the problem is that it is known only in India, China and Vietnam. It is only in these countries that paper makers know it, but export buyers are not interested.”

On Cambodia:

“Nobody will touch Cambodia, because of the government. But Thailand does have good personal relations with Cambodian politicians.”

On Phoenix’s Media Reputation:

“In 1990 Phoenix started to make a profit – construction was started on a new line to produce for export – state-of-the-art technology. This line began production in 1994 and after three months was at 100 percent capacity. The peak year, the “Golden Year” was 1995. The price of pulp was over \$1,000/tonne then; this may never happen again. But Phoenix was losing money from 1980 to 1987. Once Phoenix started to make money, it also started to attract attention. People were hired to attack [then Phoenix CEO] Davidson on environmental issues; there was pressure on Davidson to leave Thailand. Money was spent by parties to grab Phoenix. A Khon Kaen University lecturer was bribed; villagers were bribed to protest around wastewater and so forth. In reality, Phoenix had a good environmental record from the start – all the allegations were false.

CONCLUSION ON EXISTING AND PLANNED PULP MILLS

According to a summary by Asiapapermarkets.com (2002), a recent report by Credit Suisse First Boston suggests that Advance Agro is the only major pulp producer in Thailand that is globally cost competitive on a sustainable basis, primarily due to its status as an integrated producer, access to abundant supplies of high quality wood, advanced production technologies and alliances with world class players. Although no interviews were secured with representatives from Advance Agro to confirm the company’s fiber supply strategies, interviews with other producers suggest that the assumption of abundant supplies of high quality eucalyptus fiber for all of the Thai firms may be overstated. If the suggestion by Phoenix is accurate, Advance Agro has developed 70 wood collection centers in the Northeast and there is growing competition between the major producers for eucalyptus supplies. Even the largest Thai pulp producers who have purchased or leased their own plantation areas may face periodic supply crunches. It would appear that future expansions of the industry will have to be matched by increases in eucalyptus (or, in the south, acacia) production areas. Given the controversial history of eucalyptus tree crops in Thailand, the organizational skills of rural NGO protest groups, and a critical, environmentally-concerned press,³¹ the Thai pulp industry is currently at a very interesting crossroads.³²

³¹ A further indication, if needed, of the continuing controversial status of eucalyptus in Thailand can be seen in Bangkok Post (2005b, c), which highlights the attempts of farmer and biodiversity advocates in challenging the listing of a newly developed clone of eucalyptus under Thailand’s ‘Plant Variety Protection List.’ The listing would have blocked other farmers or plant breeders from using the new planting material developed by one of Thailand’s major plantation companies. The article is particularly interesting in how it highlights the continuing organization and effectiveness of the anti-eucalyptus lobby in Thailand. First is the array of people cited in speaking out against eucalyptus: from an alternative farming activist to a vice-rector at a major Thai university to a member of Thailand’s National Human Rights Commission. Secondly, the people cited working against this application were not doing so on the basis of ‘democratizing’ the availability of intellectual property – in this case, making improved, high-yielding eucalyptus clones

PROFILES OF EXISTING AND PLANNED WOOD CHIP MILLS

Thailand has a small number of key woodchip producers and exporters. Interviews were secured with three of the primary chip exporters with secondary data contributing to information on the remaining key producers.

Interviews provided more in-depth information on key woodchip producers in Thailand. This information is summarized below in profiles of the key woodchip players interviewed. The results of an interview with Oji Paper, a major purchaser of Thai wood chips, is also included. Finally, a summary of the supply strategies, buyers and price information on each player as available is provided in Table 57.

THAI WITTAWAT CORPORATION LTD.

Thai Wittawat company is located in Surin province, in Thailand's lower northeast. The company is one of three woodchip producers located in close proximity to each other. The other two are Kittawee Woodchips, also located in Surin Province and KMI woodchips in nearby Buriram. Thai Wittawat generally sources eucalyptus logs from areas to the east, northeast and southeast of Surin town (for example, from Sri Sa Kept, Upon Ratchathani, Roi Et, and Buriram), while the two other companies have staked out similar core 'source areas'. These areas also overlap to some extent and, according to informants, create competition between buyers in some areas.

Thai Wittawat is capable of consuming 200,000 tonnes of eucalyptus logs per year; and, according to the company, they generally divide this total by 2.5 to achieve a figure in bone-dried tonnes (i.e. 80,000 BDT's). The company stated that prices for eucalyptus logs in their source areas were in the range of 800 baht/tonne, which represents a 15 percent increase over last year.

Thai Wittawat does not own outright any production land. Instead, the company purchases logs from middlemen, brokers and farmers. In total, they deal with approximately 200 brokers (some of whom are also farmers) and about 400-500 contract farmers, depending on the season. In addition, they also source from farmers not under contract. As a very broad estimate, the informant suggested there may be 10,000 farmers providing logs to the company through brokers but without contracts.

available to independent, smallholder, eucalyptus farmers. Rather, they were seeking to block the spread of eucalyptus in Thailand entirely ("Today's meeting is our last chance to protect the environment and farmers' rights from being trampled by giant eucalyptus plantation operators"). Third, the article was broadly effective in associating eucalyptus as a species (recall, a tree crop concentrated in *Isan*, the northeast) to a macro-weather event currently receiving front page attention in the Thai media: a major drought currently affecting much of the northeast ("This will result in a rapid expansion of eucalyptus plantations, which will worsen water shortages in several parts of the country"). Within two days, the anti-eucalyptus coalition had succeeded in having the proposed listing shelved.

³² Very recent events in Laos back up this interpretation of a developing Thai fiber supply issue. Both Phoenix and Advance Agro have apparently taken steps to secure plantation bases in the Lao province of Savannakhet, with concessions of 15,000 ha and 5,000 ha respectively (Industry Informant Interview Feb. 12, 2005). The fact that Advance Agro, with pulp facilities in Prachinburi province, is interested in sourcing wood supply from as far as Savannakhet (a distance of approximately 600km, well outside the suggested 150km 'economic distance' for shipping woodchips overland) suggests that Advance Agro, at least, may be willing to accept a loss on raw materials supply to keep its mills running.

As an estimate, the average production area for farmers was suggested to be approximately 20 rai (3.2 ha), with some as low as 1-2 rai (0.16-0.32 ha) and others in the range of 40-50 rai (6.4-8.0 ha). The maximum area that any single farmer was likely to have under eucalyptus was 100 rai (16.0 ha). According to the company, farmers achieve a yield of approximately 8-12 tonnes per rai per rotation, working on 4-year rotations (equivalent to a productivity of 12.5-18.75 tonnes/ha/year). The company suggested that farmers would get a fair income from this productivity in comparison to the other primary agricultural products in the northeast (rubber, cassava and rice).

In terms of their dealings with brokers, middlemen sign contracts which specify a requirement to supply a certain tonnage of eucalyptus per month. All transport is by truck. Contracts are also signed with participating farmers. Under this system, guaranteed prices are offered, not at the time of planting but rather approximately 3-4 months prior to harvesting. The company has experienced shortages of supplies in the past, for example, in the rainy season or in the harvesting season. As a result, the company is attempting to establish more contracts with farmers. Currently they have 400-500 direct contracts, with the average production area comprising approximately 20 rai (3.2 ha). The company provides seedlings to the farmers and also productivity advice through a growing support team. For the other 10,000 farmers, there is no direct contact between them and the company and the transactions occur whenever the farmers have eucalyptus to sell. Currently, the company is not considering entering into the transportation or harvesting side of the business.

The primary issues for farmers were indicated to be a lack of seedling supply and low productivity. The suggestion was made that if farmers could increase their productivity to 15-20 tonnes/rai/4 years (2.5-3.2 tonnes/ha/4 years), their returns would be much improved. The yields available from the second rotation (after coppicing) were said to decline for many farmers, thus lowering their returns.

Thai Wittawat ships their production through the port at Sri Racha at Laemchabang. They sell woodchips mostly to Japan, with some shipped to Siam Pulp and Paper. The company directors stated that they did not supply either Advance Agro or Phoenix. The estimate was that out of their total production of 80,000 **BD tonnes**, 70,000 **BDT's** would be targeted to export markets. (inconsistent use, see other highlighted instances)

The purchasers in Japan were listed as Oji Paper (served indirectly through distributors) and "Diashowa," a subsidiary of Nippon Paper, which purchases lesser amounts. Total waste from wood chipping was estimated at 10 percent of log tonnage. The waste is purchased by local groups in Surin province for use as fertilizer or fuel. The company's selling prices for eucalyptus chips (**BDT/FOB** (?)) was provided at between US\$75.00-80.00.

The company leaders confirmed that many Thai pulp and woodchip companies were facing shortages of raw materials. They indicated, however, that Thai Wittawat remained running at full capacity.

An inquiry was made concerning any potential sources of logs from across the Cambodian border:

"We hear of some eucalyptus in Cambodia, but we have never purchased from them. The problem is transportation costs and the border – our sourcing distance is 200 km maximum."

Inquiry was also made concerning interest from Chinese buyers in woodchips from Thailand. The informant stated that they had heard of some interest from Chinese companies for purchasing woodchips, but that Thai

Wittawat had an existing agreement with their Japanese buyers, so that supply to China was precluded. The informant noted that there was a pulp factory in China that was interested in purchasing 100,000 BDTs from Thai Wittawat per year, although he was not sure of the company name.

According to the informant, both KMI and Kittawee also ship woodchips to Siam Pulp and Paper, with Kittawee also selling to Japan. Both of these competitors also source from small farmers and do not have any of their own land. Production levels for KMI were estimated at 150,000 tonnes of logs per year (-> 60,000 Bdt tonnes producing, using a raw material to production ratio of 2.5) and Kittawee's capacity was estimated at 400,000 tonnes of green logs per year (->160,000 BDTs using the same ratio of 2.5).³³

The informant also confirmed that there is a new woodchip mill being developed in the upper south area of Prachuab Kiri Khan Province. He suggested that the project would have a capacity of 200,000 tonnes of logs per year (80,000 BDT, based on a ratio of 2.5). The suggestion was that the project would be sourcing acacia, not eucalyptus, with the company also securing some of their own plantation growing area from the Thai government.

The company executives suggested that there was a general lack of raw material in Thailand. It was indicated that the Forestry Department does not provide enough in the way of incentives for farmers to develop fast-growing tree plantations on their land. They cited the rubber development programs that provided 3,000 baht/rai to farmers as incentive. They noted, however, that eucalyptus remains in competition with other cash crops due to the lack of such supports.

“The government worries about some people; they worry about the NGOs. This is the reason why the government does not get more involved with eucalyptus. Farmers want to plant it because they can get good money. They provide 3,000 baht per rai for rubber for example...If you compare the eucalyptus market in Thailand to other producers, Brazil, Indonesia, it is a strange case. You have so many other competitive products here.”

SIAM TREE DEVELOPMENT CO. LTD. (STD)

STD was initiated as a project in 1990 with woodchip production underway by 1992. In 2000, the company doubled their production capacity with a second line. Currently the company is running at 100 percent capacity, with capacity listed at 300,000 green tonnes per year. With a suggested conversion ratio of 2.2 to 2.3,³⁴ this implies an annual production at 130-136,000 BDTs annually. The factory sources 100 percent eucalyptus, all purchased through brokers. The company does not own any of their own plantation land and also does not engage in any fixed contract schemes with local farmers. All of their production is exported to Japan (Oji Paper).

³³ This suggests a total woodchip production from the three primary wood chipping facilities in northeast Thailand to be in the range of 300,000 BDTs per year.

³⁴ This differs from ratio of the 2.5 offered by Thai Wittawat.

STD suggested that they source from approximately 50 brokers. Interviewees estimated (very broadly) a number of 1,500 farmers in total from whom they source eucalyptus logs. Similar to the case for Thai Wittawat, it was indicated that some farmers were also brokers.

In terms of price data, STD stated that the price for logs had increased nearly 25 baht/tonne from January to July 2003. This increase raised the total price to more than 1,000 baht/tonne. When one considered that the brokers deduct costs for cutting, loading and transporting, it may be concluded that farmers would receive 600-700 baht/tonne of the total price.

STD interviewees estimated that in Thailand, there was a fairly even balance at the moment between demand, local capacity and the amount exported. From the end of 2002, however, STD noticed a “supply crunch,” as demand was increasing without a corresponding increase in plantation area. Supply issues were also suggested to be a function of new state regulations on the maximum tonnage that transport trucks could carry in Thailand. The effect of this has been to promote the harvesting of younger trees.

In terms of supply areas, STD interviewees stated that they sourced the majority of their logs from sites within 70 km of the factory gate in Chonburi. The company also sources from areas within 100 km and as far as 500 km if necessary. The informants stated that there was an “overlap” in the supply areas between producers in eastern Thailand, which creates in high levels of competition for logs (?) in some areas. The result, according to the interviewees, is that Thailand will not have any room for capacity expansion in terms of pulp and paper production without importing the required fiber. Stocks of acacia were also said to be dwindling in the northeast of the country, with supplies “almost zero.” The STD interviewees suggested that both acacia and eucalyptus were being replaced by rubber trees and cassava.

The interviewees stated that they had no information on the productivity that farmers were receiving on their smallholder plantations. However, their sense was that the yields available from eucalyptus may be declining with increased number of rotations. The energy that the company is ready to put into establishing agreements with farmers is limited. The company representatives explained as follows:

“Even if you have an agreement with farmers, the farmers can easily break the deal and supply another buyer if a higher price comes along. So you can’t develop supply agreements in a situation where there is strong competition between buyers. This is the fairest system for farmers also—they sell to whomever they want.”

The interviewees also suggested that STD has had no experiences with land conflicts with their growers, stating:

“They can plant cassava or other agricultural crops etc.; it is a decision up to the farmer to plant eucalyptus or not.”

The export prices of STD could not be made available. The company representatives, however, suggested that Thai woodchips were the lowest cost option for buyers based in Japan. Similar to the interviewee at Thai Wittawat, the STD interviewees suggested that their company had been contacted by interested parties in China regarding the purchase of woodchips. They indicated, however, that STD does not have any excess

supplies of woodchips to sell and that the prices Chinese buyers were offering were lower than those offered by the major Japanese companies.

STD interviewees also provided some information on the monthly “woodchip forum” which has recently been organized by the major Thai woodchip producers. The point of the forum is to exchange general information within a situation of tight supply. The woodchip producers have also taken recent action against initiatives by some companies to limit the exports of Thai woodchips as a strategy to ease domestic demand. In the same sense, STD interviewees stated that the goal of the Chulalongkorn University study underway is to push the Thai government to support the woodchip and pulp industries. The hope is that this team would make recommendations to the Ministry of Industry and other line agencies. STD recommended interventions such as providing financing and loans and free seedlings to farmers. The Thai government had previously developed such a program, which had, however, ended five years previously. The informants from STD suggested that the ending of subsidies provided for farmers to plant eucalyptus in 1997, combined with the large expansions in Advance Agro’s pulp capacity, created a situation in which demand was increasing without any new plantations coming on line. According to the interviewees, Thai politicians had previously understood the industry, but since the financial crisis had “failed to support the industry.”

The STD interviewees also suggested that the Thai government needed to be moving simultaneously towards deregulating the industry. For example, about ten years previously there had been restrictions on transporting logs freely across provinces. While this specific issue had been resolved, there are still problems such as restrictions on farmers owning chainsaws. Written notes on the role of the Thai government taken during the interview are given below:

STD: “Just now they are relaxing some of the regulations on owning a chainsaw. Now they [farmers] just have to register the chainsaw. This [the reason for the regulations] is [that] the RFD [is] afraid that farmers will use their chainsaws to cut down protected forests. And farmers who want to export eucalyptus charcoal, for example, or want to further process their trees, cannot do so freely. Or for a company that wants to process eucalyptus timber, for example, for construction, the government had a regulation where eucalyptus was not registered as a construction material, and thus the market could not expand. The problem is the Forestry Department; they are aware of the problems but do not take action.”

Author: “Any idea why?”

STD: “This is the behavior of the bureaucrat.”

“Another issue is with tree improvement. The RFD stopped research on this 10 years ago. They will research this if they have foreign aid, for example, from Canada or Germany, but after the program stops, they do not continue with the research. For example, some years ago there was a disease problem in eucalyptus growing areas; the RFD took no action on this. It is a matter of organization; they should have more knowledge on this issue.”

Author: “What about the reorganization of the RFD into the Ministry of Natural Resources and the Environment and the suggested creation of a new ‘Office of Economic Tree Administration?’”

STD: “All these agreements are a waste of time, a waste of energy. One of us used to go to these meetings with the RFD, listened to the speeches, but he stopped going after a while. It will not make much difference if it is an Office of Economic Trees or whatever under the RFD or if it is under Dr. Plodprasop or whoever under the Agriculture Ministry, if the government does not change their thinking. It is a waste of time if the government does not want to change themselves.”

OJI PAPER

Oji Paper was identified for an interview because of their investment into the Advance Agro company as well because of their woodchip exporting operations in partnership with STD. The interview with Oji Paper (Thailand) began with a discussion of their relationship with Advance Agro. Oji stated that they were purchasing base paper from Advance Agro, but that they were also purchasing additional supplies from Japan. The informant stated that Oji was also looking to establish their own paper facility in Thailand, but that the crucial question was from where they would source their pulp and if the fiber was available in Thailand. The informant suggested that the area of eucalyptus in Thailand was not expanding and thus Oji's interest in Thailand was therefore decreasing: “Land and farmers are the related issues, but this is up to the government.”

The informant from Oji Paper laid out the situation in Thailand as follows:

“There are two major pulp producers in Thailand: Advance Agro and Phoenix. Advance Agro's capacity is about 500,000 tonnes and Phoenix' is 250,000 tonnes. That of Siam Pulp plus others produce is about 100,000 tonnes. So the total pulp capacity in Thailand is about 850,000 tonnes. This supplies the Thai market, plus some exports.

Until September of last year Oji was buying about 200,000 tonnes of woodchips in Thailand. This amount had gradually increased from 1-2,000 tonnes in 1992-93 up to 200,000 by last year through a slow, but steady increase.

Starting last year, however, the area of plantations has decreased. And there is also the trucking issue – the Thaksin Government limited the allowable weight of trucks. This led to higher transportation costs. And the availability of harvesters/cutters also decreased in Thailand. The result was that their supplier was not able to provide the same amount of woodchips. For example, in the first half of 2003, they have only purchased about 50 percent of the woodchips they purchased last year.”

Following is a direct transcript of other parts of the discussion with the Oji Paper representative:

Author: “Where do you source from?”

Oji: “Two thirds is from the parent company of Advance Agro, Soon Hua Seng. Our supply from this source has pretty much returned to normal. One third is from STD Woodchips; this is

where the main supply problems are coming from. STD has been quite concerned about this issue; they have been lobbying the Japanese embassy on this.”³⁵

Author: “Why is that?”

Oji: “Siam Pulp and Paper has been lobbying the Thai government to limit woodchip exports, but STD wants to continue supplying to their only buyer, which is Oji. Soon Hua Seng also sells woodchips to Taiwan, South Korea and China. And there are a few other companies in Thailand that also sell woodchips to Japanese buyers. “

Author: “Why has the area of eucalyptus farming been reduced?”

Oji: “Cassava prices are quite high; the highest on 5-7 years, so farmers are choosing this crop. They also receive cash each year from this. STD sources all their woodchips from farmers.

“If farmers could grow eucalyptus properly, however, even if cassava prices were high, eucalyptus could provide a better return. But right now returns from eucalyptus are low. Some farmers do well; however, others do not put in enough care to their plantations. If you want to promote plantations you need to have a ‘model forest’ program. Someone needs to develop species, planting material; you need good nurseries and so forth. But without a government guarantee on this, it is not possible for Oji to invest in Thailand.

“Oji is interested in investing a lot of money in Thailand and this would mean more revenues for the Thai government. could also export woodchips this way (incomplete); right now the main exporter of woodchips in the region is Australia, but the price of woodchips does not fluctuate too dramatically, so it would be a good source of revenue for Thailand

“Right now the FOB price per bone-dried tonne is about US\$800. Oji already has plantations in Vietnam and we are very interested in expanding the area of these. We have been doing a survey in Cambodia and Laos. There is potential in Indochina and in Sarawak/Sabah, though not really in peninsular Malaysia. In Laos, the problem is transportation. We would need to export Lao woodchips through Vietnam, probably Da Nang. But Vietnam does not have good ports. Oji would need a big boat to provide better economies [of scale], so would need a port with about 12m of sea depth. The future could be in Myanmar, but there is no infrastructure there. Perhaps the river could be used, but again there is no port system. With Laos, the transportation costs would mean Oji would need to sell pulp or woodchips at very low prices.

“For Cambodia, Oji has visited with their forest department. The main investments of Oji have been with the Vietnamese government, in joint ventures – [smiling] – you always need to do things ‘joint venture’ in Vietnam. However, Oji is not satisfied because the Vietnamese government is not providing good land and the yield from these plantations is not the best. These plantations have grown already; they are just starting to ship this year. I am not sure of the land area and yields, but these plantations are in Quy Nhon south of Da Nang.”

³⁵ Note: If Oji was purchasing 200,000 BDTs per year from Thailand and STDs production was in the range of 130-135,000 tonnes all exported to Oji, it would imply that STD provides 2/3 of their supply, not 1/3.

“The paper market in China is certainly a big market, but it will not grow smoothly over the next 10 years. Already there is pressure to devalue the Yuan; perhaps China will follow the Japanese pattern [of no growth for 10 years]. However, Oji is investing in China; we have a \$500-million mill project. The paper mill will be aiming for 600,000 tonnes of production per year, mostly coated paper. It is situated along the Yangtze river. We are not expecting to source fiber from that region, so for now we will be importing pulp from Brazil. Phase 2 of the project will wait for more money for the pulp plant. At this point it would source woodchips from somewhere, maybe from our operations in Western Australia. But we would also be very interested in Thailand. Right now it is economical to import pulp from Brazil to East Asia; Brazil is a low cost producer of eucalyptus. But Thailand has the potential to compete with Brazil, because of the differences in distances and transport costs. There is a big potential for plantations in Thailand, if the government wants it. But Thaksin has put his emphasis on three areas: agriculture, automobiles and fashion!”

THAI MARTIN GROUP

Interviews with Thai Martin Group confirmed that Thai Martin has developed a new woodchip production facility in Prachuab Kiri Khan province. According to the informant, as of 2003 there were 100-200 acres of acacia available for harvesting in the region, which were planted nine to ten years ago. There were apparently also areas of acacia planted in northern Thailand, suggested to have an annual supply potential of 150,000 tonnes of logs. These, however, had been accessed by Phoenix some years previously. The yields from these acacia plantations, owned by the RFD, were stated to have been quite low, less than 10 tonnes per rai (1.6 tonnes per ha).

The informant confirmed that a monthly woodchip forum had been organized, which brings together industry players in order to discuss pricing and output, as well as organizing politically to fight the proposed export ban on woodchips. It was suggested that Thai Martin would develop from between 5 to 10,000 acres of community partnerships in southern Thailand to feed its chip project. The company would also attempt to lease areas of Forest Reserve land or to lease land from private land holders.

Production of woodchips was expected to begin at the end of 2003. The informant suggested that initially, the company would have enough supply to last them for the first three years, between 100-150,000 tonnes of logs. To address subsequent years' supply, the company would establish a re-planting system involving contracts with farmers.

The total production capacity of the mill would be between 200,000-240,000 green tonnes per year. The informant stated that the potential buyers of the woodchip production could include Siam Pulp as well as potential purchasers in export markets, including Indonesia, China, Korea, Japan and Taiwan. As the buyer situation was still developing, no further details were possible. It was suggested, however, that there had been interest from a Chinese firm (Rizhao Pulp and Paper), which could purchase all of their output, even if they doubled capacity. The informant also stated that:

“Oji Paper could purchase a half million tonnes per year, no problem. There are always buyers, but the market is very competitive. Price is the issue.”

A more recent interview in early 2005 suggested that Thai Martin’s production is now at 300-400 tonnes of BDT woodchips per day (110-145,000 BDT per year) and that the company had been successful in securing a lease of 10,000 hectares in the upper south region of Thailand. The Thai ‘woodchip forum’ was also stated as halted for the time being, due to ongoing competition between the major players (i.e. Advance Agro and Siam Pulp/Phoenix). Buyers were listed as Siam Pulp and a smaller Japanese importer.

CONCLUSION: MAJOR CHALLENGES TO FORESTS AND FOREST-BASED LIVELIHOODS IN THAILAND

Few aspects of rural development in Thailand have generated as much controversy as fast-growing tree plantations. There has been a consistent oppositional movement against the ecological impacts of exotic plantations as well as the issues around land tenure and displacement which have tended to accompany such development. Interestingly, however, this controversy has focused to a very large extent upon eucalyptus trees, while avoiding what are likely similar socio-ecological aspects associated with rubber plantations and other agricultural cash crops. While both Thai companies (i.e. all the major pulp manufacturers) and foreign companies (e.g. Oji Paper) seek to expand the areas of eucalyptus production in Thailand for both pulp and woodchip exports, this will inevitably come into conflict with alternative visions for community-based management, indigenous species forestry and/or non-commercial production systems. It remains to be seen which alliance of interests will predominate. It would appear, however, that incorporating the role and interests of small farmers in tree crop production would be the primary opportunity for increasing productive plantation area in Thailand, as the potential for large-scale concessions from reserve forest would be very limited and the controversies likely severe.

However, many farmers themselves are already participating in plantation commodity networks. Interviews suggest that both Siam Pulp and Phoenix are seeking to develop stronger arrangements with farmers in the form of contracts and other supports. An interest by Advance Agro in entrance into the supply networks of northeast Thailand and the withdrawal of state supports for eucalyptus farmers appear to be creating further incentives towards developing contract arrangements. This situation tends to (although not necessarily) tilt the economics of growing eucalyptus towards farmer interests and indeed it appears as though there have been substantial farm gate log price increases in recent years. One response would be to leave eucalyptus growing to the “laws of supply and demand” – as the price increases, more farmers will consider entering into short rotation eucalyptus production. Another set of interests, however, suggests that there would be substantial benefits to the Thai economy by developing forms of support for eucalyptus growers or by removing barriers to the entrance of pulp log producers. In this sense, the reception by Thai political leaders of the recent study initiated by Thailand’s Pulp and Paper Industry Association through Chulalongkorn University on fast growing tree development will be of much interest.

At the moment, exports to China includes pulp from Phoenix (likely approximately 60-70,000 tonnes per year) and pulp and paper from Advance Agro (little information on Chinese exports by Advance Agro was secured). The Thai-Chinese pulp mill proposal (for production in Thailand) has been placed on hold for a number of years now, primarily, it appears, over problems in finding sufficient land. The fiscal situation of Advance Agro, however, may also be an issue. Other firms, such as Oji, Phoenix and Siam Pulp and Paper are also seeking to expand production in Thailand, although no firm plans have been enacted to date. More recently, Laos appears to be viewed as the more likely option for plantation expansion.

In the woodchip sector, exports to Japan (especially to Oji) have risen steadily through the mid to late 1990s. It appears as though there may be only limited room for future increases without systematic attempts to increase the area of eucalyptus plantings in Thailand, given the suggested supply squeeze developing between the major log consumers. Recent moves by the major domestic and foreign players in Thailand (Phoenix, Advance Agro and Oji Paper) to begin expansion into Lao PDR, in apparent relation to fiber supply and expansion constraints within Thailand (and, for multinational Oji, elsewhere in the region), suggests that, after a decade of starts and stops, Laos may be on the verge of shifting into an important plantation supply source to Thailand and the region.

The strongest linkages between Thailand and China lie in Thailand's booming panel board industry, a sector which draws to a very large extent upon rubberwood resources. There are more tenuous and undocumented links associated with the re-export from Thailand to China of illegally imported wood from Cambodia, Laos and Myanmar.

The impacts from future expansions geared towards China will likely not affect the remaining natural forest cover in Thailand. Eucalyptus is a controversial tree crop in and of itself; and if remaining forested areas were to be replaced by eucalyptus (such as in 1989 with the Suan Kitti incident), the ensuing public scandal would perhaps be even stronger than fifteen years ago. Further, the Forestry Department/Ministry of Natural Resources and the Environment (MNRE) has been transformed into a conservation-oriented organization following the logging ban; and the institutional interests which would have supported expanded eucalyptus production areas in forested landscapes have largely been removed. The MNRE now secures its legitimacy and territorial interests from conservation and its attention is now largely centered upon ethnic minorities and protected areas. Indeed, given the controversies around eucalyptus, the RFD/MNRE may be interested in avoiding the issue altogether.

Where eucalyptus would be established, then, it would likely be replacing upland cash crops (cassava, sugar cane, non-irrigated paddy) or used as a tree crop to be planted around the margins of existing fields. The Thai Tree Farmers Association is working towards promoting such a planting strategy. Renewed, non-partisan scientific studies of the impacts of fast-growing plantations on nearby field crops and groundwater resources would likely be helpful in this regard.

The primary impacts of renewed interest in eucalyptus or other fast growing trees (particularly para-rubber) would center on socio-economics of land and resource tenure. The danger (both in Thailand and in Laos) is that areas of state forest currently used *de facto* by farmers, but claimed by Forestry Departments, would be alienated for plantation production. Independent and detailed information would need to be secured on local resource tenure, access and livelihood systems for such impacts to be avoided. There is also an

undocumented history to this question in Thailand in that many plantation areas currently used by, for example, the Forest Industry Organization, were founded upon evictions ten, twenty or thirty years ago. As the recent example of the withdrawal of FSC certification for the FIO teak plantations has revealed, further controversies of historical and current plantation displacement effects could be expected to arise around these issues.

Care would also have to be taken with promoting outgrower production systems, particularly in terms of avoiding the historical problem of ‘middlemen’ harvesters and transporters in exploiting small-scale farmers and in providing quality planting material and silvicultural advice to farmers, many of whom are currently under severe debt burdens. Promoting the role of the Thai Tree Farmers Association in promoting access to price information and other supports would likely be an important step towards ensuring that farmers receive an equitable share of the benefits from such market opportunities. Involving the newly empowered Tambon (sub district) Council administrations in adjudicating land and resource disputes would also be an important step in this direction, as aspects of the 1997 Thai constitution are directly aimed at building the capacity of representative local authorities in resource management and decision-making responsibilities.

Finally, the contentious place of community forestry in Thailand would also be an issue. There is a strong tension between different interests in the community forestry movement. The first is centered on the RFD and promotes a commercialization of community forest areas. The opposition views community forestry as a tool for ecological restoration of Thailand’s severely depleted forest landscape and sees it as a method of sheltering villagers from full exposure to market forces through village-based forest management and use. The two sides have been locked in a dispute over the Community Forestry Bill for the past twelve years. Any attempts to promote plantations in such community forest areas would therefore be leaping into this very contentious issue in Thai forest politics. Similar efforts have been suggested to promote tree crops in Land Reform areas (using Sor Por Khor 4-01 land, stipulating that farmers receiving land from the ALRO office would be required to grow trees for crop estates; see, for example, Bangkok Post, 2004d). Given the incredibly complex structure of land titling in Thailand and the limited impacts of new policies to reform this situation, it is somewhat doubtful if these plans would come to substantial fruition.

In conclusion, the negative aspects of increased plantation production could be mitigated in Thailand, *if* tree farming is promoted carefully, with farmer interests in mind and in combination with other policies. These may include the promotion of natural regeneration of forest lands, democratic village representation and local authority capacity building in resource management, fair access to information, pricing, and the law, and the security of smallholder and village resource tenure – including common property. Under such conditions, there may also be opportunity for Thai plantation farmers to better capture the potential benefits from a substantial new wood consumer in the form of China. Given the distance between these foundations and the ‘on-the-ground’ reality in much of rural Thailand, a sharper division between the ‘winners and losers’ in rural Thailand, or in Thailand’s new supplier countries, could develop.

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ANNEX: TABLES

Table 1: Forest Cover in Thailand by Forest Type and Region (km²)

| Region | Total Area of Region | Tropical Evergreen | Mixed Decid. | Dry Dipt. | Swamp Forest | Innun-dated Forest | Beach Forest | Pine Forest | Bam-boo Forest | Mang-rove Forest | Total Natural Forest | Plant-ations | Secon-dary Forest | Total Forest Area | Forest as % of total Area |
|-----------------------|----------------------|--------------------|---------------|---------------|--------------|--------------------|--------------|-------------|----------------|------------------|----------------------|--------------|-------------------|-------------------|---------------------------|
| North | 172,271 | 19,888 | 63,499 | 9,655 | 5 | -- | -- | 331 | 201 | -- | 93,579 | 1,405 | 1,287 | 96,270 | 55.9 |
| Northeast | 167,716 | 7,666 | 8,352 | 8,186 | -- | 257 | -- | 131 | 397 | -- | 24,989 | 928 | 611 | 26,527 | 15.8 |
| Central | 67,220 | 4,307 | 14,366 | 704 | 1 | -- | 2 | -- | 734 | 126 | 20,239 | 628 | 596 | 21,462 | 31.9 |
| East | 36,525 | 6,190 | 1,226 | 25 | 2 | -- | 4 | -- | 157 | 234 | 7,836 | 496 | 106 | 8,438 | 23.1 |
| South | 70,389 | 14,628 | 3 | -- | 296 | -- | 120 | -- | 15 | 2,093 | 17,154 | 21 | 237 | 17,413 | 24.7 |
| Thailand Total | 514,126 | 52,679 | 87,445 | 18,570 | 304 | 257 | 125 | 462 | 1,504 | 2,453 | 163,797 | 3,477 | 2,837 | 170,111 | 33.1 |

Source: Royal Forestry Department (2003).

Table 2: Forest Areas in Thailand by Official Forest Category

(km²; percentage, when given, is proportion of total national area, some categories may overlap)

| Region | Total Area of Nation | National Forest Reserve | National Parks | Forest Parks | Wildlife Conservation Areas | No Hunting Areas | Botanical Gardens | Arboreta |
|-----------------|----------------------|-------------------------|----------------|--------------|-----------------------------|------------------|-------------------|----------|
| Thailand | 515,114 | 230,370 (44.7%) | 52,264 (10.1%) | 870 | 34,898 (6.8%) | 2,379 | 59.0 | 36.1 |

Source: Royal Forestry Department (2001).

Table 3: Production of Timber in Thailand, 1987-2003 (1,000 m³)

| Year | Teak | | Other Reserved Species | | Non-Reserved Species | Total |
|------|------------|-------------|------------------------|-------------|----------------------|---------|
| | By Licence | Confiscated | By Licence | Confiscated | | |
| 1987 | 37.3 | 0.8 | 2,027.5 | 30.5 | 52.9 | 2,149.0 |
| 1988 | 44.6 | 2.3 | 1,890.2 | 46.2 | 64.8 | 2,048.1 |
| 1989 | 23.8 | 2.4 | 788.0 | 44.5 | 60.3 | 919.0 |
| 1990 | 10.8 | 6.8 | 167.2 | 256.6 | 50.2 | 491.6 |
| 1991 | 1.9 | 0.9 | 66.1 | 143.0 | 19.6 | 231.5 |
| 1992 | 0.4 | 0.8 | 52.1 | 27.9 | 38.2 | 119.4 |
| 1993 | 3.0 | 3.2 | 14.8 | 5.5 | 38.4 | 64.9 |
| 1994 | 0.2 | 5.6 | 7.1 | 17.4 | 32.0 | 62.3 |
| 1995 | 0.1 | 2.0 | 3.2 | 6.4 | 23.2 | 34.9 |
| 1996 | 0.0 | 10.7 | 2.6 | 13.1 | 17.5 | 43.9 |
| 1997 | 0.1 | 12.8 | 4.2 | 14.5 | 28.2 | 59.7 |
| 1998 | 0.1 | 11.9 | 12.6 | 15.8 | 14.4 | 54.8 |
| 1999 | 0.1 | 10,6 | 4.5 | 13.0 | 22.0 | 50.2 |
| 2000 | 0.0 | 10.2 | 5.5 | 10.1 | 20.7 | 46.4 |
| 2001 | 0.0 | 8.0 | 4.5 | 11.8 | 17.1 | 41.3 |
| 2002 | 0.9 | 7.8 | 5.0 | 9.9 | 10.2 | 33.6 |
| 2003 | 0.1 | 1.6 | 2.6 | 5.2 | 10.7 | 20.2 |

Source: Royal Forestry Department (2003).

Table 4: Estimates for Thailand's Domestic Wood Production, Import and Export (1,000m³)

| Year | Domestic Wood Production | Imported Timber | Exported Timber |
|------|--------------------------|-----------------|-----------------|
| 1985 | 1,882.6 | 418.2 | 11.2 |
| 1986 | 2,014.7 | 348.6 | 29.2 |
| 1987 | 2,149.0 | 725.2 | 112.0 |
| 1988 | 2,048.1 | 1,123.5 | 181.1 |
| 1989 | 919.0 | 2,508.0 | 53.3 |
| 1990 | 491.0 | 3,341.0 | 48.6 |
| 1991 | 231.5 | 3,281.1 | 57.8 |
| 1992 | 119.4 | 3,815.0 | 45.1 |
| 1993 | 64.5 | 3,168.2 | 53.8 |
| 1994 | 62.3 | 4,063.7 | 62.4 |
| 1995 | 34.9 | 3,463.6 | 80.5 |
| 1996 | 43.9 | 3,151.8 | 45.4 |
| 1997 | 59.7 | 2,358.6 | 79.7 |
| 1998 | 54.8 | 1,239.7 | 108.2 |
| 1999 | 50.2 | 1,397.3 | 289.3 |
| 2000 | 46.4 | 1,856.8 | 378.5 |

Source: Nalampoon (2003).

Original Note: *Industrial wood and confiscated sawntimber; ** industrial wood and sawntimber; *** sawntimber

Author's Note: There is no indication if these units are estimates in RWE. It is also unclear if a certain amount of double-counting is introduced by grouping 'Industrial wood and confiscated sawntimber' into a single category. Note that for column 3, the export of unprocessed logs are usually negligible from Thailand, listed officially from 1 m³ (!) to 347 m³ between 1990 and 2000 (with odd spikes up to 26,163 m³ in 1995, and 11,982 m³ in 1998) (Royal Forestry Department, 2003: 75).

Table 5: Thailand's Pulp and Paper Sector (Source: Paper Asia, 1996)

| Name | Capacity (tonnes/yr) | | | Products |
|----------------------------|----------------------|---------|---------------|---|
| | Pulp | Paper | Location | |
| Advance Agro | 175,000 | 217,200 | Prachinburi | Bleached eucalyptus kraft pulp, coated and uncoated woodfree, wrapping kraft paper, joss paper |
| Arpachal | | 2,400 | Pathum Thani | Wrapping kraft paper, joss paper |
| Asia Kraft Paper | | 84,000 | Samut Sakorn | Kraft linerboard, |
| Banglane Paper | | 30,000 | Nakhom Pathom | Paperboard |
| Bang Pa-In Paper Mill | | 13,250 | Ayutthaya | Straw pulp, printing and writing paper |
| C.A.M. Paper | 10,000 | 600 | Bangkok | Core paper |
| Capital Paper | | 6,000 | Pathum thani | Duplex board, greychip board |
| Cellog Paper | | 14,000 | Samut Prakarn | Sanitary paper |
| Central Paper Industry | | 60,000 | Samut Prakarn | Printing and writing paper |
| Charoen Chai Industry | | 3,600 | Bangkok | Kraft linerboard, |
| The Eastern Industrial | | 47,000 | Pathum Thani | Duplex board, chipboard, ribbed kraft, wrapping paper, art paper |
| Hiang Seng Fiber Container | | 300,000 | Samut Sakorn | Kraft linerboard, sack kraft, wrapping kraft, core paper, chipboard, printing and writing paper |
| Hi Tech Paper | | 41,000 | Chachoengsao | Uncoated woodfree |
| Industrial Krungthai | | 28,000 | Pathum Thani | Duplex board, printing and writing paper, kraft linerboard, wrapping kraft |
| Inter Paper industry | | 7,200 | Samut Prakarn | Printing and writing paper, proof printing and writing paper, drawing duplication, joss paper |
| Kimberly –Clark Thailand | | 20,000 | Pathum Thani | Feminine napkins and tissue paper |
| Mahachai Kraft Paper | | 2,400 | Samut Sakorn | Kraft paper, joss paper |
| Pad Riew Paper | | 5,000 | Chachoengsao | Printing and writing paper |
| Panda Paper Industry | | 3,300 | Nakhon Pathom | Kraft paper |
| Panapol Paper Industry | 90,000 | 277,000 | Ayutthaya | Pulp, kraft linerboard |
| Patoom Dhane Paper Factory | | 20,000 | Pathum Thani | Kraft paper |
| Phoenix Pulp and Paper | | 200,000 | Khon Kaen | Bleached kenaf, bamboo, eucalyptus pulp |
| Shin Ho Paper Thailand | | 140,000 | Singburi | Newsprint |
| Siam Cellulose | 57,000 | 260,000 | Kanchanaburi | Bleached eucalyptus pulp |
| Siam Kraft Industry | | 140,000 | Ratchaburi | Kraft linerboard, sack kraft |
| Siam Paper | | 260,000 | Nakhon Pathom | Printing and writing paper, duplicating paper, envelope paper, photocopying paper, card paper |

| | | | | |
|------------------------------------|--------|---------|---------------|--|
| Siam Paper Box | | 14,000 | Bangkok | Kraft linerboard |
| Siam Pulp and Paper | 44,000 | 19,800 | Ratchaburi | Bagasse |
| Sirisak Paper Industry | | 9,000 | Kanchanaburi | Printing and writing paper, duplicating paper, copy paper |
| South East Asia Paper | | 4,000 | Bangkok | Ribbed kraft, wrapping kraft, duplex chipboard, printing and writing paper |
| Wangkanai Paper | | 5,000 | Bangkok | Sanitary paper, toilet tissue |
| Supattanakorn | | 36,000 | Bangkok | Paperboard |
| Tenma Paper Mill (Thailand) | | 36,000 | Nonthaburi | Duplex board, white ivory card, colored card |
| Teppattana Paper Mill | | 14,000 | Pathum Thani | Uncoated duplex board, printing and writing paper |
| Thai Cane Paper | | 120,000 | Kanchanaburi | Kraft paper |
| Thai Card Board | | 23,000 | Nakhon Pathom | Duplex board, chipboard |
| Thai Charoen | | 3,600 | Bangkok | Duplex board |
| Thai Development Paper | | 84,000 | Samut Prakarn | Kraft linerboard, duplex board, chipboard |
| Thai Kraft Paper | | 260,000 | Kanchanaburi | Kraft linerboard, sack kraft |
| Thai Pad Riew Paper | | 10,000 | Chachoengsao | Kraft paper |
| Thai Paper | | 170,000 | Ratchaburi | Uncoated woodfree, plain paper for copier, duplicating paper, one-sided coated paper, both side coated paper, matt finished coated paper |
| Thai Product Paper Mill | | 15,000 | Chachoengsao | Kraft paper |
| Thai-Scott | | 25,000 | Samut Prakarn | Toilet paper, facial tissue, towel, napkin |
| Thai Union Paper | | 70,000 | Samut Prakarn | Printing and writing paper, color printing and writing paper, coated paper, card paper, folding box board, kraft |
| Thai Union Paper Industry | | 79,000 | Kanchanaburi | Coated duplex board, gypsum plaster board liner |
| Thanatharn Paper | | 12,000 | Samut Prakarn | Toilet paper, recycle, tissue paper, printing and writing paper |
| Tong Long Thai Paper | | 20,000 | Rayong | Printing and writing paper |
| United Paper | | 99,000 | Prachinburi | Kraft paper |
| Victory Paper | | 4,000 | Bangkok | Sanitary paper, toilet tissue |
| Wattana Paper and Container | | 1,500 | Bangkok | Kraft linerboard |

Source: Paper Asia (1996).

Table 6: Annual Pulp Capacity of Top Thai Pulp Producers

| Pulp Firm | Annual Capacity (tonnes/yr) |
|---------------------------|------------------------------------|
| Advance Agro | 430,000 |
| Panjapol Paper | 110,000 |
| Phoenix Pulp & Paper*, ** | 220,000 |
| Siam Pulp & Paper* | 126,000 |
| Siam Cellulose* | 72,000 |
| Total | 958,000 |

Source: Pitichaichan (2002).

* All now part of Siam Pulp and Paper, under Thailand's Siam Cement Group

** Despite the name, Phoenix Pulp & Paper only produces pulp.

Table 7: Thai Pulp Capacity, 1997 and 1999

| Company | 1997 (tonnes/yr) | 1999 (tonnes/yr) |
|---------------------|-------------------------|-------------------------|
| Advance Agro | 175,000 | 425,000 |
| Phoenix Pulp | 210,000 | 210,000 |
| Siam Pulp and Paper | 68,000 | 123,000 |
| Siam Cellulose | 60,000 | 55,000 |
| Panjapol | 110,000 | 110,000 |
| Bang-Pa In | -- | 3,000 |
| Total | 623,000 | 926,000 |

Source: Woodchip and Pulplog Trade Review (2002).

Table 8: Thai Pulp and Paper Production by Product Segment, 1985-2000 (1,000 tonnes)

| Year | Newsprint | P&W | Kraft Paper | Paperboard and Packaging | House/Sanitary | Total | Pulp |
|------|-----------|-----|-------------|--------------------------|----------------|-------|------|
| 1985 | 0 | 78 | 221 | 83 | 28 | 409 | 99 |
| 1986 | 0 | 98 | 238 | 89 | 30 | 456 | 117 |
| 1987 | 0 | 111 | 334 | 105 | 34 | 584 | 135 |
| 1988 | 0 | 153 | 394 | 77 | 32 | 656 | 151 |
| 1989 | 0 | 171 | 468 | 89 | 38 | 765 | 164 |
| 1990 | 0 | 192 | 557 | 95 | 48 | 891 | 159 |
| 1991 | 0 | 221 | 636 | 110 | 47 | 1014 | 185 |
| 1992 | 0 | 237 | 757 | 109 | 50 | 1154 | 203 |
| 1993 | 0 | 278 | 877 | 110 | 52 | 1317 | 201 |
| 1994 | 39 | 333 | 1062 | 174 | 57 | 1665 | 263 |
| 1995 | 116 | 381 | 1167 | 204 | 62 | 1930 | 316 |
| 1996 | 125 | 401 | 1157 | 243 | 68 | 1994 | 502 |
| 1997 | 120 | 584 | 1312 | 170 | 73 | 2259 | 553 |
| 1998 | 132 | 555 | 1286 | 175 | 73 | 2221 | 822 |
| 1999 | 120 | 612 | 1486 | 143 | 73 | 2434 | 756 |
| 2000 | 124 | 548 | 1412 | 149 | 81 | 2314 | 764 |

Source: Thai Pulp and Paper Industries Association (2000).

Table 9: Kraft Paper Capacities of Top Thai Producers

| Paper Firm (Kraft Paper) | Annual Capacity (tonnes/yr) |
|----------------------------|-----------------------------|
| Siam Kraft Industry* | |
| Thai Kraft Paper Industry* | 805,000 |
| Panjapol Paper | 505,000 |
| Thai Cane Paper* | 280,000 |
| Total | 1,590,000 |

Source: Bangkok Post, 2000)

*All now part of Siam PPC

Table 10: Printing and Writing Paper Capacities of Top Thai Producers

| Paper Firm (P&W Paper) | Annual Capacity (tonnes/yr) |
|------------------------|-----------------------------|
| Advance Agro | 470,000 |
| Thai Cane Paper | 264,000 |
| Central Paper | 68,000 |
| Total | 802,000 |

Source: Bangkok Post (2000).

Table 11: Thai Particleboard Factories: Capacities and Raw Materials Used

| Company | Annual Capacity (m ³) | Raw Material Used |
|------------------------------|-----------------------------------|-------------------|
| Thai Chipboard (extruded PB) | 6,900 | Sawmill waste |
| Dorospan | 45,000 | Rubber wood |
| Particle Planner | 123,000 | Rubber wood |
| Thai Particle Products | 93,000 | Rubber wood |
| MP Particleboard | 70,000 | Bagasse |
| Daiichi Particle | 60,000 | Rubber wood |
| Sahachai Particleboard | 45,000 | Rubber wood |
| Thainumsaeng | 60,000 | Rubber wood |
| SS Furnitech | 15,000 | Rubber wood |
| Molar Wood Products | 75,000 | Rubber wood |
| STA Particle Products | 195,000 | Rubber wood |
| Rayong Particleboard | 54,000 | Rubber wood |
| Pangnga Particleboard | 60,000 | Rubber wood |
| S. Kitchai | 30,000 | Rubber wood |
| Vanachai Panel Industries | 300,000 | Rubber wood |
| Siam Riso Wood Products | 84,000 | Rubber wood |
| Asia Planner | 100,000 | Rubber wood |
| Total | 1,364,900 | |

Source: Laemsak (2002).

Table 12: Thai Medium Density Fiberboard (MDF) Factories: Capacities and Raw Materials Used

| Company | Annual Capacity (m ³) | Raw Material Used |
|---------------|-----------------------------------|-------------------|
| Khon Kaen MDF | 66,000 | Bagasse |
| MDF Planner | 217,800 | Rubber wood |
| STA Group | 115,500 | Rubber wood |
| Metro MDF | 113,900 | Rubber wood |
| Metro Group | 115,500 | Rubber wood |
| Thai Plywood | 99,000 | Eucalyptus |
| AgroMats | 113,900 | Eucalyptus |
| Total | 841,600 | |

Source: Laemsak (2002).

Table 13: Thai Hardboard Factories: Capacities and Raw Materials Used

| Company | Annual Capacity (tons) | Raw Materials Used |
|----------------|------------------------|------------------------------|
| Thai Plywood | 66,000 | Eucalyptus and Plywood waste |
| Thai Caneboard | 50,000 | Bagasse |
| Metro Fiber | 27,000 | Eucalyptus |
| Agro Lines | 38,000 | Eucalyptus |
| Total | 181,000 | |

Source: Laemsak (2002).

Table 14: Farmer Participation in Initiating Forestry Plantations under the Private Reforestation Extension Project (1994-2001)

| | Project Plan (rai) | # Joining Project | | # Remaining by 2001 | | Remaining in 2001 by area (%) |
|--------------|--------------------|-------------------|----------------|---------------------|----------------|-------------------------------|
| | | Farms | Hectares | Farms | Hectares | |
| 1994 | 160,000 | 49,600 | 115,004 | 28,274 | 62,778 | 54.59 |
| 1995 | 160,000 | 65,596 | 151,558 | 26,411 | 51,823 | 34.19 |
| 1996 | 89,232 | 27,537 | 65,806 | 8,808 | 18,623 | 28.30 |
| 1997 | 85,000 | 17,177 | 38,512 | 7,330 | 16,277 | 42.27 |
| 1998 | 16,000 | 2,807 | 6,644 | 2,093 | 48,045 | 72.93 |
| 1999 | 4,800 | 2,218 | 5,156 | 1,982 | 4,368 | 84.72 |
| 2000 | 8,000 | 3,502 | 7,352 | 3,193 | 6,769 | 92.06 |
| Total | 523,032 | 168,437 | 390,032 | 78,091 | 165,484 | 58.43 |

Source: Private Reforestation Division, RFD (2002).

Notes: Prior data (Private Reforestation Division, RFD, 2001) indicated a "5-year participant removal rate" of 45.2% in 1999 of total participants joining in 1994 and of 65.8% in 2000 of total participants joining in 1995. In the above table, the last column indicates the percentage of plantation area initiated in a particular year still remaining as plantation in the year 2001.

Table 15: Areas Planted and the Number of Farmers Participating in the Fast Growing Trees Reforestation and Extension Project (1994-97)

| Year | # Farmers | | Area | |
|--------------|---------------|----------------|----------------|----------------------|
| | Joining | End of Project | Rai (joining) | Rai (end of project) |
| 1994 | 7,642 | 4,271 | 100,563 | 56,164 |
| 1995 | 19,639 | 11,328 | 246,688 | 143,896 |
| 1996 | 22,986 | 15,745 | 327,957 | 215,117 |
| 1997 | 18,231 | 12,659 | 291,233 | 198,274 |
| Total | 68,498 | 44,003 | 966,441 | 613,451 |

Source: Private Reforestation Division, RFD (YEAR).

Table 16: Thai Plantation Area by Species Groups

| Species Group | Area | | Industrial | Non-Industrial | Public/Private Ownership Ratio |
|-------------------|------------------|------------|------------|----------------|--------------------------------|
| | Ha. | % | | | |
| Acacia spp. | 148,000 | 3.0 | | 100 | 73:27 |
| Eucalyptus | 443,000 | 9.0 | 18 | 82 | 73:27 |
| Rubber | 2,115,000 | 43.0 | | 100 | 1:99 |
| Teak | 836,000 | 17.0 | 100 | | 73:27 |
| Other Broadleaved | 541,000 | 11.0 | 18 | 82 | 73:27 |
| Casuarina spp. | 148,000 | 3.0 | 18 | 82 | 73:27 |
| Pinus spp. | 689,000 | 14.0 | 18 | 82 | 73:27 |
| Total | 4,920,000 | 100 | | | |
| Coconut | 468,000 | | | | 1:99 |
| Oil Palm | 253,800 | | | | 0:100 |

Source: FAO website (2003).

Table 17: Annual Reforestation by Objectives (km²)

| Item | To 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|--|-----------|--------|--------|--------|--------|--------|--------|
| Afforestation by Government Budget | 6,514.9 | 65.9 | 92.8 | 54.8 | 42.1 | 55.9 | 31.4 |
| Royal Golden Jubilee Reforestation Campaign | 3,301.5 | 102.1 | 153.5 | 129.7 | 160.1 | 168.3 | 14.4 |
| Forest Industry Organization | 270.3 | 0 | 59.2 | 7.1 | 0 | 0 | 0 |
| Thai Plywood Company | 18.8 | 6.2 | 6.9 | 3.8 | 3.4 | 5.7 | 1.2 |
| Reforestation according to Ministry's Regulations | 128.0 | 9.7 | 13.4 | 14.8 | 19.1 | 4.5 | 4.7 |
| Reforestation by Concessionaire Budget | 215.2 | 9.0 | 0.4 | 0.5 | 1.4 | 24.0 | 48.7 |
| Total (km²) | 10,447.6 | 192.9 | 326.3 | 210.7 | 226.1 | 258.5 | 100.3 |
| Total (ha) | 1,044,760 | 19,290 | 32,630 | 21,070 | 22,610 | 25,850 | 10,030 |

Source: RFD (2003).

Note: "Objectives" may not correspond with actual planting or survival; not adjusted for harvesting.

Table 18: Projected Supply of Eucalyptus Production by Region for 1998-2002 (green metric tonnes)

| Year | Eucalyptus Supply by Region (tonnes) | | | | | Total (tonnes) |
|-------------------------|--------------------------------------|-----------|---------|-----------|---------|----------------|
| | Northeast | North | Central | East | South | |
| 1998 (existing) | 3,504,968 | 897,315 | 601,051 | 1,125,423 | 294 | 6,129,049 |
| 1999 (existing) | 2,042,436 | 418,589 | 248,541 | 936,584 | - | 3,646,150 |
| 2000 (projected) | 5,508,625 | 2,042,436 | 418,589 | 248,541 | 936,584 | 9,154,775 |
| 2001 (projected) | 3,810,158 | 401,997 | 522,392 | 666,006 | 255 | 5,400,809 |
| 2002 (projected) | 2,798,236 | 187,528 | 216,015 | 554,255 | - | 3,756,034 |

Source: Suthornbao et al. (1997).

Table 19: Sources of Eucalyptus in Thailand

| Institution or Group | Area (ha) | Percentage |
|--------------------------------------|----------------|------------|
| Small Landowners | 300,000 | 64.3 |
| Advance Agro | 112,000 | 24.0 |
| Siam Forestry Co. Ltd. | 24,000 | 5.1 |
| Forest Industry Organization | 12,800 | 2.7 |
| Privately Owned (Large holders) | 8,000 | 1.7 |
| TPC | 6,400 | 1.4 |
| Siam Tree Development Co. Ltd. (STD) | 3,200 | 0.7 |
| Total | 466,400 | 100 |

Source: Nakarin (2001).

Table 20: FIO Plantation Holdings (ha)

| Species | 'Project' | | | | Total |
|--------------|----------------|----------------|----------------|----------------|----------------|
| | 1 | 2 | 3 | 4 | |
| Teak | 169,906 | 67,628 | 31,843 | 255,827 | 525,206 |
| Eucalyptus | 17,079 | 28,676 | 45,438 | 36,940 | 128,134 |
| Para Rubber | 14,905 | 5,669 | 10,536 | 1,150 | 32,261 |
| Others | 7,343 | 13,450 | 13,986 | 105,896 | 140,676 |
| Total | 209,233 | 115,425 | 101,804 | 399,815 | 826,278 |

Source: Forest Industry Organization (2003).

Table 21: Plantation Owners by Type of Registration with the RFD

| Type of Registrant | # of Registrants | # of Trees | Area (ha) |
|---------------------|------------------|-------------------|---------------|
| Farmers | 6,760 | 20,416,078 | 14,307 |
| Companies | 912 | 4,895,316 | 3,853 |
| Government Agencies | 4 | 15,772 | 19 |
| State Enterprises | 189 | 30,365,503 | 53,906 |
| Total | 7,865 | 55,692,669 | 72,086 |

Source: Anonymous (1998).

Table 22: Area of Plantations on Rented Land in National Reserve Forest by Different Entities between 1978 and 2000

| Year | Private Individuals | | Company | | State Enterprise | | Government Department | | Total | |
|--------------|---------------------|--------------|-----------|---------------|------------------|---------------|-----------------------|------------|------------|---------------|
| | # | ha | # | Ha | # | ha | # | ha | # | ha |
| Pre- 1990 | 81 | 5,001 | 46 | 18,473 | 21 | 9,281 | 10 | 827 | 158 | 33,470 |
| 1990 | 2 | 227 | 1 | 80 | 4 | 577 | - | - | 7 | 885 |
| 1991 | - | - | - | - | 3 | 416 | - | - | 3 | 416 |
| 1992 | - | - | - | - | 2 | 304 | - | - | 2 | 304 |
| 1993 | 3 | 80 | - | - | 3 | 645 | - | - | 6 | 726 |
| 1994 | - | - | - | - | 4 | 641 | - | - | 6 | 1,081 |
| Total | 86 | 5,309 | 45 | 18,226 | 37 | 11,866 | 10 | 827 | 180 | 36,510 |

Source: Mahannop (2002). Original Source: Permission Division, RFD.

Table 23: Size Distribution of Plantation Areas by Private and Public Holders

| <i>Size in Rai</i> | Private and State Enterprise | | Government | |
|--------------------|------------------------------|---------------------------------|------------|---------------------------------|
| | # Farms | Total hectares in size grouping | # Farms | Total hectares in size grouping |
| 1-100 | 33 | 201 | 4 | 39 |
| 101-200 | 21 | 503 | 1 | 32 |
| 201-500 | 20 | 1,009 | - | |
| 501-1,000 | 54 | 7,376 | 3 | 409 |
| 1,001-2,000 | 26 | 6,571 | 1 | 300 |
| 2,001-5,000 | 11 | 5,970 | - | - |
| 5,001-10,000 | 7 | 9,905 | - | - |
| 10,001-20,000 | 4 | 9,012 | - | - |
| 20,000+ | 2 | 8,960 | - | - |
| Total | 178 | 49,506 | 9 | 780 |

Source: Permission Division, RFD (2002).

Note: 1 hectare = 6.25 rai

Table 24: Major Eucalyptus Purchasing Companies and their Demand as of 2000

| Company | Location | Use | Demand (eucalyptus logs in GMT/year) |
|---|---|---------------------------|---|
| Siam Tree Development (STD) | Phimai Buying Center, Nakhon Ratchasima | Buying Centre (Chip Mill) | 60,000 |
| Siam Tree Development (STD) | Payuhakiri Buying Center, Nakon Sawan | Buying Center (Chip Mill) | 10,000 |
| Siam Tree Development | Factory- Chonburi | Chip Mill | 450,000 |
| Panjapon Paper | Ayutthaya | Pulp Mill | 300,000 |
| Siam Cellulose | Kanchanaburi | Pulp Mill | 600,000 |
| Thai Plywood Company | Saraburi | MDF/ Particleboard | n/d |
| Metro Fiber | Kanchanaburi | MDF/ Particleboard | 60,000 |
| Wanachai Group | Chonburi | MDF/ Particleboard | 30,000 |
| Bangpakong Chip Mill (may be a part of Advance Agro Group) | Chachoengsao | Chip Mill | 600,000 |
| Agro-Lines (may be Advance Agro Supplier) | Chachoengsao | MDF/ Particleboard | 50,000 |
| Advance Agro | Prachinburi | Pulp Mill | 2,200,000 |
| Kittawee | Surin | Chip Mill | 250,000 |
| Thai Wittawat | Surin | Chip Mill | 250,000 |
| Phoenix Pulp and Paper | Khon Kaen | Pulp Mill | 1,000,000 |
| | | | 5,860,000 Green Metric Tonnes/Year |

Source: "Eucalyptus Woodchip Factory as of Nov. 2000." Tree Farmers Association of Thailand, TFAT.

Table 25: Thai Woodchip Log Supply and Demand

| | |
|--------------------------------------|----------------------|
| Rotation Length | 5 years |
| Yields | 75 tonnes/ha/5 years |
| Log Demand from Woodchip Industry | 6,395,000 GMT/yr |
| Harvested Areas | 85,267 ha |
| Total Plantation Areas Needed | 426,335 ha |

Source: *Thaitsu* (2002).

Table 26: Thai Import Volumes of Logs and Sawntimber, 1983-2003 (m³)

| Year | Logs | Sawntimber | Totals |
|------|-----------|------------|-----------|
| 1983 | 231,784 | 398,591 | 630,375 |
| 1984 | 199,458 | 382,032 | 581,490 |
| 1985 | 172,100 | 246,140 | 418,240 |
| 1986 | 152,714 | 195,937 | 348,651 |
| 1987 | 282,928 | 442,292 | 725,220 |
| 1988 | 446,959 | 676,563 | 1,123,522 |
| 1989 | 1,193,340 | 1,314,684 | 2,508,024 |
| 1990 | 1,847,392 | 1,493,573 | 3,340,965 |
| 1991 | 1,747,201 | 1,533,611 | 3,280,812 |
| 1992 | 2,036,090 | 1,778,349 | 3,814,439 |
| 1993 | 1,366,719 | 1,801,516 | 3,168,235 |
| 1994 | 1,548,899 | 2,516,847 | 4,065,746 |
| 1995 | 1,377,869 | 2,085,687 | 3,463,556 |
| 1996 | 936,300 | 2,215,538 | 3,151,838 |
| 1997 | 895,545 | 1,463,081 | 2,358,626 |
| 1998 | 278,076 | 961,617 | 1,239,693 |
| 1999 | 468,501 | 1,254,999 | 1,723,500 |
| 2000 | 487,368 | 1,027,082 | 1,514,450 |
| 2001 | 516,860 | 1,285,470 | 1,802,330 |
| 2002 | 641,352 | 1,924,568 | 2,565,920 |
| 2003 | 380,105 | 1,650,290 | 2,030,395 |

Source: *Modified from RFD* (2003).

Table 27: Thai Timber Imports by Leading Country of Origin, 1994-1998 (m³)

| | 1994 | 1995 | 1996 | 1997 | 1998 |
|-----------------|-----------|-----------|-----------|-----------|---------|
| Malaysia | 2,407,463 | 1,934,838 | 2,127,979 | 1,274,392 | 823,627 |
| Myanmar | 539,382 | 252,363 | 173,571 | 126,035 | 94,676 |
| Cambodia | 578,633 | 596,752 | 113,873 | 296,466 | 67,354 |
| Laos | 278,272 | 273,934 | 240,740 | 199,062 | 110,145 |
| USA | 54,075 | 63,091 | 77,580 | 72,676 | 43,830 |

Source: *RFD* (1998); cited in *Lakanavichian* (2001).

Table 28: Thai Timber Imports by Leading Country of Origin, 1999-2002 (m³)

| | 1999 | 2000 | 2001 | 2002 |
|-----------------------------------|------------------|------------------|------------------|------------------|
| Malaysia | 1,012,231 | 707,914 | 734,120 | 1,116,833 |
| Laos | 227,752 | 281,857 | 402,719 | 378,281 |
| Myanmar | 137,587 | 120,209 | 143,849 | 410,039 |
| New Zealand | 107,846 | 130,792 | 117,787 | 98,324 |
| USA | 105,411 | 71,326 | 157,205 | 359,144 |
| Totals (All countries) | 1,723,500 | 1,514,450 | 1,802,330 | 2,565,920 |

Source: Modified from RFD (2003).

Table 29: Thai Imports of Logs and Sawntimber by Leading Country, 2002 and 2003 (m³)

| Country | 2002 | | | 2003 | | |
|-----------------------------------|---------|-----------|------------------|---------|-----------|------------------|
| | Logs | Sawnwood | Total | Logs | Sawnwood | Total |
| Malaysia | 104,741 | 1,012,092 | 1,116,833 | 129,879 | 961,276 | 1,091,155 |
| Laos | 4,020 | 374,261 | 378,281 | 8,701 | 345,504 | 354,205 |
| Myanmar | 385,831 | 24,208 | 410,039 | 126,444 | 21,375 | 147,819 |
| USA | 20,703 | 338,441 | 359,144 | 2,363 | 76,873 | 79,236 |
| New Zealand | 40,125 | 58,199 | 98,324 | 37,168 | 83,348 | 120,516 |
| Brazil | 0 | 47,337 | 47,337 | 0 | 69,475 | 69,475 |
| Indonesia | 23,252 | 7,024 | 30,276 | 9,183 | 16,384 | 25,567 |
| China | 1,011 | 4,708 | 5,719 | 1,379 | 8,318 | 9,697 |
| PNG | 18,467 | 0 | 18,467 | 25,769 | 0 | 25,769 |
| Gabon | 11,235 | 0 | 11,235 | 10,194 | 0 | 10,194 |
| Totals (All Countries) | 641,352 | 1,924,568 | 2,565,920 | 380,105 | 1,650,290 | 2,020,395 |

Source: Modified from RFD (2003).

Table 30: Tropical Hardwood Log Imports to Thailand (m³)

| Country | 2001 | 2002 |
|-------------------|----------------|----------------|
| Malaysia | 83,186 | 104,701 |
| Burma | 123,611 | 385,831 |
| Laos | 98,613 | 4,020 |
| Indonesia | 107,319 | 23,252 |
| India | 438 | |
| Gabon | 5,587 | 11,235 |
| Solomon Islands | 11,602 | 18,615 |
| South Africa | 5,330 | 5,594 |
| Papua New Guinea | | 18,467 |
| Maldives | | 1,378 |
| Others not listed | 362 | 6,591 |
| Total | 436,048 | 579,724 |

Source: USDA (2003).

Table 31: Tropical Hardwood Lumber Imports to Thailand (m³)

| Country | 2001 | 2002 |
|--------------------------|------------------|------------------|
| Malaysia | 650,934 | 1,012,092 |
| Laos | 304,106 | 374,261 |
| Burma | 20,238 | 24,208 |
| Brazil | 38,835 | 47,337 |
| Indonesia | 11,185 | 7,024 |
| Cambodia | 5,116 | 4,476 |
| South Africa | 542 | 474 |
| Chile | 4,477 | 6,025 |
| India | 2,967 | 6,025 |
| Uruguay | 732 | -- |
| Others not listed | 1,794 | 32,825 |
| Total | 1,040,926 | 1,510,362 |

Source: USDA (2003).

Table 32: Hardwood Veneer Imports to Thailand (m³)

| Country | 2001 | 2002 | *2003 |
|-------------------|---------------|---------------|---------------|
| Indonesia | 1,624 | 1,757 | 1,576 |
| Malaysia | 1,353 | 4,788 | 14,000 |
| Finland | 1,091 | 1,399 | 1,353 |
| China | 1,816 | 2,032 | 4,077 |
| Germany | 238 | 508 | 437 |
| Brazil | 1,464 | 1,312 | 1,105 |
| Taiwan | 628 | 138 | 188 |
| Burma | 1,188 | 2,805 | 106 |
| Japan | 303 | 36 | 60 |
| Laos | 688 | 1,559 | 6,077 |
| USA | 859 | 1,127 | 956 |
| Others not listed | 886 | 493 | 1,062 |
| Total | 11,279 | 16,827 | 30,997 |

Source: USDA (2003). *2003-data from RFD (2003).

Table 33: Hardwood Plywood Imports to Thailand (m³)

| Country | 2001 | 2002 | *2003 |
|-------------------|--------------|---------------|---------------|
| Indonesia | 5,074 | 9,086 | 20,665 |
| Malaysia | 1,366 | 8,543 | 61,979 |
| Laos | 296 | 266 | 0 |
| Taiwan | 274 | 639 | 0 |
| Singapore | 385 | 1,706 | 32 |
| China | 391 | 115 | 1,332 |
| Burma | 0 | 1,046 | 1,664 |
| Others not listed | 7,794 | 573 | 1,756 |
| Total | 7,843 | 21,971 | 87,428 |

Source: USDA (2003). *2003-data from RFD (2003).

Table 34: Thailand's Wood Product Imports, 1999-2003

| Thailand (m ³) | 1999 | 2000 | 2001 | 2002 | 2003 |
|-----------------------------|---------|---------|-----------|-----------|-----------|
| Logs* | 466,000 | 487,000 | 517,000 | 641,000 | 673,000 |
| Tropical Sawn wood** | 925,000 | 922,000 | 1,187,000 | 1,806,000 | 1,896,000 |
| Veneer | 14,000 | 15,000 | 12,000 | 18,000 | 19,000 |
| Tropical Plywood | 0 | 41,000 | 8,000 | 22,000 | 23,000 |

* mainly from Myanmar (63% in 2002) and Malaysia (17% in 2002); ** mainly from Malaysia (71% in 2002)

Source: ITTO (2003) - Annual Review and Assessment of the World Timber Situation Annex II: Country Export Statistics (Table 1-1-c, and others).

Table 35: Thailand's Wood Product Exports, 1997-2003

| Thailand (m ³)* | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 |
|------------------------------------|--------|---------|---------|---------|---------|---------|-----------|
| Logs | 0 | 12,000 | 0 | 0 | 1,000 | 3,000 | 3,000 |
| Tropical Sawn wood | 77,000 | 59,000 | 175,000 | 311,000 | 403,000 | 784,000 | 1,001,000 |
| Veneer | 2,000 | 3,000 | 2,000 | 2,000 | 2,000 | 2,000 | 2,000 |
| Plywood | 1,000 | 12,000 | 24,000 | 40,000 | 3,000 | 3,000 | 3,000 |
| Particleboard** | | 207,000 | 379,000 | 433,000 | 495,000 | 383,000 | |
| Fiberboard*** | | 194,000 | 281,000 | 433,000 | 516,000 | 596,200 | |
| Hardboard | | 95,000 | 93,000 | 82,000 | 105,000 | 77,000 | |
| MDF | | 89,000 | 165,000 | 340,000 | 389,000 | 330,500 | |
| Pulp (metric tonnes) | | 214,000 | 227,000 | 250,000 | 341,000 | 191,000 | |
| Paper & Paperboard (mT) | | 867,100 | 903,200 | 716,600 | 756,000 | 787,300 | |
| P&W (mT) | | 967,000 | 366,000 | 297,000 | 311,000 | 305,600 | |
| Wrapping and Packaging (mT) | | 672,000 | 509,000 | 399,600 | 424,000 | 459,700 | |

"Thailand's [tropical log] production is based almost entirely on its rubber wood and other plantation resources."

** "In Thailand and Malaysia, rubber wood is the main source of raw material for particleboard mills" (as well as fiberboard).

*** Includes hardboard, MDF and insulating board.

Source: ITTO (2003) - Annual Review and Assessment of the World Timber Situation Annex II: Country Export Statistics (Table 1-1-c, and others)

Table 36: Thai Export of Logs and Sawntimber by Species, 2002 and 2003 (m³)

| Species | 2002 | | | 2003 | | |
|-----------------|--------------|------------------|------------------|-----------|------------------|------------------|
| | Logs | Sawntimber | Total | Logs | Sawntimber | Total |
| Teak | 2,866 | 5,937 | 8,803 | 0 | 5,445 | 5,445 |
| Conifer | 0 | 1,360 | 1,360 | 0 | 1,724 | 1,724 |
| Yang | 0 | 30 | 30 | 0 | 0 | 0 |
| Pra-Du | 0 | 2,685 | 2,685 | 0 | 2,853 | 2,853 |
| Teng and Rang | 0 | 123 | 123 | 0 | 58 | 58 |
| Para-rubberwood | 0 | 1,514,385 | 1,514,385 | 9 | 1,064,806 | 1,064,815 |
| Eucalyptus | 17 | 0 | 17 | 0 | 0 | 0 |
| Oak | 0 | 99 | 99 | 0 | 1 | 1 |
| Beech | 0 | 945 | 945 | 0 | 0 | 0 |
| Sleepers | 0 | 223 | 223 | 0 | 2 | 2 |
| Others | 174 | 33,378 | 33,552 | 68 | 30,928 | 30,996 |
| Total | 3,057 | 1,559,165 | 1,562,222 | 77 | 1,105,817 | 1,105,894 |

Source: RFD (2003).

Table 37: Thailand's Exports of Logs and Sawntimber by Leading Country, 2002 (m³)

| Country | Logs | Sawntimber | Total |
|-----------------|--------------|------------------|------------------|
| China | 0 | 844,052 | 844,052 |
| Hong Kong | 0 | 577,601 | 577,601 |
| Malaysia | 0 | 49,439 | 49,439 |
| Japan | 0 | 30,000 | 30,000 |
| Vietnam | 0 | 14,084 | 14,084 |
| Others | 3,037 | 43,989 | 47,026 |
| Total | 3,057 | 1,559,165 | 1,562,222 |

Source: Modified from RFD (2003).

Table 38: Thailand Tropical Hardwood Log Exports (m³)

| Country | 2001 | 2002 |
|-------------------|------------|--------------|
| Malaysia | 155 | |
| Yemen | 177 | |
| Burma | 14 | |
| China | | 2,866 |
| Laos | | 17 |
| India | | 174 |
| Others not listed | 1 | |
| Total | 347 | 3,057 |

Source: USDA (2003).

Table 39: Thailand Tropical Hardwood Lumber Exports (m³)

| Country | 2001 | 2002 |
|-------------------|----------------|------------------|
| China | 157,448 | 844,052 |
| Hong Kong | 144,004 | 577,601 |
| Vietnam | 16,644 | 14,084 |
| Malaysia | 10,685 | 49,439 |
| Taiwan | 6,080 | 8,077 |
| Australia | 4,005 | 4,402 |
| Japan | 32,390 | 30,000 |
| Netherlands | 2,754 | 1,751 |
| Belgium | 1,285 | 2,539 |
| Germany | 1,832 | 2,108 |
| USA | 10,306 | 11,514 |
| Others not listed | 15,123 | 13,598 |
| Total | 392,250 | 1,547,651 |

Source: USDA (2003).

Table 40: Thailand Hardwood Veneer Exports (m³)

| Country | 2001 | 2002 |
|-------------------|--------------|--------------|
| Denmark | 665 | 623 |
| UK | 233 | 163 |
| France | 227 | 209 |
| Germany | 102 | 80 |
| Italy | 63 | 91 |
| Finland | 52 | 70 |
| Netherlands | 81 | 120 |
| Sweden | 79 | 61 |
| Singapore | 32 | 44 |
| Malaysia | 61 | 42 |
| USA | 75 | 140 |
| Others not listed | 316 | 256 |
| Total | 1,911 | 1,759 |

Source: USDA (2003).

Table 41: Thailand Hardwood Plywood Exports (m³)

| Country | 2001 | 2002 |
|-------------------|--------------|--------------|
| India | 1,346 | 1,484 |
| Bangladesh | 501 | 159 |
| UK | 125 | 152 |
| Hong Kong | 196 | 0 |
| Laos | 47 | 100 |
| Cambodia | 128 | 0 |
| Singapore | 74 | 0 |
| Nepal | 27 | 45 |
| Pakistan | 32 | 47 |
| USA | 170 | 23 |
| Others not listed | 91 | 1,019 |
| Total | 2,567 | 3,006 |

Source: USDA (2003).

Table 42: Thai Exports of Wood in Chips or Particles, 1999-2003 (tonnes)

| 1999 | 2000 | 2001 | 2002 | 2003 |
|---------|---------|---------|---------|---------|
| 390,055 | 585,985 | 678,073 | 305,644 | 696,405 |

Source: Modified from RFD (2003).

Table 43: Woodchip Production in Thailand (metric tones)

| User Industry | 1998 | 1999 | 2000 |
|---------------|------------------|------------------|------------------|
| MDF | 82,260 | 153,760 | 153,760 |
| Hardboard | 174,000 | 174,000 | 174,000 |
| Chip Export | 312,418 | 390,055 | 585,986 |
| Pulp | 2,403,500 | 2,403,500 | 2,403,500 |
| Total | 2,972,178 | 3,121,315 | 3,317,246 |

Source: Thainutsa (2002).

Table 44: Thai Woodchip Exports, 1996-2000

| Year | Metric Tonnes | Value (*1,000 Baht) | Baht/tonne |
|------|---------------|---------------------|------------|
| 1996 | 193,322 | 518,256 | 2,681 |
| 1997 | 260,314 | 714,188 | 2,744 |
| 1998 | 312,418 | 792,427 | 2,536 |
| 1999 | 390,055 | 958,399 | 2,457 |
| 2000 | 585,986 | 1,192,324 | 2,035 |

Source: Thainutsa (2002).

Table 45: Thai Export of Woodpulp and Pulp Other than Wood by Leading Country, 1999-2003 (tonnes)

| Country | 1999 | 2000 | 2001 | 2002 | 2003 |
|------------------|----------------|----------------|----------------|----------------|----------------|
| China | 104,531 | 70,509 | 133,205 | 72,166 | 142,627 |
| Australia | 19,875 | 30,209 | 33,151 | 30,279 | 30,316 |
| Indonesia | 4,523 | 22,404 | 24,057 | 21,155 | 27,623 |
| Korea Rep. | 2,050 | 37,294 | 41,677 | 34,320 | 23,452 |
| Malaysia | 101 | 1,275 | 6,356 | 6,835 | 9,483 |
| Taiwan | 12,069 | 4,794 | 18,587 | 8,610 | 9,315 |
| Others | 88,022 | 87,999 | 89,900 | 17,504 | 30,368 |
| Totals | 231,171 | 254,484 | 346,933 | 190,869 | 273,184 |

Source: Modified from RFD (2003).

Table 46: Thai Exports of Paper and Paperboard by Leading Country, 1999-2003 (tonnes)

| Country | 1999 | 2000 | 2001 | 2002 | 2003 |
|------------------|----------------|----------------|----------------|----------------|----------------|
| China | 175,131 | 161,961 | 219,824 | 214,792 | 193,278 |
| Malaysia | 99,102 | 102,174 | 99,389 | 93,169 | 102,970 |
| Hong Kong | 240,118 | 141,418 | 105,407 | 94,067 | 90,410 |
| Singapore | 75,445 | 74,159 | 63,976 | 53,338 | 56,449 |
| Vietnam | 13,791 | 16,512 | 21,455 | 29,024 | 51,448 |
| Taiwan | 52,479 | 38,979 | 43,086 | 41,930 | 42,273 |
| Others | 322,663 | 274,498 | 311,941 | 302,194 | 357,492 |
| Totals | 978,729 | 809,702 | 865,078 | 828,514 | 884,320 |

Source: Modified from RFD (2003).

Tables 47-52: Thai Paper Sector Exports, Rankings (by value) of Hong Kong and Mainland China as Export Destinations

Table 47: Paper and Paper Products (\$US)

| |
|---|
| #1 - Hong Kong: (1999- \$118.48 million; 2000- \$88.01 million; 2001- \$70.43 million; 2002- \$67.66 million) · (10.21% Jan.-May 2003) |
| #3 - China: (1999- \$61.44 million; 2000- \$69.34 million; 2001- \$74.65 million; 2002- \$74.70 million) · (9.03% Jan. –May 2003) |

Source: Thai Department of Export Promotion (2003).

Table 48: Paper for Writing, Printing or other Graphic Purposes (\$US)

| |
|---|
| #1 - Hong Kong: (1999- \$28.53 million; 2000- \$31.83 million; 2001- \$44.58 million; 2002- \$43.00 million) · (17.85%, Jan.-May 2003) |
|---|

Table 49: Kraft Paper (\$US also?)

| |
|---|
| #1 - China: (1999- \$25.36 million; 2000- \$30.98 million; 2001- \$39.04 million; 2002- \$35.36 million) · (57.84% Jan.-May 2003) |
| #2 - Hong Kong: (1999- \$26.93 million; 2000- \$20.22 million; 2001- \$5.99 million; 2002- \$4.51 million) · (8.52% Jan.-May 2003) |

Table 50: Paperboard (\$US also?)

| |
|--|
| #1 - China: (1999- \$16.89 million; 2000- \$18.97 million; 2001- \$15.79 million; 2002- \$20.34 million) · (19.63% Jan.-May 2003) |
| #6 - Hong Kong (3.68 % Jan.-May 2003) |

Table 51: Toilet Paper, Handkerchiefs and Sanitary Paper (\$US also?)

| |
|--|
| #6 - Hong Kong: (1999- \$16.25 million; 2000- \$8.35 million; 2001- \$11.26 million; 2002- \$10.40 million) · (6.77% Jan.-May 2003) |
|--|

Table 52: Paper Packaging Containers (\$US also?)

| |
|---|
| #2 - China: (1999- \$1.68 million; 2000- \$5.91 million; 2001- \$8.81 million; 2002- \$9.18 million) · (13.92% Jan.-May 2003) |
| #6- Hong Kong: (1999- \$0.79 million; 2000- \$ 1.81 million; 2001- \$3.05 million; 2002- \$3.48 million) · (4.02% Jan.-May 2003) |

Table 53: Siam Pulp and Paper Holdings and Equity Stakes

| | |
|---|---------------------------------------|
| Siam Cellulose Co. Ltd. (99.99%) | (Pulp) |
| Phoenix Pulp and Paper (2002: 61.26%) | (Pulp) |
| The Siam Forestry Co. Ltd. (99.99%) | (Forest Plantation) |
| Siam Panawas Co. Ltd. | (Forest Plantation) |
| Suanpa Rungsaris Co. Ltd. | (Forest Plantation) |
| Panas Nimit Co. Ltd. | (Forest Plantation) |
| Thai Panaboon Co. Ltd. | (Forest Plantation) |
| Thai Panaram Co. Ltd. | (Forest Plantation) |
| Thai Panadom Co. Ltd. | (Forest Plantation) |
| Thai Panason Co. Ltd. | (Forest Plantation) |
| Thai Wanabhum Co. Ltd. | (Forest Plantation) |
| Thai Paper Co. Ltd. (99.99%) | (P & W Paper) |
| Thai Union Paper Public Co. Ltd. (99.95%) | (P & W Paper, Duplex Board) |
| Siam Kraft Industry Co. Ltd. (99.99%) | (Kraft Paper) |
| Thai Kraft Paper Industry Co. Ltd. (99.99%) | (Kraft Paper) |
| Thai Union Paper Industry Co. Ltd. (99.99%) | (Duplex Board and Gypsum Liner Board) |
| Thai Containers Ltd. (69.99%) | (Packaging) |
| Thai Containers Industry Co. Ltd. | (Packaging) |
| Thai Containers Ratchaburi (1989) Co. Ltd. (69.99%) | (Packaging) |
| Thai Containers Songkhla (1994) Co. Ltd. (69.99%) | (Packaging) |
| Thai Containers Chonburi (1995) Co. Ltd. (69.99%) | (Packaging) |
| Citypack Co. Ltd. (69.99%) | (Packaging) |
| Nippon Hi-Pack (Thailand) Co. Ltd. (51.80%) | (Packaging) |
| Thai Containers V&S Co. Ltd. (63.00%) | (Packaging) |
| Siam Pulp and Paper Holding Co. Ltd.(99.99%) | (Holding Co.) |
| Thai Containers Group Co. Ltd. (69.99%) | (Holding Co.) |
| P.P.G. Services Co. Ltd. | ---- |
| Thai CTMP Co. Ltd. | ---- |

Associated Companies (Direct & Indirect Holdings, 2002)

| | |
|---|----------------------|
| United Pulp and Paper Co. Ltd. (Philippines) (43.37%) | (Kraft Paper) |
| P & S Holding Co. Ltd. (Philippines) (40.00%) | (Holding Co.) |
| Siam Toppan Packaging Co. Ltd. (48.99%) | (Packaging) |
| Thai British Security Printing Public Co. Ltd. (49.33%) | (Security Documents) |

Source: SPP Annual Report (2002).

Table 54: Siam Pulp and Paper Production Capacities**Plantations:**

| | |
|----------------------------|--|
| The Siam Forestry Co. Ltd. | Production Capacity: 20 million seedlings per year |
|----------------------------|--|

Pulp: (total capacity-171,000 tonnes/yr)

| | |
|--|--|
| The Siam Pulp and Paper Public Company Limited | Production Capacity of two pulp mills in 200: - Bagasse Pulp : 48,000 tons/year - Chemi-Thermo-Mechanical Eucalyptus Pulp : 68,000 tons/year |
| Siam Cellulose Co., Ltd. | Production Capacity: 55,000 tons/year Bleached Pulp from Eucalyptus |

Paper, Packaging and Board: (total capacity-1,601,170 tonnes/year)

| | |
|--|--|
| Siam Kraft Industry Co., Ltd. | Production Capacity: Kraft Paper for Packaging Industry : 280,000 tons/year |
| Thai Kraft Paper Industry Co., Ltd. | Production Capacity: Kraft Paper for Packaging Industry : 520,000 tons/year |
| Thai Union Paper Industry Co., Ltd. | Production Capacity: Duplex Board & Gypsum Liner Board : 76,000 tons/year |
| Thai Containers Group Co., Ltd. 1. Thai Containers Ltd. 2. Thai Containers Industry Co., Ltd. 3. Thai Containers Ratchaburi (1989) Co., Ltd. 4. Thai Containers Songkhla (1994) Co., Ltd. 5. Thai Containers Chonburi (1995) Co., Ltd. 6. Citypack Co., Ltd. 7. Nippon Hi-Pack (Thailand) Co., Ltd. 8. Thai Containers V&S Co., Ltd. | Production Capacity of Group: Corrugated cartons: 402,000 tons/year |
| Thai Paper Co., Ltd. | Production Capacity: Printing & Writing Paper: 260,000 tons/year |
| Thai Union Paper Public Company Limited | Production Capacity: - Printing & Writing Paper : 44,870 tons/year - Industrial Paper : 18,300 tons/year |

Source: SPP Website.

Table 55: Special Incentive Privileges Received by Siam Pulp and Paper from the Thai Board of Investment

| Siam Pulp and Paper Subsidiary | Exemption from Corporate Income Tax for 8 Years, starting from: | 50% Reduction of Normal Corporate Income Tax for 5 years, starting from: |
|--|--|---|
| Siam Pulp and Paper Public Company Limited (pulp manufacturing) | Jan. 16, 1998 | -- |
| Siam Cellulose Co. Ltd. (pulp manufacturing) | Sep. 24, 2001 | -- |
| Phoenix Pulp & Paper Public Company Ltd. (manufacture of pulp for project II) | Oct. 1, 1994 | October 1, 2002 |
| Thai Containers Songkhla (1994) Co. Ltd. (manufacture of corrugated paper, corrugated cartons, paper cartons and paper board) | Dec. 28, 1995 | Dec. 28, 2003 |
| Nippon Hi-Pack (Thailand) Co. Ltd. (manufacture of corrugated paper, corrugated cartons, paper cartons and paper board) | Feb. 5, 1997 | -- |

Source: SPP Annual Report (2002).

Table 56: Information on Advance Agro from its Annual Report

Subsidiaries in which Advanced Agro has an equity position of 10 percent or more:

| | |
|---------------------------------------|--|
| Hi-Tech Paper Co. Ltd. | Uncoated Printing and Writing Paper Production (99.99% shareholding ratio) |
| Advance Agro Holding Co. Ltd. | Investment Company (99.99%) |
| 99 Group Center Co. Ltd. | Printing and Writing Paper Distribution (99.99%) |
| Advance Agro Capital BV Co. Ltd. | Investment Company (100%) |
| Hi-Tech Specialty Minerals Co. Ltd. | Calcium Carbonate Production (51.0%) |
| Advance Paper Co. Ltd. | Printing and Writing Paper Production (99.99%) |
| AA Pulp Mill 2 Co. Ltd. | Pulp Production (99.99%) |
| A.A. Core Co. Ltd. | High Quality Paper core (99.99%) |
| 99 DA Group Center Sdn. Bhd. | Printing and Writing Paper Distributor (14.8%) |
| 99 Group Center (Australia) Pty. Ltd. | Printing and Writing Paper Distributor (100%) |
| 99 Group Center Korea Co. | Printing and Writing Paper Distributor (100%) |

Business Operations (Divided into 3 Categories)

| | |
|---------------------------------------|--|
| Pulp production | 2 pulp mills for manufacturing short-fiber pulp Pulp Mill 1: 175,000 tpa capacity; mainly pulp for company's paper production Pulp Mill 2: 252,000 tpa capacity; under AA Pulp Mill 2 Co. Ltd., for domestic and export sales of market pulp |
| Printing and Writing Paper Production | Paper Mill 1 - 220,000 tpa capacity Paper Mill 2 - 220,000 tpa capacity Hi-Tech Paper Co. Ltd. - 33,000 tpa capacity; 99 Group Center Co. Ltd. is the distribution agent for selling paper to outside customers |
| Electricity Generation | 2 co-generation power plants, operational since 1996 |

Products

| |
|---|
| Uncoated paper |
| Coated paper |
| Bleached Hardwood Kraft Pulp, including: -- Slurry Pulp (40% of production, sent to 2 paper machines) -- Wet Lab pulp (10%- all for domestic sales, sold to Hi-Tech for paper production) -- Dry Pulp (50% of production, for domestic and export sales) |

Sales

| |
|---|
| Paper Sales: 40% local and 60% export markets |
| Pulp Sales: 25% local and 75% exports |

Competition and Market Share

| |
|--|
| Bleached Pulp: Advance Agro has 30% share of Thai market in Bleached Pulp: 250,000 tonnes are sold for export |
| Paper Manufacturing: Advance Agro and Siam Pulp account for 70% of Thai market in paper, rest accounted for by several small producers |

Top Shareholders in Advance Agro (Voting Blocks) products

| | |
|---|--------|
| Soon Hua Seng and Dumnernchanvanit family | 28.69% |
| Stora Enso Group | 18.88% |
| Oji Paper Group (Thailand) | 5.53% |

Top Shareholders in Advance Agro (Shares

| | |
|--------------------------------------|---------------|
| Thailand Securities Depository | 29.39% |
| Thailand Securities Depository Co. | 23.45% |
| Enso Oyj | 18.88% |
| SHS Holding Co. Ltd. | 10.85% |
| D Group Co. Ltd. | 8.21% |
| Oji Paper Co. Ltd. | 5.53% |
| Commonwealth Development Corporation | 1.14% |
| Mr. Yothin Damnernchanvanit | 1.13% |
| SHS Rice Co. Ltd. | 0.56% |
| SHS Co. Ltd. | 0.56% |
| | 99.70% |

Total Long Term Debts of the Company and Subsidiaries (2002)

| |
|---|
| Debt: 17,910,640,000 baht (approx. USD \$407,060,000) |
| Total Liabilities to Net Worth: 2.55:1 |

Table 57: Information on Independent Woodchip Producers in Thailand: Summary

| Company | Mill Location | Capacity/ Production | Supply Strategies | Buyers | Notes |
|------------------------------------|---------------|--|---|--|---|
| Siam Tree Development (STD) | Chon-Buri | - 300,000 Green tonnes/year - running at capacity - stated conversion ratio of 2.2 to 2.3 for BDT -> 130-135,000 BDT | - 100% eucalyptus - no company plantations, no fixed contracts with farmers - supplied through about 50 brokers, sourcing eastern Thailand - perhaps 1,500 farmers - mostly within 70 km, some 100 km and even up to 500 km if in need of supply | - 100% exported to Japan's Oji Paper | - Factory gate price 1,000 baht/tonne - up 25 baht since Jan. 2003 - farmgate price for growers is 600-700 baht/tonne - transport costs generally upwards of 40% of factory gate price |
| Thai Wittawat | Surin | -200,000 green tones/yr, at capacity -stated conversion ratio of 2.5, -> “approx. 80,000 BDT” | - euca, all from NE Thailand, incl. Sri Sa Ket, Buriram, Ubon & Roi Et (generally areas E/NE of Surin town) - sourcing distance is “200 km maximum” - approx. 200 brokers and approx. 400-500 primary contract farmers, depends on season - probably 10,000 non-contract farmers | - ship through Laemchabang port - last year 10,000 BDT to SPP - 70,000 BDT export last year, indirectly to Oji, & some to ‘Diashowa’ (Nippon Paper) - do not supply AA or Phoenix | - Factory gate price 800 baht/tonne - up 15% from 2002 - average farmer area approx. 20 rai, min. 1-2 rai, max. 100 - current FOB \$US75-80 |
| KMI * | Buri-ram | - Production 150,000 green tones/yr. @ conversion ratio 2.5 -> approx. 60,000 BDT | | Siam Pulp and Paper, among others | - SPP’s role as buyer confirmed by SPP themselves, but SPP would not provide data on volume purchased |
| Kittawee * | Surin | - Production 400,000 green tones/yr. @ conversion ratio 2.5 -> 160,000 BDT | | SPP and Japan | |

| | | | | | |
|---|---------------------|--|--|--|---|
| Thai Martin Group | Prach-uab Kiri Khan | <ul style="list-style-type: none"> - 300-400 tonnes BDT chips per day; = approx. 110,000-145,000 tons/year @ conversion ratio of 2.2-2.3, implies log consumption at 242,000 (low) to 330,000 (high) green tonnes per year @ conversion ratio of 2.5 = 275,000-360,000 green tonnes) - production started end of 2003 | <ul style="list-style-type: none"> - a 10,000-ha lease zone in central-southern Thailand - existing supply suggested on hand for first 3 years, then to establish a replanting program & partnerships with farmers | <ul style="list-style-type: none"> -to Siam Pulp and an unnamed smaller Japanese firm (possibly Rizhao) | |
| Estimated 2002-03 Estimated Totals 2004 ** (post Thai Martin, assuming others hold production) | | <ul style="list-style-type: none"> - approximately 500,000 BDT - see Tables 42-44 for RFD (2003) and Thaiutsa's (2002) data. - assuming production rates remain stable, a possibility of 672,000-795,000 BDT (although note that a portion of Thai Martin's production is not exported, but shipped to Siam Pulp) | | | <ul style="list-style-type: none"> - note that Oji stated they purchased 200,000 BDT from Thailand in 2002 - the portion not supplied by STD was through a chip mill from Soon Hua Seng (likely Bangpakong Chip mill) |

**Indirect Informatio- based on interview with Thai Wittawat on July 17, 2003 (and using Thai Wittawat's stated conversion ratios).*

***Note that given the suggested fiber supply squeeze occurring in Thailand, exports are likely being re-routed to domestic buyers and the supply arms of the major pulp firms are likely competing with the smaller woodchip mills for limited supplies.*

Source: Author Interviews.