13 INDIGENOUS KNOWLEDGE AND THE USE OF FALLOW FORESTS IN NORTHERN THAILAND

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ABSTRACT

Fallow forests, which have been generated by shifting cultivation, cover large parts of the highlands of Northern Thailand. This paper presents the case study of a village, in which a particularly sustainable form of shifting cultivation was practiced until the early 1990s. Secondary forests, which regenerate on the fallow swiddens of this village were found to be surprisingly rich in tree species and complex with respect to stand structure. Most of the species occurring in these forests are useful within the context of a traditional subsistence-oriented economy and there exists an extensive indigenous knowledge concerning the potential uses of these trees. Swidden cultivation is discouraged by authorities in Thailand and is increasingly being replaced by permanent farming. This change of land use causes a reduction in the area covered by fallow forests with negative consequences for the biodiversity and landscape ecology of the concerned region. In this paper, the argument will be put forward that fallow forests, which are ecologically more valuable than is usually supposed, could also play the role of an economic resource in the more commercially oriented economy that is currently developing in Northern Thailand. Indigenous management practices and indigenous knowledge of tree species could be the basis for devising land use systems for the utilisation of these fallow forests. Such a development has not been possible until recently within a political framework, which did not provide for the legal use of forests by village communities. The introduction of community forestry legislation, however, may provide a basis for the management of fallow forests with the aid of indigenous knowledge.

13.1 INTRODUCTION

The vegetation cover of Northern Thailand consists to a large extent of secondary vegetation formations, which have originated from swidden cultivation. These secondary formations are commonly regarded as degraded vegetation, i.e. poor in biodiversity and with almost no economic value. This view does not take into account that swidden cultivation is complex and that secondary vegetation formations can be significantly different from each other as a result of variations in site conditions and swiddening techniques.

Swidden cultivation in the northern highlands is practiced mainly by ethnic minorities, who have been migrating into Northern Thailand for centuries. Two main categories can be distinguished: primary forest swiddeners and secondary forest swiddeners (Grandstaff, 1980). Primary forest swiddeners have been migrating into Northern Thailand from the middle of the 19th century onwards, and are mainly found at elevations above 1 000 m, where they practice an intensive type of swidden cultivation with long cultivation periods of several years. This type of swidden cultivation has resulted in soil and vegetation degradation. Secondary forest swiddeners, on the other hand, have occupied an intermediate altitude between 600 and 1 000 m for several hundreds of years. Up until the present they have practiced an extensive and rotational type of swidden cultivation with short cultivation periods of only one to two years, and long fallow periods of up to 15 years.

Secondary forests or, more correctly, fallow forests regenerate rapidly on fallow swiddens and are again cleared for the establishment of new swiddens after the end of the fallow period. Research has provided evidence that these fallow forests are complex in terms of species composition and stand structure, and play an important role in the traditional economy of secondary forests swiddeners; furthermore that this complexity is related to indigenous management practices and knowledge about the properties of plant species in secondary vegetation formations (Kunstadter, 1978b; Kunstadter et al., 1978; Sabhasri, 1978; Schmidt-Vogt, 1999).

Highland development, which has been an agent of change in Northern Thailand since the early 1960s, causes the replacement of subsistence-oriented land use systems by commercial crop production and of swidden cultivation by permanent farming (Rerkasem and Rerkasem, 1994). Fallow forests are losing their economic function both as a reservoir of nutrients for the maintenance of swidden cultivation, and as a storehouse for materials used within the context of traditional economies. This kind of land use change is not considered to be entirely beneficial, mainly because of the ecological consequences of chemical input and loss of diversity, but also because of the economic uncertainties associated with the cultivation of cash crops (Sutthi, 1989).

This paper discusses an alternative option for land use change, which includes fallow forests as a resource within the context of a more commercially oriented economy, achieved by using indigenous knowledge and management systems. The Lawa, a small Mon-Khmer speaking ethnic group with a population of not more than 107 346 in 1995 (Schliesinger, 2000) has been living in the highlands of Northern Thailand for at least 600 years. They belong in the category of secondary forest swiddeners and have become famous for a particularly sustainable type of swidden cultivation (Kunstadter, 1974; 1978a; Schmidt-Vogt, 1995; 1997a; 1999).

13.2 CASE STUDY: FALLOW FORESTS IN THE SWIDDENING ECONOMY OF BAN TUN

13.2.1 Site and Methods

Ban Tun is located at an altitude of 1 100 m about 30 km to the NE of the town of Mae Sariang near the Thai-Myanmar border (Figure 13.1). In the early 1990s, when fieldwork began, Ban Tun was one of the last Lawa villages, where the traditional system of swidden cultivation was still in practice. It has been preserved because the half the population left after a fire in 1988, and the village therefore retained a favourable balance of population and available cultivable area. In 1992, 177 people in 27 households had access to 800 ha of cultivable land, including irrigated land and fallow land, which was sufficient to maintain the traditional swiddening system with a 15 - 17 year long fallow period.

The study of swidden farming techniques and the ecology and ethnobotany of secondary forests was carried out in close cooperation with the people of Ban Tun village. Living in the village and participating in the communal activities of villagers was an integral part of this research project. Fieldwork consisted in vegetation studies, observations of land use techniques, and inquiries concerning plant knowledge and plant use.

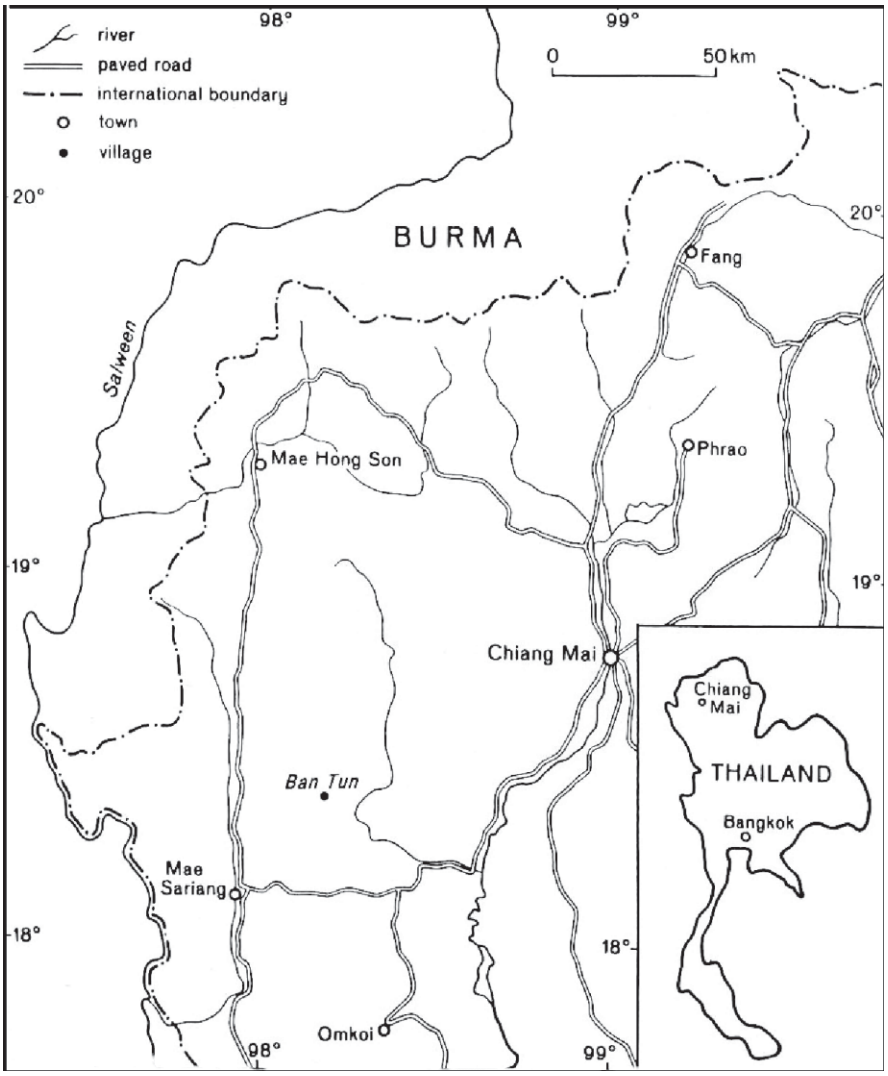


Figure 13.1: Location of Ban Tun.

Vegetation analysis was carried out by a combination of two methods. The early and intermediate stages of secondary succession, which are mainly composed of herbaceous plants, were studied by the releve sampling method of Braun-Blanquet (Mueller-Dombois and Ellenberg, 1974), secondary forests by the method of stand structure analysis - a quantitative method, which supplements floristic information with measurements of the position and dimensions of trees in a transect (Schmidt-Vogt, 1997b). Information on plants and plant use was provided by the villagers and especially by the study's main informant Khun Un-Khanyam, the former headman and village priest.

13.2.2 Swidden management

In Ban Tun, according to Lawa custom, one large swidden area of about 60 ha is prepared every year at around the beginning of February by the village community for the cultivation of dry rice. A unique feature of swiddening in the Lawa tradition is that new swiddens are prepared not by clearing the forest, but by a process, more correctly referred to as thinning. This entails a gender division of labour: the women cut the brush and small trees with a diameter of 8 - 12 cm (photo 3, appendix III), but leave the trees with a larger diameter standing, which are then pruned by the men to prevent shading of the future crop. Sometimes they remove the entire foliage, but more often a few branches are left at the top to ensure that the tree survives. These remnant trees or relict emergents are a conspicuous feature of the cultural landscape of secondary forests swiddeners and especially of the Lawa (photo 4, appendix III). The average number of relict emergents on the swiddens of Ban Tun is 244 per ha. When the cutting of trees is finished, the branches and foliage are left on the ground to dry until they are ready for burning.

Burning of the swiddens is carried out in two stages. The first burn consumes foliage and branches but leaves behind charred logs, which are collected into piles and burned separately about two weeks later. Rice planting starts with the onset of the first monsoon rains in April. At the same time, secondary succession is also setting in with the emergence of weeds and woody regrowth from the stumps that have been left on the fields. Weeds grow so plentifully that weeding must be carried out about three times each cropping season. At the time of rice harvesting, the ground is already covered with a dense carpet of weeds and resprouting woody plants.

One year later, the most successful weed species - mostly exotics such as Chromolaena odorata - have achieved dominance and form the upper layer of a two meter tall and almost impenetrable tangle of vegetation. This successional stage persists for about three to four years, and is then gradually replaced by a scrub stage, which develops out of the growth of coppice shoots and root suckers. During the fifth and sixth year, the scrub stage passes on to the secondary forest stage, and by 12-15 years is considered ready to be cut for a new round of swiddening.

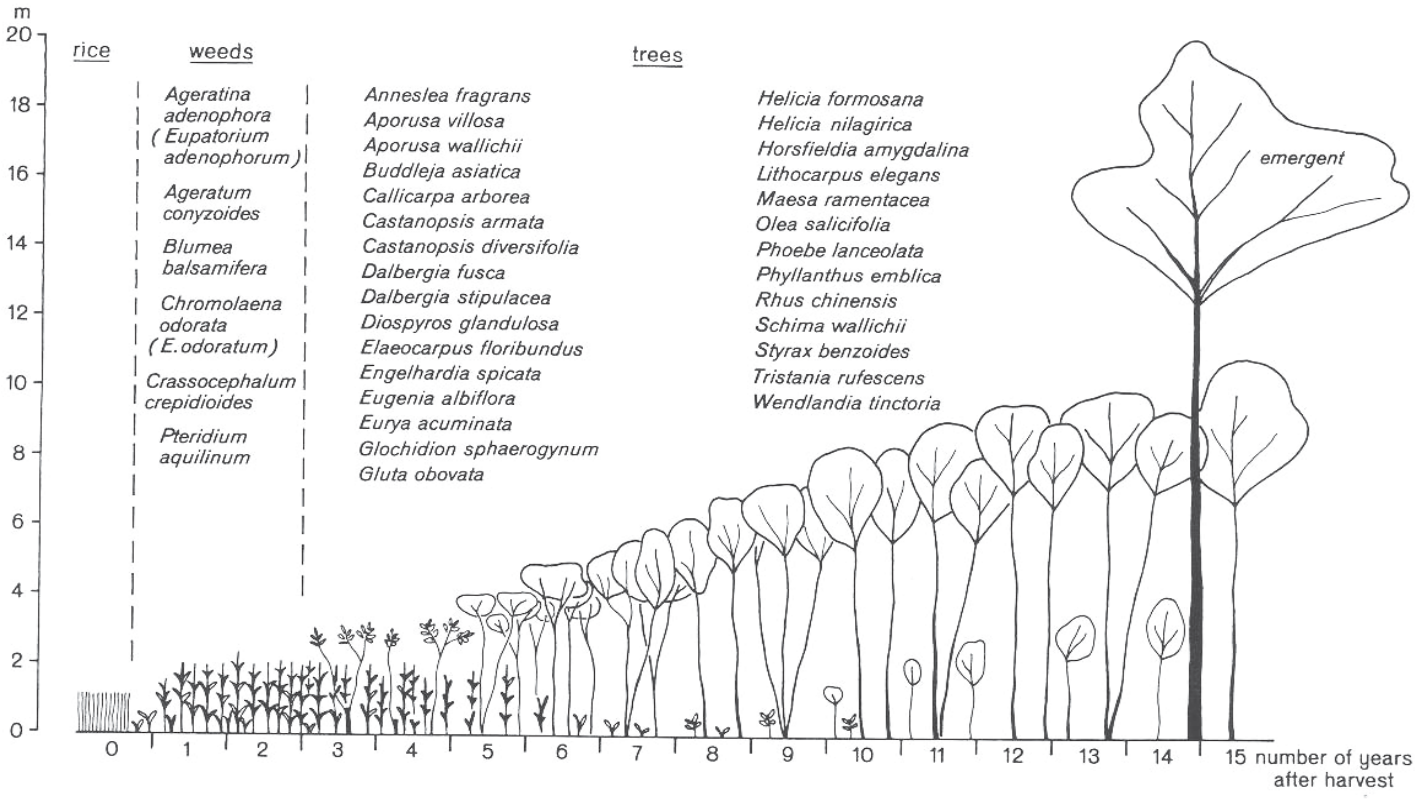
13.2.3 Characteristics of swidden forest

Stands at this stage are structurally complex (Figure 13.2). Three types of trees forming three distinct layers can be distinguished:

- relict emergents from the previous stand with a height of more than 10 m in the uppermost layer;
- coppices of trees felled in the last swiddening cycle with a height of 8-10 m in the main canopy;
- seedlings and saplings, which have developed under the canopy of the coppicing trees, with a height of 4 m or less.

The fallow forests of Ban Tun are extremely dense and contain 2 096 trees/ha on the average. Basal area is variable depending on the number of relict emergents; it averages 27.4 m^2/ha, but can be as high as 54.0 m^2/ha, similar to the value of old growth forests in the same area.

Figure 13.2: Successional sequence on fallows at Ban Tun with frequently occurring weed and tree species.



Such forests are also rich in tree species, not dominated by one or a small number of species as is often the case in tropical secondary forests (Brown and Lugo, 1990; Richards, 1996). The most species-rich stands contain more than 30 species / 500m^2 in the tree layer alone, and the total number of species in the tree layer is 78. The complex mixture of tree species in these forest stands can be explained by the location of the swidden fields in the transition zone (above 1000 m), where montane forests are penetrated by floristic elements from forest types of lower elevations.

Forest stands are characterised by a rapid increase in wood volume due to the growth of coppices. If these forests remain undisturbed, further forest development will consist mainly in the maturation of coppicing trees, and the filling in of gaps in the canopy by younger trees.

Species richness, structural complexity, and rapid increase in wood volume can be related to indigenous management practices in the following manner:

- the preservation of stumps and rootstocks as a source for coppices ensures the rapid development of a woody fallow;
- the preservation of relict emergents enhances the structural complexity of the emerging fallow forests;
- long fallow periods permit the development of trees from both coppices and seeds and therefore contribute to species richness.

13.2.4 Economic value of the fallow forests

In addition to serving as a source of nutrients for the regeneration of soil fertility, fallow forests are a source of timber and non-timber products useful in traditional subsistence-oriented society. Villagers described 49 of the 78 tree species as useful, most of them for two or three different purposes (see Figure 13.3). The wood of trees from fallow forests is mainly used as construction timber and firewood, and for the making of fences and tools. Fallow forests are also an important source of food, mainly of fruit. The land on which swiddening is practiced and on which fallow forests regenerate is regarded as common property and individual plots are allocated to households by the village priest only during the cultivation period. Fallow forests are not managed and there are no regulations concerning the use of these forests for grazing or for the extraction of wood or other forest products.

13.3 DISCUSSION

13.3.1 Dynamics of highland development in Northern Thailand

Despite the existence of sustainable types of swidden cultivation, such as the one practiced by the Lawa, government authorities in Thailand discourage this form of land use and promote the conversion of swidden land to permanently cultivated farmland or to (ecologically impoverished) pine plantations.

Until the 1970s, the main reason for suppressing swidden cultivation was the concern about opium production and drug trafficking. An emphasis on conservation and watershed protection has emerged in the 1980s.

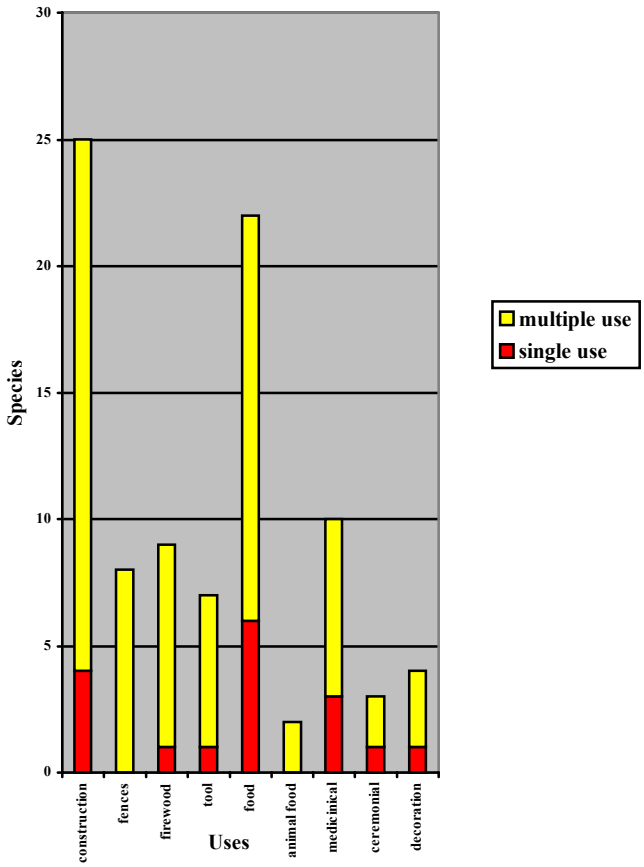


Figure 13.3: Uses of fallow forest trees.

The government is in a strong position to enforce its policies due to the Land Code of 1954, which stipulates that all mountain land and land within 40 m of the foot of a mountain must not be damaged, destroyed or taken possession of. The hill tribe population therefore has no legal right to the land in the mountains and even though their land use has to a large extent been tolerated, it is unlikely that they will be granted land tenure in the future (Rerkasem and Rerkasem, 1994).

The extension of permanent farming has been further enhanced by the construction of a road network, which was started in the 1960s and which provides access for highland farmers to markets in the lowlands. Many farmers have changed their land use from swidden farming for subsistence purposes to permanent farming for the production of temperate cash crops, for which there is a market in the lowlands. However farmers can experience economic problems due to market instabilities and price fluctuations. These changes are often accompanied by soil degradation, water pollution by herbicides and pesticides, and the overall reduction of forest cover due to the replacement of fallow forests by permanent farmland.

13.3.2 Fallow forest management: an alternative option

The course of development that is currently taking place in the highlands of Northern Thailand is aimed at intensifying the agricultural component of swidden agriculture. This development results in the loss of the close relationship between forests and agriculture, and of the need for indigenous knowledge of fallow forests. The most obviously negative consequence of this development, from an ecological point of view, is the reduction of the forest cover because there is no longer a subsistence need for fallow forests.

As an alternative option, these forests could be preserved and made useful at the same time by land use systems that are capable of utilising these forests within the context of a commercial economy. Indigenous knowledge of tree species and of management practices can be an important asset in the development of such management systems. Sabhasri, who in the 1970s carried out one of the first surveys of secondary vegetation on fallow swiddens of the Lawa, proposed that the swidden farming system of the Lawa be transformed into a forest management system for the production of firewood (Sabhasri, 1978). At that time the major obstacles in the way of such a development were the unresolved issue of landownership of the minorities and the lack of infrastructure for the transport of firewood. Landownership by minorities is still a contested issue, but the transport situation has improved significantly so that there are better opportunities today for marketing forest products than there were 20 years ago.

The sale of firewood is only one possibility among others for obtaining a cash income from forest products. The secondary forests of Ban Tun contain a number of tree species which are suitable for commercial utilisation. *Styrax benzoides*, for instance, which is a common fallow forest species, produces an aromatic resin that can be sold in markets. In Laos, a closely related tree species, *Styrax tonkinensis*, is cultivated for this purpose in agroforestry systems.

This leads to the question of which land use systems could be suitable for the commercial use of trees in secondary forests. There are several possibilities:

- the conversion of swidden farming systems to agroforestry systems, which could be similar in structure to the swidden fields with relict emergents of the Lawa;
- the supplementation of swidden farming with the management of fallow forests;
- the combination of swidden farming with forest management according to the taungya principle.

Fallow forests could be managed for the production of small timber, firewood, charcoal, and a wide variety of non-timber forest products. The ethnobotanical knowledge of swidden farmers is the basis for identifying the economic potential of these forests. It must be supplemented, however, by a study into the marketability of tree species in fallow forests. Forest management could be based on the principle of thinning with which the Lawa are already familiar and be supplemented by the practice of enrichment planting.

A severely limiting factor is the attitude of the Forest Service towards swidden farmers and towards the local use of forests in general. Most of the forests in Northern Thailand are government forests, which are administered directly by the Forest Service. This applies also to forests used by swidden farmers. Forest policy is generally aimed at a more effective control of forest land through the Forest Service and therefore at diminishing the control of local groups and local institutions. A law concerning the introduction of community forestry could change this situation, but is still pending. Once it has been passed, it could provide a basis for the establishment of fallow forest management through local communities. Administrative problems are therefore an important factor that must be kept in mind when discussing the possibilities of development with the aid of indigenous knowledge.

13.4 CONCLUSIONS

Secondary forests regenerating on fallows of rotational swiddening systems were found to be valuable because of their plant diversity and because of their vital role in the traditional subsistence economy. The replacement of these subsistence-oriented swiddening systems by more commercially oriented systems based on permanent fields means that fallow forests lose their economic significance and may also lose their proportional share in the vegetation cover of Northern Thailand. The emerging modern land use systems have been criticised for their substantial input requirements as well as for the income instabilities associated with the cultivation of cash crops in monocultures. Diversification of cropping systems therefore must be a key issue of highland development in Northern Thailand.

The argument of this paper is that both conservation of the ecologically valuable fallow forests and broadening of the resource base of village economies can be achieved by developing the economic potential of fallow forests or of fallow forest trees within the context of a commercial economy. Utilisation of these forests could be based on the extant indigenous knowledge concerning the properties of plant species occurring in secondary formations as well as on certain elements of the traditional management systems.

Important research requirements for such a development are inventories of traditional knowledge, which in some areas have already been carried out; studies into the marketability of fallow forest products, which are still missing; and research with farmers into developing their own priorities in a local context. The most important requirement is a legal framework for forest management by local communities; such community forestry legislation is under debate in Thailand.

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