Working Group

Socio-Economics of Forest Use in the Tropics and Subtropics

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Utilization of Floodplain Vegetation in Northeastern Thailand: Compilation of Survey Results from Ban Pak Yam, a Village in the Songkhram River Basin

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Preface

This report is a compilation of findings on a village based survey in Ban Pak Yam in the Songkhram River Basin in Northeastern Thailand. The research stay in 1997 was designed within the DFG Graduate College 'Socio-Economics of Forest Use in the Tropics and Subtropics', at the Albert-Ludwigs-University of Freiburg as a cultural-geographic study on the 'Use of floodplain and its vegetation at a Mekong tributary in Northeastern Thailand'.

This compilation of survey results provides basic data and findings, and I hope that these informations are useful for anybody working on the topic, being researcher, activists, or any people looking for information on that particular Thai village.

For further readings on the ecology and use of floodplains in Northeastern Thailand see the attached bibliography.

Anybody is invited to ask for further information.

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Ban Pak Yam: A village survey on the use of its floodplain area

This compilation contains a summary of information gathered between December 1996 and September 1997 at the Nam Songkhram Basin during a village case study in Ban Pak Yam, Subdistrict Sam Phong, District Sri Songkhram, Nakhon Phanom Province.

The paper was compiled by using data from different sources. During the village stay observations and day to day talks with people provided basic information. Data were also obtained by conducting semi-structured interviews with the village headman, Subdistrict Council members, teachers and other villagers on specific topics. Furthermore, some people with specific professions and middlemen from outside the village were interviewed on their occupations.

The NGO 'Project for Ecological Recovery' (PER) works in the river basin. PER carried out a sample survey on household structure, fishery activities, agriculture, and economic patterns in 4 villages. The questionnaire form was developed as a preliminary survey tool before applying an action research methodology to strengthen the self-develop ability of the villagers in the river basin. Collecting data in Ban Pak Yam with this questionnaire was done within the Ph.D.-survey (PER-Survey, 1997). In Ban Pak Yam 107 of the 141 households (76 %) gave detailed information on their household structure and family economics within this survey.

Additionally, the two nearby district afternoon markets were visited to observe availability and marketing of floodplain vegetation products. On this two markets 186 interviews were conducted. Visits to these markets were made alternately once or twice per month in December 1996 (15 interviews), in 1997 in January (5 interviews), February (13 interviews), March 1997 (34 interviews), April (23 interviews), May (15 interviews), June (46 interviews), July (25 interviews), and August (11 interviews). On the markets all vendors selling floodplain vegetation products were interviewed, vendors refusing questioning were included by counting the products and asking for prices.

Other data on land use and village infrastructure stems from maps and aerial photographs and from District and Subdistrict offices. Statistics obtained at District office of the Department for Community Development are data of the Rural Village Development Survey, carried out every two years on village level (NRDC, 1996).

1. Village location and infrastructure

The village under study is Ban Pak Yam, in Sam Phong Subdistrict, Sri Songkhram District, Nakhon Phanom Province. This village was chosen because of its location at the confluence of two rivers (Nam Songkhram and Lam Yam) and its use of the floodplain as a resource of vegetable, mushrooms, bamboo shoots, fishery places as well as its changing land coverage from a former rich and dense forest into an area with cropping fields and bamboo forest.

During the rainy season (May to October) the Mekong water level rises fast and its tributaries, like the Nam Songkhram, get trapped in their beds until the water spills over the edges and the low laying floodplains get flooded for two to three month (July to October).

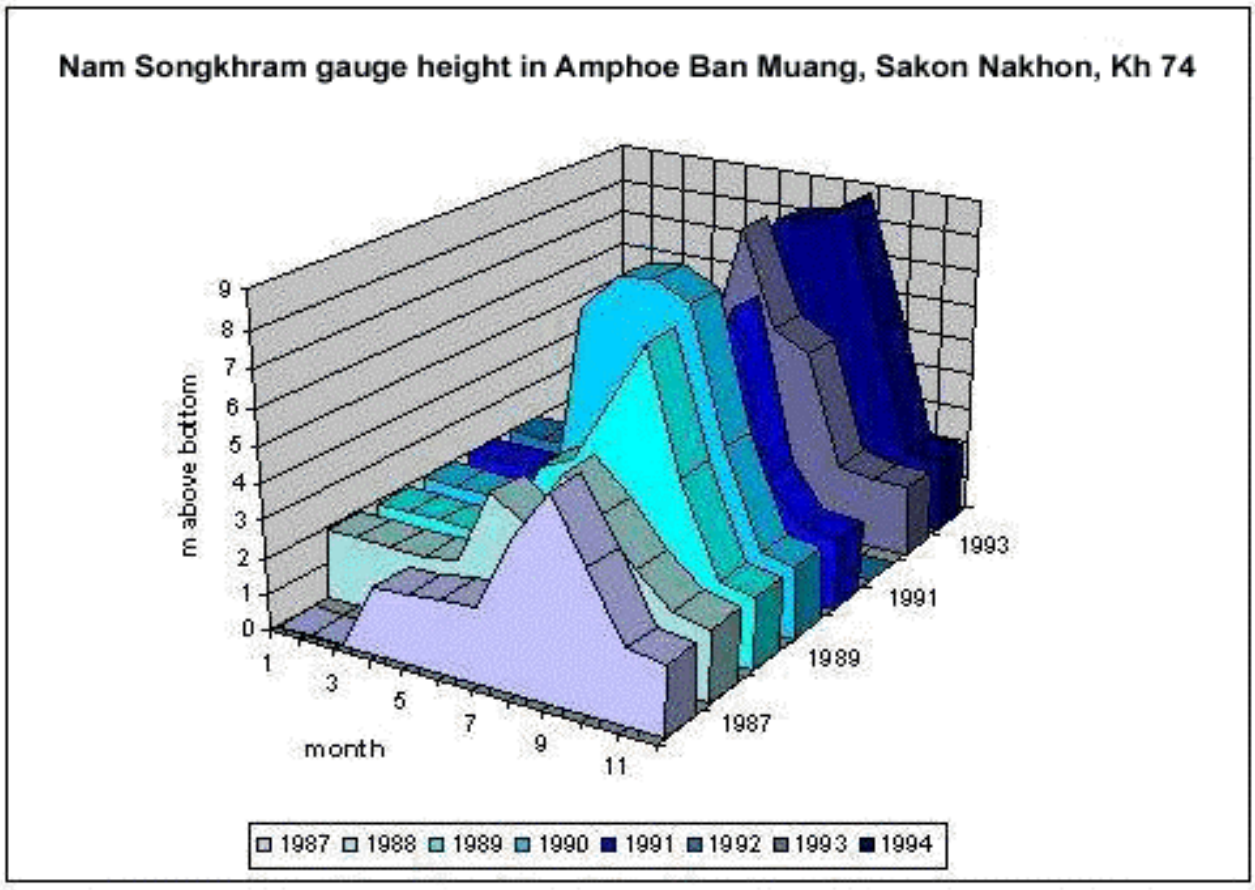


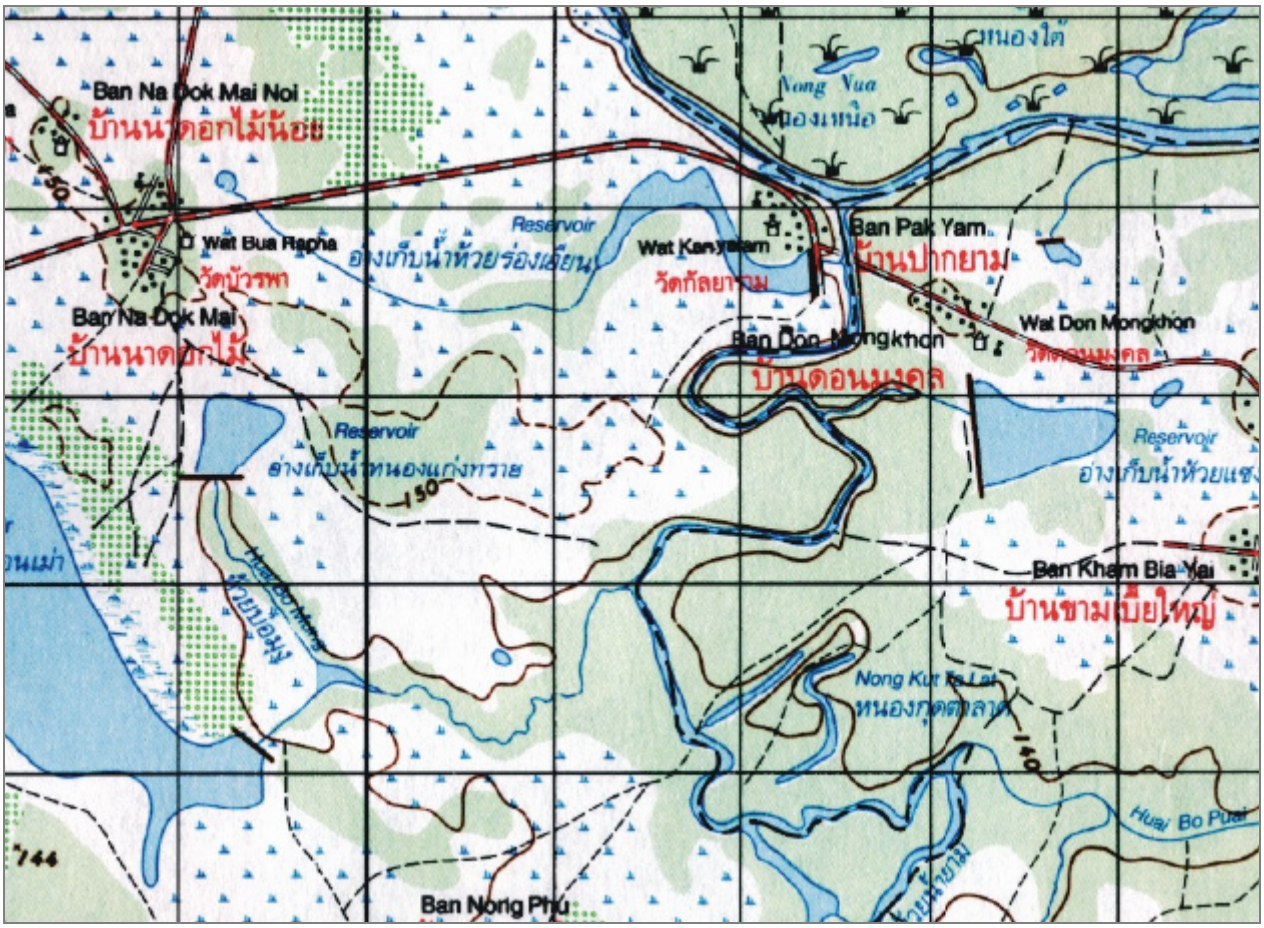
Table 1: Mae Nam Songkhram water level at Kh 74 from 1987 - 1994
(Source: Royal Irrigation Department 1987, 1989, 1995, 1996)

1.1. Location of the village

The village is located at the confluence of the small river Yam and the Songkhram river, about 40 km upstream from where the Songkhram river flows into the Mekong river or Mae Nam Khong in Chaiburi, District Tha Uthen in Nakhon Phanom Province.

The houses of the village are located on a slightly higher level than the surrounding area. In the north the Songkhram river, in the east the river Yam, and in the south and west a reservoir give the village Ban Pak Yam the impression of an island. But two roads connect the village: to the south a bitumen covered road leads over a bridge crossing the river Yam to Ban Kha and in the west a dirt road connects the village to Ban Na Dog Mai, belonging to Akat Amnuai District in Sakon Nakhon Province.

The village itself belongs administratively to Nakhon Phanom Province, but the rice fields nearby and the village area are located in Sakon Nakhon Province. The public land of the village across the river Songkhram belongs to Nakhon Phanom Province. According to the 1997 village information provided by the village headman 141 families live in Ban Pak Yam with a total population of 886 inhabitants. The village area consists of 4450 rai (712 ha), including the housing area of the village which covers less than 10% (400 rai / 64 ha). Agricultural area is 2600 rai (416 ha), public land on the floodplain covers 900 rai (144 ha), and rivers and lakes cover 550 rai (88 ha).



Map 1: Location of Ban Pak Yam
(Extract of topographical map 1:50,000; Series L7017, Sheet 5844 III, Ban Kha)

The public land which is flooded annually from mid of July to mid of October is covered by dense bamboo forest. This area used to be a diverse flooded forest 10 to 15 years ago. On the public land there is also a huge lake, called Nong Aeg. It was a former meander and turned into a lake when the river left its old river bed. These kind of lakes are called 'oxbow lakes'. The unique form of Nong Aeg indicates the former course of the Songkhram river. Some other, smaller ox-bow lakes keep water throughout the year and smaller depressions fall dry in the hot season or are pumped dry to catch all the fish in December or January.

1.2. Occupation pattern and infrastructure in the village

For the most village families fishery is the main source of income. If one family does not have the resources to fish with big nets and engine equipped boats, members are working as labourers for better-off families in the village or in other villages nearby. At home mostly women are in charge of cleaning and processing the catch, but they also join the fishery activities, especially during the peak season in September.

Around 10 families grow rice for the first crop, 40 families also have fields for the second rice crop. With flooding frequently occuring on both kinds of fields, the harvest is often destroyed. Therefore the rice supply from the village itself does not meet the demand. Working in the rice fields for other villagers provides additional cash income for women and men, or it is carried out in a labour exchange system.

About 15 families grow Eucalyptus as a cash crop, other cash crops are groundnuts, vegetables, and corn (NRDC, 1996).

For the house compounds in the village the families hold NS3 land title deeds. Farmers hold this land title deed for most of their rice fields. The area of the public land (900 rai / 144 ha) on the floodplain is currently under privatisation. Each family in the village will get 18 rai with SPG land title deed. No irregularities concerning selling the public land to outsiders, as it happened in Ban Dong San or in Ban Khae, occured in Ban Pak Yam. This land title scheme was set up during the first Chuan Leekpai Government.

According to the NRD2C statistics on village level from 1996 other income generating on-farm activities are buffalo raising (22 households, 88 buffaloes), cattle raising (15 families with 105 cows), and pig raising (9 families, 78 pigs).

In the early rainy season, collecting bamboo shoots and mushrooms also provides additional income. These products are also important - besides wild vegetables, small animals and insects - for household consumption.

One family runs a small commercial fish sauce factory and nearly all households produce the famous fermented fish sauce *Pla Ra* for home consumption as well as sale. Ten women are members of the housewife group. The women organised in this co-operative produce *Pla Ra* and other special kinds of *Pla Ra*. The products are sold in the village as well as on fairs, to shops and to middlemen.

Photo 1: Housewife group preparing fermented fish sauce *Pla Ra*

In the same district, an agro-industrial company called 'Suntech' grows tomatoes and produces canned tomatoes. Some villagers work seasonally on the tomato fields of Suntech.

From 141 families 40 families have members migrating (mostly to Bangkok) for labour. In general, women migrating as labourers are younger than men and the migrants usually return to the village for holidays or for the peak season in fishery and rice growing (PER, 1997; NRDC, 1996).

The village has a primary school, a public health station, a temple (with one permanent monk and four novices) with a Thai steam bath and a gathering hall. A small library and public reading place near the school provides books, but it is rarely used.

In the village 5 shops are selling daily necessities, one repair shop provides technical help for boat engines, iron buffaloes and motorcycles. Two private telephone services are run in the village and five small rice mills are operated.

All houses are connected to the public electrical grid and tap water is available in all houses pumped from the village reservoir Nong Ian. Rainwater is stored in big earthen jars to be used as drinking water. The village itself is divided into 11 neighbourhood groups.

Until the 1980s, transportation was mainly done by boat since the roads were mere oxcart paths. Even during the non-flooded seasons, transportation by road was difficult. Since the end of 1996 the road to Ban Kha was upgraded with a bitumen surface, and transportation by road is now possible most of the year.

2. Brief history of the village Ban Pak Yam (Ban Dong Lek Din)

Ban Pak Yam was founded by a salt trader. About 100 years ago in Laos and Northeastern Thailand supply of salt was expensive since salt was difficult to produce. In Laos, near Tha Kek, a well was operated by salt producers and salt traders. Salt extracted from the saline water was stored in bamboo poles and traded throughout the region.

One of this traders - Nai Bunmi - came twice to the area of Ban Pak Yam, staying at a village upstream the river (Ban Dong Nong Khon). He recognised that the area has huge resources especially for fishery and he moved with his wife and four children to the mouth of the river Yam into the river Songkhram. According to Khun Sin Samut an old villager and former village headman, this was about 97 years ago (1900 / 2443).

The first house in the village was located at the old road to Ban Na Dog Mai. Descendants of the village founder still life in the old house.

Four early followers of the pioneer family came with their families from Chaiburi at the river Songkhram's confluence with the Mekong Other people came from Luang Prabang, Ban Phaeng, That Phanom, Ubon Ratchathani, and other places. These early villagers were fishermen and they also produced salt at a nearby place (Ban Tha Sa-at) in Seka District, Nong Khai Province.

First the settlement was called Ban Dong Lek Din (Small Earthen Hill). About 50 yeas ago, the name was changed into Ban Pak Yam (Mouth of the River Yam). Later on the village expanded due to in-migration and marriages and the number of families grew.

In the early years the village was located within dense forest, no road linked the settlement with other villages, but transportation was easy on the rivers especially during the high water season.

Village expansion reached a peak during the Vietnam War, due to refugees from Laos, Vietnam, and from border areas to Laos. Some of these refugees settled permanently in Ban Pak Yam, but after the war most of them went back to their home countries.

3. Villagers changing way of life

In this chapter a description of the most common traditional occupations and their development is given. These are fishery, pottery, logging and charcoal burning, growing of rice and other crops. Other occupations related to the present use of the vegetation of the floodplain are described in chapter 4.

3.1. Fishery

The first settlers were fishermen and traders of salt and fishery products. Rice was not grown in the village but in the neighbouring villages of Ban Na Dog Mai and Ban Kham Bia. Villagers of Ban Pak Yam got rice in exchange for fish, fish sauce, and salt.

Since the village is located at the confluence of two rivers, fish is available throughout the year. In the flooding period (July to October) migrating fishes are abundant. Swimming upstream from the Mekong, they spawn and hatch in the floodplain areas of the tributaries. After the spawning period, the adult and young migrating fishes move back to the Mekong. With the dense vegetation on the floodplain the conditions are perfect for fish during the rainy season and the flooding: shallow, slow moving water, lots of debris, insects and small animals as nutrition, and a lot of bushes and bamboo under water which serves as shelter against predators are available.

The villagers' way of life relied on fishery, which is still the main occupation with peak and low seasons. Throughout the year fish was caught mainly for home consumption. During the flooded season, and especially when the flood decreases, fishery reached its peak and fish was sold or processed. The fish and fishery products were used in exchange for rice and other necessities from other, older rice growing villages.

Villagers preserved fish by fermentation (*Pla Som*) and used all kind of fishes to produce the famous fermented fish sauce (*Pla Ra*). This sauce is still a main trading item, produced at village level. The dependence on fishery as the main source of income still characterises the village.

Some of the fishery techniques and tools were developed in the village and some were adopted from other villages and from refugees during the Vietnam war. Introduction of nylon nets and ropes enables fishermen to construct new and better tools, like the big trap net (*Dong*), which is 40 m wide and up to 80 m long, or the drum shaped netcage traps (*Loob*), which are set up at the banks of the river. With the availability of engine equipped boats, bigger tools could be used and the area of fishery activities expanded. The introduction of big sized lift nets (*Sadung*), fixed on rafts (*Sadung ruea*) is also a recent development. According to the villagers, most successfully used tools today stem originally from Vietnam. The techniques were introduced during and after the Vietnam war, when refugees settled in the river basin. Villagers in Ban Pak Yam adopted the new techniques and developed them to meet their needs.

3.2. Pottery

At a small depression called Nong Ian people from Ubon Ratchathani dug clay and made pottery. To burn the pottery the local bamboo specie '*Kasa*' was used to generate high temperatures during the hardening process. The pottery was sold to the villages and districts nearby. Burning pottery stopped when a small dam was constructed to create a reservoir (Nong Ian) about 20 years ago (early 1980s) and the clay soil was drowned.

3.3. Using wood for construction, logging and charcoal burning

The villages floodplain forest area is located mainly on the northern side of the river around Nong Aeg. The area is not forested by big trees anymore, it is a bamboo forest nowadays. Other forested flooded areas were located on the river terraces of the river Songkhram.

In former times wood from the floodplain forests was cut to construct houses and boats. Hard wood used for construction was *Mai Hae, Mai Saeng, Mai Madan, Mai Kasin* and *Mai Kradon*. Today, there are only very few bigger trees left, and wood for houses and boats has to be bought in the district towns. Boats are often bought from Laos, brought to the village and reconstructed there to meet the quality needs of the villagers.

Photo 2: Reconstructed boats in the village

Beside using trees to construct boats and houses, the villagers used the annually flooded forest in former times to collect firewood for their own needs and burned small amounts of charcoal to be sold to middlemen or exchanged for rice and other necessities. Firewood was collected throughout the year. During the annuall flood villagers collected firewood from dead trees by boat.

Commercial logging and charcoal burning started around 1965 when the first outsider, a trader, set up rectangular shaped kilns and hired villagers to burn charcoal. In the beginning even elephants were used to tear the trees down and to transport them to the kilns. Soon other investors joined this business. The middlemen tried to meet the increasing demand in District and Provincial towns nearby. Eight families from Ban Pak Yam worked in this business as labourers since it started, one kiln was operated by two families. The kilns were dug into the ground near the slope to the river (convenient to set up the kiln, to get water and wood, and for easy transportation). They were rectangular in shape and thatched with flatted petrol cans. Besides villagers from Ban Pak Yam, also villagers from Ban Sam Phong and Ban Si Woenchai exploited the floodplain forest of Ban Pak Yam, either as hired labourers or in charge of their own kilns.

The village monk worked as a woodcutter and charcoal burner between 1974 and 1986 in the river basin. During this period the locations to cut wood changed every two years. Trees cut for charcoal and also for construction were mainly *Mai Blueai, Mai Krabau, Mai Krasin, Mai Saeng, Mai Khon Phueng, Mai Fueang Nam, Mai Si, Mai Hae, Mai Wa*. Until 1986 no restrictions for cutting wood or burning charcoal along the river existed. Since 1986 a fee of 1000 Baht has to be paid to the Governor.

According to another informant the governor tried to impose taxes on charcoal sales. Middlemen, investors, and richer villagers offered corruption money to the village headman, who had set up a local concession system to regulate the charcoal burning business on the villages public land. In the late 1970s this issue gained publicity due to reports in newspapers. The investors running the charcoal and logging business changed their strategies afterwards: they asked villagers to cut wood and erect houses - these houses then were bought by the investors and the wood was resold or burned to charcoal.

Income from charcoal was the second major income source. The wood cutting and commercial charcoal burning stopped in 1988/89 due to the lack of wood. Since the late 1970s chain saws enabled woodcutters to fell even the biggest trees like *Mai Hae* and *Mai Wa*, which were left over due to their hard wood and big size.

Now charcoal is mainly burned from trees growing in the rice fields or from fruit trees out of the backyard gardens in the villages and also from planted Eucalyptus trees. The charcoal is not sold outside the village, but some villagers are hired from richer neighbours to burn charcoal for them.

Photo 3: Charcoal kiln operated at the slopes of the river Lam Yam

Cooking with charcoal is still important in this part of Thailand. A lot of dishes are prepared in a barbecue style. Gas is not used to prepare sticky rice as it is more expensive than charcoal. But most households have a gas stove for heating and frying food.

3.4. Cultivating Rice

In the 1950s three villagers started to grow rice for their own consumption. One of these early rice farmers was a son of the first settler Nai Bunmi, the two others came from older villages nearby (Nai Roi Nakadchad from Sam Phong and Nai Su from Don Mongkol.

The rainfed rice fields (one crop per year) are still located on the second river terrace near the old road to Ban Na Dog Mai, about 1 km away from the river near Na Sae PatIn the early 1970s expansion of the villages rice land towards the village of Dong Kon Phueng in the south was initiated by one villager coming from Ubon Ratchathani.

Photo 4: Rice fields in the south of the village

10 years ago second rice crop farming was introduced to the villages supported by the former Governor. 20 families participated in that program when it started. Now 56 families have 2nd crop rice fields with irrigation facilities on low level land, where the second crop is planted during the dry season, when the flood water vanishes.

Even today, and despite the introduction of second rice cropping, rice yields are not sufficient for the village due to early or out of season floods which often destroy or damage the crops. Many families have to buy rice as staple food. In former times rice was exchanged against fish, fishery products, and charcoal.

Some villagers also stated during interviews that fishing generates more income and some indicated that they gave up rice growing due to the lack of family labour force and due to the insecurity of harvest.

3.5. Cash crops

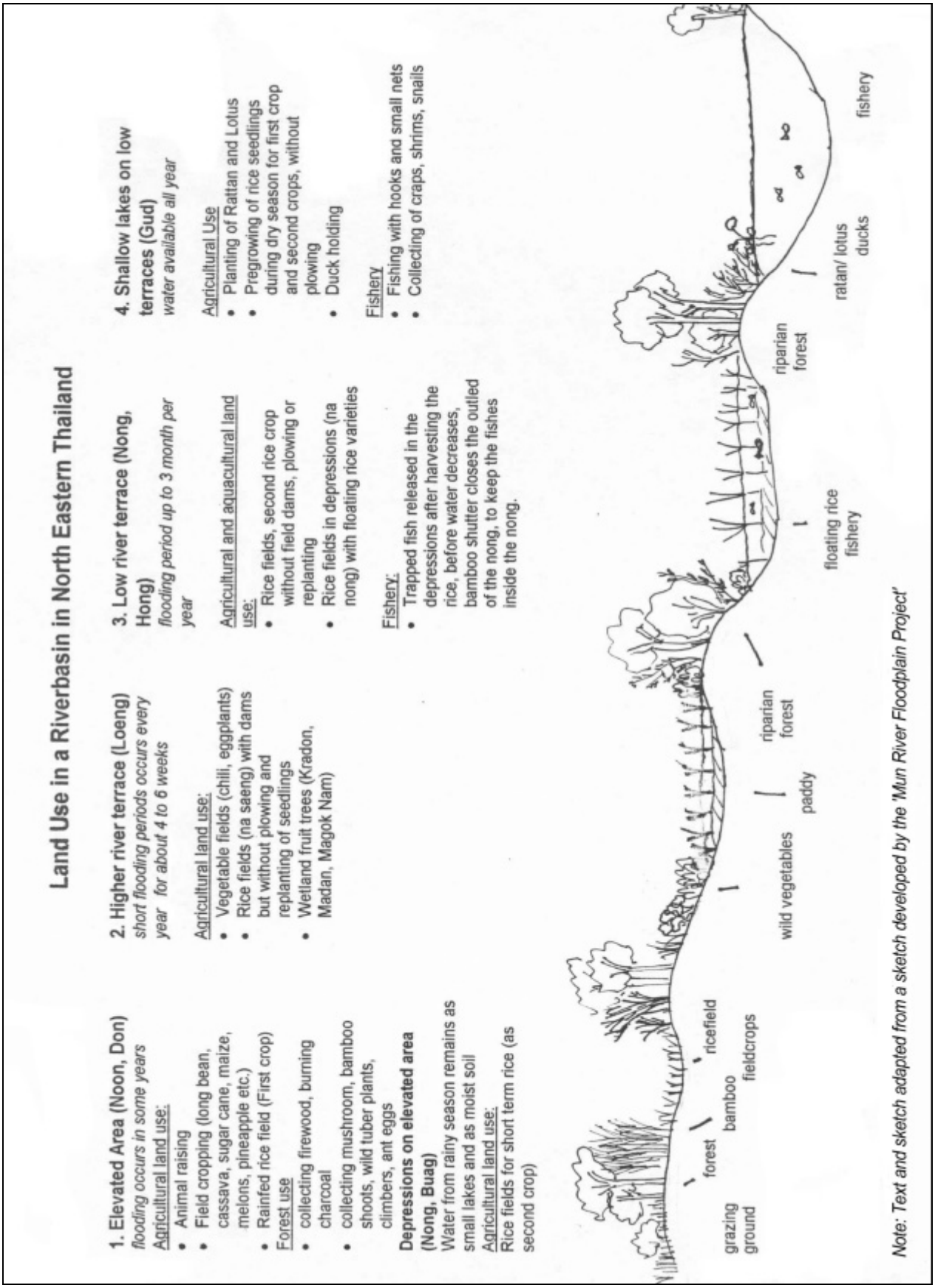
Cash crops introduced to the villagers since the 1970s were kapok trees, vegetable, cashew nuts, kenaf, cassava, cabbage, melons, long beans, groundnut, and eucalyptus. Neither of these crops have a significant influence on the land use on the floodplain. Some vegetables and groundnuts are grown as dry season crops on fields located in the public land area on the moist floodplain. Cassava is grown on higher level areas in other villages' areas, where people from Ban Pak Yam hold land but are not willing to invest much labour force or other investments because of poor soil conditions and low prices. Cassava growing is decreasing since several years in the region.

Vegetables are cultivated as a second crop for selling at markets or to middlemen. Additionally vegetable are found in the family yards to meet the daily needs. Also available in the yards are fruits (Mango, Lamyai, Coconut, Tamarind etc.).

More recently introduced land uses are tree plantations of eucalyptus and *Katin Thepa* (*Accacia mangium*) trees, supported by subsidies of the government. Farmers can also apply for land title deeds for areas under tree plantations.

4. The use of the floodplain and its products

Table 2: Land use in a typical northeastern riverbasin



4.1. Utilisation of lakes

The village areas occupied by water bodies (lakes, reservoirs, rivers) sum up to 550 rai or 88 ha. As mentioned above the water bodies in the flooded area are used as fishery areas and also for irrigation purposes.

4.1.1. Fishery

After the annual flood decreases in October water remains in small lakes and artificial ponds on the floodplain. This small lakes belong to the village's public land and the village headman is in charge for setting up an auction, where villagers can bid for the use of this lakes during the next seasons until it is flooded again in July or August.

The bidding prices depend on the size of the lakes and also on their richness of fish, according to villagers experiences. The initial bidding prices are set up together at a village meeting. In September bidding is done secretly. Single bidders or bidding groups, suggest a price, higher than the initial bidding price, written on a piece of paper together with the bidders name, submitted into a ballot. The fisherman or the group of fishermen who offered the highest price will get the concession. Initial bidding prizes set up for 1997/98 are ranging from 500 Baht for smaller lakes up to 1000 Baht for bigger ones.

Villagers holding concessions on small lakes identified 14 fish species commonly caught in this kind of lake and in the river and 21 more seldom caught species. Fish caught in this lake are most commonly *Pla Chon* (Snakehead Fish) and *Pla Duk* (Catfish).

In the shallow lakes fish are caught by cast nets and other nets which are dragged through the water by several people as well as with bare hands. In the deeper lakes or earlier in the season, common nets, rots, trap nets, lift nets, sawing etc. are used. In December the shallow lakes are pumped empty and all fish remaining in the mud are caught by hand or with nets erected in front of the pump. At the edge of the lakes small freshwater shrimps are caught, and snails are collected from the mud.

Photo 5: Sorting the catch of a day in a family compound

Fish are then brought to the families yard, sorted according to species and size. Bigger fish up from 200 gr are sold to middlemen or to other villagers, smaller and less valuable ones are used to produce fish sauce (*Pla Ra* and *Nam Pla*) or to be sold as grilled fish.

4.1.2. Irrigation of rice fields for the second crop

Near the oxbow lake Nong Aeg 40 families maintain rice fields for the second rice crop during the dry season. The Irrigation Department subsidies these farmers with pumps and the digging of canals to irrigate the fields if it is necessary. The water is pumped out of Nong Aeg into the fields. But not every year the second rice harvest is successful. The area on the floodplain is endangered by occasionally out of season flooding, if this happens, the crop will be destroyed.

Due to the issuing of SPG land title deeds, villagers will expand the cropping area on the floodplain. Recently cleared areas are found in the floodplain bamboo forest. The issuing of the documents is pending, since measuringof the patches had do be done repeatedly due to shifting application areas.

In Ban Pak Yam SPG land was not sold to outsiders before the issuing of the documents as it happened in other villages nearby. The villagers refused to sell when investors came into the village. They did not want to sell the land, since the documents were not issued yet and only little money was offered (100 Baht/rai). Villagers believe that the investors are related to the Asiatech / Suntech Company, which is part of a bigger conglomerate of various companies operating in the Songkhram River Basin. The people of Ban Pak Yam want to keep the land, so they can use it for collecting bamboo shoots and vegetables. Additionally they will be able to ask for refund if the land will be permanently drowned because of the planned weir at the river mouth.

4.2. Use of the floodplain as grazing ground for cattle

In the village 15 families raise cattle which is supported by the Agricultural Extension Office in the District. There are about 100 cows in the village. Cattle is raised for meat, not for milk. During the dry season, when the water level in the river is low, the cattle is guided through the river to the public land. There the animals find abundant grazing grounds. Also water buffaloes are brought there. In the village 22 families own together about 80 buffaloes. During the flooded season, cattle and buffaloes are fed with hay harvested on planted meadows. If feeding with hay is not sufficient, they are brought to the non-flooded land on higher level areas and neighbouring villages.

4.3. Use of the floodplain vegetation for handicrafts and tools

Note: list of utilised plants is attached as Table 5

In the village two elder women are producing roof thatches made from a special local grass specie (*Ya Faeg*). It grows naturally on the floodplain on public land and around the village. The women get up to 10 Baht per thatch sheet and they produce approximately 100 sheets per season, which lasts from November to December. *Ya Faeg* was promoted in the early 1990s by the King of Thailand to prevent erosion on dams and at all kinds of artificial and natural slopes. In this area villagers do not plant *Ya Faeg* against erosion or as resource for thatch making.

Other kinds of grass are used to weave mats (*Ya Phue* and *Ya Lai* or *Ya Gog*), hats, and baskets to store sticky rice. This is done by women and mainly for their own needs, or in exchange against other handicrafts or food and not for sale.

All kind of bamboo and shrubs like *Don Ben* are used to produce traps and fishery tools mostly by men. Leaves of a climber are used to make a dye for nets. A special fish trap, called '*kha*', is shaped like a huge basket made of flexible branches and bamboo weaving. The *kha* is fixed on the bottom of a river, pond, or shallow lake. Branches of bamboo are put into the mouth of the *kha*. This will attract small fish and shrimps which hide there. To harvest the catch out of a *kha* the whole tool is lifted on a boat and fish are collected from a small attached net, which is fixed at the small end of the *kha* and secured by a wooden shutter.

Thorns of a shrub (*Don Nam Khe*) are used as toothpicks or as a tool to eat snails from the floodplain. Gras, bamboo branches, and soft branches of various shrubs are used as binding material to carry tools and to create a selling unit of collected mushrooms and small fish. Leaves are used to wrap insects, ant eggs, larvae, shrimps, and fruits collected. Branches of various shrubs are burned over fires to create a good smell. Flowers like the flowers of the shrub *Don Intahua taam* and orchids found in the natural vegetation on the floodplain are used for religious and cultural purposes and also for decorating home gardens or for women outfit.

4.4. Use of the floodplain vegetation as a food resource

Note: list of utilised plants is attached as Table 5

The floodplain and its vegetation is often compared with the traditional food storing cupboard, a 'freezer' or a 'supermarket' by the villagers. To enrich the daily diet villagers bring home various leaves, fruits, flowers, mushrooms, and roots, which are eaten fresh or used with curry dishes. Even during the flooded season people collect these vegetables and bamboo shoots by boat.

Most important eatable plants are bamboo shoots, the floodplain mushrooms, and leaves of *Mai Kradong*, which are eaten fresh. These plants are also sold to middlemen and on the markets surveyed.

The following summarises information obtained during interviews with villagers, vendors at districts markets, and middlemen.

4.4.1. Bamboo shoots

Collecting of bamboo shoots for selling starts mid of January, the most and best shoots are available from mid of April to June. In July, when it rains a lot and the water level of the Mekong rises, the flooding of the floodplain starts and collecting shoots gets harder. Shoots now mainly are collected to meet the families' needs.

In the early season people collect the real shoots and also the sprouts at the branches. In 1997 the middlemen paid 10 Baht for the shoots and 8 Baht for the other sprouts. In the peak season, when the shoots are more easy to find, the prices decreased to 2 or 3 Baht per kg. In 1997 more middlemen than in the former years came to the village. Due to this competition the prices for shoots raised again to 3 and 4 Baht per kg. A good collector can get 10 to 15 kg per day in the early season, and up to 40 kg in the peak season, which is equivalent to a daily income of 120 Baht, but one couple in the village collects bamboo shoots worth 300 to 400 Baht per day throughout the season. In Ban Pak Yam people from about 40 households collect shoots professionally, but most households use self collected shoots for curry dishes at home.

Photo 6: Trader buys bamboo shoots and other floodplain products in the village

Some professional bamboo collectors stop collecting during the peak season when the prices are too low. Others collect the shoots but process them first before they resell the sour fermented shoots or canned shoots at a better price.

Throughout the season, middlemen from Ban Na Dog Mai come to the village every day. They resell the shoots to other traders from province towns of northern Isan. During the peak season up to 6 middlemen from other provinces come to buy. Additionally, in the village one women buys shoots to resell them to middlemen coming from Akat Amnuai, Kalasin, and Sakon Nakhon.

A middlewoman coming from Kalasin stated that she resells bamboo shoots to various provincial markets and also to a bamboo shoot canning factory in Khon Kaen. During the peak season in April, May, June, and July she buys 1000 to 3000 kg of shoots per day in Ban Pak Yam and three other villages nearby. When the supply is high she has to come twice to the area to transport all the shoots to the markets. On Saturdays and Sundays more shoots are collected and sold because many students from the villages also go out to collect shoots to gain an extra money.

On the district markets shoots from *Kasa* bamboo are sold in various forms up from December: fresh, peeled and cut, sour fermented, canned, or burned. Also ready made curry is available.

4.4.2. Mushrooms

The second important good for professional gatherers is a mushroom specie called *Hed Phueng Taam* (literally translated 'Floodplain Honey Mushroom'). Mushrooms are much rarer than bamboo shoots at the markets, but the prices are high with 60 to 80 Baht per kg. Villagers collecting shoots collect mushrooms too, selling them to the same middlemen who are buying bamboo shoots. In June and July mushroom collectors can find up to 2 kg per day.

4.4.3. Wild vegetables and fruits

4.4.3.1. Leaves of trees and shrubs

Vegetables gathered on the floodplain are leaves of trees like *Pak Kradon*, which is eaten fresh with the local minced meat or fish dish '*Laab*'. *Pak Kradon* is sold all over the year and a grip (150 gr.) costs only 1 Baht.

Other leaves from trees or shrubs eaten as vegetables are collected from *Don Mai Madan, Mai Huling, Mai Som Gung, Don Mai Kon Phueng, Don Mai Ben, Mai Kakog, Mai Kanchang, Mai Muead Ae, Mai Gluai Noi,* and *Mai Saeng*.

4.4.3.2. Leaves from annual climbers, climbers, ferns, and weeds

Wild vegetable are also collected from various plants growing in shallow water like lotus, *Pak Bung*, *Pak Wen*, *Pak Kha Chap,* and *Pak Khi Bor*.

Smaller plants growing on the ground or climbers used as wild vegetables are ferns like *Pak Gud*, climber like *Kruea Lam Duan, Kruea Sa Mak Lod,* and small weeds like *Pak Hai Gai* and Pak *Khi Khom Khi Som*.

4.4.3.3. Eatable flowers

Also used as wild vegetables are flowers of some trees and climbers growing on the floodplains. Examples are flowers of *Mai Khae Ba, Mai Lin,* and *Mai Kradon* and of the climber *Kruea Lam Duan*.

These vegetables are also found on the District markets. They are very cheap, mostly one grip or bunch, enough for one dish, costs one or two Baht.

4.4.3.4. Fruits

For villagers fruits from the floodplain are less important than the plant parts used as vegetables. The fruit of *Makog*, which is sold at the markets, is used with the local variation of the Green Papaya Salad - a daily dish in Isan. Fruits collected by villagers in the floodplain forests are from Lotus, from the trees *Mai Gluai Noi*, *Makog*, *Mai Saeow*, *Mai Huling*, *Mai Madan,* and from the waterweed *Pak Kha Chab*.

4.4.3.5. Tuber

People use only one wild tuber plant from the floodplain. This is called *Man Saeng*, tubers are like a sweet potato. It was found only twice at the district markets.

4.5. Wild animals used as a food resource

The floodplain and its vegetation is also a rich and diverse habitat for all kind of animals. Humans always used this resource to hunt and collect animals for their protein supply, but also for their skin, fur, and products like wax, honey, and eggs.

Wild food from smaller animals, especially from insects, still provides a daily protein supply in the diet of the rural population since this resource is easy to exploit by everybody. At the markets products like insects and small water animals are very cheap compared to fish or meat.

4.5.1. Hunting wild animals

In former times, when the floodplain was still a lush and dense forest, people hunted mammals, birds, and even crocodiles there.

4.5.1.1. *Mammals*

Tigers were hunted, especially when they threatened villagers and their animals. The meat was also eaten, an old woman compares it with beef. The meat of the tiger was shared between the families of the hunters. Those with pregnant wives got a bigger share, because it was believed the husbands need more strength.

Other mammals hunted were deer, wild pigs, foxes, monkeys, squirrels, and bamboo rats. Today people still hunt squirrels and bamboo rats for their own consumption.

4.5.1.2. *Birds*

In former times, birds were abundant in the seasonally flooded forests, especially during the flooding season when migrating birds like the Chinese Igris visited the floodplain for mating and breeding. Birds were hunted for their meat, especially wild ducks and wild chicken. According to villagers, today birds are very seldom seen in the floodplain, and some species like *Nog Gala Ga Nam* are already extinct.

Also all kinds of bird eggs were collected. Some villagers still collect eggs from wild birds. These are not sold but consumed as a special and rare food in the village. Birds are still hunted with guns in the rainy season and during the decreasing water period.

4.5.1.3. Reptiles

More than 40 years ago, outsiders hunted crocodiles in the Songkhram river area. These hunters killed the crocodiles for their soft skin at the belly. The dead animals were left at the river banks and villagers ate their meat. As one elder woman recalls, there where years when villagers had at least one crocodile per day.

Other reptiles, besides crocodiles and snakes found in the floodplain, were lizards and turtles. They were all hunted and are extinct or very rare today. If people find lizards they catch them to eat them. Turtles are caught and sold on the markets. Customers set them free to make merit.

People still hunt cobras and a snake called *Ngu singh* (Lion snake). *Ngu singh* is occasionally sold at the district market in Akat Amnuai. One snake, up to 1,50 m long, costs 80 to 100 Baht there. Snake meat is considered very delicious.

4.5.2. Collecting smaller animals

4.5.2.1. *Insects*

Insects and insect eggs are a traditional food resource, especially in Isan. On the floodplain people collect all kind of beetles and larvae of beetles (*malaeng chuchi*). Waterbugs, grasshoppers, and crickets are also eaten and a very common ingredient for egg dishes and sour salad dishes are *khai mot daeng*, the eggs and larvae of red ants. All kind of insects and larvae are sold at the markets, either fried or raw. Prices are low from 1 to 5 Baht per selling unit which are mostly a pile on a leave, about 100 to 250 gr.

Photo 7: Insects sold at the district market

Honeycombs are found in bigger trees on the floodplain. People use the honey but also the combs with the eggs and larvae as a delicious snack. Pieces of honeycombs with honey and larvae are more expensive, a 8 cm x 8 cm patch costs 12 Baht on the market, 0,5 l of wild honey about 60 Baht. Wild honey and bee larvae from floodplains were found only once on the markets. In the village, when people collect honeycombs from the floodplain, it is considered as a special food and used at home or is given to neighbours.

4.5.2.2. Shrimps and snails

Snails, mussels, and shrimps are easy to find and to collect at the banks of the lakes and rivers as well as on the floodplain when the flood decreases. Small freshwater shrimps are collected with bare hands, small lifting nets, or baskets. Snails and mussels are picked up from the vegetation and from the moist soil. These animals are used in the village for home consumption, are given to neighbours, or are sold. Big snails are sold at the markets for 5 to 10 Baht per kg, shrimps and smaller snails are sold on leaves in units of approximately 200 gr for 5 Baht.

4.6. Floodplain vegetation as a resource for traditional medicine

Note: list of utilised plants is attached as Table 5

Treatment with traditional herbal medicines is carried out by special people called Mo Ya Samut Phrai (Herbal Doctor). Treatment involves special rites and offerings, otherwise it is not supposed

to help. Knowledge of traditional medicine has to be acquired by training from elder experienced and spiritual powerful healers.

In Ban Pak Yam the traditional healers do not use plants from floodplains for their cures as only few different plants remained on the villages floodplain. But another well known local healer from a neighbouring village uses trees and climbers from the floodplain to prepare treatments. Examples are *Mai Krabau* (corewood, seeds, bark), *Mai Saeng* (corewood, bark, roots), *Mai Huling* (corewood, leaves, roots), *Mai Gluai Noi* (roots), and wild tamarind (roots).

In Ban Pak Yam and the adjoining villages some species of the floodplain vegetation are used especially by elder people for traditional medicine and emergency treatments. But medicines derived from vegetation on higher level are often considered as stronger.

Common knowledge in the village for wound treatment is the application of chewed leaves from *Mai Ben* to stop bleeding. Ground branches of *Mai Ben*, mixed with water, can be drunk against diarrhoea. Other remedies against skin infections and parasites (mites) are produced with ground and soaked bark of *Mai Khamek* and *Mai Kradon*. Roots and core wood *of Mai Saichu* are used to produce a dilution against furuncles. Fever can be treated with a dilution of ground roots from different trees, including *Muead Ae* roots. Wood and roots of a climber, *Kruea Samak Lod*, is used against jaundice.

5. Fishery activities in the rivers

Fishery is the most important source of income in the village, and the settlement was established due to the rich fish resources in the rivers. In an ongoing research on fish biodiversity in the Songkhram River Basin 131 species were counted.

Fishery in Thailand is forbidden during the close season between mid of May to mid of October. Fishermen in the Songkhram River Basin now want this close season regulation to be better adapted to the local conditions. They argue that the spawning and hatchery season in Northern Isan starts one month earlier as well as the rainy season starts about one month earlier than in the Central Region.

Fishery activities are adapted according to the financial power of the fishermen, the season, and the locations. There are different tools used in various sizes and shapes.

Fishery tools are made from natural materials like bamboo and soft branches of shrub. Nowadays nets are made from nylon, but they are usually not bought ready made. Therefore a special occupation in the village is the preparing and manufacturing of the nets, traps, hooks, and boats for the various fishery activities. Smaller tools like *Bet*, *Loob*, and *Hae* are manufactured and prepared by the fishermen themselves, but special professions are reconstruction of boats, manufacturing of big *Dong*, and the construction of big bamboo traps like the *Loob uan* and *Kha*. The craftsmen take orders to process special tools before the season starts, and they are very busy to finish the orders from people in- and outside the village before the season starts. With their special crafts they gain additional income to that earned by fishery.

5.1. Fishery tools using nets

5.1.1. Lifting nets (*Yoo, Sadung,* or *Kradung*)

Up from November on the rivers Yam and Songkhram big lifting nets attached on rafts (*Sadung*

yai) with a shelter hut are operated. The rectangular nets measure up to 12 m at one side and are fixed at a bamboo structure which can be lifted by one person. Smaller lifting nets are also operated by hand in shallow ponds and lakes (*Yoo*).

Photo 8: *Sadung ruea* in the Songkhram river

5.1.2. Dang

In lakes and ponds nets are laid on the ground and lifted with the help of several people. Fish are collected out of the net by hand or with baskets (S*um*).

5.1.3. Mong Yang

Big gill nets are fixed on both sides of a river upstream and downstream from the confluence with a tributary. Fish are trapped by the nets and caught out with lifting nets, baskets etc. Using this kind of net is against the fishery law, because it blocks the course of the fish.

5.1.3.1. Chasing fish with boats and nets (Tum mong)

A gill net is fixed either between two boats or in the water body and the fish are chased into the net by making noises on the water surface with iron sheets or pieces.

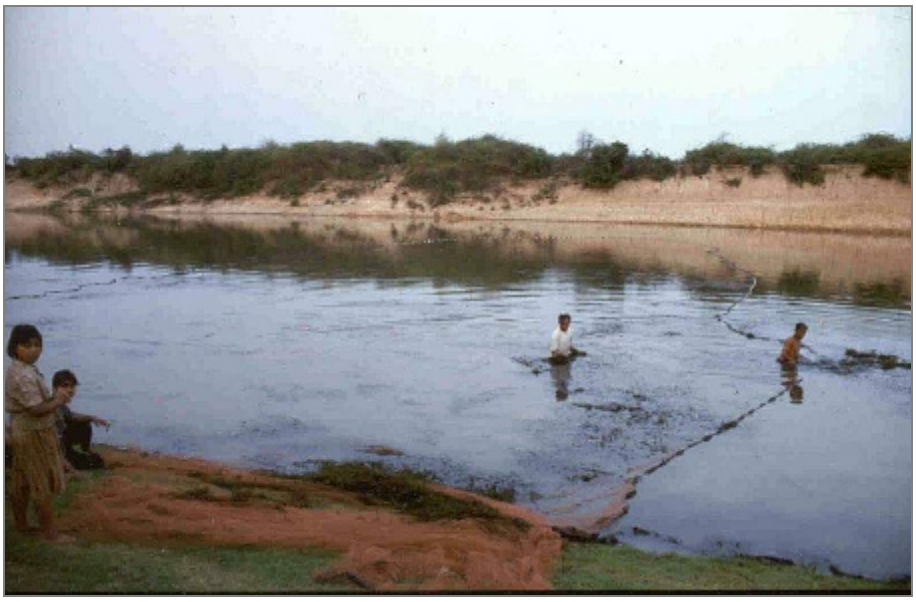


Photo 9: *Tum mong* in the Songkhram river

5.1.4. Dong

Dong is a big conical, bag like net up to 40 m wide and 80 m long. It is set only 12 days per year at various places along the Songkhram river. During the high water period it is also used at outlets of reservoirs and in smaller tributaries. It is used by many families at the Songkhram when the water decreases. The *Dong* is fixed on both sides of the river and it is dragged down to the bottom by stones. By law this tool is not allowed to use, since it is said it blocks the fish migrating paths.Oral agreements between the local extension of the Fishery Department and villagers exist.

5.1.5. Hae

Small round cast net, operated by one person. It is thrown flat on the water, fish are caught under the net.

5.1.6. Sawing

Small round net fixed on a ring operated by one person like a sieve.

5.2. Fishery tools and traps made of bamboo

5.2.1. Dum / Sai

Small fish traps made of bamboo. It is used with bait in shallow water ponds and in rice fields.

5.2.2. Loob

Loob is a drum shaped netcage trap. The opening is over the whole length of the cylinder. In former times instead of nets a bamboo woven structure was used. *Loob* is set upright on the river banks between bamboo poles. *Loob* is used during the increasing water period up from June to September. *Loob* are approximately 1,6 m high and 0,8 m in diameter.

A variation is the *Loob noon*. It is made from bamboo, the opening is at the round bottom. *Loob*

noon is laid on the water ground in the floodplain during the decreasing water period. *Loob noon* is more than 3 m long and 1,40 m in diameter.

Photo 10: Manufacturing of *Loob noon* in the village

5.2.3. Kha

Big basket-like structures of bamboo, which are set on the bottom of still water (river, lakes, ponds). The *Kha* is filled with branches of bamboo and Mai Ben to attract small fish and shrimp as a shelter. A shutter keeps the baskets closed, it is lifted to wash the caught animals out.

Photo 11: *Kha* fish trap

5.2.4. Tong

This is a huge bottle shaped bamboo trap, sometimes up to 3 m height and 1,5 m wide, set upright between bamboo poles in deeper water. Fish are attracted by bait and enter the *Tong* from the bottom. *Tongs* are used downstream at the Songkhram river and at the banks of the Mekong.

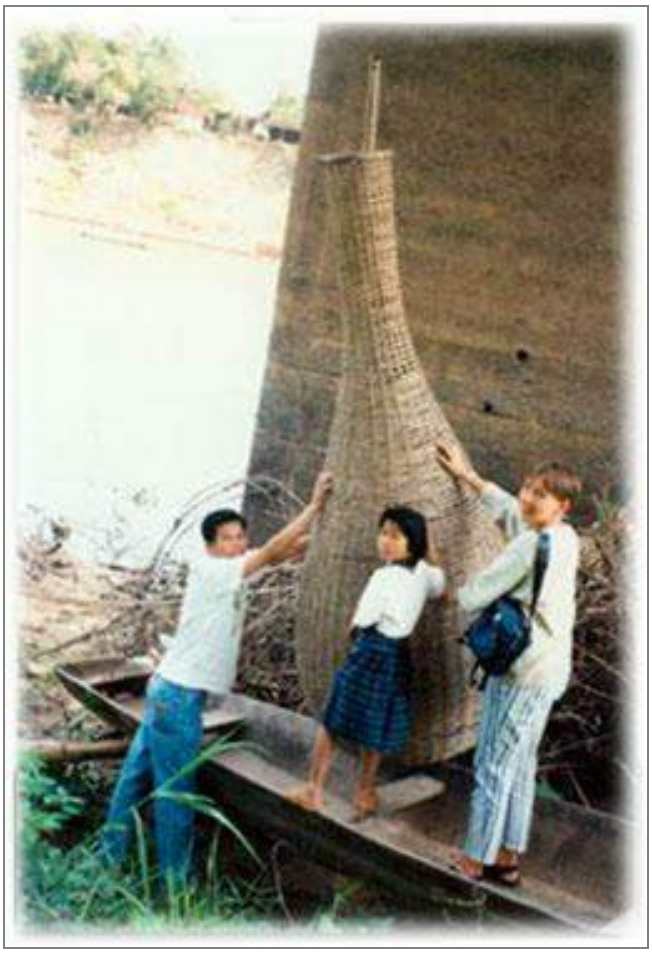


Photo 12: A *Tong* at the riverside near Chaiburi

5.2.5. Chon

Chon is a bottle shaped bamboo trap up to 1,5 m long, with a trap shutter at one small end. It is used in still water.

5.3. Fishing lines and rods (Bet rau, Bet)

Bet are single fishing lines either fixed on a rod or as *Bet rau* it is used with multiple lines on long horizontal ropes, spanned over the water surface. Baits are fixed on metal fishhooks.

6. Calendar of selected agricultural and fishery activities

The following table is a summary of observations and information given during interviews. It is not complete, but shows the season of the most important activities, giving an overview of different land and water uses according to the season and the environmental setting.

Due to the diverse natural resources used by the villagers the scale of the land and water use is adapted to the real seasonal conditions and it is not fixed at any rate. For example, when the rainy season is delayed, rice planting starts later. The fishery calendar depends on the water level and on the behaviour of the migrating fish, highly influenced by the Mekong water regime downstream and by rainfall and water use for irrigation upstream.

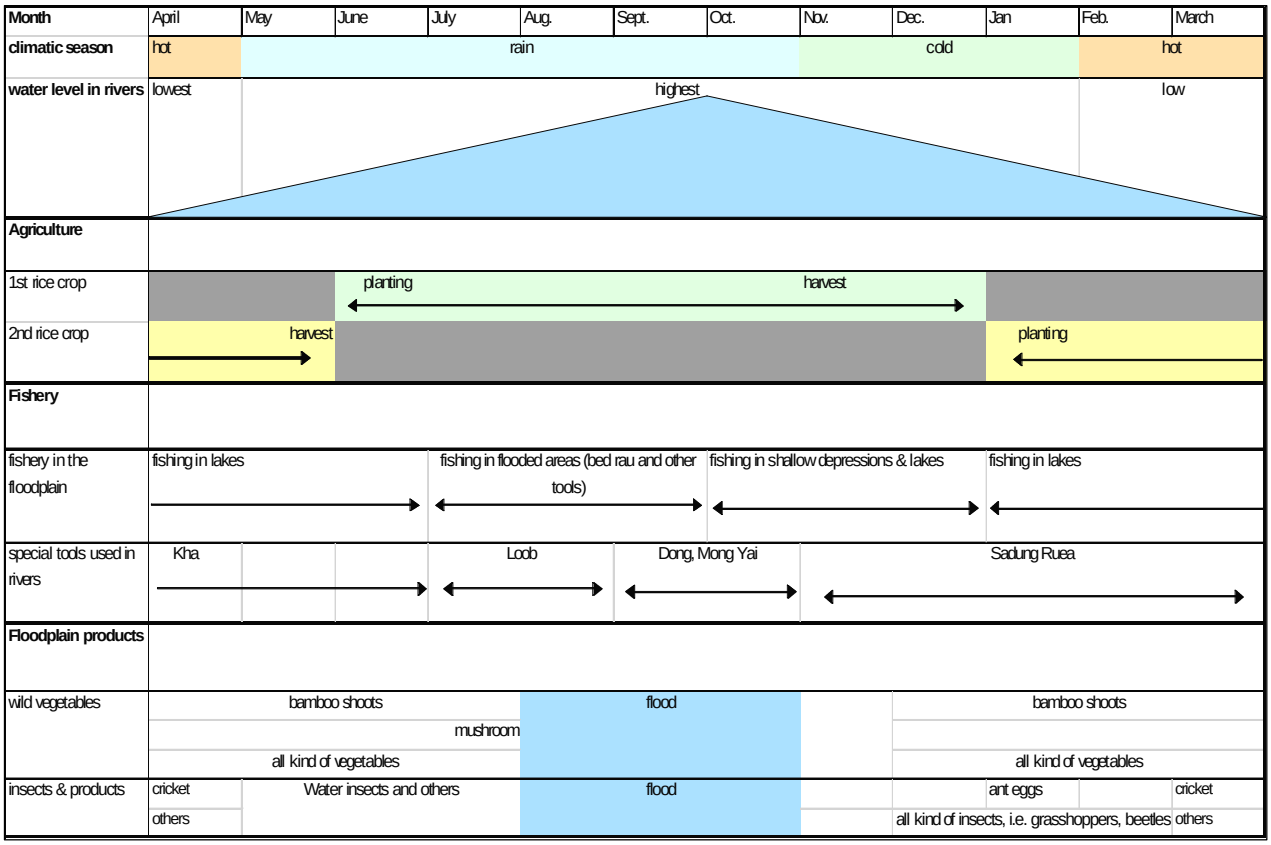
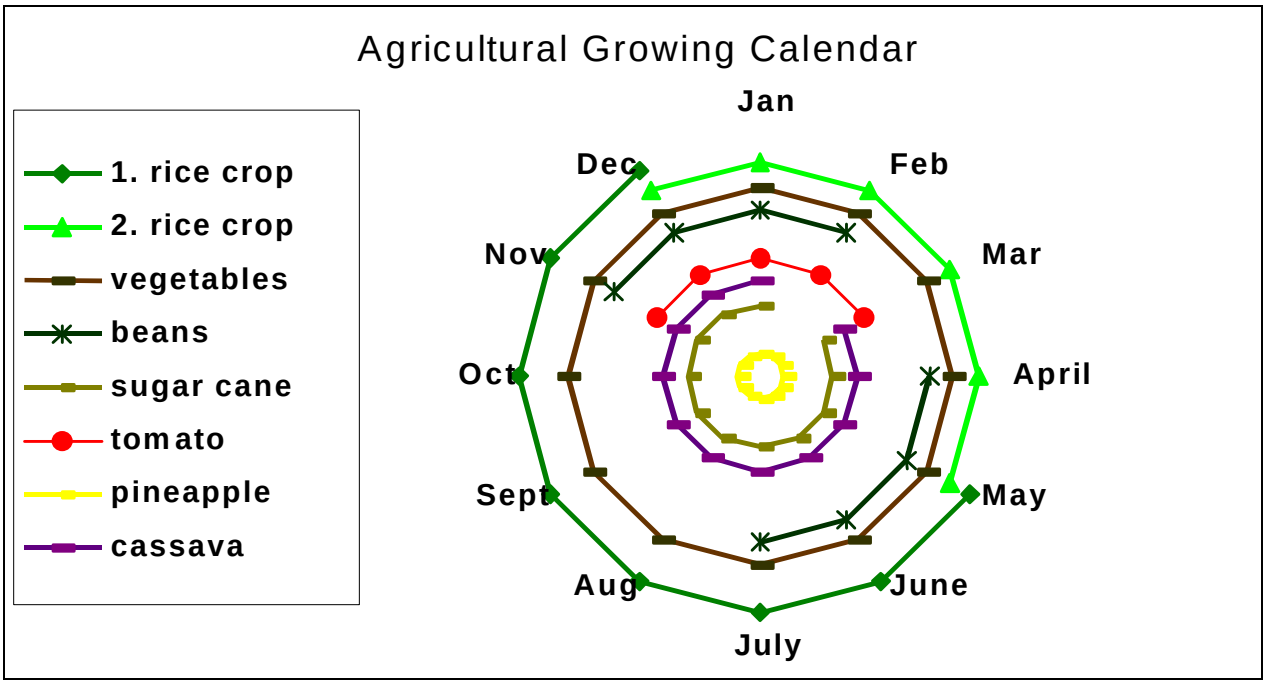


Table 3: Seasonal calendar of selected land and water use in Ban Pak Yam

A more general calendarian cycle of agriultural activities is given in Table 4. It includes also activities in upland areas which are not affected by annual floods.

Table 4: Calendar of agricultural activities in the Nam Songkhram Basin



7. Summary of utilised plants from the floodplain vegetation

At the end of this report a table summarises the information on the use of the floodplain vegetation. More photographs and information on the vegetation structure and biodiversity are available in the final research report of Ms. Wangworn Sangkamethawee.

Table 5: Use of floodplain vegetation - list of plants

Thai name	Scientific name	Family	Habitat	Utilisation			
				Construction	Food	Medical use	Others
Khi Khom, Khi Som	*Glinus sp.*	Aizoaceae	water weed		leaves		
Makog	*Spondias pinnata*	Anacardia-ceae			leaves, fruits		
Gluai Noi	*Rauwenhof-fia siamensis (Scheff.*	Annonacea	tree, shrub		leaves, fruits	roots	
Gud	*Athyrium eseulentum*	Athyriaceae	fern		leaves		
Kradon	*Barringtonia acutangula (Gaertn.)*	Barringto-niaceae	tree	wood	leaves, flowers	bark	
Khae Ba	*Dolichan-dron serru-lata*	Bigno-maceae			flower		

Thai name	Scientific name	Family	Habitat	Utilisation			
				Construction	Food	Medical use	Others
Saisu taam	*Capparis radula (Gagnep.)*	Capparaceae	scandent (?)			roots, core-wood	
Kanchang	*Maytenus mekongensis Ding Hou*	Celastraceae	shrub		leaves		
Ben, Ben Nam	*Combretum trifoliatum Vent.*	Combreta-ceae	tree, shrub		leaves	leaves	branch. for fishery tools
Fueang Taam		Combreta-ceae	tree shrub				charcoal
Ka Chap	*Xanthium strumarium Linn.*	Compositae	herb		leaves, stem, fruits		
Bung	*Ipomoea sp.*	Convolvi-laceae	annual c. (waterplant)		leaves, stem		
Lam Duan	*Ipomoea sp.*	Convolvu-laceae	annual climber		leaves, flow-ers		
Ya Gog, Lai	*Cyperus sp.*	Cyperaceae	gras				hats, mats
Ya Phue	*Cyperus sp.*	Cyperaceae	gras				mats
Lin Haet	*Tetracera scandens Merr.*	Dilleniaceae	climber		flower		
Man Saeng	*Dioscorea sp.*	Dio-scoreaceae	herbaceous climber		tubers		
Saeow	*Elaeocarpus hygrophilus*	Elaeocar-paceae	tree		fruits		
Kabau	*Hydnocar-pus anthel-minthicus (Pierre)*	Flacourtia-caea	tree			core-wood, seeds, bark	charcoal
Phai Kasa	*Bambosa sp.*	Graminaea	shrub		shoots, sprouts		branches for fishery tools and as wood for pottery,
Ya Faeg	*Veliveria zizanioklea*	Gramineae	gras				roof thatch
Madan	*Garcinia schom-burgkiana Pierre*	Guttiferae	shrub, tree	wood	leaves, fruits		
Huling	*Hymenocar-dia wallichii (Tul.)*	Hymenocar-diaceae	tree, shrub		leaves, fruits	corewood leaves, roots	

Thai name	Scientific name	Family	Habitat	Utilisation			
				Construction	Food	Medical use	Others
Hae	*Crudia chrysantha (Schum.)*	Leguminosae – Cae	tree	wood			charcoal
Kon Phueng	*Cynomedra craibii (Gagnep)*	Leguminosae-Cae	tree		leaves		charcoal
Blueai, Blueai Nam	*Lagerstroemia sp.*	Lythraceae	tree, shrub				charcoal
Muead Ae	*Memecyclon pauciflorum Bl.*	Memecylacaea	tree		leaves	roots	
Nam Khe	*Maclura cochinchinensis Corner*	Moraceae	scandent		leaves		thorns as toothpick, needle
Wa	*Syzygium sp.*	Myrtaceae					charcoal
Kamek	*Syzygium sp.*	Myrtaceae				bark	
Bua	*Passiflora foetida (Linn.)*	Passifloraceae	waterplant lotus		stem, seed		flower
Intahua Taam	*Gardenia sp.*	Rubinaceae	shrub				flower ornaments
Kasin	*Schoutenia ovata (Korth.)*	Tiliacea	tree	wood			charcoal
Saeng	*Xantophyllum lanceatum (Mig.) J.J.Smith*	Xanthophyllaceae	tree	wood	leaves	core-wood bark, roots	
Hai Gai			weed		leaves		
Khi Bor			waterplant		leaves, stem		
Samak Lod			climber, liana		leaves	wood, roots	
Si							charcoal
Som Gung			shrub		leaves		
Wen			fern		leaves, stem		

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