



Deforestation in Northern Thailand: The Result of Hmong Farming Practices or Thai Development Strategies?

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Taking an historical perspective, this article explores the social, economic, and political context of deforestation and watershed degradation in the highlands of northern Thailand. After the Second World War, the Thai government began promoting the colonization of the highlands, encouraging lowland landless farmers, agribusinesses, and logging companies to colonize and deforest the highlands. In the 1980s, the Thai government declared the closure of the frontier and gave the Royal Forest Department (RFD) the role of protecting the nation's forests and reforesting the denuded areas. Based on information gathered in a Hmong village and an RFD station, the article argues not only that the RFD is unsuccessful in dealing with the problems, but that its policies ultimately lead to further deforestation, worsen the present water imbalance, and result in the harassment of the resident ethnic minorities, who are held responsible for the negative effects.

Keywords deforestation, environmental degradation, ethnic minorities, hill tribes, Hmong, *Pinus merkusii*, Royal Forest Department, slash and burn, swidden, Thailand

For thousands of years, swiddening, shifting cultivation, or slash-and-burn farming, as it is alternatively called, has been the most common farming practice (Taavitsainen, Simola, and Gronlund 1998; Kamada and Nakagoshi 1997; Pott 1993). While it has now been largely abandoned in temperate countries, it is still practiced in many tropical countries (Lambert, 1996). The reasons are various. From a socioeconomic point of view, they include the poverty of the peasants and the lack of farm land (Ochoa-Gaona 2001). From an ecological point of view, there is the fact that in tropical countries the nutrients necessary to grow a crop are in the vegetation rather than the soil, and they are released in the form of ashes when the trees are burned (Kleinman, Pimentel, and Bryant 1995). After the land is cleared, it can be cultivated for a few years without using pesticides or fertilizers. However, the land

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quickly degrades, and if the farmers cannot add fertilizers and pesticides (for example, if they are subsistence farmers who do not have the cash to buy chemical fertilizers and pesticides), the yield is soon very low and the farmers move on, clearing new land.

A large number of critics, from colonial powers (see Renard 1979) to the FAO (Brown 1997), and from academics (Ickis and Rivera 1997; Myers 1991) to the popular press (*Bangkok Post* 1999a), blame swidders for what they consider an “inefficient” use of the forest, which ultimately leads to deforestation. The alternatives proposed are “more efficient” uses, such as the export of the wood that earns a country foreign currency (Ekoko 2000), internal colonization to promote the growth of exportable cash crops, construction of dams to produce the electricity necessary for industrialization (Goodland, Juras, and Pachauri 1992), or conservation of the forest for various reasons. These can include protecting the watersheds to guarantee a constant water supply to the lowland agricultural areas and cities (Tungittiaplakorn 1995; Giambelluca et al. 2000), conserving biological diversity in the hope of finding new medicines (Plotkin 1990; 1994), and attracting tourists who can help finance conservation (Wilkie and Carpenter 1999; Gossling 1999). Some of these “more efficient” uses are not intended to protect the forest, but simply to generate higher returns than the “inefficient” swiddening. The problem of redistribution of these higher returns, and in particular how much swidders should receive as compensation for their loss of land, is rarely addressed, and when it is, it is dealt with unsatisfactorily (Peters 1998).

The negative view of swidders as destroyers of the forest is magnified in countries where they are ethnic minorities. This is the case in mainland Southeast Asia. In Burma there are over 7 million people who belong to ethnic minorities (over 14% of the total population), in Thailand approximately 800,000 people (1.3%), in Laos 2 million (46%), and in Vietnam 10 million (14%) (Kampe 1997, 15–25). Altogether, these four countries have over 50 ethnic groups, most of which are, or were until relatively recently, practicing swiddening. Many of them are said to have migrated from neighboring countries, and this is often considered a reason to deny them the right to use the forest.¹ These ethnic groups also have little, if anything, in common with the lowland populations, thus causing problems of mutual misunderstanding and dislike.

In mainland Southeast Asia, the view that swiddening is an inefficient use of the land is exacerbated by the fact that most of the ethnic groups who engage in slash and burn agriculture live in the highlands. There, they are said to destroy the watersheds, causing changes in the water regime downstream (Kampe 1997).

In this article, we review the situation in Thailand. The majority of the Thai population, 64% in 1994 (World Bank 1996), are at least part-time rice farmers and dependent on a constant supply of stream water. This constant supply is thought to be guaranteed by a mature forest in the water catchment areas, most of which are in the northern highlands (Figure 1). Deforestation is blamed for increasing sedimentation, reducing the amount of rainfall, and compromising the regular water runoff, worsening flooding during the rainy season, and drought during the dry season. This view is taken by the popular press (*Bangkok Post* 1996; 1997a; 1998a; 1999a; 2000), as well as some academics and nongovernmental organizations (NGOs) (*Bangkok Post* 1997d). These environmental problems cause very high social costs, and the Thai government is rightly concerned. In particular, the fact that rivers dry earlier compromises the ability of lowland farmers to grow a second crop after the rice that is grown during the rainy season. Deforestation is also blamed for the floods in the lowland cities during the rainy season and for drought during the dry season that forces rationing of urban water supplies.

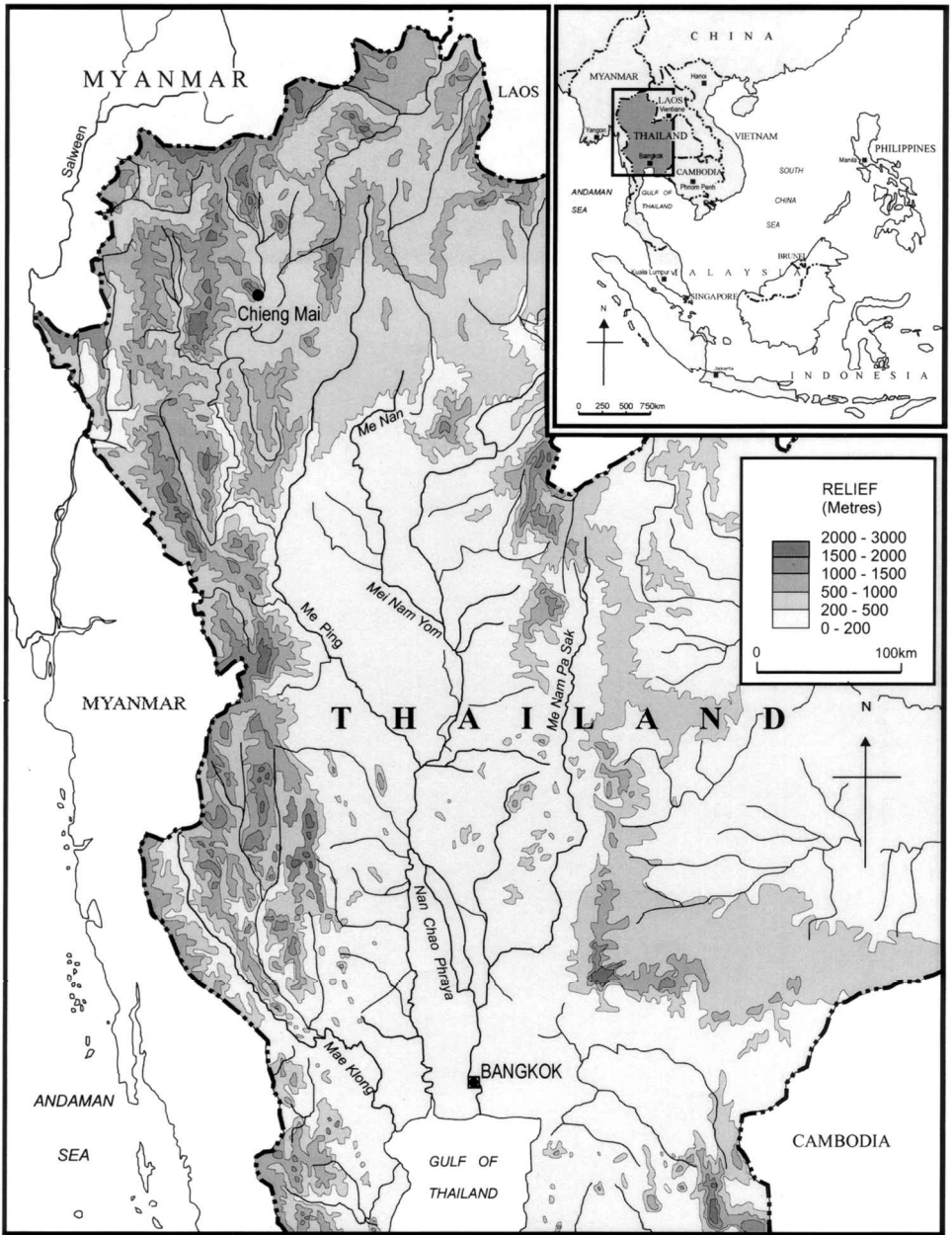


FIGURE 1 Map showing the sources of the main rivers in the highlands of northern Thailand.

In reality, the relationship between deforestation and water in the rivers is not as straight forward (Enters 1992; McKinnon 1997, 128–131; Giambelluca et al. 2000). Many factors can be responsible for the water imbalance, including road construction, which may also cause far more sedimentation problems than does shifting cultivation (McKinnon 1989).

Thus, these “foreigners” are said to negatively affect the economy of the majority “autochthonous” population, who live in the lowlands. The fact that the highlanders might have actually settled in the region before the lowlanders is obviously ignored by the latter. In spite of deforestation having been caused by a complex range of factors and a large number of groups, with the ethnic groups living in the highlands being only one of them, it is the ethnic groups that are most often blamed. In Thailand, much of the blame has been centered on one of the ethnic groups inhabiting the region, the Hmong (*Bangkok Post* 1998b; 1999a), while the accusers include the Royal Forest Department (RFD), NGOs, academics, the media, and politicians (Hongladarom 2000).

We start by reviewing the development strategy that caused deforestation, first in the lowlands and then in the highlands. We then introduce the highland population, and focus on the position of the Hmong in the midst of a majority population, and the interlinks between economy, history, and culture that catapulted the Hmong into the forefront in the current spate of accusations. We then discuss the role of the RFD as guardian and manager of the national forest. We then describe the situation in a reforestation area of the RFD, situated near a Hmong village, about 100 km east of Chiang Mai, the largest city in northern Thailand. This article is based on 12 months of fieldwork in a subdistrict, which included this Hmong village and an RFD station.

Thai Development Strategy: The Colonization of the Periphery

The signing of the Bowring treaty in 1855 forced Siam to open itself to world trade, so that large areas of the Chao Phraya basin were planted with rice. The colonization of the periphery was partly motivated by the fear of invasion by the colonial powers who had occupied the neighboring countries [Britain in Burma (Myanmar), and France in Cambodia, Laos, and Vietnam]. Until the 1930s it was still said that the problem was that of the peripheral areas being underpopulated (Zimmerman 1931, cited in Hirsch 1987), with 70% of the country covered with forests (Feeny 1988).

The colonization of the periphery progressed at a staggering speed. While in 1850 less than 960,000 hectares (ha) was planted with rice, in 1905 there were over 1.44 million ha, and in 1950 about 5.6 million ha. The expansion of rice land was at the expense of forests. Figure 2 illustrates the loss of forest as rice land increased between 1905 and 1995.

Most of this increase in rice production was for export rather than the domestic market; between 1855 and 1934 the Thai population doubled from 6 to 12 million while rice exports multiplied by 28 times (Mitchell 1998, Table C17; and Ingram 1971, 37–40). However, “only a fourth of the total land area of Thailand is suitable for agriculture” (Anderson 1993, 43). The result was that progressively less fertile land was opened to rice farming. The reduced fertility of the land was coupled with lack of investment in increased productivity, a pattern that would continue until the present. In 1974, only 10% of the total government investment were destined for agriculture, compared with 20% in Malaysia and 36% in the Philippines. The limited funds available were invested in a rail network to allow further colonization of the periphery, rather than for example irrigating the Central Plains (Hirsch 1990).

The consequence is that the productivity of land has constantly declined. Hirsch (1990) calculated that the productivity declined by 69% between 1906 and 1940, while Feeny (1982, 47) estimated it declined by 18% between 1921 and 1941. It

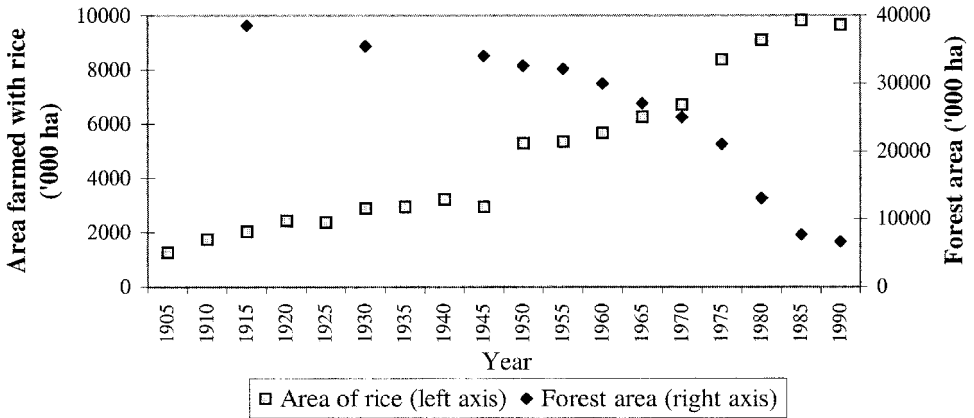


FIGURE 2 Rice land versus forest area in Thailand. Sources: Riceland from Mitchell (1998, Table C1), forest cover from Hirsch (1987, Table 3.1).

is not surprising that paddy yields per hectare became among the lowest in Asia. In 1972 they were only 42% of those in Taiwan and 29% of those in South Korea (Douglas 1983).

Highland Colonization from World War II to the 1980s

This pattern of colonization in the lowlands continued until World War II (WWII), when it was temporarily interrupted because of the disruption in world trade that resulted from the war. The end of the war brought a new political–economic environment. Increased trade in the area of influence of the United States and the competition of the two superpowers for politico-ideological hegemony had profound effects on the Thai highlands. While until WWII deforestation was caused by landless rice farmers, the new political economy involved many other groups in deforestation, this time in the highlands and with different objectives, but still with the encouragement of the government.

Cash Crop Farming

First of all, there was a surge in demand for highland cash crops, of which two were particularly important for the North: maize and soybeans. Maize in particular became a popular cash crop in the 1950s, after the introduction of Guatemalan hard maize, and was mainly grown for export for the feedstock industries of Japan and Taiwan (Hirsch 1987, 91). From 12,960 ha in 1950–1952, these two crops were grown on 1,192,160 ha in 1989–1990 (Table 1).

Both lowland farmers and agribusiness became involved in growing cash crops. Lowland landless farmers became involved because unclaimed land in the lowlands was becoming increasingly scarce. As a consequence, they had to move up into the hills to find unclaimed land to clear and farm. In the highlands it was not always possible to build paddy fields because of the lack of streams nearby, or because of the steep slope of the land. Land farmed with dry rice was half as productive, and

TABLE 1 Area Under Major Upland Crops by Region, 1950–1990 (thousands of hectares)

	1950–1952	1958–1960	1965–1967	1980–1981	1989–1990
Maize					
Center	16.32	111.84	552.48	322.56	458.56
North	2.40	10.40	25.60	745.28	824.96
Northeast	20.00	67.84	67.04	362.72	497.12
South	1.92	13.92	12.96	3.04	5.60
Total	40.80	204.00	658.08	1433.60	1786.40
Soya beans					
Center	10.88	12.32	32.16	10.56	47.36
North	10.56	8.64	9.92	109.28	367.20
Northeast	0.32	1.28	0.64	5.76	99.04
South	—	—	—	—	—
Total	21.76	22.24	42.72	126.08	513.44

Note. From Phongpaichit and Baker (1996, 54).

the harvest more variable, than that farmed with paddy rice (Kunstadter 1978). This resulted in very low incomes, exacerbated by the rice premium, a tax on the export of rice instituted in 1955. In spite of different opinions on its many consequences (reviewed by Ingram 1971, 243–261), there is widespread agreement that the rice premium decreased the price of rice, reducing the income received by Thai farmers. Without the rice premium, the farmers would have received between 23% and 85% higher prices for their rice (Hirsch 1990). Therefore, a preferred alternative by these farmers was to grow cash crops.

Lowland farmers did not have the knowledge of how to farm sustainably in the new environment. When they cleared a patch of forest using fire, this often spread, destroying a much larger area than originally intended. They neither rotated nor fallowed their fields, so that after only a few years the land became infertile. They then moved on and farmed other areas in a similar, unsustainable manner. Because of the large number of people involved, eventually large areas of forests were destroyed.

Agribusinesses, often with financial help from the government, also became involved in the production of these temperate-climate cash crops. In 1966 the government set up the Bank of Agriculture and Agricultural Co-operatives (BAAC), whose purpose was to increase the capital available to cultivators. Commercial banks were forced to lend a fixed proportion of the money deposited with them to farmers. However, “as most commercial banks found it difficult to administer loans to small and medium peasants, they preferred to lend to big agribusiness or to make deposits with BAAC, which in turn lent mainly to agribusiness or big cultivators” (Phongpaichit and Baker 1996, 60). National agribusiness firms were also encouraged with tax breaks, duty privileges, and other promotional measures (Phongpaichit and Baker 1996). The government also encouraged foreign investment. From the mid 1960s, “the returns from uplands cash crop exports played a major role in the balance of payments. The government had an interest in promoting expansion” (Phongpaichit and Baker 1996, 59). The consequence was a boom in the land taken over by these crops.

Logging

Deforestation did not take place only to increase agricultural land. Until the 1950s, logging companies concentrated on high value timber (such as teak), leaving the majority of the other trees standing, so that the forest area diminished slowly. From the 1950s demand increased for all kinds of wood, and logging expanded at a rapid rate. In 1968 the government passed a law granting logging companies 30-year concessions to cut the forest, on condition that the area be replanted. Policing was difficult and there was little interest in enforcing the law. As a consequence, some tracts were grown with commercial trees, others were transformed into agricultural land, and others were simply left bare.

Communism and Road Construction

In the 1970s another factor exacerbated deforestation in the highlands. The highland forests had become a refuge for the opponents of the military regime. Members of the Communist Party of Thailand had established bases in the forests in many provinces. These were joined by “those fleeing political repression following the massacre at Thammasat University on October 6, 1976” (Hirsch 1990, 52) and by some members of ethnic minorities (commonly referred to as “hill tribes”), most of whom were Hmong.

To deny territory to these people, the government built roads into the forests and encouraged lowland farmers to settle along these roads. While the rail network (the expansion of which stopped at the beginning of World War II) had been developed to colonize the lowlands, the road network, largely financed by the United States, was essential for colonizing the highlands. Figure 3 shows the historical development of the rail and road network.

In theory, farmers were only permitted to settle within a 1-km radius from the road (Phongpaichit and Baker 1996). However, when land there had become scarce, the farmers opened new fields further into the forest. Because every new village or field in the forest meant less land for the communist insurgents, the army tacitly welcomed the diminution of land under the control of insurgents and did nothing to stop the farmers.

Logging helped the policy of denying the forest to the insurgents. It is not surprising that the government encouraged it. From 1973 to 1978, when the campaign

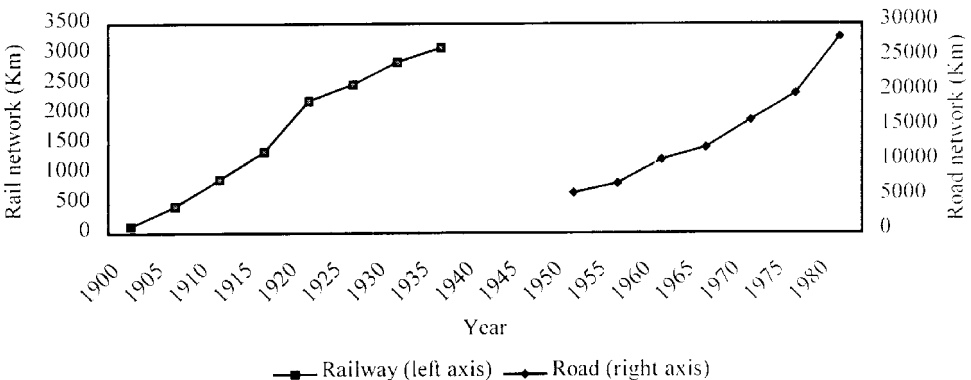


FIGURE 3 Rail and road network. Sources: railway from Mitchell (1998, Table F1), road (includes state, provincial, paved, and unpaved) from Uhlig (1984, 126).

against communist insurgents was at its peak, the forest in the north alone was being cut down at a rate of 345,600 ha/year (Phongpaichit and Baker 1996).

The Highland Populations

Before the Thai started to colonize the highlands, these areas were inhabited by 9 ethnic groups, usually living in small villages of 20 to 50 houses each, at an altitude of 600 to 1200 m above sea level (ASL). These ethnic minorities are usually divided into two groups: secondary forest and primary forest swiddeners.

Secondary forest swiddeners include the Karen and the Lua, and numbered about 285,000 people in 1987 (Tribal Research Institute 1989), and 418,000 in 1996 (Kampe 1997, 23). Secondary forest swiddening involves rotating the fields rather than moving the villages. The land is farmed for only 1 year, and left fallow for 6 to 15 years, after which it is farmed again for 1 year (Marshall 1997; Kunstadter 1978). All the fallowed land is covered with trees of different height, and the plants that grow there are utilized for a very large number of purposes: for food and medicine, as construction material, for fencing, as poison for fish, as insect repellent, for weaving and dying, and for decoration. Kunstadter (1978, 132–133) recorded 482 uses from plants that grow on Karen fallowed swiddens. Secondary forest swiddeners have lived in Thailand for several centuries. The Lua are said to have been living in Thailand longer than the Thai themselves, who migrated from China approximately 700 years ago. The Karen are usually thought to have migrated into the area about 200 years ago, but they probably arrived several centuries earlier (Ronald Renard personal communication). There is still limited migration into Thailand by Karen fleeing military repression in Burma (Delang 2000).

Primary forest swiddeners include the Hmong, Lahu, Yao, Akha, H'tin, and Lisu. They have been migrating from China to Thailand through Laos over the last 150 years, and numbered about 261,000 people in 1987 (Tribal Research Institute 1989), and 362,000 in 1996 (Kampe 1997, 23). Primary forest swiddeners practiced a more destructive form of swiddening. Rather than cultivating the land for only 1 year, they cultivated it for 3 to 4 years if they grew rice and 15–20 years if they grew opium (Keen 1978; Cooper 1984, 94). After this, the land was exhausted, and the primary forest swiddeners moved to another area and cleared another patch of primary forest. *Imperata cylindrica* took over the abandoned land. This grass reaches over 1 m high and is very thick, so that forests recover only slowly. The prevalence of this grass after the primary forest swiddeners have finished cultivating the land creates the impression that the land is destroyed. The land requires a fallow period as long as 100 years or more before it returns to forest (Keen 1983).

As long as population pressures remain low, both forms of swiddening are environmentally sound. This farming system requires neither artificial fertilizers nor pesticides, with the land being fertilized by the ashes that remain after the forest has been cleared with fire. Also, for the few years the land is farmed, weeds or insects are not a major problem, so that pesticides are not needed. The system breaks down as population pressures increase and the length of the rotation cycle is reduced. In northern Thailand this started to happen in the late 1970s.

From the 1980s: Closing the Frontier and Reforesting the Highlands

The policies described in the previous section went on until the early 1980s, when the situation changed quite suddenly. In 1981–1982, the military declared that the

insurgents had been defeated after closing the last jungle bases. The end of communism reduced the political interest of the military in pushing ahead the frontier, opening up debate on what to do with the forest. Also, Thailand started to change its development strategies with industrialization and import substitution policies, for which it needed cheap labor. By closing the frontier it created landless peasants employable by industry. So the closing of the land frontier “was not a question of expansion coming up against some kind of natural limit, although that was how it was often expressed” (Phongpaichit and Baker 1996, 81).

To help create the political climate to stop land colonization, in the early 1980s the RFD published satellite maps showing the extent of deforestation that had occurred during the previous two decades. In November 1988, a massive mudslide carried away two villages in the south, causing the death of 251 people and affecting the livelihood of over 300,000 (McKinnon 1997, 120). Logging and the planting of rubber trees that replaced the original forest above the villages were blamed for causing the mudslide (McKinnon 1997). In 1989, after fierce protest by environmental groups, the government revoked all logging licenses, outlawed the felling of trees, and declared the closure of the frontier. According to McKinnon (1997), logging was wrongly blamed, and the logging ban “was in fact imposed to provide a fillip for friends of the military who were placed in a position to take advantage of the ban by extending their logging operations not only [into Burma] but also into Cambodia and Laos” (McKinnon 1997, 125). Logging concessions were granted to Thai companies after General Chavalit, the army chief and future prime minister, had talks with the Burmese military. The sudden change from domestic production to imports is shown in Table 2. Until 1988, domestic wood production was at about 2 million m³. In 1989 this halved to less than 1 million m³, and in 1990 it halved again. However, consumption constantly increased. The difference was made up by imports, which increased almost fivefold between 1987 and 1990, to account for 88% of domestic wood consumption in 1990.

While many factors were responsible for deforestation in the highlands, it is difficult to estimate which of them had the greatest effect. However, looking for an easy scapegoat, the government and the press blamed the hill tribes. This was not new. The National Reserve Forest Act of 1964, written while the government was busy building roads to facilitate the access of the highlands and encouraging logging and the migration of lowland farmers, was accompanied by the following text:

Much of the land in the northern provinces was once densely forested hills. Over the course of years, swidden agriculture, unregulated logging, and fires have destroyed a vast area of forest, which is one of the nation's most valuable natural resources. Swidden cultivation is therefore regarded by law

TABLE 2 Domestic Wood Consumption (1000 m³)

	1987	1988	1989	1990
Domestic wood consumption	2,762.20	2,990.30	3,373.70	3,783.90
Domestic wood production	2,149.00	2,048.10	919	491.6
Imports	725.2	1,123.30	2,508.00	3,340.90
Exports	112	181.1	53.3	48.6

Note. From Royal Forest Department (2000).

as harmful to the economy of the nation and is indirectly prohibited. It is the government's policy to keep half of its territory as forest. It is believed that the destruction of forest will cause a shortage of natural water supply during the dry season. This will result in losses to the agriculture and economy of the nation. (quoted in Rerkasem and Rerkasem 1994, 10)

We have seen that deforestation was caused by a number of groups and for several reasons. However, swidden cultivation and unregulated logging were considered the only sources of forest loss. It is not denied that shifting cultivation is destructive of the forest. Feeny (1988) estimated that shifting cultivation accounted for the clearing of about 500,000 ha annually throughout Thailand. However, while both lowland Thai and highland minorities were swiddening in the highlands, it is the latter, among them especially the Hmong, who were most blamed. As a senior government official said, "Forest destruction in the northern region could chiefly be blamed on the hill tribe people. Moreover, they are also responsible for polluting water sources with residue from insecticides and other chemicals used in their farming" (quoted in Pungprasert 1989, 364). In reality, according to Anderson (1993, 43), more lowland Thai practiced shifting cultivation than did all the tribal people combined. Furthermore, only 4% of the mountains was under active cultivation at any one time. The rest was in some state of regrowth and covered with vegetation (Hoare 1985). It was also not recognized that there are different techniques of shifting cultivation, and that there was scope for improving the shifting cultivation techniques, especially of the primary forest swidders. Rather, all forms of swiddening were outlawed and bare areas were reforested. This was sometimes accompanied by the expropriation of farm land and the forced removal of villages.

The Hmong

The Hmong originally came from the basin of the Yang-tze river and were driven south by the expanding Han Chinese population (Mottin 1980). They settled in the Himalayan highlands and became one of the over 100 minority groups that lived (and still now live) in that area. The history of the Hmong became intertwined with world political economy when they became involved in opium production, after China lost the Second Opium War and encouraged the minorities living in the Himalayan highlands to grow opium (Renard 1997). Opium grows best above 1000 m ASL, where cultivable land is relatively scarce. Because of this, and the fact that opium can only be grown for up to 15–20 years on the same land, the Hmong were in regular migration. This brought them from China to Vietnam, Laos, and Thailand, where they continued to grow opium (Geddes 1976). In Thailand, opium was outlawed in 1959 (Renard 1997, 316), but the Hmong continued to grow it, albeit at a decreasing rate, until the late 1980s.

The ethnic group most often blamed for the deforestation of the highlands is the Hmong. This is partly due to their destructive farming technique, which gives the impression that they exhaust the land. If it is very difficult to estimate the total amount of land cleared and farmed in the highland, it is even more difficult to estimate the amount cleared and farmed by any one particular group. We can try to do this for the Hmong considering the total number of individuals, estimated to be 45,800 in 1960 (Young 1962, 85) and 82,356 in 1987 (Tribal Research Institute 1989), and the per capita yearly needs of land under cultivation, calculated by Lee

(1981, 335) to be 0.47 ha and by Geddes (1976, 173–175) to be 0.46 ha. Using the data published in Lee (1981), the Hmong had under cultivation 0.41% of the highlands in 1960 and would have been farming 0.74% of the highlands in 1987, had they not stopped swiddening by then. By highlands is meant all land above 600 m which in northern Thailand consists of 5.24 million ha (Shinawatra 1985, 88).

To these low percentages one has to add the land that is left fallowed, which would increase the total land area several times. However, even this would not warrant stressing blame on the Hmong for the deforestation observed in Thailand in the 1970s and 1980s. This blame is still repeated in the Thai press, over 10 years after virtually all Hmong stopped swiddening. Rather, reasons for blaming the Hmong are to be found elsewhere, in particular in their bad reputation and low status in Thai society. This probably started when some Hmong were involved in the armed struggle against the Thai military junta in the 1970s, resulting in a defamatory campaign in the Thai press. Now they are often labeled in the Thai press as drug dealers (e.g., *Bangkok Post* 1997b; 1998c; 1999a). Cultural differences do not help. While the Thai tend to relate to each other hierarchically (Harrison 1992), the Hmong have a very egalitarian society (Jacques Lemoine personal communication). As a result, they do not consider wealth and position in a hierarchical power structure when interacting with others, including high-ranking government officials. Therefore, the Thai consider the Hmong to be rude and proud. This dislike has gone as far as creating popular expressions such as “to be as dirty as a Hmong” among the Thai.

The Royal Forest Department

The RFD was established in 1896 and in 1936 was given full jurisdiction over the nation's forest (Tungittiplakorn 1995). While the Thai government encouraged logging and the settlement of the periphery, it gave the RFD the role of saving the forest. In 1951, the RFD was given the task of conserving the forest on 50% of the national territory. In 1964, the National Forest Reserves Act revised down this figure to 40%, while the Fourth Plan of 1977–1981 further revised it down to 37% (Feeny 1988). The RFD gradually mapped areas designed as “forest reserves,” and by 1985 these covered 42% of the country. By 1993 these had risen to 45% (MIDAS 1993, 10–11), a percentage that has remained stable until 1998. Since 1961, the government has created 87 national parks, 65 forest parks, 46 wildlife conservation areas, 44 no-hunting areas, 15 botanical gardens, and 53 arboretums (Royal Forest Department 2000). Most of these protected areas are in the northern highlands (Table 3).

Unfortunately, decisions on which lands were to be protected were made by demarcating areas in outdated maps rather than by surveys in the field. As a consequence, if an area is declared “forest reserve” it does not necessarily imply that

TABLE 3 Number and Area of National Forest Reserves 1998 by Region (ha)

	North	North-East	Central and East	South	Total
Number	257	353	143	468	1,221
Hectares	11,196,478	5,533,340	3,488,906	2,818,315	23,037,039

Note. From Royal Forest Department (2000).

the area is forested. Forests have constantly been shrinking. In 1930 it was estimated that 70% of the territory was covered with forests; in 1950 this had shrunk to 62%, in 1965 to 53%, in 1974 to 37%, in 1980 to 25%, and in 1986 to 15% (Hirsch 1987, Figure 1). Now it is estimated to be approximately 13%.

A very large proportion of the total cultivated land is situated in "forest reserves." MIDAS (1993) estimates that 10.72 million ha of "forest reserves," almost half of the total (last column, Table 3), is under cultivation. The social and political consequences of this mismatch between reality and what the RFD believes the situation to be are very grave. Every time the RFD redraws its maps, millions of farmers find themselves suddenly illegally farming in "forest reserves," even though they may have been living in the same area for generations. They then face relocation. Many oppose this strenuously, like a subdistrict chief quoted in the *Bangkok Post* (1999b): "Forestry officials used a fake map to force us to move from our land. We have a map from the Royal Thai Survey Department, which shows our farmland is not included in the national park. We'll fight against all forms of relocation." However, even when the RFD backs down, the threat is constantly present.

Reforestation Policies

The favorite trees used for reforestation have been *Eucalyptus* and the two fast-growing pine species *Pinus kesiya* and especially *Pinus merkusii*, both of which produce a harvestable crop in about 15 years (Anderson 1993, 46). Both these pine trees are native to northern Thailand, and naturally occur in mixed broadleaf coniferous forests at altitudes of 700 to 1000 m. However, in northern Thailand coniferous forests also include other species: the *Castanopsis*, *Lithocarpus*, and *Quercus* species of the family Fagaceae. This distinctive combination of species prompted Pendleton (1962) to call this forest type the "northern Thai pine and oak mixed forest."

The ethnic minorities living in these areas have developed several uses for the products from the trees of deciduous forests and pine and oak mixed forests. The nuts are used for food, the bark for dyeing, the resin and fruit for medicine, and the trunk as construction material (Anderson 1993, 90, 146, 166, 174). The forest is inhabited by many animals that people hunt, and is used by foraging cattle during the rainy season, when people are tending crops in their agricultural fields. It also contains many other plants and different species of grass that have traditionally played a very important role in the diet of the local population.

By creating monocropped pine plantations, the RFD is taking away land from the local population, and this has major consequences in local people's lives. The highland population makes very little use of pine plantations. The only use of *Pinus merkusii* is to splinter from the trunk pitch-filled woods, which are used to start fires. The wood is not suitable for house building because it decays very quickly. Very little lower level vegetation grows in pine plantations, and this contributes to repelling wild animals, so that the local population can neither collect plants nor hunt, with subsequent loss of protein intake. The temperatures during the dry season are higher than in deciduous forests or in pine and oak mixed forests. The lack of vegetation and the heat also prevent local people from grazing cattle in the pine plantations. Those surrounded by pine plantations are forced either to give up cattle all together, or else to leave them in a native forest at some distance. This means that the farmers have to waste a lot of time when they regularly go to the forest to look after the cattle. Plantations are also high consumers of water from the soil, so that the availability of water decreases.

These pine plantations, excluding all the other species that naturally occur in coniferous forests, are criticized by both environmentalists and ethnic minorities but continue to be created. Also, pine plantations are often planted at elevations where they do not naturally occur, altering the soil conditions and creating forests very susceptible to fire (Anderson 1993, 46). Before logging was outlawed, the rationale for creating pine forests may have been their economic value. However, the outlawing of logging did not change the preference for pines, while in many places it prevented pine plantations from being cut.

Reforestation Program in Pa Kia

The following case study illustrates the role of the Hmong in the deforestation of the highlands, and the approach followed by the RFD. It might suggest some reasons for the preference for pine plantations by the RFD, in spite of the negative ecological consequences and the economic and dietary problems these forests cause to the local population. The information is based on 12 months of fieldwork carried out in an area about 100 km from Chiang Mai. This area includes the Hmong village of Pa Kia (not its real name), where the author lived in the house of the headman. Near the Hmong village there is a RFD station that is responsible for locally enforcing the national plan of forbidding swiddening and the cutting of trees, as well as reforesting land. The area is at an altitude of about 1000 m ASL. The author interviewed local RFD personnel, Hmong, and Thai Yai, as well as Thai and Karen who live in the neighboring villages. Some of the more than 40 interviewees gave contrasting information, but they agreed on the following points.

In about 1960 the RFD arrived in the area. At that time, the mountain opposing the Hmong village of Pa Kia was "prime opium land." The Hmong had been living in the village for some years already, and some of the land surrounding the village had already been abandoned after being farmed to exhaustion. The abandoned land was covered with *Imperata cylindrica*.

The RFD set up a station near the village of Pa Kia, expropriating some of the paddy land of the Hmong to use as a nursery for its trees and promising to return the land to the Hmong when the RFD no longer needed it. It then hired lowland Thai farmers to work in the station, and planted *Pinus merkusii* on all the abandoned land and on some of the land where the Hmong were growing opium. *Pinus merkusii* is not native to the area.

To make up for the loss of land, when the RFD planted *Pinus merkusii* on farmland, the Hmong cleared some of the surrounding primary forest. As a consequence, the policies of the RFD had the effect of further decreasing the primary forest. How can one blame the Hmong, who just tried to keep their income unchanged?

When the RFD arrived, the Hmong only had small trails from the village to the fields, as they used to walk there, or go there with their horses. To reforest the areas, the RFD built roads to facilitate vehicular access. The Hmong are now using these roads for transporting the harvest of their cash crops, the most popular of which is cabbage, to the market in Chiang Mai. Cabbage is a crop that needs a lot of water, or, in the absence of water, a lot of pesticides. Therefore, during the dry season the Hmong often use large amounts of pesticides, a problem to the people downstream who use the stream water to wash clothes and for bathing (*Bangkok Post* 1997c). However, because cabbage is a heavy and bulky product, the Hmong would not be involved as much in cabbage production had the government not built the roads and

encouraged cash crops as alternatives to opium. What is also rarely mentioned is that the price of cabbage is very volatile, and every four or five seasons the price is so low that the crop is left in the fields to rot because it is not worth the price of the petrol to bring to the market. The Hmong would like to grow a different crop, too, if there were alternatives.

In spite of still being often accused of cutting the forest, many Hmong have a land surplus and leave some fields fallow while cultivating the others. After a few years trees start growing. Under normal circumstances, because of the surplus, the Hmong would let the forest regenerate, only cutting the trees when they require the land. However, since the law forbids the cutting of trees, and the RFD can take out of cultivation any land covered with trees, the Hmong cut or root out the trees on their surplus land when they are still very small, as this is not against the law. In this case, it seems that the reason why the native forest does not regenerate is the national policy of outlawing swiddening.

The Thai who helped the RFD to plant the pine trees only worked there for a few years. However, the pine plantations require considerable maintenance, including weeding to reduce the risk of fire, stopping the fires that do spread during the long and hot dry season, and replanting pine trees where they have burned. All these activities need a ready workforce. However, this is not supplied by the Hmong, who do not like to work for a wage. The cultural refrain against working for a wage is exemplified by the fact that the Hmong word for “employee” is the same as that for “slave” or “servant.” All laborers at the Pa Kia RFD station are now Thai Yai. The Thai Yai are the Burmese cousins of the Thai. They speak Thai, albeit with an accent, and can pass for Thai on all occasions. The only difference is that they are not Thai citizens, and hence they work illegally for the RFD.

The Thai Yai

According to the local Hmong and Thai Yai interviewed, the Thai Yai were hired in Burma by RFD officials who went to Burma, spread the word that they were looking for people, and brought them to the Pa Kia station. Thirty families were hired in Burma in June 1999. In November 1999, at the time of the fieldwork, only 20 were left. The other 10 had left Pa Kia and were working illegally in Chiang Mai.

Wages in Chiang Mai can be very low, as little as 1500 Baht (about US\$35) a month, with free food and accommodation. However, this is still higher than in the RFD station. In spite of having being promised wages of 75 Baht (less than US\$2) a day, below the legal minimum wage in Chiang Mai province, the Thai Yai had never been paid. The workers had therefore worked for free for the last 5 months. As they did not have money to pay for food, the RFD officials had been selling them rice on credit for the last 5 months, at a price higher than in the local shop, and with interest. As a consequence, the Thai Yai were not only working for free, but also heavily indebted. The reason given by the RFD official for not paying them was that the officials had not yet received the money from Bangkok. The reason given by the Thai Yai and the local Hmong was that the RFD officials were keeping the money for themselves. Because the Thai Yai are illegal workers, they do not have any legal means to force the RFD officials to pay them. Also, by complaining they face the risk of being deported to Burma, a risk nobody is willing to take.

To the Thai Yai, the advantage of remaining in Pa Kia was that they did not have to fear being arrested by the police, unlike if they worked in Chiang Mai or

other cities. As they were not paid by the RFD, they tried to make an income in other ways, working part-time for the local Hmong, or for Thai who rented land from the Hmong. There is no discrimination for agricultural work locally, with the Thai Yai earning 80 to 100 Baht (US\$2 to 2.50) a day, like everybody else.

The local Hmong did not seem to mind the presence of the Thai Yai, because they know of the persecution people face in Burma. However, they were resentful of the RFD officials who have destroyed the local environment by planting *Pinus merkusii*. Nor had the RFD returned the land it took from the Hmong for the tree nursery. Instead, it was now rented to some of the Thai Yai.

The RFD has indeed much power. Since all land in the region is considered as protected, and therefore under its jurisdiction, RFD officials have the power to arrest virtually anybody, accusing the person of cutting trees. For this reason, nobody wants to come into conflict with the RFD. On the other hand, the RFD officials too do not want to come into conflict with the Hmong, who have a reputation of being proud people who do not let others "step on their toes." The situation is rather one of a delicate equilibrium, with both parties careful not to cross the line.

Conclusion

We have seen that deforestation in the Thai highlands was caused by several factors within the framework of the national development strategy pursued by the Thai government. From the end of WWII until the 1980s the Thai government encouraged lowland farmers, agribusinesses, and logging companies to expand in the highlands, in the name of national development, and as a means to deny territory to the communists. In the 1980s the Thai government declared the closure of the frontier because it attempted to change its strategy for national development. Not ready to take responsibility for its actions, it blamed the highland ethnic groups (among them especially the Hmong) for the deforestation in the highlands. These groups were partly responsible for the deforestation, but not as much as the Thai press and the RFD maintain. The Hmong are still called "mountain nomads" in the popular press (*Bangkok Post* 1997d), even though they stopped migrating 20 years ago.

The approach used by Thailand to tackle reforestation begins with two misconceptions: that the highland populations have caused deforestation and are "enemies" of the forest, and that swiddening causes water imbalance. The solution of the Thai government is to outlaw swiddening, sometimes displace hill tribe villages, and whenever possible plant pine trees on the land that is left fallowed. Because these solutions are the result of a misunderstanding of the causes of the problems, they do not address these causes and are counterproductive. While the hill tribes look after native forests that surrounded their villages—for example by stopping wild fires because they use many of the products they can find there—they have no reason to look after pine plantations. As a consequence, the RFD has to employ salaried workers to stop the fires and replant the area, which increases the costs of reforestation but has the advantage that the staff can retain some of the funds. Constantly replanting trees also contributes to drying the watersheds, which can then be blamed on the hill tribes, justifying their removal and the creation of more pine plantations.

The official reason for reforestation is to protect the watersheds while taking into consideration the "commercial values of the wood" (Royal Project 1995, 25). Unfortunately, these two objectives are hardly compatible, so that one has to take

precedence. Apparently, the commercial value of the wood is the first consideration when choosing what trees to plant, even in watershed areas. However, because the trees are usually no longer harvested, the negative consequences on the ecology of a commercial tree like *Pinus merkusii* are no longer offset by its positive commercial benefits. Since logging has been outlawed, there is no longer any reason for taking into consideration the commercial value of the wood. It seems that recreating a diverse native forest would be a better alternative, for the ecology, for the economy of the country, and for the local people.

The situation is very complicated, and there are several issues that prevent the problem of deforestation from being solved: the power structure in Thai society, which prevents those at the bottom of the scale, more familiar with the local problems, from having any impact on the policies pursued; the poor reputation of the Hmong, and the mutual mistrust of the Hmong and the RFD officials; the lack of budget for the RFD, insufficient to carry out its duties; the low wages of RFD officials, which prompt them to engage in petty corruption; the fact that government departments are competing against each other; and the chronic lack of long-term planning. All these problems, some deeply entrenched in Thai society, prevent any technical solution from succeeding.

This case study of Thailand highlights the difficulties involved in finding a solution to the problem of deforestation. Often the wrong people are blamed for it—the minorities and the landless farmers without a voice in the national political arena or the national press. The wider political reasons underlying deforestation—first of all, why there are landless farmers in the first place—are ignored, while the roles of logging, agribusiness, or livestock companies, often owned by national politicians or people close to them, are minimized. This misconception of the problem is so entrenched in the discourses of deforestation, in the press, among forestry officials, and in international organizations, that in most circles it has become an aphorism. It is this misconception, and the underlying political and economic reasons, that prevent those responsible from finding a solution to deforestation.

Note

1. Elarat Charndraprasert, director general of the Department of Public Welfare, addressing the workshop “Information Exchange on Development Experiences with Highland People,” organized by UNDP in Chiang Mai, 18–20 November 1997.

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