

IMPACTS AND EFFECTIVENESS OF LOGGING BANS IN NATURAL FORESTS: THAILAND

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INTRODUCTION

Thailand has a total land area of 513 115 km² and a population of 61.1 million people (1998) with an annual growth rate of 1.1 percent (World Bank 2000). The economy consists of a diverse mix of agriculture, manufacturing and service industries. Rapid urbanization has taken place since the 1980s. The population density is about - 120 persons/km² (RFD 1998) and 23 percent of the population live in urban areas.

Government estimates indicate that Thailand's forest cover declined from 53.3 percent of the total land area in 1961 to 25 percent in 1999 (Table 48). FAO (1999) estimates place forest cover at only 22.8 percent in 1995. Annual deforestation rates have exceeded 3 percent for much of the time since 1961 (FAO 1998) and reached 3.9 percent between 1976 and 1982 (Jantakad and Gilmour 1999). Reforestation did little to stem the trend. A total of only 850.000 to 900.000 ha were planted between 1906 and 1996 (RFD 1998; Green World Foundation 1999).

Table 48. Status of forest area in Thailand

Year	Thousand ha	Percent
1961	27 363	53.3
1973	22 173	43.2
1975	20 525	40.0
1976	19 842	38.7
1978	17 522	34.2
1982	15 660	30.5
1985	15 087	29.4
1988	14 380	28.1
1989	14 342	28.0
1991	13 670	26.6
1993	13 355	26.0
1995	13 149	25.6
1998	12 972	25.3
1999	12 839	25.0

Sources: Figures for 1961-1998: Charupatt (1998)

Figures for 1999: Author's calculation based on current Royal Forest Department's data.

Past attempts by the Royal Forest Department (RFD) to rehabilitate degraded forests met with little success due to overwhelming constraints posed by "illegal encroachers" residing in the forests (Jantakad and Gilmour 1999). These "illegal encroachers" were bolstered by incoherent and uncoordinated Government policies regarding natural resources and agricultural expansion. An estimated 1.3 million households are living on the surveyed (official) forestlands (TFSMP2 1993).

Policy environment concerning the forestry sector

Major forest policies

Since the establishment of the RFD in 1896 until the imposition of the logging ban, Thailand enacted four main forest policies, according to a few forestry acts and national plans. The Forest Protection Act of 1913 set out principles for the long-term exploitation of forests benefiting the State. The 1961 First National Economic and Social Development Plan (NESDP) aimed to protect 50 percent of Thailand's areas as forests. The second NESDP (1967) reduced the area to be protected to 40 percent. Finally, the first formal National Forest Policy was "announced" in 1985, emphasizing economic or production forests and conservation or protected forests. It divided the 40 percent of land under forests into 25 percent for economic forests and 15 percent for conservation forests. The seventh NESDP (1992-1996), following the imposition of the logging ban, reversed the allocations to 25 percent of conservation forests and 15 percent of economic forests to emphasize conservation objective.

Due to various pressures, in particular the devastating floods in southern Thailand (1988), the Royal Thai Government (RTG) officially imposed a "total logging ban" in natural forests in January 1989. Since then, the National Forest Policy has been amended to encourage forest protection. In 1991, conservation forests were gazetted to cover 27.5 percent of Thailand's total land area. However, considerable areas of conservation forests exist only on paper.

Conservation measures have consequently played a major role in Thailand's forestry policy, especially after 1989. Since then, officially designed conservation forests have increased rapidly, and now comprise up to 79 percent of the country's total area. Protected forests total 40.5 million ha, including both the core conserved forests (34 percent) and additional conservation areas, such as forest reserves, forestlands awaiting reserve status, botanical gardens, and designated forestlands still under cabinet resolutions. The core legally designated conservation areas are national parks, wildlife sanctuaries, forest parks, non-hunting areas, watershed Class 1, and mangrove conserved forests (declared by Cabinet Resolution), which total 17.4 million ha (Table 49).

Table 49. Forest conservation and reserve areas in Thailand

Conservation Type	Number	Area (million rai)	Area (million ha)
Conserved area under laws and cabinet resolutions, including:			
National Park	87	27.61	4.42
Wildlife Sanctuary	46	20.42	3.27
Forest Park	65	0.54	0.09
Non-hunting Area	44	1.94	0.31
Watershed Class 1	25	58.24	9.32
Mangrove Conserved Forest	-	0.27	0.04
Subtotal		109.02	17.45
Additional conservation area	1 221	143.98	23.04
Total		253.00	40.48

Sources: RFD (1998), Green World Foundation (1999)

Policies and other aspects of the forestry sector

The RTG has been concerned about deforestation and forest degradation for many years. It has passed several forest acts, including the Forest Protection Act in 1913, the Wildlife Protection and Preservation Act in 1960, the National Park Act in 1961 and the National Forest Reserve Act in 1964. In 1989, the national "logging ban" in natural forests was declared. The Forest Plantation Act was enacted in 1992, and the Community Forest Act was drafted in 1990. This last act has yet to be enacted. The logging ban has reduced the domestic supply of legally harvested wood available to wood-processing industries, forcing domestic industries to import logs and sawnwood from neighboring countries. This reliance on imports has created a negative image of Thailand as a destroyer of its neighbors forests (TFSMP5 1993). Furthermore, the high prices for logs have increased illegal logging in Thailand.

In addition to the enactment and expansion of conservation forests, one of the RTG's main responses to deforestation has been to encourage the development of large-scale commercial forest plantations (TFSMP5 1993). Forest plantations have been incorporated in the economic forest zone. They have been promoted largely because the RTG expects that large-scale private plantations can help mitigate deforestation, improve the ailing forestry sector, and supply wood for domestic consumption. However, while deforestation occurred in natural forests, reforestation focused on open land or degraded forests. The RFD provided long-term leases (30 years) at the rate of 10 baht/rai (62.5 baht/ha) annually. Such low rental rates have caused resentment among villagers and NGOs, as commercial plantations threaten the livelihood of many local communities (PER 1992).

Thailand's local farmers and environmental NGOs claim that monocultures of fast-growing forest species are no substitute for the natural forest biodiversity, which many local people depend on. When conflicts between local people and the large-scale plantation sector escalated, commercial reforestation was stopped (TFSMP5 1993). This has led to the present impasse in reforestation in Thailand, although the RTG has continued to promote small-scale private plantations. However, the success of small-scale tree farms remains doubtful due largely to the insufficient incentives and long gestation periods. It also requires lengthy procedures to legalize tree felling and sale of wood, and relatively sophisticated establishment and management technologies for some tree species (e.g. teak, dipterocarps). Unfortunately, the RFD has been unable to support and strengthen the development of markets for small-scale plantation owners and wood-product enterprises.

However, there is also a serious concern that Thailand will become overly dependent on imports of both wood and non-wood products. Some researchers and involved parties have suggested that parts of the deforested areas should be reforested for the production of wood and non-wood products (TFSMP2 1993). The forest plantation program will include local people in the development plans. It will also consider appropriate scale, technology and finance from available sources to build up new partnerships with the local people. It is suggested that since Thailand has enough land, technology, and perhaps finances to support silviculture activities, it may not be necessary to import wood in the future (TFSMP2 1993).

Strategies promoting forest conservation

With the implementation of the logging ban, the main objective of forestry in Thailand shifted from production to conservation. The major strategies include:

- demarcate and declare conservation forests, such as national parks, forest parks, wildlife sanctuaries, non-hunting areas and forest reserves;
- strengthen law enforcement and strict forest patrolling
- relocate people residing in forest reserves or conservation forests; and
- attempt to limit the occupation of the upland and highland areas by local people.

THE NATIONAL LOGGING BAN IN THAILAND

Background

Between 19 and 24 November 1988, heavy rains triggered massive landslides that affected 16 villages in southern Thailand. Three villages were buried under 1 to 3 m of sand and debris. All of Thailand's eastern coastal provinces from Chumpom to Narathiwat were affected. The 1988 floods were particularly unusual because disastrous floods were previously rare in southern Thailand. Total damages from the flood were estimated to be 7 357 million baht (Natalaya 1991)¹. The severe floods also caused the death of 373 people, injured hundreds and rendered thousands homeless in Nakorn Srithammarat Province.

The following factors caused the flood (Nalampoon 1991):

- Excessive rainfall of 1 051 mm during 6 days: The center of the damage, resulting from flash floods, was in the mountains of Khao Luang, which included several villages. The most heavily affected villages were Baan Kathun Nua, Phi Pun district; Baan Huay Ko, Phi Pun district and Baan Kiriwong, Lam Saka district, all located in Nakorn Srithammarat. The peak flows at Klong Kathun and Klong Thadi were over 300 and 400 m³/second, respectively.
- Topographic conditions: Khao Luang Mountain Range consists of several high peaks (up to 1 518 m) with steep slopes. Natalaya's study (1991) showed that steeper areas had more landslides in the 1988 catastrophe.
- Soil conditions: Khao Luang has a granite core under loose soils. On steep slopes, the soils were

saturated with water and were the cause of many landslides.

- Conversions of forests into para-rubber plantations: Many forests in the Khao Luang Mountain were converted into para-rubber plantations. The soils of these plantations are unstable and prone to landslides under heavy rainfall. Large quantities of rubber tree debris as well as previously stockpiled timber were found at the foot of Khao Luang Mountain.

Prior to the disaster, NGOs and the media had tried to pressure the Government to conserve the country's natural resources. For example, the Project for Ecological Recovery (PER 1992) stressed that the anti-logging, sentiment had started long before the catastrophic floods, but gained momentum from two events. One was the juridical ruling that granted logging rights to 22 companies in areas designated as national parks or wildlife sanctuaries. The Huay Kha Kaeng Wildlife Sanctuary, awaiting declaration as a World Heritage Site by UNESCO, was at the center of this controversy. The second event was the 1988 devastating floods and landslides.

The enormity of the disaster, coupled by persistent public pressures from NGOs and the media, finally convinced the Government to impose a logging ban on 17 January 1989 in the form of a Cabinet Resolution (Order number 32/2532). This revoked all logging licenses in natural forests, effectively banning commercial logging, particularly in the uplands (Jantakad and Gilmour 1999).

A policy paper, "Ten Measures to Save the Forests," submitted to the RTG (PER 1992), highlighted three areas for action:

- a comprehensive plan for protecting forest areas that had been part of the concessions;
- the administration of "economic" and "conservation" forests under separate regulations; and
- the rights for local villagers to own and manage their ecosystems as community forests.

In response, the RTG reassigned the national target areas for conservation and economic forests to 25 and 15 percent, respectively. Between 1990 and 1995, the Thai Forestry Sector Master Plan (TFSMP) was formulated. It attempted to strengthen sustainable management and conservation of natural forests and ecosystems, develop a strategy for policy implementation through sustainable and participatory methods, and enhance capacity building for monitoring and evaluating the progress (TFSMP-2 1993). Unfortunately, opposition from various groups (environmental NGOs were among the leading opponents of the TFSMP) and other obstacles prevented the implementation of the TFSMP.

Goals and objectives of the logging ban

The logging ban was the RTG's most drastic form of forest protection ever attempted in Thailand, although logging in plantations and mangrove forests was not affected. The ban officially terminated the relationship between the RFD and logging concessionaires, and caused uncertainty about the RFD's future role in forest management (IUCN 1996).

The goal of the ban was, in the first instance, to protect the remaining natural forests and secondly, to enforce rules and punishment of encroachers in the protected forests. There was general consensus that logging had contributed to or actually had caused severe nation-wide deforestation, although it was recognized that appropriate logging practices do not cause deforestation directly (FAO 1998). However, logging roads indirectly provide access for illegal loggers and the rural poor in search of new land. Some individuals and environmental groups viewed the ban as an opportunity to shift towards integrated participatory development with proper conservation measures.

Although the conservation objectives of the ban were never clearly announced, its main objectives, according to various sources (TFSMP5 1993, IUCN 1996, Jantakad and Gilmour 1999, Phonpanpua 1999), appear to be:

- protection and rehabilitation of natural forests;
- improvement of degraded forestland to sustainable and productive land uses;
- securing livelihoods for forest-dependent people;
- increasing the RFD's capacity to implement the new strategies through sustainable and participatory methods; and
- conservation of soil and water resources, and biodiversity.

The cancellation of concession licenses in upland natural forests was a hasty response to fears of more landslides and flash floods. In 1996, the RTG also revoked logging licenses in mangrove forests to halt their destruction, which was especially excessive during the 1980s and early 1990s when mangrove forests declined from 312 000 ha (1979) to 53 000 ha (1993). Still, with concessionaires leading the campaign to

oppose the ban, logging operations continued in mangrove forests. In April 2000, the RFD Director General announced that the RFD aimed to discontinue the concessions once their licenses expire. The effectiveness of the ban in mangrove forests has been questioned not only for ongoing logging, but also because of illegal encroachment for prawn farming, construction of resorts and other non-timber uses, which are destroying the mangroves.

Twelve years after imposing the ban, illegal logging and upland encroachment remain barriers to forest conservation. Upland watershed deterioration with all its negative externalities and resulting economic impacts continues, particularly affecting Thailand's water resources. Many concerned stakeholders have not yet embraced the idea of participatory approaches and decentralized forest management and conservation. The roles of the public administration directly responsible for forest policies (such as the RFD) still need to be redefined, and innovative partnerships with local communities and NGOs must be clearly specified.

Apart from the logging ban, other activities in Thailand's forests can potentially contribute to conservation objectives too. The Government, through the RFD, is focusing its activities on forest rehabilitation aimed at forest restoration and biodiversity conservation. The area set aside for conservation has steadily increased (Table 50), law enforcement has been strengthened, and people residing in the conservation forests have been relocated to buffer zones or other designated areas, although this last strategy has resulted in numerous conflicts (Phantasen 1995).

Table 50. Natural conservation and recreation areas in Thailand

Category	1994		1995		1996		1997		1998	
	No.	thousand ha								
National park	79	4022	81	4 174	82	4 233	82	4 233	87	4 418
Forest park	42	53	42	63	57	76	66	86	65	87
Wildlife sanctuary	37	2 889	38	2 939	42	3 099	44	3 201	46	3 267
Non-hunting area	43	296	42	296	44	322	43	297	44	310
Botanical garden	13	2	15	6	15	6	15	6	15	6
Arboretum	44	3	47	3	47	3	49	3	53	3
Total	258	7 265	265	7 481	287	7 739	299	7 826	310	8 091

Source: RFD, *Forestry Statistics of Thailand (1998)*

Relocating people living in the conserved forests has been problematic since the residents are concerned that the RFD will relocate them to degraded or marginal lands that are unsuitable for farming. Examples such as the *Khor Jor Kor* Project (Project for Land Allotment to the Poor in the Degraded Forest Reserve) and the relocation of hilltribes to "Forest Villages" in north and upper northeast Thailand have not diminished their fears. Protests by the poor relocated farmers in the *Khor Jor Kor* Project led to the failure of the project, which was consequently revoked in 1992 (Phantasen 1995).

Organized groups of villagers have also moved into prohibited forest reserves such as the *Dong Yai* Forest Reserve in Northeast Kalasin Province in late 1999, and to Phu Pan National Park in the Northeast Province of Sakol Nakorn in March 2000. Even though villagers of *Dong Yai* have customary land rights to the area, they vacated the forest to allow the Government to put the area to good use. When the land was converted to commercial plantations of *Eucalyptus spp.*, it caused intense resentment among the displaced villagers. They finally decided to move back to their own parcels of land, raising severe conflicts with the RFD, which has tried to evict the villagers.

The incident in Phu Pan National Park was caused by the unrealized promise from the Government through the RFD, that arable land would be granted to villagers. In fact, the villagers, who joined the Communist Party of Thailand at the time, had moved out to give way to the Government. The forest was later named the Phu Pan National Park. After 20 years, the villagers claim they have limited means of making a living since they are landless.

About 16 percent of the Thailand's total land area is included in the protected area system (Jantakad and Gilmour 1999). Additional national parks are waiting for the Royal Decree to be declared, which would be a significant increase of the national conservation and recreation areas. This is one of the strategic improvements related to current conservation efforts by the RFD, although substantial gaps in the protected area system (PAS) remain (Ingles 1999, cited by Jantakad and Gilmour 1999) and their management remains problematic.

Many measures to restrict utilization of the upland forests and to control shifting cultivation have been ineffective due mainly to increasing population pressures. In addition, lowland people have continued to encroach into the forest reserves, conservation forests and upland watersheds. This has led to further conflicts between ethnic minorities and Thais, particularly in the North, and between Government officials and local villagers in the Northeast, where both parties are very suspicious of each other. Government officials think that the villagers are incapable of managing the forestland, while the villagers believe that the Government officials are unreliable and ineffective.

Many Thai people seem to understand and are interested in various national policy agenda and activities related to natural resources and the environment. The current Constitution enacted in October 1997 emphasizes the rights of rural people to actively participate in the management and utilization of natural resources (Thailand Constitution Drafting Council 1997). Participation has been viewed as a strategy to implement policies and ensure sustainability. Moreover, the local people and NGOs emphasize the need for a real partnership between the RFD and local people.

POLICY, ECONOMIC, ENVIRONMENTAL AND SOCIAL IMPLICATIONS OF THE LOGGING BAN

Policy implications

Suitability of current policy and legislative arrangements to assure logging ban effectiveness Thailand's forestry sector has been affected by the imposition of the logging ban and civil society feels that the ban should not be revoked in the near future. The implementation of the ban has been hindered by a lack of clear policies and strategy, a shortcoming of the RTG's previous efforts to manage Thailand's natural forests sustainably. In the past, many efforts were symbolic without well-developed strategies and appropriate internal management structures. Hence, public opinion is that "the logging ban should remain [or] the forest will just be destroyed" (TFSMP2 1993).

However, the ban on commercial logging has not prevented further deterioration of the natural forests. In addition, neighboring countries have blamed Thailand for the destruction and degradation of their domestic forests. There has never been any pre- or post-implementation legislation regarding the logging ban. As discussed earlier, the only apparent adjustment was to demarcate more protected areas and to strengthen law enforcement. Sustainable forest management, decentralization and devolution of natural resource management have been discussed among Thai academics and civil society since the 1980s, but the impact of the discussions remains unclear.

Significance of timing on the effectiveness of the logging ban

The 1989 logging ban took many people by surprise. The Chatchai Government had neither formulated an appropriate policy nor developed legislative structures or technical preparations when the ban was announced. Ultimately, the decision to revoke logging permits was political. Such an overnight policy shift contributed towards Thailand's present critical situation. The economic implications of the logging ban were unacceptable to many people who were concerned that the neighboring countries were using income earned from their timber exports to finance their ethnic wars.

On the other hand, some response from the Government should have been expected. During the late 1980s, the environmental movement had gained momentum and NGOs increasingly influenced policy makers. While most people in Thailand and the international community appreciated the RTG's decision to ban logging, concessionaires and the wood-based industries were forced to import raw materials, although illegal domestic harvesting continued to put pressure on Thailand's forest resources.

Since 1990, the RFD has attempted to protect the remaining forests and to encourage private sector involvement in establishing plantations. To some extent, awareness of the importance of local participation in forest management has increased in the RFD. In practice, however, the RFD's rigid technocratic structure and top-down approaches continue to prevail. This inability to change has jeopardized several projects involving

local people in collaborative management of forest resources and the environment.

Consistency of sustainable forest management with international conventions

Despite its serious deforestation, Thailand ratified some international conventions and has followed the outcomes of the 1992 United Nations Conference on Environment and Development (UNCED). In general, Thai officials, researchers and NGOs are aware of the significance of Chapter 11 of Agenda 21 ("Combating Deforestation"), sustainable forest management and biodiversity conservation, although the ratification of the Biodiversity Convention by Thailand has been delayed. The main points of the conventions have been incorporated in many national policies and the NESDP, which has been the backbone of Thailand's economic planning and development, particularly the 7th and 8th Plans. As a result, the involved agencies, local people and NGOs are playing a more significant role in natural resource conservation and forest management.

Requirements for the effective implementation of the logging ban

The experience in implementing and enforcing the Thailand logging ban suggests a number of options are still needed to effectively achieve forest protection and conservation objectives, such as:

- Reassess and modify RFD's role and the professional attitudes of forest officers. The RFD needs to develop a vision for the future, restructure accordingly and rethink its responsibilities.
- Strengthen institutional capacity to facilitate collaborative decision-making, and increase transparency and accountability in forest management.
- Establish security of land tenure, and provide access to resources for local people.
- Pass the Community Forestry Bill to clarify people's rights in using and managing forests.
- Develop capabilities within local institutions and acknowledge local villagers' traditional rules and regulations. This should facilitate the preparation of natural resource management planning and implementation through the Tambon Administrative Organization (TAO)², under the TAO Act in 1994.
- Foster cooperation and coordination among the involved agencies in policy formulation, planning, and natural resource management, monitoring, and evaluation, and clarify the responsibilities of stakeholders.
- Demarcate forestlands on the ground and develop skills in conflict resolution.
- Revise or abolish conflicting, inappropriate or obsolete legislation/regulations.

Economic implications

Wood production, consumption and trade of major wood products after the logging ban

The official statistics on wood production, consumption, exports and imports published by the RFD are somewhat unreliable. Although the production figures include confiscated timber, fuelwood and charcoal, much of the illegal activities are not captured in the current statistics. In 1994, the Forest Industry Organization (FIO) estimated that Thailand's demand for all types of wood, including teak, dipterocarps and para-rubber, was about 25 million m³ (Forestry Research Center 1994). However, only 4.1 million m³ were consumed in the same year (Table 51). The RFD Data Center reported that only 1.2 million m³ were consumed in 1998, while the Committee on Agricultural Cooperatives Policy and Planning, estimated that 25.2 million m³ were consumed in that year. Not surprisingly, many people are critical of the figures published by the RFD.

Table 51. Thailand's domestic wood production, imports, exports and consumption (thousand m³)

Year	Wood production (1)	Wood imports (2)	Wood exports (3)	Domestic wood consumption [#]
1987	2 149.0	725.2	112.0	2 762.2
1988	2 048.1	1 123.3	181.1	2 990.3
1989	919.0	2 508.0	53.3	3 373.7
1990	491.6	3 340.9	48.6	3 783.9
1991	231.5	3 280.8	57.8	3 454.5
1992	119.4	3 814.4	45.1	3 888.7
1993	64.9	3 168.2	53.8	3 179.3
1994	62.3	4 065.7	62.4	4 065.6
1995	34.9	3 463.6	80.5	3 418.0
1996	43.9	3 151.8	45.4	3 150.3
1997	59.7	2 358.6	79.7	2 338.6
1998	54.8	1 239.7	108.2	1 186.3

Sources: (1) Royal Forest Department (1998); (2) and (3) Department of Customs
[#](net consumption) = (1) + (2) - (3)

Thailand has been a net importer of wood since the mid-1970s. The gap between imports and exports increased steadily even before the logging ban, due to the rapid economic development. With the imposition of the logging ban, official records of imports grew even faster, particularly in terms of its value (Table 52). However, this growth was severely curtailed by the financial crisis that hit Thailand in June 1997. Imports stumped to pre-logging-ban levels.

Table 52. Thailand's export and import of logs and sawnwood

Year	Wood Exports		Wood Imports	
	Volume (thousand m ³)	Value	Volume (thousand m ³)	Value (million baht)
1987	112.0	716.33	725.2	3 602.46
1988	181.1	1278.50	1 123.3	5 211.80
1989	53.3	1 170.02	2 508.0	10 602.50
1990	48.6	1 214.14	3 340.9	13 776.10
1991	57.8	1 340.36	3 280.8	16 074.37
1992	45.1	1 244.46	3 814.4	18 315.67
1993	53.8	1 411.73	3 168.2	18 808.19
1994	62.4	1 793.26	4 065.7	23 729.94
1995	80.5	2 216.13	3 463.6	27 017.88
1996	45.4	1 946.10	3 151.8	23 518.57
1997	79.7	2 230.09	2 358.6	18 633.94
1998	108.2	2 577.07	1 239.7	8 919.94

Source: RFD (1998)

Note: US\$ 1 was approximately 38 Thai baht in 1998

The most affected sub-sector was the sawmill industry. In 1990 alone, 188 enterprises closed down (PER 1992), while the remaining sawmills (687 factories in 1998) adjusted their procurement methods (RFD 1998). Many industries shifted to higher-value processing, and converted the sawnwood production to furniture and crafts (PER 1992). However, this change was triggered more by the 1975 log export ban than the 1989 logging ban (Kashio 1995). The wood-based enterprises that survived the ban rely heavily on the plantation-grown timber from the FIO and confiscated timber, in addition to imported wood.

The FIO is a semi-private enterprise operating sawmills, wood-product factories, plantations and forest villages. Since the imposition the logging ban, the FIO has played a major role in processing the confiscated logs. It conducts its own logging operations but has been severely affected by the prohibition of logging in the natural forests and has been threatened with bankruptcy. At present, the Government has to support the FIO fully, as it has been unable to remain economically viable as a semi-autonomous entity. However, it is still the responsibility of FIO to balance wood production and consumption for the whole country.

Illegal logging and trade

The RTG reduced log import tariffs and promoted wood imports particularly from Myanmar, Laos and Cambodia. In 1991, Myanmar was the most important timber supplier (PER 1992). Illegal timber trade was taking place along the Thai-Cambodia border, although it was officially "closed" in late 1994 following the murder of 22 Thai timber workers (Global Witness 1995). However, a great number of logging trucks continued to cross the border in 1995.

Conflicting claims about the importance of exports to Thailand abound. The five major exporters include Cambodia, Laos, Malaysia, Myanmar and the United States. According to official statistics, in 1998 Thailand imported sawlogs and sawnwood from Malaysia totalling 4 396 million baht, or US\$ 115.69 million (823 627 m³), and from Myanmar 1 250 million baht or US\$ 32.89 million (94 676 m³) the same year (Table 53).

Table 53. Thai imports of wood by country of origin, 1994-1998

Countries	1994		1995		1996		1997		1998	
	Volume m ³	Cost million \$								
Malaysia	2 407 463	366.44	1 934 828	359.92	2 127 979	384.41	1 274 392	261.88	823 627	115.69
Myanmar	539 382	3.36	252 363	120.04	173 571	72.76	126 035	45.66	94 676	32.89
Cambodia	578 633	81.45	596 752	102.83	113 673	28.81	296 466	52.18	67 354	19.67
Laos	278 272	40.54	273 934	38.98	240 740	37.24	199 062	33.96	110 115	19.96
U.S.A.	54 075	18.99	63 091	25.44	77 580	25.25	72 676	27.89	43 830	22.01

Source: RFD (1998)

Unfortunately, official statistics are usually incomplete. For example, Global Witness (1996) claimed that Cambodia was the largest source of timber imports for Thailand. It reported that up to 750 000 m³ of illegal timber entered the Thai harbor of Kalapangha, Trad Province annually, which Thai and Cambodian officials ignored. In fact, Cambodia imposed a timber export ban in December 1996 (Global Witness 1997), although Thai companies continued to operate illegally in Cambodia.

However, illegal logging did not intensify only across Thailand's borders in neighboring countries (see Box 1). 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.

Generation of alternative wood supplies

In 1992, the RTG enacted the Forest Plantation Act, allowing the private sector to establish plantations on degraded forestland. As an incentive, investors are exempted from paying royalty fees for plantation-grown wood (Kampiraparb 1993).

Various other schemes were initiated to expand the plantation area. One of the most popular programs was the *Forest Plantation Project to Commemorate the King's Jubilee Reign*, which invited all Thai and non-Thai residents to plant trees. Planned for 1994-1996, the project was extended to 2002 upon request from the RFD because the 5-million rai (800 000 ha) goal could not be achieved within the time specified. By 1997, only 2.7 million rai (436 800 ha) had been reserved for establishing plantations. Trees had been planted on only 1 million rai (164 800 ha), or 37.7 percent of the target (Green World Foundation 1999), which suggests that the incentives provided were not sufficient to stimulate investments in plantations. In fact, land-use conflicts in many areas increase the risk for investors, and numerous public campaigns against plantations and particular species such as *Eucalyptus camaldulensis* also discourage the private sector.

The cumulative total area of reforestation by both the RFD and private sector during 1906-1996 is shown in Table 54. The figures indicate that the forest plantation policy was ineffective for sustaining the forestry sector. Most importantly, forest degradation and deforestation have continued at or near the rate of around 2-2.6 percent annually (FAO 1999). Eventually, pressures will grow stronger and the PAS or conservation forests will be affected more significantly. It is clear that in the short- to medium-term, Thai wood-processing industries will continue to be dependent on imports and illegally cut domestic timber.

Box 1: Case studies of illegal logging

Song district of Phrae Province and Ngao district of Lampang Province

Northern Thailand has the highest proportion of forest area in the country, and also the highest rate of illegal logging. The booming tourism industry in the North has created conditions for the growth of furniture and crafts industry. Arts and crafts made from wood are encouraged by the Thai Government. All provinces in the North that attract many tourists, particularly Chiang Mai, are centers for woodwork factories.

Phrae Province has the highest rate of illegal logging in Thailand. It is well-known for its abundant teak forests. The logging business in this area has existed for a long period of time. Logging was first undertaken by the Veterans Organization, and later by Phrae Kam Mai and Chartphaiboon Companies. The nation-wide logging ban has had little or even no effect on the logging activities in this area, which have been extended to other rich forest areas in Lampang, Payao and Nan Provinces.

The two groups of people involved in illegal logging are from the Song district of Phrae Province and Ngao district of Lampang Province. The cut logs are sent to Song and Sungmen districts of Phrae. Sungmen is a well-known illegal timber market among wood traders. The villagers in Song cut trees in Maepung, Maepou and Mae Ten National Forest Reserves, and adjacent forests, while Ngao's villagers logged trees in Mae Yom National Park and nearby forests.

Illegal logging is practiced all year round, with wood being transported by land and water. Tree felling is sometimes undertaken during the rainy season, as it is easier to transport the logs via the Yom and Ngao Rivers when water levels are high. Nevertheless, the rate of tree felling is highest during the dry season, which coincides with the off-farm period for the villagers. In the past, the villagers tied the logs together as rafts and floated them down the river. Nowadays, the mode of transport is by the "submarine method" of sinking the logs under water and having them float up to the surface in Song, where they are retrieved by the middlemen and transported to Sungmen.

Eleven villages in the area are involved in the illegal logging.

Sources: PER (1992); Tantiwittayapitak (1992)

Table 54. Reforestation by the Royal Forest Department and private sector in Thailand

Duration	Area (rai)	Area (ha)
1906-1960	50 984	8 157.44
1961-1966	142 500	22 800.00
1967-1971	171 820	27 491.20
1972-1976	294 861	47 177.76
1977-1981	1 357 615	217 218.40
1982-1986	1 901 180	304 188.80
1987-1991	764 750	122 360.00
1992-1996	943 750	151 000.00
Total	5 627 460	900 393.60

Source: Green World Foundation (1999)

Environmental implications

Effects on the Protected Area System, biodiversity and watershed conservation

An important positive impact of the logging ban is the increased awareness of the need for effective forest conservation. Unfortunately, this has yet to impact positively on the rate of deforestation. First, Thailand needs to understand the root causes of the problem and include all stakeholders in the planning process prior to taking remedial actions.

It should be recognized that the logging ban has been a catalyst for the RTG in general, and the RFD in particular, to develop more purposeful management activities for forest conservation. The protection of scenic, amenity and public recreation areas has received more attention. Numerous Royal Decrees were passed to declare permanent forest reserves, national parks, forest parks, wildlife sanctuaries and other designated areas since the imposition of the logging ban. What is crucial now is the organization of multi-partite cooperation in maintaining the reserved and protected forests. Equally important is the effective management of available forests and biodiversity conservation without ignoring the needs of forest-dependent people (i.e. to balance the needs of conservation with sustainable livelihoods in rural Thailand).

To conserve biodiversity effectively, it is necessary to protect the remaining forests, produce alternative wood supplies from plantations, and focus on natural regeneration. Enhanced conservation and effective management and protection of national parks and wildlife sanctuaries are also important. The World Bank (1998) has suggested a number of key measures including:

- more effective enforcement of the logging ban through enhanced policing, capabilities (surveillance, logging monitoring and trade control technologies), better prosecution and tougher penalties;
- more frequent monitoring of forest cover changes using satellite images and ground verification;
- increased staff capacity;
- effective demarcation of protected areas, in consultation with local communities;
- participatory development of management plans for protected areas and buffer zones;
- involvement of local communities and NGOs in implementing management plans; and
- full financing of the recurring costs of appropriate conservation and protection management through increased user and service fees, or concession fees where appropriate.

The causes of watershed degradation are quite similar to those of deforestation. Although the logging ban should have boosted management of critical watersheds, conflicts between upland and lowland residents, and between the Government and forest-encroachers, have increased (in some areas) the deterioration of watersheds instead. Policies are irregular and unique in some specific watersheds. Watershed areas are categorized into 5 classes (see Box 2). Class 1 watersheds, including both 1A and 1B, are mainly conservation forests. Watersheds in this category are considered so important that the upper watersheds (Class 1, greater than 35 percent slope) cannot be utilized in any way and no humans are allowed to reside in these areas.

Class 1B watersheds are slightly less restrictive than Class 1A. Many are "disturbed watersheds" that are in need of rehabilitation.

Ethnic minorities, or hilltribes as they are usually referred to, and their shifting cultivation practices have often been blamed for destroying watershed forests. The total hilltribe population in Thailand is estimated to be almost 1 million (Public Welfare Department 1998; cited by Phonpanpua 1999). The debates about the agricultural practices of the hilltribes have been going on for the past 40 years. Research and development projects have been undertaken for the last 20 years to implement sustainable agriculture, although the success rate of such efforts has been disappointing. On the other hand, shifting cultivation practices have been reduced or have stabilized with permanent cropping, due to several factors:

- shifting cultivation in the "protected" watershed areas is considered illegal;
- limited land is available in the mountainous regions of the country;
- the huge number of hilltribes is disproportionate to the available arable land; and
- the Government, through several agencies, has attempted to restrict shifting cultivation for at least 20 years.

Box 2: Watershed classifications in Thailand

Thailand's watersheds are generally categorized into five watershed classes (WSC) as follows:

WSC1: Protected or conservation forest and headwater source. This class is divided into 2 sub-classes

- **WSC1A: Watershed protection forest** includes the headwaters of rivers. Usually at high elevations and very steep slopes, and should remain as permanent forest cover.
- **WSC1B: Disturbed WSC1** areas have similar physical and environmental features to Class 1 A, but parts of the areas have been cleared for agriculture, thus requiring special soil conservation measures. Where possible, the areas should be replanted as forest or maintained as permanent agroforestry.

WSC2: Commercial forest is for protection and/or commercial use, where mining and logging are allowed within its boundaries. Usually at high elevation with steep to very steep slopes. It may be used for grazing or crop production with soil conservation measures.

WSC3: Fruit-tree plantation covers uplands with steep slopes and less erosive landforms. It may be used for commercial purposes, grazing, fruit trees or certain agricultural crops with soil conservation measures.

WSC4: Upland farming areas cover those with gentle sloping lands suitable for row crops, fruit trees and grazing with a moderate need of soil conservation measures.

WSC5. Lowland farming covers gentle slopes or flat areas needed for paddy fields or other agricultural uses with few restrictions.

Source: Tangtham (1996)

Impact on institutional arrangements for forest conservation

Originally, the institutions involved in the implementation of the logging ban were the RFD, FIO, and the Ministry of Agriculture and Cooperatives. The latter was responsible for overseeing the policy implementation. The RFD's main policy objective, as emphasized by the current Director-General, is forest protection and strict enforcement of the relevant laws. The RFD administered the logging ban according to the administrative structure of the RTG at four levels:

- The central office in Bangkok is responsible for overall administration, overseeing all offices including regional and provincial offices.
- There are 21 regional offices, although plans to reduce this number to 15 in the near future are being considered.
- There are 76 provincial offices.
- About 5 000 district offices are under the umbrella of local administration offices at the district level.

The RFD's central office is divided into 6 programs as follows:

- Forest Administration;

- Forest Conservation;
- Forest Extension and Development;
- Forest Research;
- Tourism Development and Promotion: and
- Environmental Quality Control.

Only 4 of the 6 programs were granted budgets in 1998. Of the total US\$ 222.59 million, Forest Extension and Development received the largest allocation (US\$ 93.59 million), followed by Forest Conservation (US\$ 90.17 million). Administration (US \$31.68 million) and Forest Research (US\$ 7.15 million). Prior to 1997, the Forest Extension and Development program was inactive.

The role of the FIO in forest conservation is limited to expanding the plantation areas.

Social implications

Impact on employment

The most immediate impact of the logging ban on employment has been the closure of many sawmills and wood-product factories and provincial logging companies. Many employees were dismissed. Most of them looked for alternative employment, but few succeeded in locating new jobs nearby. Some have likely encroached further into the forests or turned to illegal logging, either on their own, or as employees for others. Some have returned to their rural homelands and become full-time farmers. The logging concessionaires and wood industrialists have been affected to a certain extent, although most have moved operations to neighboring countries.

The provincial logging concessionaires, sawmills and wood-product factories had to reorient operations towards furniture manufacturing, woodworking and woodcrafts. Nearly 200 sawmills were closed down because of rising log prices that made operations too expensive to be viable. In 2000, about 687 sawmills were in operation, almost similar to the number in 1960 with 680 sawmills (de Backer and Openshaw 1972).

While it is clear that the unexpected logging ban led to hardships for some people, the social impacts have never been fully quantified. No detailed studies of the illegal logging business and the impact on income Generation of the wood-industry workers have been conducted. This is probably because the years following the logging ban were characterized by extremely high economic growth in Thailand. Employment generated by this growth far outstripped the job losses due the logging ban. The assumption that laid-off workers would have found alternative employment in other sectors of the industry remains untested, but is likely true in many cases.

CONSTRAINTS TO THE EFFECTIVE IMPLEMENTATION OF THE LOGGING BAN

The impacts of the logging ban have never withstood an in-depth review, but it has been criticized by many as being futile, fruitless, and even counter-productive. The unwillingness to critically review the impacts of the ban may be due to a reluctance on the part of the RFD. For more than a decade, the issue of the logging ban has been rarely raised, but the RFD has generally played down the policy. Some RFD officials are still ashamed or angered until today because the ban was introduced instantaneously without their input and a proper strategy for implementation. It is obvious that the implementation of the ban suffers from a number of constraints including:

- In announcing the logging ban, the RTG reacted to a natural disaster without spending the time to discuss an appropriate strategy and to involve key stakeholders in the design of the policy.
- No supportive legislation was enacted after the declaration of the total logging ban in natural forests.
- Little sustained political will and effort followed the declaration. Only limited staff and funding were available to implement a comprehensive protection and conservation program and enforce the logging ban.
- There was only limited understanding of the potential economic and social impacts of the logging ban. The RFD was not put into a position to prepare any nation-wide programs to assist in, monitor and evaluate the adjustment process.
- The logging ban has been largely treated as a sacred action, beyond deliberate and open discussion or debate. The policy agenda and goals were not critically discussed. Individuals and organizations initially involved with developing and implementing the ban have been relatively passive in terms of evaluating and assessing the actual accomplishments, impacts and difficulties. To date, there has been no systematic analysis of the impacts of the logging ban.

- Although the RFD has attempted to involve local people in reforestation and forest conservation schemes to some extent, the results have been dismal, mainly because the villagers see few incentives for their participation.

A strong desire to combat deforestation and to rehabilitate the degraded forests has been apparent among RFD officials, in particular the Director General. It is also recognized that the RFD alone cannot effectively implement the logging ban. The challenge for the future of Thailand's forests is to define new roles and responsibilities based on partnerships with civil society and to focus on the rehabilitation of the degraded forest landscape and conservation of the forest remnants (Jantakad and Gilmour 1999). In short, RFD officials must abandon their past centralized authoritarian role, which emphasized policing and licensing functions. Instead, a new role focused on facilitating community-based forest management and technical support for large and small-scale forest plantations is likely to be much more effective.

Conclusions

The impacts of the logging ban in Thailand have been mixed. Although all are inter-related, forest policy and the environment appear to be most seriously affected, followed by economic and social aspects. Minimal preparation and the lack of a comprehensive strategy prior to the launch of the logging ban have caused confusion, difficulties in balancing wood production and consumption, and major challenges in achieving forest conservation.

It is apparent that Thailand has been unable to cope with the imbalance of timber and wood products, imports and exports. In economic terms, Thailand's forestry and forest-product industry have reduced production and have foregone considerable income. Markets have responded with higher prices, which have led to increased imports and expenditure of foreign exchange. Shortages and higher prices have caused the private sector and involved parties to increase illegal harvesting and deforestation in Thailand and its neighbors, sometimes with encouragement from the RTG to log forests across the borders.

Socially, the logging ban has directly affected employment and personal income. In some areas, villagers were forced to turn to illegal activities, further threatening the already degraded forest ecosystems.

Nevertheless, the logging ban has been useful in two ways:

- Experience with implementing and moving forward after the ban has led the RTG to issue a policy on forest conservation and PAS. If the logging ban had not been implemented, conservation efforts may have come about much to be effective. Legal enforcement of conservation legislation has not yet met with expected outcomes. This issue is highly complex, involving socioeconomic, political and cultural factors.
- Important reasons have been learned that can be of benefit to other countries. It must be emphasized that the Thai experience may have been different if sound legislative and technical preparation had been in place, based on suitable planning and a broad public consensus. It is, therefore, suggested that any country intending to implement a logging ban should study past experiences diligently, set up the policy planning process carefully and pursue implementation gradually, with consideration of environmental and socioeconomic impacts, and the livelihoods of forest-dependent people.

POLICY OPTIONS

It is feasible to adjust logging and conservation policies with consideration of the above impacts. As many researchers, RFD and FTO officials have Thailand must produce more of its own timber and wood products for domestic consumption, yet at the same time protect its natural forests and environment. This can only be possible by involving forest-dependent people including forest dwellers, illegal loggers and city dwellers in forestry activities. The responsible Government agencies, such as the RFD, must alter the attitudes and behavior of its personnel to facilitate collaboration with local people. Many local communities in Thailand have proven that they can protect and manage community forests effectively. Thus, the following suggestions propose two alternatives for setting up sustainable forest management in support of forest conservation while fully implementing the logging ban.

Option 1: Community-based forest management with timber production

Establish community-based forest management, which incorporates small- and medium-scale plantations for commercial production, with technical assistance from the RFD. This option would integrate all c, ups of users

and the population dependent on natural forests. Participation in forest management and planning, leading to closer cooperation between the State and people would be implemented. The TAO, local groups, and local people would be the center of operations on available land, either degraded forest belonging to the State or community lands. The necessary components of such an approach would include:

- the RTG must adjust its rental procedures for State-based forestlands to make land readily accessible to small farmers and communities;
- the Community Forestry committee/working group must be elected to work on sustainable timber production in communities, incorporating social and environmental services, and management plans for such units should lead to sustainable forest management;
- favorable land taxes and incentives to promote reforestation, conservation and intensive land use are needed to promote sustainability;
- exemption or minimum logging royalty fees should be used as an incentive to encourage conservation and sustainable management practice;
- training on nursery techniques, plantation maintenance, and harvesting is necessary, and the RFD must simplify guidelines, rules and logging procedures for non-Government forestry operations;
- an effective, transparent and accountable open market system operated by the TAO and RFD, with equitable sharing of costs and benefits is needed; and
- trees should be integrated into farming systems throughout the country so that agroforestry can contribute to economic and environmental goods and services.

Option 2: Collaborative forest rehabilitation

Undertake forest rehabilitation in the degraded forest area by Government agencies, incorporating the opinions and collaboration of local people. Arrange partnerships with local communities, which focus on sustainable forest management with a sustainable flow of wood outputs. Requirements of such an approach would include the following components:

- A forest rehabilitation program should be developed with clear laws, policies, and operating procedures, including provisions for cost- and benefit-sharing, among the partners.
- The RFD would administer the program. New legislation and policies to guide the harvesting of wood, and the production and consumption of forest products, as well as wood imports and exports, would be developed based on broad participation and consensus. Local partners would help formulate the working processes in the field.
- Select native species for forest rehabilitation, with high survival rates, and easy maintenance by the local people. Also set up co-managed forest nurseries to produce high-quality seedlings for establishing the new commercial plantations.
- Allow timber utilization and collection of non-timber forest products from healthy natural forests, based on rural subsistence uses first, and then allowing additional timber production for industrial utilization if forest resources and sustainable capacity allow.
- The RTG should simplify the administrative procedures for logging permits and develop an effective legal framework based on sustainable logging legislation. Thailand's 1941 Forest Act and 1992 Forest Plantation Act, which control logging operations, would need to be updated to reflect the current forest situation.
- The RTG should provide favorable conditions and incentives, such as low forest-use and rental fees to small farmers on the State's degraded forests to facilitate rehabilitation, and contract small farmers to do the work. Other incentives would include exemption of royalty fees on harvested timber, and low land taxes.

REFERENCES

de Backer, M. and Openshaw, K. 1972. Thailand forest policy at present and in the future: Study of wood and resources demands during 1970-2000. Report to the Royal Thai Government, No. 10-3156. UNDP. (in Thai).

Charupatt, T. 1998. Forest situation in the past 37 years (1961-1998). Bangkok: Royal Forest Department. (in Thai).

FAO. 1998. Asia-Pacific forestry towards 2010. Report of the Asia-Pacific Forestry Sector Outlook Study. Forestry Policy and Planning Division, Rome; Regional Office for Asia and the Pacific, Bangkok.

FAO. 1999. FAO-Forestry profile-Thailand. Bangkok: FAO. Electronic Version available at

www.fao.org/infosylva.

Forestry Research Center. 1994. Analysis of forest situation before and after the "logging ban" in Thailand. Seminar Report. Bangkok: Faculty of Forestry. Kasetsart University.

Global Witness. 1995. Forests, famine and war - the key to Cambodia's future. A briefing document by Global Witness. Electronic Version available at www.oneworld.org/globalwitness/reports.

Global Witness. 1996. Cambodia, where money grows on trees. A briefing document by Global Witness. Electronic Version available at www.oneworld.org/globalwitness/reports.

Global Witness. 1997. A tug of war. The struggle to protect Cambodia's forests. A briefing document by Global Witness. Electronic Version available at www.oneworld.org/globalwitness/reports.

Green World Foundation. 1999. Thai environmental situation, B.E. 2540-2541 (1997-98). Bangkok. Amarin Printing and Publishing Co. Ltd. (in Thai).

Ingles, A. 1999. Personal communication; cited by Jantakad and Gilmour 1999.

IUCN. 1996. A review of the Forestry Sector Master Plan. World Conservation Union. Prepared for the Department of International Development Cooperation, The Ministry of Foreign Affairs of Finland.

Jantakad, P. and Gilmour, D. 1999. Forest Rehabilitation policy and practice in Thailand. Mimeograph.

Kampiraparb, C. 1993. Draft of forest policy: Would it be the legal framework. In M. Colchester and L. Lohmann. eds. *The tropical forestry action plan: what progress?* 1990. translated and edited by W. Panyakut. (in Thai).

Kashio, M. 1995. Sustainable forest management in Asia and the Pacific. In Proceedings of a Regional Expert Consortium on Implementing Sustainable Forest Management in Asia and the Pacific. December 12-15, 1995. Bangkok: Food and Agriculture Organization of the United Nations. pp. 17-31.

Nalampoon, A. 1991. FAO technical cooperation project: Rehabilitation of Slopes affected by floods in Southern Thailand. Terminal Report. Bangkok: Food and Agriculture Organization of the United Nations.

Nutalaya, P. 1991. Recent slope disaster due to heavy rainfall in Southern Thailand and their mitigative measures. Proceedings of the Second Seminar on Natural Resources Conservation and Environment of Thailand, June 15-16, 1991. Bangkok. pp. 370-395.

Phantasen, A. 1995. Forest crisis and its future alternatives. In *Thai environmental situation*, B.E. 2538 (1995): *Green world - the new awareness of human beings*. Bangkok. pp. 113-125. (in Thai).

Phonpanpua, P. 1999. National assessment of forest rehabilitation policy and practice. Paper presented at the National Seminar on Forest Rehabilitation. November 24-25, 1999. Chiang Mai. (in Thai).

PER. 1992. *The future of people and forests in Thailand after the logging ban*. Project for Ecological Recovery. Bangkok: Paap Pim Printing Co., Ltd.

RFD. 1998. Forestry statistics of Thailand. Royal Forest Department, Information Office, Bangkok.

Tangtham, N. 1996. Watershed classification: the macro land-use planning for the sustainable development of water resources. Paper presented at the International Seminar on "Advances in Water Resources Management and Wastewater Treatment Technologies." July 22-25, 1996; the Sixth Anniversary of Suranaree University of Technology, Nakorn Ratchasima.

Tantiwitayapitak, W. 1992. "Illegal logs: No answer in Prae Province." In *Before the Breathlessness of Tomorrow*. Compiled Report. Bangkok: Sarakadee Publisher. pp. 145-175. (in Thai).

TFSMP2. 1993. Thai Forestry Sector Master Plan Vol. 2, Executive Summary and Proposed Forestry Sector Policy. Ministry of Agriculture and Cooperatives. Thailand and FINNIDA.

TFSMP5. 1993. Thai Forestry Sector Master Plan Vol. 5, Subsectoral Plan for People and Forestry Environment. Ministry of Agriculture and Cooperatives. Thailand and FINNIDA.

Thailand Constitution Drafting Council. 1997. Thailand Constitution of 1997. Bangkok Co. Ltd. World Bankok. 1998. Rural development strategy report. August 1998 Mission Report. Washington D.C., U.S.A.

World Bank. 2000. Thailand environment monitor. Electronic version available at www.worldbank.or.th/environment.

Notes

¹US\$ 1 = baht (May 2001; in 1989 it was about 25 baht)

²The TAO is the elected local body responsible for all local administration and management of tambons (prefectures), replacing the local administration to some extent as part of the decentralization process.