1. Introduction

The Thai-German Highland Development Programme (TG-HDP), which started in 1981, is a long-term Rural Regional Development (RRD) project operating with GTZ assistance. Highland development programmes were initiated in Thailand by His Majesty the King in 1969 and several projects operated by the World Bank and bilateral donors came into the picture during the late 1970s. Most of the early programmes focused on either social welfare and community development matters or single-sector agricultural development issues. Since the inception of the TG-HDP, the situation in the highlands of northern Thailand has changed considerably for the inhabitants of the ethnic minorities in this zone: what were initially very remote living areas with purely subsistence shifting agriculture and some opium cultivation for sale, have now become a region fully integrated into the Government’s highland development schemes. The emphasis of Royal Thai Government (RTG) policies has been altered. Development assistance has increased enormously and the approaches used in working with the highlanders have been progressively modified.

At the time the TG-HDP was initiated, considerable international concern focused on the issue of opium poppy cultivation, while now the main concerns are erosion and natural resource protection. The Project Goal is:

"The quality of life of the highland population is improved, the drug abuse problems are reduced and the ecological balance is maintained better". Although the overall goal has not changed, the project purpose for the final phase of the TG-HDP from October 1994 to September 1998 reads:

"The highland population of Mae Hong Son (MHS) Province is increasingly self-reliant in applying economic, ecological and social practices, which have been developed and tested successfully in the TG-HDP pilot areas. Relevant Government Organisations (GOs) and Non-Government Organisations (NGOs) have applied improved concepts, strategies and instruments for integrated highland development in MHS and increasingly in 4 other northern provinces with severe drug abuse problems". One of the four indicators is:

"As of 1997, community based natural resources management is accepted at policy level as a sustainable and ecologically sound practice" (IP 205).

It is believed that the TG-HDP’s experience with different working approaches has considerable significance. Many applied researchers and some GOs still maintain a "demonstration of new technology" mentality. The TG-HDP has grown to believe that "learning from and with farmers" provides the best avenue for farming practice development in the situation of the project. This has led to a shift of extension approaches from crop substitution initially to soil and water conservation and currently propagated Community-based Land Use Planning and Local Watershed Management (CLM).

The poster will briefly explore the different extension approaches used by the TG-HDP since its inception and then concentrate on the two predominant agricultural systems in the project areas together with experiences of the last few years. During this time, much greater attention has been paid to building on the traditional (indigenous) practices of different ethnic groups with which the project works. The effects of extension approaches and the future of shifting cultivation conclude the poster. The TG-HDP has concentrated on three project areas (Diagram 1):

- Nam Lang in Mae Hong Son Province; second project area started in 1983.
- Huai Poo Ling in Mae Hong Son Province; third project area started in 1990.

Diagram 1: TG-HDP Project Areas in Northern Thailand
The two main types of shifting cultivation will be used as an example from the two project areas in which the TG-HDP is currently working, namely **Pioneer Swiddening** in Nam Lang practised by Lahu and Lisu hilltribes as well as **Rotational Swiddening** in Huai Poo Ling by the Karen hilltribe.

### 2. Traditional Shifting Cultivation

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. These systems and settlement structures differ by ethnic origin and cultural background.

In the past, these very extensive farming systems were well adapted to highland conditions, when population density was low and available land for shifting cultivation was still abundant in the forest. In around the last 30 years, the hilltribe population in northern Thailand has nearly quadrupled from 217,000 in 1960 (Young, 1962) to 800,000 (NSC/NESDB, 1993 and IP 198), due to population growth and migration from mainly Burma. As a result of this increase, more marginal forest is encroached upon, fallow periods are decreasing and deforestation and forest degradation are taking place. This development causes ecological imbalances in the highlands and reduces its watershed functions. Given this general trend, it is necessary to look at shifting cultivation systems in detail with their changing fallow practices.

In shifting cultivation systems, about 1 to 1.5 ha (1 ha = 6.25 rai in Thai units) of forest for **Pioneer Swiddening** and regenerated fallow for **Rotational Swiddening** are burned annually per household for rice cultivation, a classical slash and burn system. The annual cycle of cultivation is similar for both systems (Table 1).
Table 1: The Annual Cycle of Cultivation (source: IP 157)

<table>
<thead>
<tr>
<th>Month</th>
<th>Swidden Activities</th>
<th>Paddy Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>Select swidden sites; start clearing</td>
<td>No fixed schedule, level new fields, dig new ditches</td>
</tr>
<tr>
<td>February</td>
<td>Cut swiddens</td>
<td>Same as January</td>
</tr>
<tr>
<td>March</td>
<td>Cut swiddens, burn off</td>
<td>Same as January</td>
</tr>
<tr>
<td>April</td>
<td>Same as March, build huts, complete fencing, plant maize</td>
<td>Same as January</td>
</tr>
<tr>
<td>May</td>
<td>Complete maize planting, then follow with rice planting</td>
<td>Prepare and sow irrigated nursery; after rains begin, repair dikes and plow fields</td>
</tr>
<tr>
<td>June</td>
<td>Start weeding</td>
<td>Plough and harrow depending on onset of rains, transplant seedlings</td>
</tr>
<tr>
<td>July</td>
<td>Continue weeding, some vegetables ripen</td>
<td>Complete soil cultivation, transplanting and weeding</td>
</tr>
<tr>
<td>August</td>
<td>Continue weeding, harvest vegetables</td>
<td>Weed and make necessary repairs</td>
</tr>
<tr>
<td>September</td>
<td>Final weeding</td>
<td>Weed and general management</td>
</tr>
<tr>
<td>October</td>
<td>Rice ripens, some harvesting in late October</td>
<td>Rice ripens, some harvesting</td>
</tr>
<tr>
<td>November</td>
<td>Complete harvesting and carry rice to village</td>
<td>Complete harvesting, carry rice to village</td>
</tr>
<tr>
<td>December</td>
<td>Finish carrying rice to village</td>
<td>Finish carrying rice to village</td>
</tr>
</tbody>
</table>

The prime crop is rice, but other cereals or vegetables are also grown on the cleared land. Livestock is allowed to graze freely in forest or fallow areas during the rainy season, whereas in the dry season the animals are kept close to the village. Traditionally, no fertilisers or pesticides are used.

Traditionally, there was little or no fallow management, as all activities were concentrated on the cleared land for agricultural production. However, livestock grazed freely on fallow areas. It can be hypothesised that traditionally fallow management as such did not exist because it was not necessary. It only came into the picture as development projects attempted to discourage hill tribes from growing opium and later shifting cultivation, as they were considered destructive practices to the forest.

There are, however, major differences between the **Pioneer** and **Rotational Swiddening** farming systems (Table 2).
Table 2: Characterisation of Pioneer and Rotational Swiddening Systems

<table>
<thead>
<tr>
<th>Pioneer Swiddening</th>
<th>Rotational Swiddening</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>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.</td>
</tr>
<tr>
<td>Trees are cut and uprooted to allow tillage, so tree regrowth is not possible and fields are later dominated by Imperata cylindrica grass.</td>
<td>Trees are cut at breast height, but not uprooted, to allow regrowth, mulching, fodder and seed production.</td>
</tr>
<tr>
<td>Rice only is grown in the rainy season followed by opium, no intercropping.</td>
<td>There is mixed cropping on the cleared areas: rice with vegetables and tubers, but no opium cultivation.</td>
</tr>
<tr>
<td>After 1-3 years the rice yields decrease and cash crops are grown until fields are abandoned.</td>
<td>Cash crops are intercropped with rice in the same area.</td>
</tr>
<tr>
<td>Little grouping of households for joint area cultivation, very scattered fields.</td>
<td>Several households grow crops in a joint area, there are a few clusters of large fields.</td>
</tr>
</tbody>
</table>

3. TG-HDP Extension Approaches

1984-1987

Similar to other development projects in northern Thailand, the first approach employed by the TG-HDP in the agricultural sector was the "crop substitution or replacement" of opium poppy by alternative cash crops such as coffee or red kidney bean. New crops were introduced via researcher managed demonstration plots, the provision of seeds/seedlings and training given in cultivation techniques. Extension was carried out by Government employed field workers who were few in number. The impact was moderate, as farmers were also concerned about maintaining the yields of subsistence crops. Unfortunately there was no evaluation of this approach and the TG-HDP moved on to characterise the traditional farming systems as a vicious circle (IP 80) before introducing the new extension phase.

1987-1990

Extension of a Soil and Water Conservation (SWC) package was a means to achieve semi-permanent production from sloping land. Vegetative strips, legume rotation, reduced burning, mulching etc. were the main technical elements demonstrated and extended with project provision of incentives in cash and kind (seeds, seedlings, fertiliser) for both field workers and farmers (IP 80, 100, 111). There was rapid adoption, which dropped off markedly once the subsidies were discontinued. Incentives also included the provision of identification cards to hilltribes for those adopting the extension package. A subsequent study found that the respective perspectives of technicians and farmers as to why swiddening and fallowing took place varied considerably (IP 165). The technicians' view concentrated on soil fertility decline, whilst that of farmers on weed build up.

Since 1990

Perhaps, as an acknowledgement for the need to modify the SWC package combined with the possible resettlement of highlanders proposed by the RTG, the TG-HDP's assistance programmes have been based much more on the traditional practices of particular ethnic groups. Due to these efforts, resettlement never occurred in the project areas. Two closely related elements have emerged: Community-based Land Use Planning and Local Watershed Management (CLM) and Sustainable Farming Systems (SFS), whereby current activities are all taking place under the heading CLM (IP 113, 135, 141, 143, 171, 189). The main idea is to establish three types of areas:

- permanent cultivation areas/permanent settlement
- community forest areas
- conservation areas.

The latter is a result of the discussion process to demarcate outer user boundaries beyond which no activities are permitted. By mapping the areas on land use maps to a scale of 1:5000 and displaying this information on three-dimensional land use models made of cardboard or styrofoam, it should be possible to measure the areas
This can then be used as a basis for discussion to increase the size of conservation areas and demonstrate to Government authorities that villagers can manage and protect forests themselves. In the areas for permanent cultivation, the SWC concept is promoted (no longer with incentives), and the community forest areas can be used for wood production as well as the collection of non-wood forest products like mushrooms and bamboo shoots (IP 190). The whole participatory planning approach is meant to operate via Land Use Planning Advisory Teams (LUPAT) from various implementing agencies as a holistic, though slightly idealised, process.

The last review of this approach, with five recommendations for change, dates back to 1993 in which it was admitted that the outer user boundary was often understood by farmers as taking away land from them, thus leading to a certain reluctance to openly display their areas of cultivation (IP 171). There was also the mention of necessary adjustments to the LUPAT working approach to improve the work relationship between Government officers and villagers. This issue has led to a transformation of the LUPAT and greater cooperation in exchanging of information with the Responsible Implementing Agencies (RIAs). The TG-HDP staff can now concentrate on enabling farmers to map information at village level by using topographic models and give them the tools to negotiate land use and forest issues with the Government. This includes training in mapping and model building as well as the aggregation of information at sub-district (Tambon in Thai) level using models. This could become very important with the ongoing process of decentralisation in Thailand, which would give Tambon Administrative Organisations (the lowest level of government in Thailand) the mandate to regulate natural resource issues with respective budget allocations. An added component is the Community Forestry Act that is in the stage of public hearings and, once passed, it will provide a legal framework for the resolution of land use rights and communal forest management.

The land categories identified on land use models are:

- village and housing area including homegardens
- arable land for annual crops
- arable land for perennial crops and agroforestry
- pasture areas
- social and community forest land
- watershed areas and conservation forest

Land use models have been built in all target villages and are updated at the farmers’ request. At the moment, the TG-HDP focuses on updates and the aggregation of information at Tambon level.

4. The Future of Shifting Cultivation
When looking at the efforts of the Thai Government to establish permanent cultivation in the highlands, and those of the TG-HDP to promote soil and water conservation, one may get the impression that shifting cultivation has no future, as everything focuses on the limitation of forest encroachment and the erosion control of agricultural areas. In an attempt to preserve the remaining forest areas, any land that can be classified by highlanders as conservation areas (thus being beyond the outer user boundary) is counted as forest land. In exchange for returning land to the RTG, farmers have access to extension services. In this process the available land is gradually reduced and all available labour is used to work on permanent plots. Thus, fallow areas and their periods are declining. This “land deal” only involves swidden intensification as far as converting this land to permanent agriculture through the development of irrigated areas, fruit tree orchards and vegetative hedgerow management. It would lead to a complete modification of indigenous practices up to the point of their abandonment in favour of mainstream permanent farming.

However, when looking back at the history of TG-HDP extension approaches from 1984 to date, there has been an evolution from straightforward crop replacement without consideration of indigenous practices, to a more sensitive and less technically oriented approach to the management of natural resources in the northern highlands. Here again, it is useful to differentiate between the effects of agricultural extension on the Pioneer and Rotational Swiddening systems (Diagram 3).

Diagram 3: Transition from Traditional Pioneer System to Permanent Agriculture

In the Pioneer Swiddening system the main extension effort is quite clear in that it has no future, as the RTG wants to stop the encroachment on new forest areas. Initially, all efforts concentrated on the establishment of permanent areas with buffer strips of congo grass (*Brachiara ruzizensis*) and crop rotations involving rice, beans, maize and fruit trees. As the congo grass grew and spread quickly, it soon became a weed and was either uprooted or allowed to grow as this land was abandoned by farmers to become pasture in favour over a new area for cultivation.

Partly as a result of the learning process from farmers, the TG-HDP and Department of Land Development (DLD) modified the extension approach to include more crops and let farmers choose what best suited their indigenous practices. Later, hedgerows were promoted with pigeon pea (*Cajanus cajan*), leucaena (*Leucaena leucocephala*),...
vetiver (*Vetiveria zizanioides*) and gliricidia (*Gliricidia sepium*). In addition, fruit trees have become quite popular. The access to the main road between Chiang Mai and Mae Hong Son has increased marketing opportunities for fruit, which has allowed some villages to earn a living from cash crops while slowly having to give up their indigenous practices. Opium cultivation has also gone down remarkably. However, this is not so much because villagers are convinced by agricultural alternatives, but due more to the increasing efficiency of the Government to carry out aerial surveys of opium fields for destruction. The most important factor in the transition of **Pioneer Swiddening** to permanent agriculture has been an indirect one; the construction of a tarmac road to Mae Hong Son.

The situation for **Rotational Swiddening** differs in that the population density is much lower and there is no tarmac road, making access to markets very limited. Here, the extension approach has been modified according to farmers' needs to suit the traditional fallow system and make it more productive. The extension recommendations have been successful insofar as the integration of pigeon pea dib planting in fallow areas a year after the sowing of rice (fields are only used for one year traditionally). There is dense planting of 2-3 seeds per hole at roughly every 70 cm and leucaena every 1 m at random and not in a row. This improved fallow management or swidden intensification ensures that the area is not burned and crops are not destroyed. Due to the quick establishment of pigeon pea and leucaena, with its beneficial side effects of soil maintenance and mulch, the fallow cycle has been reduced by 50%. Farmers may return to the same area after four years instead of eight (Diagram 4), and thereby reserve more land as conservation forest.

This approach goes in parallel with paddy rice area expansion through irrigation, thus reducing upland rice cultivation. As far as rice is concerned, paddy cultivation is the most popular method. Pigeon pea and leucaena are harvested and sold to the Department of Land Development (DLD) as an added income and used to feed poultry and pigs. Cattle still graze freely on fallow areas and the promoted cut and carry system has not been adopted, as one farmer summed up convincingly:

"Animals have four legs, we only have two legs, so why should we feed them?"

There is a need for the improvement of livestock management, as free grazing slows down the fallow regeneration process. Traditionally, fences have been erected along the newly burnt areas for rice cultivation and break apart after one year, thus, livestock grazing freely can damage fallow regeneration in subsequent years, particularly if the duration is reduced to four years. The TG-HDP has promoted barbed wire to fence water catchments through subsidies, but the fences have not been used much in upland areas. They are used for high value crops like fruit trees and paddy fields instead, and, therefore the threat of erosion persists. However, in one case the absence of grazing cattle on fallow areas has led to an improved fallow management that is likely to spread.

Five years ago in Ban Huai Hee, a village of 22 households in Mae Hong Son Province, some farmers participated in a field trial involving pigeon pea and leucaena with the provision of barbed wire. The wire was used for fruit trees instead of fallow land. Nevertheless, leucaena and pigeon pea grew well and, in the following slash and burn cycle last year, the fine rice harvest was perceived to be as good as when using traditional cultivation practices. The improved fallow was, therefore, meaningful and this year more farmers want to grow pigeon pea and leucaena. They are even willing to partly fence this fallow area with traditional stick fences. Perhaps this success is due to the fact that there is no paddy area in this village, thus rice cultivation is 100% upland. Results from four other villages were disappointing with regard to the destruction of leucaena and pigeon pea by grazing cattle. There, the paddy areas produced 50% of the required rice for consumption, and fallow improvement was not that important. Here, it also seems that, with progressing intensification, there will be less time and space to concentrate on fallow management, which is again in the interest of forest preservation in Thailand. Perhaps there is more room to accept the Karen agricultural system as sustainable. This form of shifting cultivation, with improved fallow areas, has more future than the pioneer system.

**Diagram 4: Traditional and Modified Rotational Swidden System**
5. Conclusion

The general trend in Thailand is indeed towards a gradual decrease in fallow areas and, therefore, fallow management in favour of permanent cropping systems for the highlands in fixed demarcations. This development can also be observed in other countries and should not be considered unusual in a changing world of agriculture with ever increasing population densities. After all, where in highly populated Western Europe does one find swiddening systems? The CLM process employed by the TG-HDP is an entry point into grouping land use and its awareness. Land suitability and capability assessment as a village can exert control on members who do not follow guidelines, which increasingly extends to closely monitored land use by the RTG as land becomes more and more valuable in Thailand. This process also applies to the gradual reduction in fallow areas in favour of agricultural intensification and forest protection, which may become more effective with participatory approaches involving the highlanders as protectors of the forest, once the Community Forestry Act has been passed.

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Nam Lang Impact Survey


Findings of the Review of the Community Based Land Use Planning and Local Watershed Management Process and Recommendations


CLM Guidelines in Brief, Community Based Land Use Planning and Local Watershed Management and Approach to Achieve Sustainable Land Use


Study on Non-Wood Forest Product Identification, Availability, Improved Production and Potential for Marketing in Northern Thailand


The TG-HDP Participatory Working Approach


Project Progress Report