

# **The identification and application of communication tools for participatory land use planning at sub-district level in the highlands of northern Thailand<sup>1</sup>**

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## **Abstract**

The aim of this paper is to present a tool for land use planning in the project areas of the Thai-German Highland Development Programme (TG-HDP) in northern Thailand in the form of digitised land use maps at village and sub-district (Tambon) level in Mae Hong Son province. There are conflicting interests between the nearly 800,000 hilltribe people in northern Thailand and the government, which has declared that most of them live in forest reserves under the watershed classification category 1A, according to which they are neither allowed to settle in these areas nor practice any agriculture or use forest resources for subsistence. Yet hilltribe communities have practised their various forms of shifting cultivation for centuries in a sustainable way and it is important to have their types of land management accepted by the central government.

## **1 The problem background**

### *1.1 General situation*

The highlands of northern Thailand face a rapidly increasing change process from different types of shifting cultivation to permanent agriculture (Ratanasorn and Puginier, 1997), accompanied by a progressive integration of highlanders of different ethnic origin into mainstream Thai society. This is accompanied by a rapid hilltribe population increase, which during the last 30 years has nearly quadrupled from 217,000 in 1960 (Young, 1962) to 800,000 (NESDB, 1993) due to population growth and migration from mainly Burma. As a

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result of this increase, more marginal forest is encroached upon, fallow periods are decreasing and deforestation as well as forest degradation are taking place, such that currently only about 26% of the country are under forest cover (TFSMP vol. 2, 1993). This development causes ecological imbalances in the highlands and reduces its watershed functions.

In reaction to this land degradation the government has banned commercial logging in 1989 and has declared that under the National Forest Policy 40% of the country are to become forest again, of which 25% are to be protected forests and 15% production forests (Amornsanguansin, 1992). The implementation of this policy by means of a watershed classification which places the entire project area of this study in the highest order of protection 1A, thus banning all settlement and agriculture, places a lot of stress on the hilltribes who live in the forests traditionally and farm there. This creates a strong dilemma between the Ministry of Agriculture and Cooperatives that seeks to protect the highlands and the Ministry of Interior, which aims to register hilltribe villages with permanent settlement and village boundaries. This dilemma or “policy vacuum” has led more and more projects in Thailand to employ participatory approaches to natural resource management, and village land use maps as well as topographic models are increasingly used to show that hilltribes protect their environment while adapting to permanent farming.

## *1.2 Traditional Shifting Cultivation*

When examining the problem situation it is important to take a brief look at traditional shifting cultivation in order to appreciate that a change to permanent agriculture is not that easy. The traditional agricultural systems of highlanders from different ethnic origins are based on shifting cultivation, with upland rice and maize on sloping land, paddy rice production in the valleys and poppy, as well as extensive livestock production for the farmers' cash demand. Shifting cultivation was

accompanied by shifting settlement, so that there was no permanent village location or boundary, as hilltribes migrated with the availability of land. However, these systems and settlement structures differ, due to ethnic origin and cultural background. The two main types of shifting cultivation will be used as an example, namely **Pioneer Swiddening** in Nam Lang practised by Lahu and Lisu hilltribes as well as **Rotational Swiddening** by the Karen hilltribe (see table 1).

**Table 1: Characterisation of Pioneer and Rotational Swiddening Systems**

<b>Pioneer Swiddening</b>	<b>Rotational Swiddening</b>
After burning, an area is cultivated for 4-5 years until soil fertility declines. Then a new area will be chosen. An area will not be cultivated again, as there is no cycle.	After burning, an area is cultivated for 1 year only and left to fallow for 8-10 years before farmers return to carry out a cyclical cultivation pattern.
Trees are cut and uprooted to allow tillage, so tree regrowth is not possible and fields are later dominated by <i>Imperata cylindrica</i> grass.	Trees are cut at breast height, but not uprooted, to allow regrowth, mulching, fodder and seed production.
Rice only is grown in the rainy season followed by opium, no intercropping.	There is mixed cropping on the cleared areas: rice with vegetables and tubers, but no opium cultivation.
After 1-3 years the rice yields decrease and cash crops are grown until fields are abandoned.	Cash crops are intercropped with rice in the same area.
Little grouping of households for joint area cultivation, very scattered fields.	Several households grow crops in a joint area, there are a few clusters of large fields.

## **2 Research objective**

As laws alone do not protect the forests, highland development policy therefore shifted towards participatory approaches such as the Community Based Land Use Planning and Local Watershed

Management (CLM) of the Thai-German Highland Development Programme (TG-HDP) in 1990 (Anonymous, 1998). In order to protect forests, while at the same time supporting hilltribes in the transition towards permanent agriculture and residence, a participatory process of classification and mapping of natural resources at village level was initiated in 3 villages (30 by 1998) of Mae Hong Son province. The aim was an improved sustainable use of land, water and forests, a rehabilitation of watershed catchment areas and an intensified agricultural production on suitable land. One of the most useful visualisation tools became three-dimensional topographic models on a scale of 1:5000 in order to demarcate village areas including outer user boundaries for village registration, permanent cultivation areas, community forest areas for use and conservation/watershed forest areas for environmental protection.

In order to go beyond the demarcation of land types and to carry this process up from village level to higher planning, the research project was initiated to combine CLM with GIS. The advantages and risks of participatory GIS for hilltribe farmers as the primary stakeholders and for government agencies are manifold (Abbot et al., 1998). Yet for future planning with government offices it was important to create:

- Durable and easily transportable maps recognised by all parties;
- Aggregated information at sub-district level for regional planning;
- A tool that allows regular updating of land use data for the rapidly changing land use in the highlands.

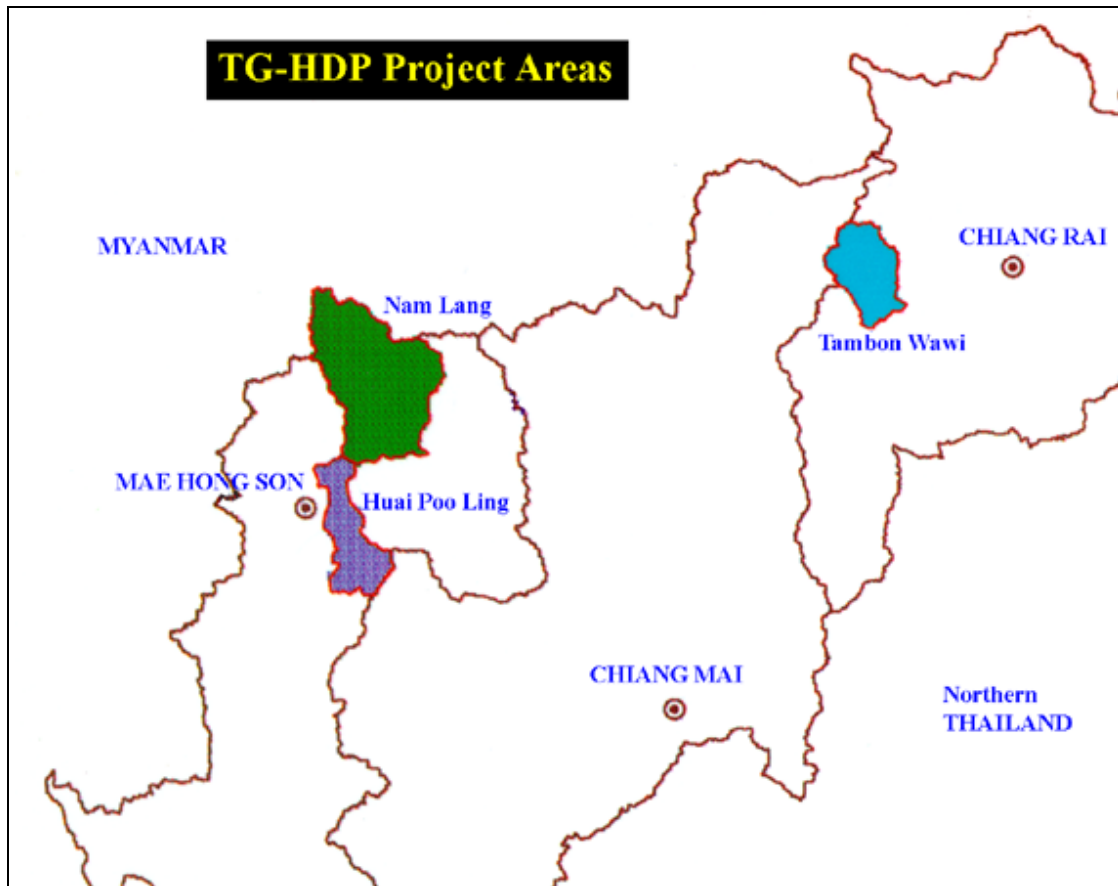
### **3 Hypothesis**

After years of exposure to project driven land use mapping and planning, hilltribe farmers are aware and want to decide their own future land use.

## 4 Methodology

The research was conducted in two of the three project areas of the Thai-German Highland Development Programme (TG-HDP), namely Nam Lang (renamed Pang Ma Pha when upgraded to a district in 1996) and Huai Poo Ling (see diagram 1). One village of each farming system is shown here and an aggregated map at sub-district (Tambon in Thai) level is displayed. It is important to note that what villagers displayed in the maps is based on their own natural resource management system that was visualised with the help of TG-HDP village extension workers, keeping in mind the national target for forest cover of 40%. The maps show a mixture of traditional shifting cultivation and an adaptation towards permanent farming.

The hand-drawn village maps were digitised using a hand digitiser into the GIS programme ArcInfo and then converted into maps using the map-drawing programme ArcView 3. Contour lines were obtained from the Remote Sensing Centre of Chiang Mai University to give a three-dimensional perspective, with 20 m intervals for the village maps and 100 m intervals at Sub-District level. The roads and streams, as well as the sub-district boundaries for Huai Poo Ling were obtained from the Survey section of the Northern Narcotics Control Office (NNCO) in digitised form and overlaid with the remaining data. The different land categories were then colour coded using the same colours as on village maps. Maps were presented using the Universal Transverse Mercator (UTM) coordinates as reference points in steps of 1 km<sup>2</sup> for village maps and 5 km<sup>2</sup> for the Sub-District map. For the area calculations the corresponding polygons were added up. The same procedure was carried out at Sub-District level for Huai Poo Ling, and the data for the 10 target villages aggregated into one map.



**Diagram 1: TG-HDP Project Areas in Northern Thailand**

Once the maps had been digitised and printed, they were taken back to villages for modifications or corrections, with the aim to later distribute them in plastified A1 size to villages for longer term use. With the closure of the TG-HDP it is likely that the models will not be updated and will disintegrate over time, and the hand drawn maps may suffer the same fate. Digitised printouts can also be distributed to other agencies and can be taken to network or district meetings to discuss land use issues. Maps were also distributed to district forest officials to facilitate their work in land use monitoring. The data and the GIS software were then transferred to the Survey Section of NNCO as well as to the ICRAF office in Chiang Mai that collects this data for the whole north of Thailand.

## 5 Results

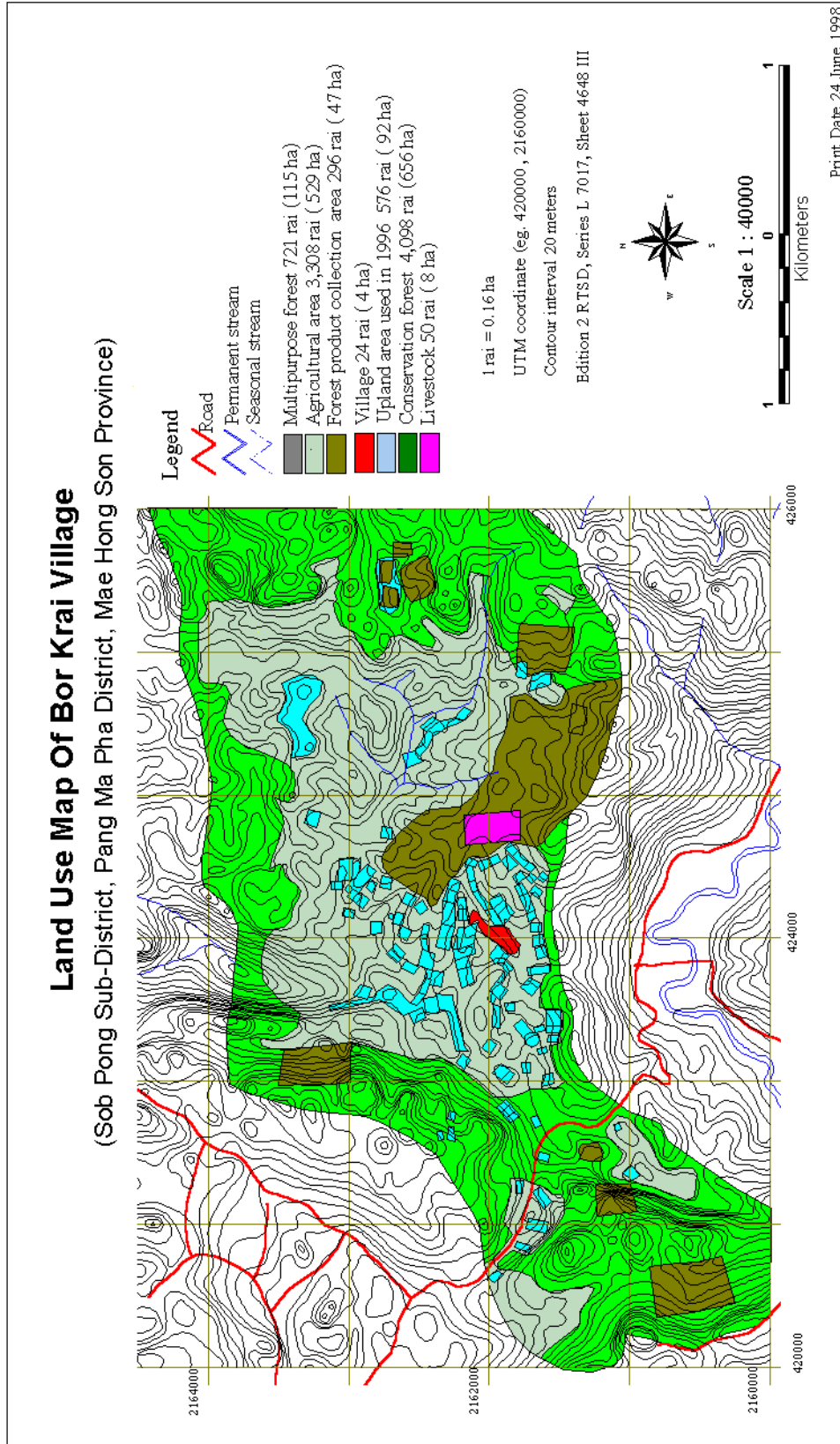
### 5.1 *Bor Krai Village in Nam Lang*

Bor Krai (see diagram 2) is inhabited by 160 Black Lahu (Lahu Sheleh) for 20 years and became officially registered 1996. The villagers migrated from the original village of Ja Bo to the north in 1978, mainly to find a new place to cultivate crops and to raise animals, as with the rapid population increase in Ja Bo the land resources had reached their limits. Some villagers still have land in Ja Bo, but the two villages have reached an agreement regarding their outer user boundaries. Bor Krai is located within the Pai Wildlife Sanctuary and thus a very sensitive area as far as the conflict between agricultural use and wildlife conservation is concerned.

The traditional farming system was **Pioneer Swiddening**, but is in a transition towards permanent agriculture. Most of the crop production is carried out on sloping land and scattered pockets of flat land in the valleys and hillsides surrounding the village. The total village area is 1450 ha, of which 818 ha or (57%) are conservation forest, and 628 ha have been demarcated as agricultural land (43%), yet only 10% or 63 ha are farmed every year, while the rest remains under fallow. Farmers own 3-6 fields on average, of between 1-5.5 ha in size. Whereas previously fallow cycles lasted as long as 7-8 years, now they are reduced to 3 years since the inclusion of Bor Krai in the Community based Land use planning and local watershed Management (CLM) approach of the TG-HDP 5 years ago. As a consequence upland rice harvests have gone down from 1 tang seeds yielding 40 tang to only 20 tang (1 tang = 20l container). Villagers report a lot of weed problems on upland fields, as the fires after shorter fallow periods are not hot enough to destroy weed seeds. Due to less fallow material accumulating, there is less burning material and fires are cooler. Last year the rice harvest failed due to insufficient rain, so that people are forced to sell pigs to buy paddy rice, which has less taste and is less nutritious. In spite of these drawbacks of adaptation to intensification, the village has set up strict natural resource

management rules in order to show that it is in line with forest protection policy.

**Diagram 2: Land Use Map of Bor Khrai Village**





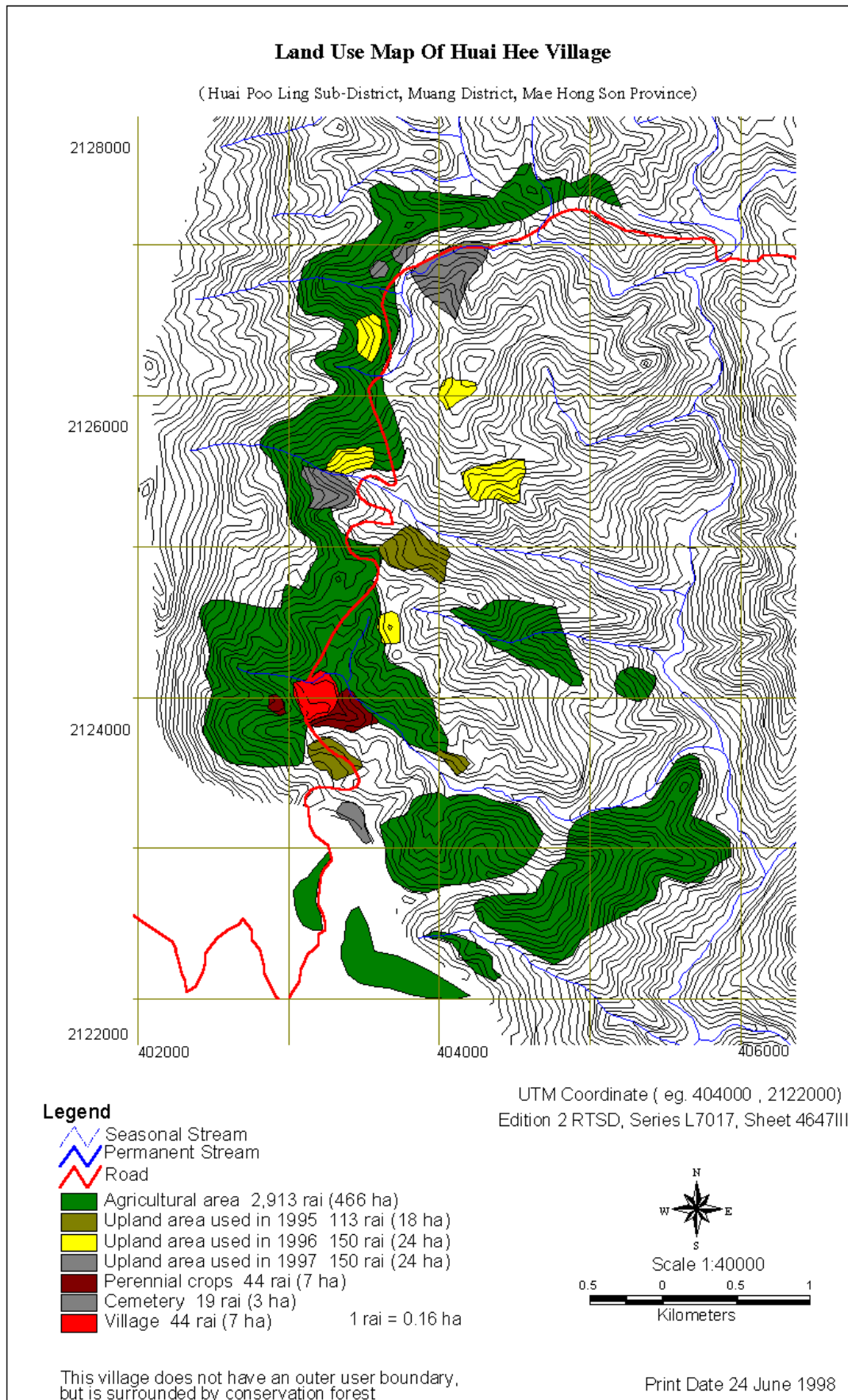
The process of agricultural intensification is not easy and alternative means of income are sought. The villagers have started some eco-tourism on a small scale for additional incomes such as hosting guests and taking them to the Fish Cave. Bamboo shoots and mushrooms are collected for sale too. The village committee feels that Bor Krai has an uncertain future and looks for land security and support from government extension services to live sustainably.

## 5.2 *Huai Hee Village in Huai Poo Ling*

Huai Hee (see Diagram 3) is inhabited by 127 Karen (Sgaw Pakanyaw) for more than 20 years and became officially registered in 1983. Due to the surrounding steep slopes, there is no paddy cultivation and the village thus has to rely on upland rice for its staple food, interplanted with vegetables. Some livestock are reared and there are also perennial crops grown. The village is bordered by the Nam Tok Surin National Park to the West and had agricultural area within the national park in the past. Due to pressure from the Royal Forest Department (RFD) this land had to be abandoned.

Huai Hee practises mainly subsistence agriculture of the **Rotational Swiddening** type, but here too there is a transition towards permanent agriculture and fallow periods have decreased from 15 years to 8 years. Although the village map does not include an outer user boundary (the topographic model does), the total area is 1700 ha, of which 1084 ha are conservation forest (64%), while 36% of the land is used for agriculture. There is an inconsistency in the pattern of land use in that some upland area lies outside the demarcated agricultural area, an indication that fixed areas and mapping are not yet part of the villagers' view of their farming system. Of the total agricultural area of 466 ha, only 5 % on average have been used during the last three years. This is half the land used in Bor Krai, while Huai Hee has 80% of the population of Bor Krai. It may be interpreted that this is much more of a subsistence farming system with more interaction with the forest in the collection of forest

**Diagram 3: Land Use Map of Huai Hee Village**



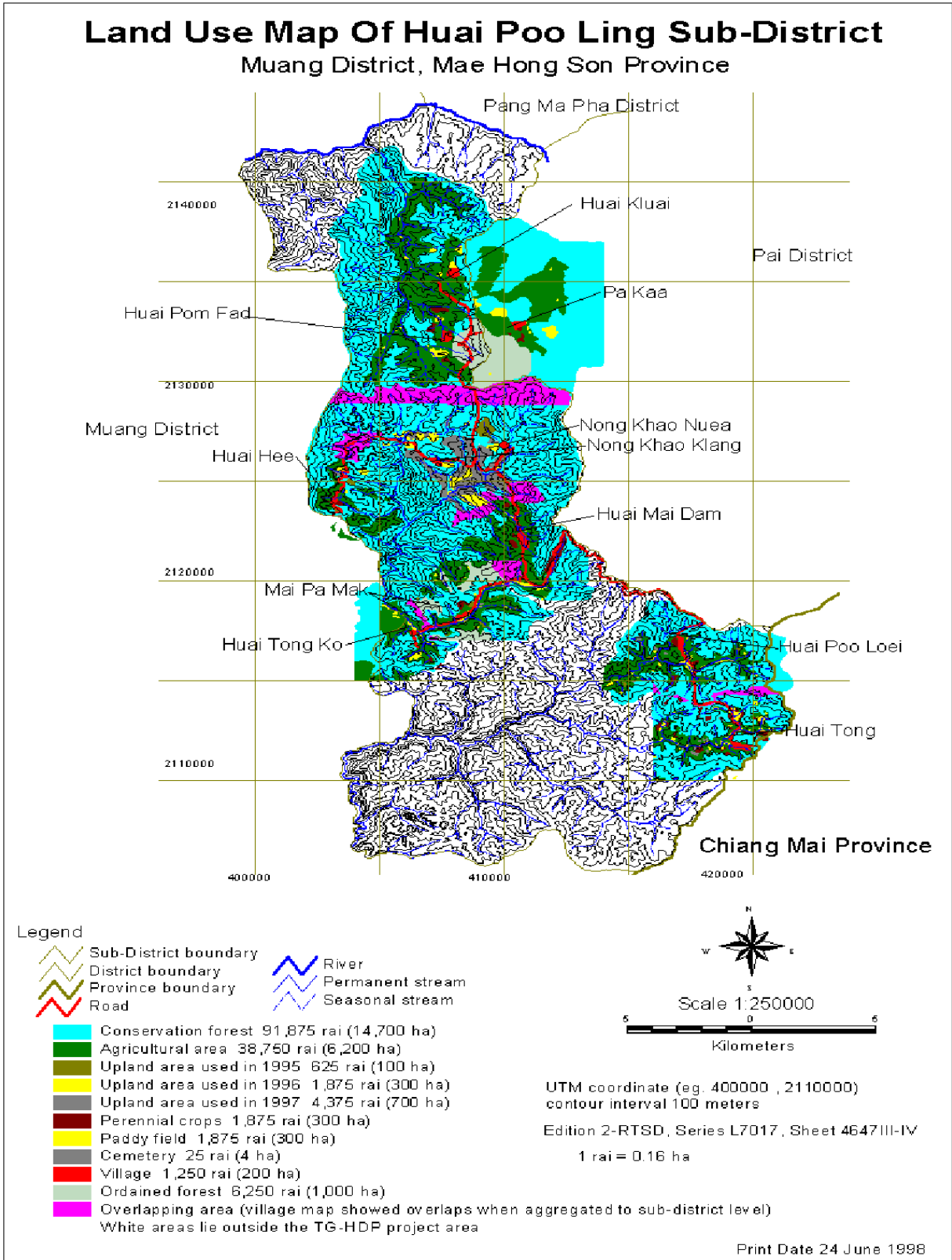
products, while strict guidelines have been established to save the forest. Fruit trees play a minor role with 7 ha under cultivation, as the fruits are only grown for home consumption due to the lack of a market. With shorter fallow periods as a result of gradual intensification, the farmers experience a similar decrease in rice yields and. In the situation of land insecurity, the main fear is land confiscation by RFD if fallow periods are too long and trees have grown too big. Here the traditional system is clearly in conflict with the purely protective interest of RFD.

In order to boost its income the village has started to get involved in an eco-tourism project funded by the Thailand Research Fund and it will be interesting to see if this will bring changes in the land use patterns. With its limited agricultural potential, yet blessed by a spectacular environment, eco-tourism could become an alternative way of land use planning, but the need for government support is strongly felt by the village committee.

### *5.3. Aggregation at Sub-District Level*

In the project area of **Huai Poo Ling** the ten village maps were aggregated on a sub-district map (see Diagram 4), and the white areas indicate villages that lie outside the TG-HDP project area. It is interesting to note that the village of Pa Kaa lies outside the Tambon boundary (in neighbouring Pai district in fact), if the data provided by ONCB are correct. To date there exist no reliable maps from the Royal Survey Department indicating Tambon boundaries and work is in progress to produce this data, yet the provincial office gives the total area of Huai Poo Ling as 37152 ha. As far as land use planning is concerned it is important to note that there are overlapping areas claimed by adjacent villages (marked in pink), which may lead to conflicting claims over its use. In most cases this land lies in conservation forest areas, which means that the total forest area claimed by each village is actually less when aggregated to Tambon level.

**Diagram 4: Land Use Map of Huai Poo Ling Sub-District**



The total upland area of 6200 ha makes up some 17% of the whole Tambon area, or with perennial crops paddy fields and land used in the last three years amounts to 7600 ha or 20% of the Tambon. The total mapped forest area amounts to 14700 ha or 40% of the Tambon, but as only 22500 ha of the Tambon have actually been mapped, the fact that 65% of it is conservation forest is more significant. This by far exceeds the target of 25% protected forests set by RFD nationwide. According to own calculations the area cultivated each year has increased from 100 ha (1.3%) in 1995 to 700 ha (9.2%) in 1997, a rather sharp increase that needs to be verified. It is obvious that the aggregated data has a relatively high level of inaccuracy, but the most important relation for planning purposes is that between conservation forest and upland area, and the figures show that the forest cover in Huai Poo Ling is very high while only a small area is burned and cultivated every year. Compared to totally deforested areas in the Northeast of Thailand, the highland areas of Mae Hong Son are well forested and shifting cultivation only has a small impact on the environment.

## 5. Conclusion

On the **technical** side, resource mapping at community level needs to be developed to produce accurate maps, and this should be supported by a new attempt to produce aerial photographs of higher accuracy too (the available ones only go as far as a scale of 1:50,000), so that detailed mapping becomes possible. The national goal of forest cover has definitely been achieved in Mae Hong Son and the watershed classification needs to be reviewed to take into account the many permanent settlements. At present digitised maps still only have a limited usefulness given the inaccuracy of village maps and poor interpretation skills of village representatives and district forest officials. Here ICRAF in Chiang Mai, as a research institution, is best suited for map updating and distribution, and currently this data is collected for the whole of northern Thailand. Maps are essential for natural resource management planning, as can be seen by the fact that the maps produced for this paper are being used by the newly forming Tambon Administrative Organisation

(TAO) representatives at provincial level in Mae Hong Son in a petition to submitted to the Parliament for the recognition of highland farming systems.

After the closure of the TG-HDP in September 1998, the complex process of participatory land use planning is seriously threatened by the politics of the new Governor of Mae Hong Son province, who only allows 2-year fallow periods on uplands and only 2 upland fields per household. Farmers overstepping this limit have been arrested. Additionally, RFD has the permission to confiscate fallow land with trees that have a breast diameter of more than 10 cm to declare it permanent forest, yet none of these measures are backed up by RFD policy (the only official regulation is the outdated watershed classification according to which all highland areas are forests). This new development undermines the achievements to date and calls for a clear position of the government towards land use in the highlands.

The process of participatory mapping and planning is gaining more and more acceptance by development agencies in Thailand, though not yet in terms of **policy**, as the hotly debated Community Forestry Act shows, which has been discussed since 1991 without conclusion (Amornsanguansin, 1992). In an effort to update forest policy, a Forestry Sector Master Plan was developed with Finnish and United Nations assistance in 1993, yet it has not been ratified by parliament. The recent revocation on 30 June 1998 of three resolutions passed in April 1997 granting settlement in forest areas occupied prior to 1993, shows the uncertainty as to whether participatory land use planning really has a chance in Thailand. What was a step towards solving the issue of settlement in forest areas by the Chavalit Government was neutralised the subsequent year by Chuan Leekpai. Even though the political backup for this process is still missing, various organisations are working with participatory mapping and planning approaches at different levels, and Non-Governmental Organisations (NGO) as well as informal farmer networks are gaining more and more importance. The furthest steps have been taken by the NGO, CARE, in its Integrated Natural Resources

Conservation Project in Mae Chaem district of Chiang Mai (Anonymous, 1997). The establishment of Village Forest Conservation and Watershed Management Committees, in which government and village representatives are members and sign land use agreements, is the only case known where written documents exist. These have given highland farmers the necessary confidence that their land management systems are indeed endorsed by the government and should serve as a model to be followed.

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