

6 The role and importance of living aquatic resources to rural livelihoods

In most rural parts of the lowland plains, as well as in much of the uplands, fish and other aquatic animals provide between seventy and ninety percent of the animal protein in people's diet. For many of these people, not yet or barely in the cash economy, there is no affordable substitute source of protein." (Claridge 1996, p.10)

People here have adapted their lives according to the cycles of the Mekong and the fish. Everything depends on fish...because fish give us strength - (Say Singsouvan in Baird 1996)

6.1 Introduction

As the two opening quotes reveal, there is growing recognition of the important role that living aquatic resources play in rural Lao communities. However, there is a dearth of knowledge on the specific role and function of these resources. The previous two chapters outlined the broad scale influence of environment and economics to the development of aquaculture in each of the study districts. This chapter investigates the importance of living aquatic resources for rural livelihoods in rural communities with specific attention given to the relative contribution of aquaculture and capture fisheries. This leads directly on from Bebbington (1999) who argues that contribution should be divided into (a) the instrumental role - providing nutrition and income, and (b) the hermeneutic role - the ways in which aquaculture and capture fisheries give meaning to people's lives. Living aquatic resources are therefore analysed in terms of daily sustenance and socio-cultural embeddedness of rural people that influences management and development directions.

The role of living aquatic resources in rural livelihoods can be represented in a variety of ways. In government and non-government development organisations different methods are used. Nonetheless, they are mainly concerned with the instrumental roles that can be quantified and easily communicated – a point taken up in the next chapter. First, this chapter looks at how the role of living aquatic resources can be represented and how these representations influence the perceived importance of culture and capture fisheries in rural communities. The following compares fish consumption and livelihoods analysis, two common institutionalised representations of living aquatic resources, with

more nuanced cultural, social and political representations which to date have not been incorporated into planning and policy. This is an important consideration in Laos where there is a dearth of empirical measurement and analysis of living aquatic resources. Past research has predominantly focused on quantitative measurements that are easily incorporated into traditional fisheries assessments. The wider meanings of living aquatic resources are rarely considered. However, as the following shows, these nuanced representations are inherently political and often communicated to policy makers in lieu of strong empirical data.

This chapter therefore challenges wider orthodoxies of living aquatic resources development by comparing material and discursive measures of importance. These orthodoxies include: (i) aquaculture as a means of providing a basis for rural development and poverty alleviation; and (ii) aquaculture as an alternative to declining capture fishery resources. Questioning these orthodoxies with empirical research is central to the critical political ecology approach adopted by this thesis. By developing a better understanding of human-environment interactions questions can be formulated that consider how and why knowledge of aquaculture and capture fisheries has been produced and reproduced. Inherent within this knowledge is the dichotomy between simple (linear) and complex (multi-linear) ecologies of human-environment relations. The following compares consumption, livelihoods and wider political processes, providing a more complex methodology of measuring, reporting and communicating society-environment relations.

The chapter builds on the theoretical framework of a geography of living aquatic resources by incorporating key themes of complex social-ecological systems and livelihoods analysis, both outlined in Chapter Two. The common link between these two frameworks is vulnerability and resilience: two concepts that incorporate analysis beyond single equilibrium, recognising the importance of wider social, cultural and political influences. A *sustainable* rural livelihood is one that is resilient to change by spreading risk over a number of activities (Ellis 2000). The notion of vulnerability incorporates more than material measures such as consumption, now including wider notions of well-being and freedom (Sen 1999). In the context of this chapter these concepts include the multiple equilibriums of human-environment interaction, influenced by wider social and cultural processes of power and knowledge within communities. As

such, this chapter is the focal point of the thesis, providing an empirically textured understanding of living aquatic resources in rural Laos.

The first section outlines the methodology of the three empirical sections of the chapter. The next section gives a detailed background to the six communities studied. Section 6.4 begins the empirical analysis by outlining the results of one of the first longitudinal fish consumption surveys conducted in the country. Section 6.5 then presents the results of the livelihood analysis moving away from purely quantitative measures to an understanding of culture and capture fisheries within the wider portfolio of activities of rural communities. The third empirical analysis, in section 6.6, then outlines the wider importance and embeddedness of both culture and capture fisheries in rural Lao communities. Attention is given to how social, cultural and political meaning influences the extension and management of both activities within rural communities.

6.2 Methodology

Two research methodologies are used in this chapter to contrast the instrumental and hermeneutic role of living aquatic resources. The first is a quantitative survey of fish consumption, while the second is based on qualitative interviews and observation, incorporating participatory research techniques, focus groups and semi-structured interviews. Both were employed over several visits to six communities who took part in field studies from November 2001 to December 2002.

Representative sampling was an important issue due to time and access constraints of working with rural Lao communities. Each community was identified in collaboration with provincial and district DLF staff. Villages were selected on the basis of previous contact with aquaculture development projects and the diversity of environments within each district. Permission to work with the communities was granted by the village committees. Within communities households were purposefully sampled so as to identify information rich cases.

6.2.1 Fish consumption survey

The fish consumption survey method was adapted from a range of other studies in the Mekong Basin including Mogensen (2001), Garaway (1999), Prapertchob (1989) and Noraseng *et al.* (1999). Most instructive for this study was Mogensen (2001) who

conducted a longitudinal study of fish consumption in rural Cambodian communities. His study was the first in the Basin to directly measure the amount of fish consumed by households.

The survey in this thesis is the first longitudinal record of its kind in Lao PDR. The survey involved four sample periods the first over a 10-day period and the subsequent three over 14-day periods.¹⁸ Each of the survey periods were representative of different seasons of the year, each with different availabilities of fish: October is the peak of the wet season; February is the middle of the cold season; May is the middle of the dry season and finally; August which is the beginning of the wet season.

In total four families were sampled from each of the six study villages. The main selection criterion was the ownership of fish ponds. Two families selected in each village had a fish pond while the other two did not. To assist the accurate measurement of fish and other aquatic animals (OAA), a 1 kg scale was given to each of the families. Each family was trained to use the scale accurately and record the weights in a log book. Specific details of the logbook and measurement procedure are given in Appendix C.

6.2.2 Participatory research activities

Two participatory methods were incorporated into the research. The first, participatory action research, involved a number of activities or tools summarised in Box 6-1. These activities were carried out over an initial 3-day visit to each of the communities. The material outputs from each activity were diagrams and maps. These formed the basis of subsequent interviews and focus groups. Particular attention was given to the participatory mapping focusing on the location of agricultural and aquatic resources.

The rest of the time spent in the villages was used for participant observation providing a number of entry points for further discussion. During this time strong relationships were developed with a number of people in each of the villages who became key informants during walks around the villages, visits to fishing grounds and fish ponds. Meals and social occasions in the village also provided an important entry point for discussion with

¹⁸ The shorter initial 10-day period was due to administrative difficulties within the Provincial Livestock and Fisheries Office.

a range of people not included in the action research groups, most notably young men, children and women.

6.2.3 Focus groups

A number of days after entering the communities focus group sessions were conducted during which the maps and diagrams from the participatory action research activities were 'interviewed' (see Garaway 1999). The first group included fish pond owners discussing the history of fish pond development, levels of investment, the preferences of species (e.g. taste, growth rate, market value) and finally the main constraints and benefits of owning fish ponds. The second group included people without fish ponds. Discussion focused on the spatial extent and description of aquatic resources, the seasonal use of these resources and the overall importance of each resource to various sections of the community. The importance and desirability of different species was addressed in terms of taste, market value and overall significance in the village fishery. The final group focused on management and development activities that the village had undertaken, as well as past conflicts that had arisen with respect to aquatic resources. This group also included a brainstorming session of ideas for the future management and development of capture fisheries and aquaculture in the village.

Box 6-1 Examples of participatory research tools used in the group sessions.

- **Timeline** – This tool was used to elicit the historical sequence of events in the development of the village. Two areas were focused on: 1. the history of environmental change to aquatic resources, and 2. the history of project intervention
- **Matrix rankings** – This technique was used to elicit ranked responses of: a comparison of water bodies, the use of water bodies by different members of the community, a comparison of different fish species.
- **Wealth Ranking** – This tool was used to identify the characteristics and representation of different socio-economic wealth ranked groups out of a sample of 50 households. The criteria for each categorisation were determined by the participants and the lists provided the basis for selecting households with and without fish ponds for in depth interviews.
- **Village Resource Mapping** – Maps were a very important tool for identifying and discussing not only the patterns of aquatic resources but also environmental change and development patterns. These maps formed the basis of the focus group discussions and were also used in household interviews.
- **Seasonal Calendar and Activity Ranking** – The different activities of the village were identified and then ranked according to their overall importance. From this list the seasonal patterns of use were also identified.
- **Village Organisation and Institutions** – This diagramming activity was the basis the organisational and governance structure of the village and rules governing the use of living aquatic resources. Discussion also focused on the intervention of different development projects and how they were introduced to communities.

6.2.4 In depth semi-structured interviews

Formal interviews were carried out with four households from each village – two with aquaculture ponds and two without. Each was identified in discussion with community leaders and the wealth ranking exercise. The main criterion, apart from the ownership of a fish pond, was that each household is in a different wealth ranked group. Interviews followed a semi-structured format focusing on the range of activities of household livelihoods and the contribution of both capture and culture fisheries. Topics included:

- The responsibilities of different members of the household
- Purchase and sale of fish throughout the year
- Seasonal fishing patterns by every household member

- Debt and lending
- Constraints to fishing and aquaculture
- Off-farm income opportunities of the extended household, and
- Costs and income from aquaculture relative to other sources activities.

6.3 Area of study

The six communities differ in their availability and use of aquatic resources. The following describes the characteristics of different social, political and natural capital available to communities, providing a general background to the complexity of living aquatic resource exploitation, as well as a basis from which to assess some of the orthodoxies of aquaculture extension. The location of each village is shown in Figure 6-1 and a summary of village characteristics is given in Table 6-1.

6.3.1 Chumphone villages

As described in chapter 4, Chumphone district is characterised by its abundant aquatic resources. The two villages selected for this study, Ban Kadan and Ban Phone Muang, both exhibit abundant aquatic resources but differ in their investment in aquaculture, linkages with development projects and level of vulnerability.

Ban Kadan

Ban Kadan is characterised by its diversity of aquatic resources, strong political ties and relative wealth. The village is located 7 km from Khengkhek, the district capital, along an arterial road with access to the district market, and main roads to Savannakhet. A characteristic of the village is its diverse range of aquatic resources including small streams, extensive seasonally flooded wetlands adjacent to the Chumphone River, a number of seasonal water bodies and close proximity to Gio Reservoir (see Figure 6-2). Community members have also extended these water resources by constructing a number of small weirs on a small stream, Huay Kadan, as well as installing three small irrigation pumps, two in the Chumphone River and one in the main water body Nong Khut Keen. The abundance and diversity of these resources means that the community has range of options over both wet and dry season for fishing location and activities.

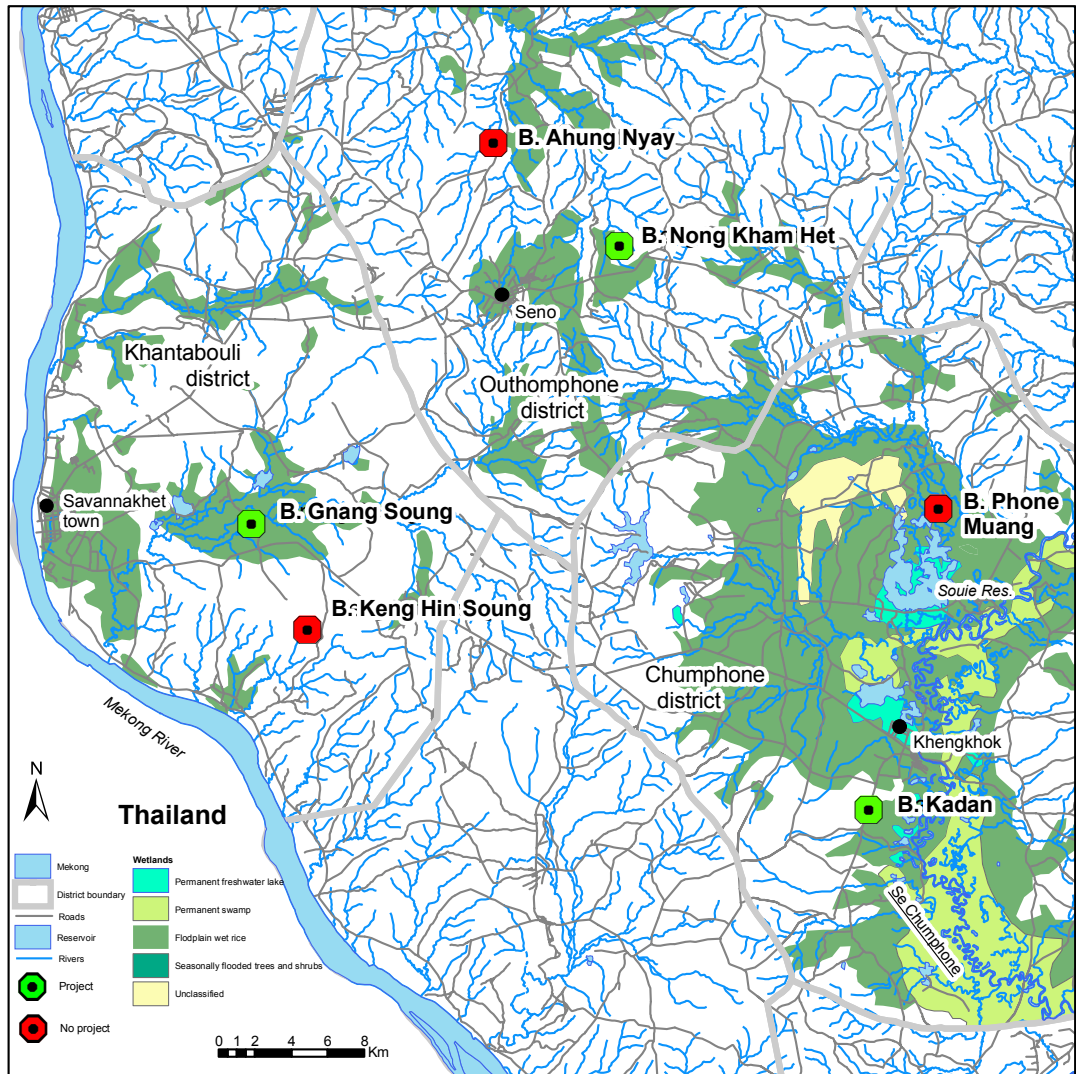


Figure 6-1 Location of study villages in three districts

Map projection: WGS 1984, UTM zone 48 north

(Source: Wetlands from MRC, Administrative boundaries and roads from WHO, Rivers from MRC, Reservoirs from MAF)

Table 6-1 Comparison of six study villages

District	Village	Aquatic Resources	Aquaculture	Project intervention	Other characteristics
Chumphone	Kadan	<ul style="list-style-type: none"> • Chumphone River • Gio Reservoir • Nong Khut Keen • Floodplain area of Chumphone River 	<ul style="list-style-type: none"> • Began in 1978 • Extension of natural water body • First fish pond in 2000 • Number of families hired tractor 	<ul style="list-style-type: none"> • AIT Aqua Outreach • UNDP/FAO Provincial Aquaculture Development Project 	<ul style="list-style-type: none"> • District capital before revolution • High dependency on remittances from over seas
	Phone Muang	<ul style="list-style-type: none"> • Beung Sangaa managed wetland • Souie Reservoir • Huay Souie • Huay Kaseua 	<ul style="list-style-type: none"> • Ponds dug from irrigation canal construction • Two ponds dug by families 	<ul style="list-style-type: none"> • Department of Irrigation, supplied pumps 	<ul style="list-style-type: none"> • Flooding from reservoir extension in 2000 • Saline soil affected rice crops • High dependence on capture fishery from reservoir
Outhomphone	Nong Kham Het	<ul style="list-style-type: none"> • Huay Maa Tai • Huay Vai 	<ul style="list-style-type: none"> • A number of privately dig ponds throughout village • Poor soils do not hold water all year • One fish spawning farmer 	<ul style="list-style-type: none"> • Provincial Governors ‘Quality of Life Project’ • UNDP/FAO Provincial Aquaculture Development Project 	<ul style="list-style-type: none"> • Dry village, seasonal water shortage • Reliant of forest products
	Ahung Nyay	<ul style="list-style-type: none"> • Huay Ahung • Huay Sok • Seasonally managed community pond • Weir constructed on stream 	<ul style="list-style-type: none"> • Community fish ponds from road construction • A number of privately dug ponds 	<ul style="list-style-type: none"> • Department of irrigation constructed small weir on Huay Ahung 	<ul style="list-style-type: none"> • Dry village, seasonal water shortage • Reliant on forest products
Khantabouli	Gnang Soung	<ul style="list-style-type: none"> • Huay Somphoie • Floodplain area of Huay Somphoie • Beung Leuk • Managed canal 0- Hong Nong Sim 	<ul style="list-style-type: none"> • A number of privately dug fish ponds • Fish spawning farmer 	<ul style="list-style-type: none"> • Stirling University Rice-Fish Culture Project • UNDP/FAO Provincial Aquaculture Project • Department of Irrigation • Save the Children • GTZ - Biogas 	<ul style="list-style-type: none"> • Village given title of Provincial Cultural Village in 2000 • Diverse range of agricultural activities • Strong links to provincial government departments
	Keng Hin Soung	<ul style="list-style-type: none"> • Huay Soun Chai 	<ul style="list-style-type: none"> • A number of privately constructed fish ponds built as weirs on small canals in rice fields 	<ul style="list-style-type: none"> • ADB Forestry eucalyptus production project 	<ul style="list-style-type: none"> • Elevated village in dry area of district • Small area of wet rice cultivation • Highly dependent on non timber forest products

Aquaculture in the village began in 1978 when fish caught from nearby streams were stocked in a small natural water body near Huay Kadan. This water body was extended a number of times by the community until 1994 when one family claimed ownership of the pond by stocking culture species bought from Thailand. The first purpose built fish ponds were dug in 2000 when a tractor was hired by a group of families. There are now nine large ponds and a number of smaller ponds all situated close to small streams and the village, indicating investment is limited to suitable land with access to water and no seasonal flooding.

Ban Kadan has strong social and political ties which have facilitated a number of government and non government projects. Before 1975 the village was a district capital within the now defunct Chumphone province, with a large number of people working in the old regime. After the LPRP came to power many of these people emigrated as refugees to the United States (see Souvannavong 1999). As a result the village is now relatively wealthy with a high proportion of households receiving remittances which are used for house construction, business development and farm machinery. The village also maintains strong political ties within the new regime, successfully attracting a number of health, agricultural and education projects - including the AIT Aqua Outreach project and Phase II of the UNDP/FAO Aquaculture development project. The village is therefore an example of a relatively wealthy rural community with both abundant natural living aquatic resources and successful aquaculture development.

Ban Phone Muang

Ban Phone Muang is similar to Ban Kadan in that it has a strong tradition of exploiting living aquatic resources. The community manages a small wetland area adjacent to the village, Beung Sangaa, and two other small streams, Huay Souie and Huay Kaseua (see Figure 6-3). However, where Kadan is wealthy and socially connected, Phone Muang is vulnerable to flooding and soil salinity, as well as being relatively isolated within the district.

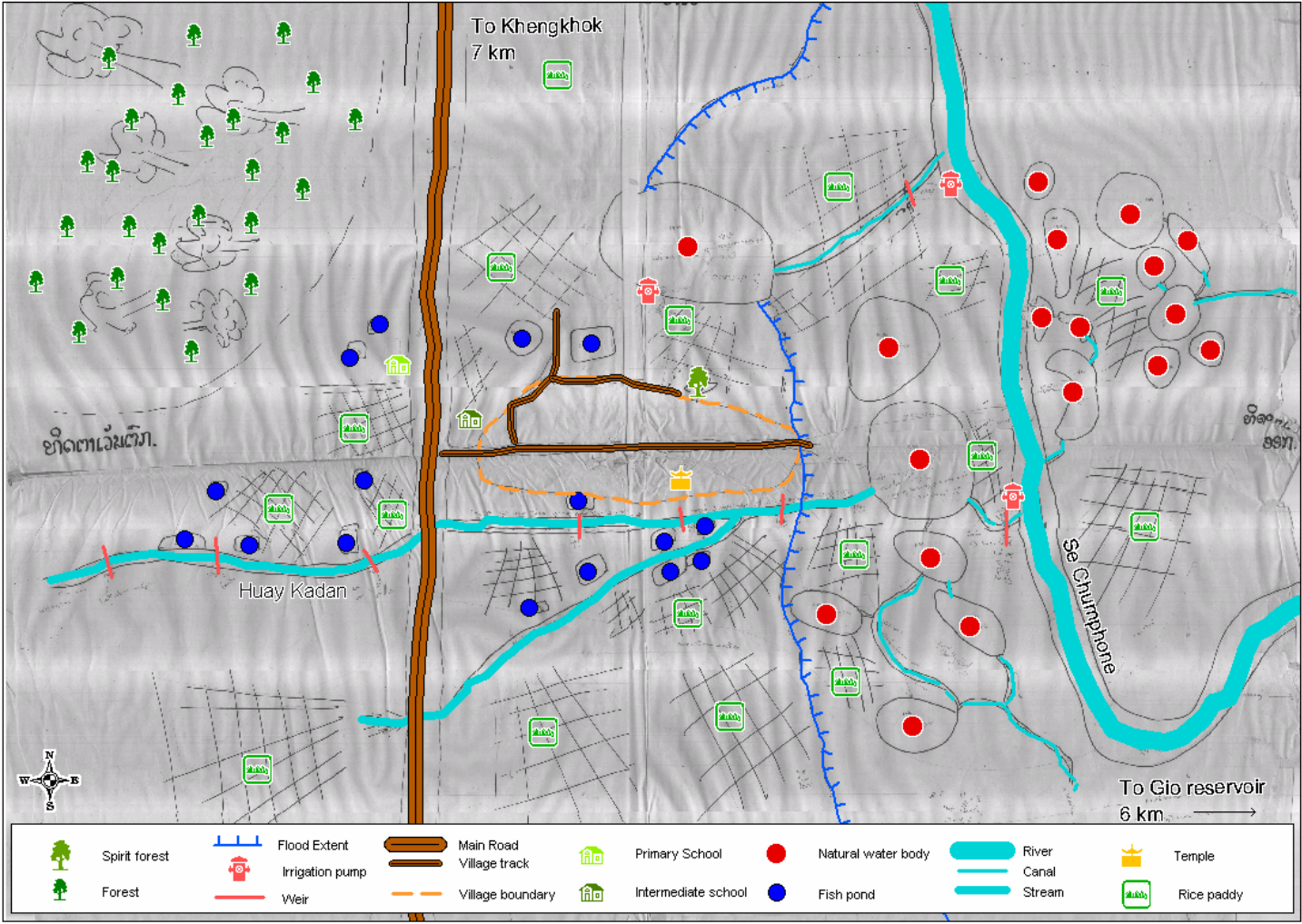


Figure 6-2 Kadan village map

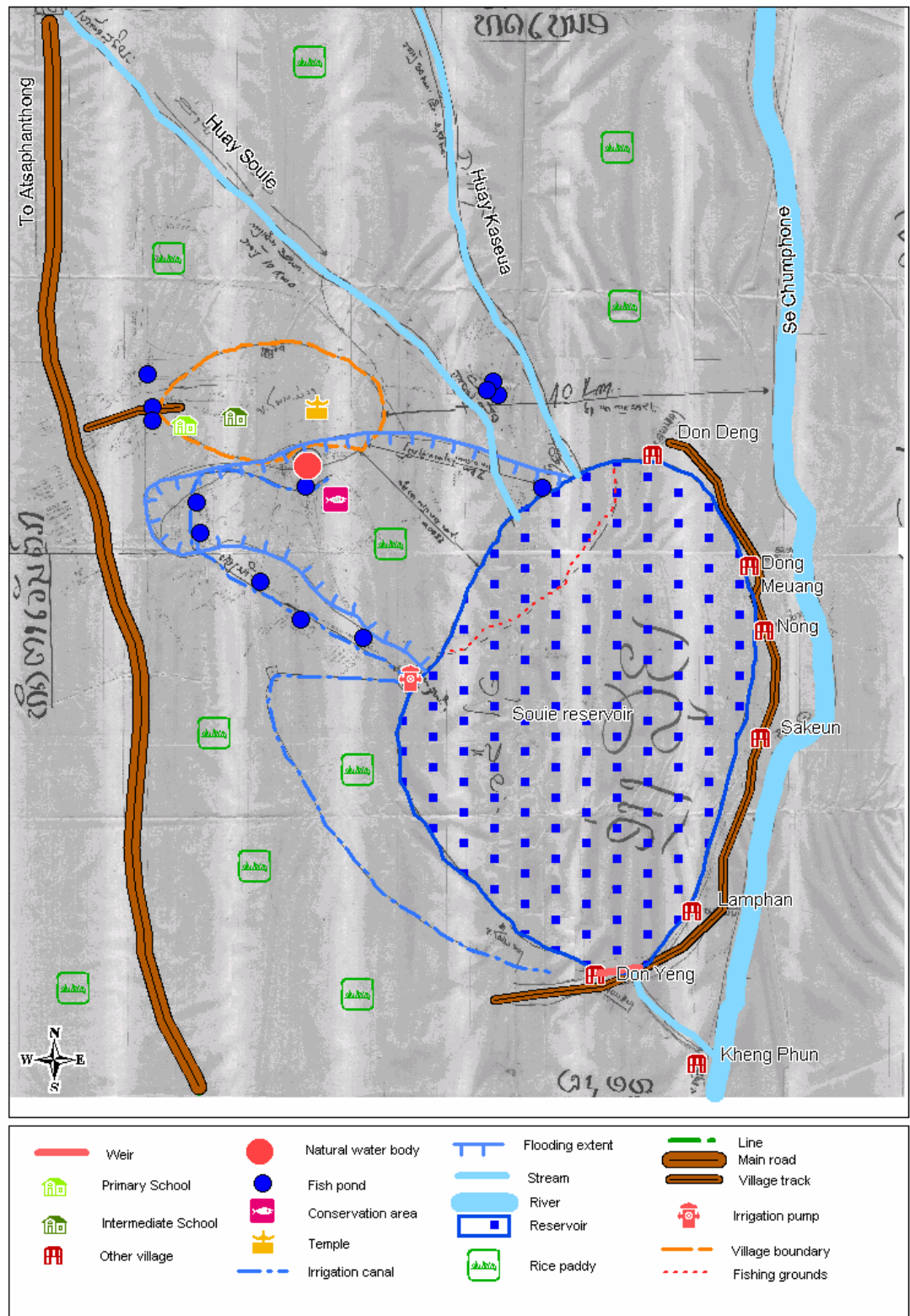


Figure 6-3 Phone Muang village map

Phone Muang is located 30km from Khengkhek along a minor road leading to Atsaphanthong District. The defining characteristic of the village is its location next to Souie reservoir, which was first constructed by the provincial Department of Irrigation from a small wetland area in 1960 and then extended in the 1980s and again in 2000. It is now the largest reservoir in the province and the main source of native fish sold in Savannakhet markets. The latest extension to the reservoir, again sponsored by the Department of Irrigation, was completed in 2000 with the intention of extending the area of dry season irrigated rice production. Phone Muang has had no net gain in area of rice cultivation. As the area of the reservoir increased, it flooded a large area of wet rice owned by the village. The area of dry season cultivation gained from irrigation is equal to the area lost. The soil in the area has also become salt affected reducing yields from the dry season rice.¹⁹ This has adversely affected the village. Before the extension of the reservoir the community reports having an annual rice surplus whereas they are now in rice deficit. As one farmer responded:

Rice production is less than before the flooding of Souie when the wall of the dam was made higher. For me this is difficult because there are now more people in my family. It was easier to produce rice for them before the dam was built. I was able to sell rice before, now we have only enough to eat and trade only a very small amount for petrol for the water pump to irrigate the dry season rice. (Interview 12, 15/03/02)

The village economy is now more reliant on living aquatic resources harvested from the reservoir. Until recently the reservoir has been an open resource stocked with exotic species by the government and fished by communities up to 30 km away. As such Phone Muang is increasingly reliant on a single fishery resource coming under increasing competition.

The only project intervention in Phone Muang has been the installation of irrigation pumps and the construction of canals by the Provincial Department of Irrigation. During

¹⁹ The incidence of soil salinity in Chumphone is increasing as land use patterns change such as the construction of reservoirs and deforestation (Last 2004; Wiszniewski 2004). This has especially contributed to higher incidence of saline soils in areas with groundwater discharge. These coincide with wet rice production land in lowland areas.

the construction a number of aquaculture ponds were constructed as soil was excavated by contractors for canal construction (as shown in Figure 6-3). This pattern of pond development is similar to the relationship between roads and ponds outlined in Chapter 4. The site of ponds is therefore not selected by farmers, but is instead an artefact of construction and often located a long distance from the village. Only two families have invested in aquaculture from funds they earned while working illegally in Thailand, placing their ponds next to the village. Overall, farmers have a poor knowledge of fish husbandry, many of them having never succeeded. Despite the lack of investment there is a perceived need for aquaculture as an alternative source of nutrition and income. Phone Muang is therefore a community that, despite the abundant capture fishery, identifies aquaculture as providing a number of potential benefits.

In summary, Ban Kadan and Ban Phone Muang are highly reliant on a rich variety of aquatic resources including aquaculture. However, both villages represent communities with very different patterns of exploitation based on political and social capital.

6.3.2 Outhomphone villages

Outhomphone district is characterised by a lack of aquatic resources and a high incidence of extensive aquaculture (See Chapter 3). The two villages selected in this study – Nong Kham Het and Ahung Nyay – show the variable availability and use of aquatic resources across the district.

Ban Nong Kham Het

Ban Nong Kham Het is located 7 km from Seno. It has no perennial water resources and, as such, is vulnerable to drought. The village, with its large population, has adapted to an annual period of water shortage. For administrative purposes the community has recently been divided with the establishment of a second village, Ban Nong Kham Min.

Nong Kham Het is typical of the plateau landscape of Outhomphone characterised by a myriad of intermittent streams and extensive open woodland across gradual sloping hills. The village is highly reliant on non timber forest products for both food and income, despite extensive wet season rice fields. However, crop yields are low and the community experiences regular deficits in supply. Vegetable cash crops are grown during the dry season in areas surrounding the village and these are regularly sold in

Seno market. Aquatic resources are limited to two small intermittent streams, Huay Maa Tai and Huay Vai, which are only fished at the peak of the wet season (from September to November).

The village has been the focus of a number of technical rural development projects aimed at increasing agricultural production. Projects have focused on increasing water availability through well construction and improved fish production through technical training. It has also been the subject of a 'Quality of Life' project led by the Provincial Governor's Office that promoted a range of livestock and aquaculture skills in response to the severe food shortages from crop failure in 1995. This project led to the formation of two development committees that aim to coordinate chicken and aquaculture production. The village was also involved in the UNDP/FAO fish spawning training which one farmer has successfully adopted and continued. A number of other ponds have subsequently been dug in Nong Kham Het, most of which are dispersed throughout the village. Some of the ponds are located in a forested area near Huay Vai - a source of termites used for feed. However, the majority are located in rice fields in relatively close proximity to the village.²⁰

²⁰ Like most local place names, *Vai*, meaning rattan, indicates the dominant characteristic or main use of the area surrounding the stream. In this case the forested area adjacent to the stream was the major source of rattan and other non-timber forest products for the communities.

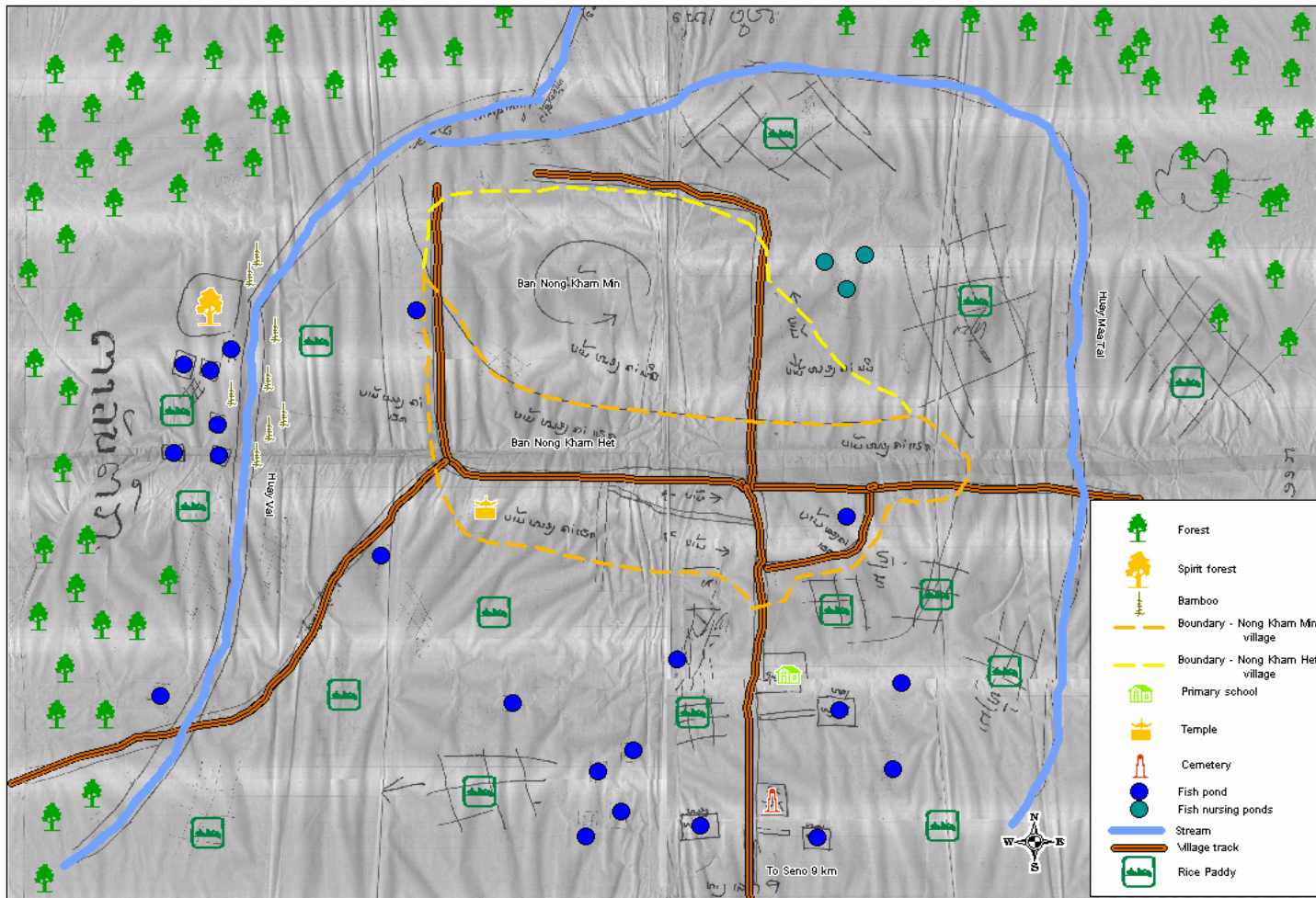


Figure 6-4 Nong Kham Het village map

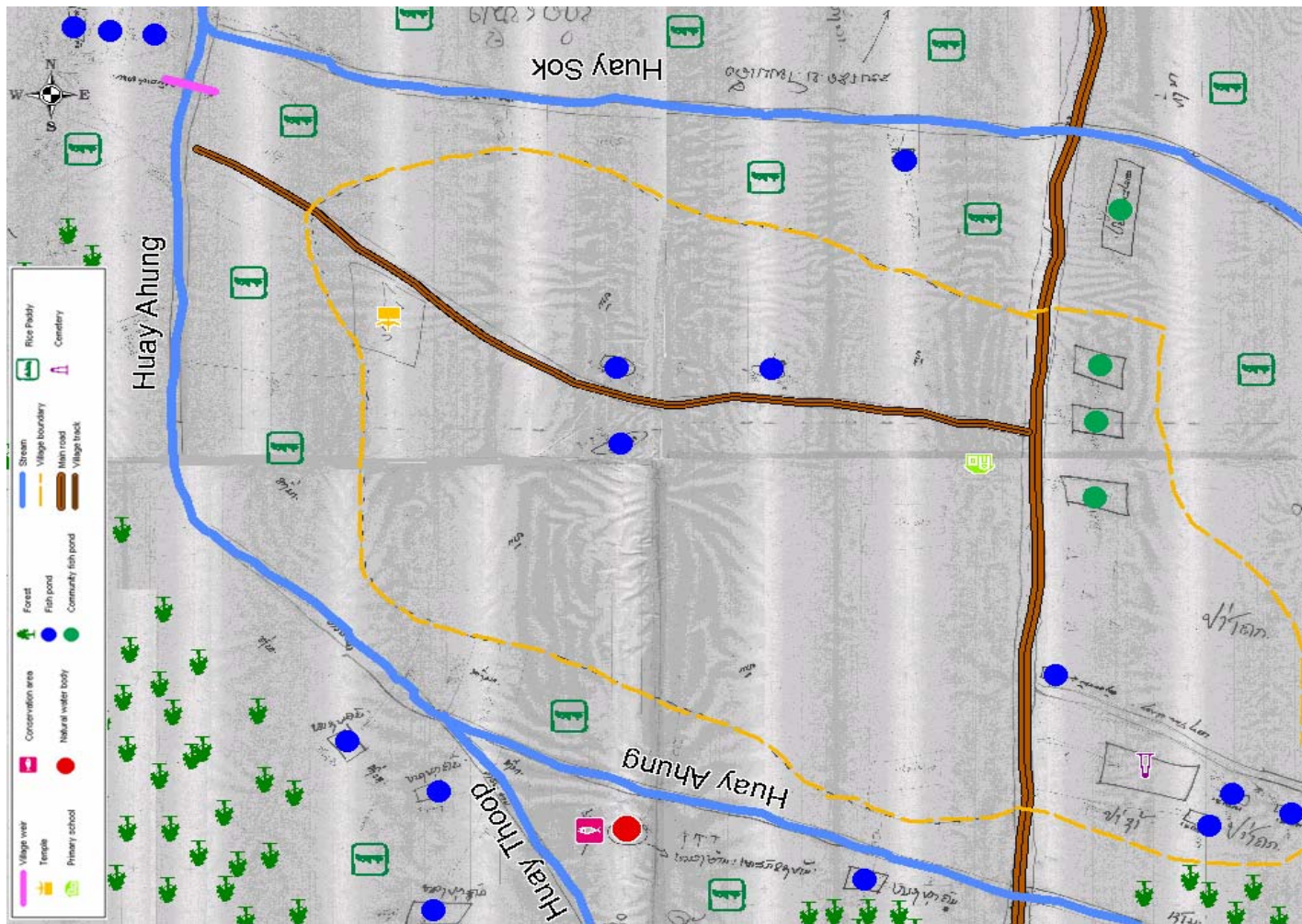


Figure 6-5 Ahung Nyay village map

Ban Ahung Nyay

Ban Ahung Nyay differs from Ban Nong Kham Het considerably in that it has a range of aquatic resources that are fished throughout the year. The village is located approximately 13 km from Seno along the main road to Atsaphanthong and adjacent to a large expanse of open woodland. The village has two large streams that are fished between March and September and two smaller streams, which are fished in the peak of the wet season. The village also has a tradition of managing a community water body through an annual fishing day. This system is common to a number of parts of Southern Laos (Tubtim 2001; Garaway 1999). There are also four ponds that have been dug on the main road to the village which are managed as community ponds and used for work days and festivals.²¹ A number of private ponds have also been constructed in the village, located near streams in family rice fields. Most of these were built in 1995 when a number of families hired a tractor, the same year that the irrigation weir was constructed. None of the families have had training in fish husbandry and report low yields from their ponds.

Despite the seeming abundance of aquatic resources the community, like many others in Outhomphone, reports a chronic lack of water. There is also a history of livestock disease. As such the village has a vulnerable food supply. In response the government constructed a series of wells as part of a district wide clean drinking water initiative. In addition, the village committee successfully lobbied the Department of Irrigation to construct a small weir to irrigate dry season cash crops. Due to poor soil retention the weir was not as successful as anticipated and the village continued to suffer a water deficit. The weir has also impacted on fish stocks. The community reported that stagnant water in this reservoir was responsible for an epidemic, of what appears to be a form Epizootic Ulcerative Syndrome (EUS), that lead to periodic fish kills.

Both villages have a lack of perennial aquatic resources, and are therefore vulnerable to drought. In response aquaculture ponds appear to have provided an alternative source of fish and water. Despite this each community has a range of natural aquatic resources they exploit at different times of the year, the complexity of which is expanded on below.

²¹ Harvesting for work days, visitors and festivals is a common system of management of communal water bodies. The fish provide a means of sharing the cultural burden of providing food for special occasions.

6.3.3 Khantabouli villages

The two villages selected in Khantabouli – Gngang Soung and Keng Hin Soung - each represent the diversity of environments in the district. Both villages are located in close proximity to Savannakhet town. However, Ban Gngang Soung is better connected in terms of transport as well as socio-political linkages while Keng Hin Soung is relatively isolated with poor aquatic resources and poor social-political linkages.

Ban Gngang Soung

Ban Gngang Soung is located on the floodplain of Huay Somphoie, 15 km from Savannakhet adjacent to Route 9 South (Figure 6-6). The village is relatively wealthy, rich in aquatic resources, with extensive rice fields across the floodplain of Huay Somphoie. This provides a long rice growing season and a number of seasonal water bodies. The village also manages a small canal, Hong Nong Sim, through a community fishing day.

The community has very strong political and social ties within Savannakhet. The title of ‘Cultural Village’ was given in recognition of the community’s proactive role in rural development ‘self help’ and community ‘solidarity’. This ability has been facilitated by members of the community who work for provincial government departments. The projects have conducted a range of activities including pump irrigation systems, bio-gas production, livestock feed and vegetable cash crops. One community member who recently retired from the Provincial Livestock and Fisheries Office was able to attract the UNPD/FAO Provincial Aquaculture Project and the Stirling University Rice-Fish culture project to the village. He has also provided a readily available source of technical support for fish culture to families in the village who have subsequently dug ponds throughout their rice fields (See Figure 6-6), in areas both near and distant to natural aquatic resources.

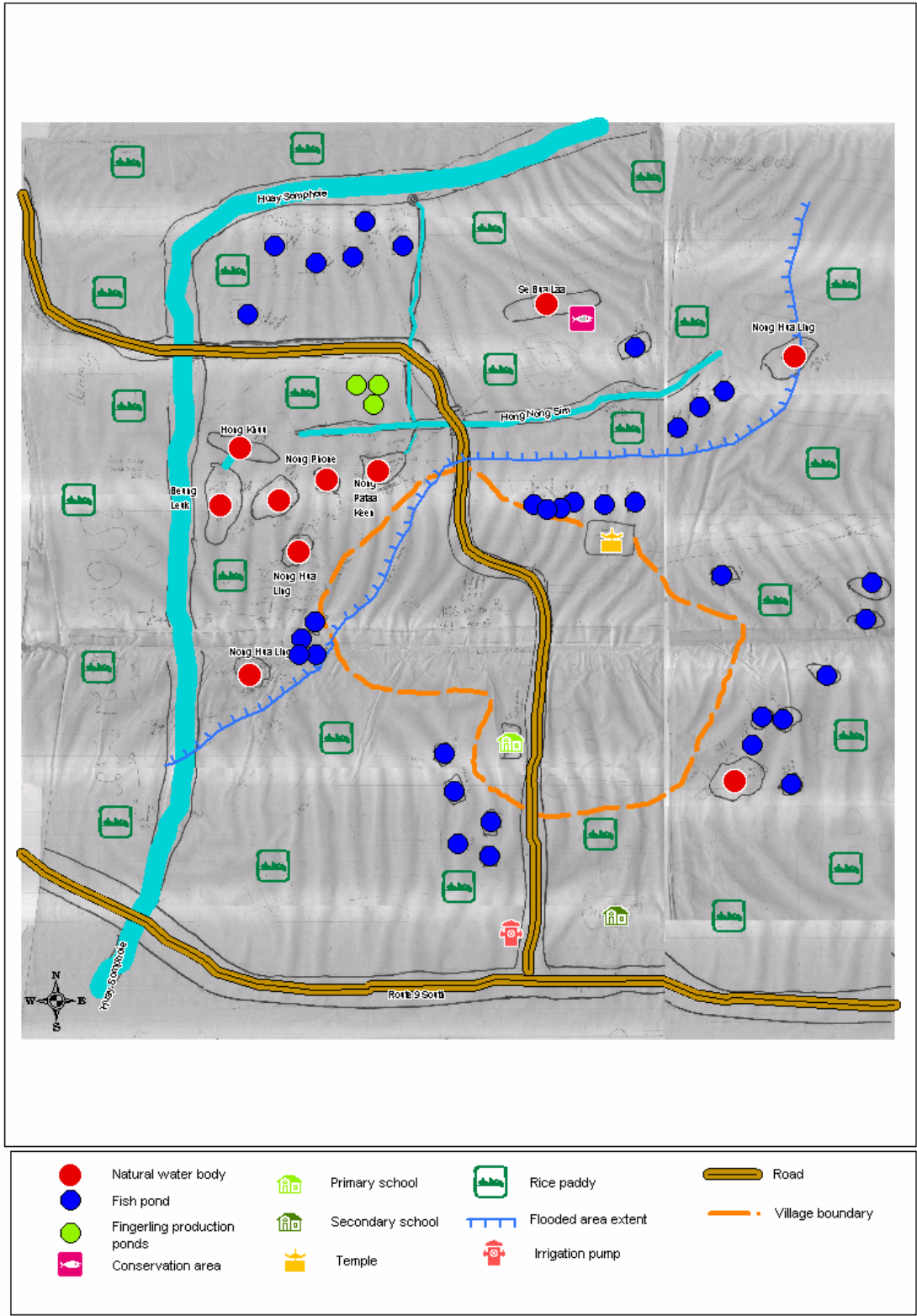


Figure 6-6 Gngang Soung village map

Ban Keng Hin Soung

Ban Keng Hin Soung is a small isolated village located in a densely wooded area on an elevated plateau. The village is situated 7 km from the main road along a small track making wet season access difficult. Like Nong Kham Het in Outhomphone, Keng Hin Soung has highly seasonal water resources located at the head of two small streams that flow to the Mekong River. These are used in the wet season along with five other small water courses that feed these streams. The average size of land owned by each household is very large, however much of this land is under forest and used for livestock rearing. The community is heavily reliant on the surrounding forest for non timber forest products that provide both food and income to the majority of households.

Unlike Gngang Soung the community has very little involvement with development projects. The Department of Forestry has established an extensive area of eucalyptus forest funded by the Asian Development Bank near the village on land that the community sold to a business man from Savannakhet. He has since been a major contributor to the village providing assistance with road access, and assisting with the construction of a small weir on Huay Soun Chai, which retains a small amount of water for household use close to the village. He has constructed a series of fish ponds on his land and employs some people from Keng Hin Soung to assist production. Aquaculture in the village has been relatively limited. Because of the topography two farmers have constructed dams on small canals in their rice fields. These ponds have a good supply of water long into the dry season. Other farmers have dug ponds close to the village next to the main stream. Nonetheless, there has been no formal instruction on aquaculture and most pond owners report low yields.

6.3.4 Summary

Each village highlights the diversity of environments and conditions between and within the three study districts. Each village is characterised by different physical, natural, social and political capital which contribute to the level of investment in aquaculture and the conditions under which capture fisheries are exploited. There is a rich diversity of natural aquatic resources, with spatial and temporal patterns of exploitation unique to each community. Within these patterns are a series of complex, locally specific strategies of resource use at the household level. Unravelling the complexity of this intra-village variation is the focus of the rest of the chapter.

6.4 Fish consumption: quantifying importance

The previous chapter found that fish from small-scale rural aquaculture in Savannakhet do not significantly contribute to market trade. It is therefore plausible that these fish contribute to the household consumption or intra-village trade. A key assumption of small-scale rural aquaculture is that the fish grown provide an important source of protein for rural communities (Edwards 1999). Few surveys have quantified this consumption and none have compared the relative contribution of capture and culture fish. Despite this fish consumption is one of the main measures of the importance of living aquatic resources in the Mekong Basin (Hortle and Bush 2003). This section reports on the results of a survey that compares the relative contribution of culture and capture fish in families with and without fish ponds. The survey was conducted from August 2002 to October 2003 in each of the six villages.

6.4.1 Existing estimates

Food consumption records in Lao PDR are sparse. This is especially the case with information on fish and other aquatic animals (OAAs) which have not been included in the last two national consumption surveys.²² The current government estimate for fish consumption is 7 kg/person/yr. This figure has been reproduced from estimates made in the 1960s (see *Ministere-de-L'Economie-Nationale* 1972). A number of surveys have since made higher estimates ranging from 17 to 36 kg/person/year (Table 6-2) (Baird *et al.* 1998; Funge-Smith 1999; Garaway 1999; Mattson *et al.* 2003; Sjorslev 2000). These studies have focused on a range of upland and lowland communities exploiting a variety of fisheries including streams, reservoirs, the mainstream Mekong, small water bodies and aquaculture ponds. However, none have compared the contribution of culture and capture fish nor considered seasonal variation.

²² Other aquatic animals include amphibians, molluscs, crustaceans, as well as insects and aquatic mammals.

Table 6-2 Fish consumption studies in Lao PDR.

Province	Inland Fresh Fish (kg/per/year)	Other Aquatic Animals (kg/per/year)	Total Fresh Fish Equivalent (kg/per/year)	Protein (kg/per/year)	% of total meat
Luang Phrabang ¹	19.4	19.0	39.0	11.0	59.0
Nam Ngum ²	61.1	-	61.1	12.5	56.3
Savannakhet ³	17.5	-	17.5	na	na
Champassak ⁴	43.0	-	43.0	-	-
Oudomxay ⁵	9.5	11.7	21.2	na	33.4
Savannakhet ⁵	9.3	18.7	28.1	na	71.4
Sekong ⁵	6.3	12.2	24.1	na	120.6
Xayaboury ⁵	6.8	17.3	18.5	na	51.2
Xieng Khwang ⁵	12.7	20.5	33.2	na	69.3

¹ Sjorslev (2000), ³ Mattson (2000), ² Garaway (1999), ⁴ Baird *et al.* (1998), ⁵ Funge Smith (1999)

6.4.2 Survey results

The results of the fish and OAA consumption survey carried out in this thesis calculated an overall annual average per capita consumption of 22.7 kg/person/yr for native fish and 15.1 kg/person/yr for culture fish (Table 6-3). However, OAAs, with an average per capita consumption of 44.8 kg/person/yr, make up 46% of overall consumption.

These figures are generally higher than other studies, mainly as a result of survey method. All other studies carried out in Laos have relied on recall, from between one day and six months, which are biased towards underestimation (Ferro-Luzzi 2002). In one of the more accurate of these recall studies Garaway (1999) found an average consumption of inland fresh fish (IFF) of 17.4 kg/person/yr in communities exploiting small water bodies.²³ In the mountainous northern province of Luang Phrabang Sjorslev (Ed.) (2000), using a six month recall, found an average fresh fish consumption of 19.4 kg/person/yr and a similar OAA consumption of 19.0 kg/person/yr.²⁴ Funge-Smith (1999), in a survey of potential and current aquaculturalists, was the only study to find a considerably higher consumption of OAAs, up to 1.8 to 2.7 greater than the consumption of inland fresh fish.

²³ This is one of the more accurate studies of fish consumption in Laos. Garaway used recall assisted by visual aids she called 'fish sticks', these gave a guide to the size of fish caught and consumed. She then used these sticks to calculate size to weight ratios of different species.

²⁴ This study used six month recall to assess annual fish consumption. Although a large amount of data was collected this method has a large degree of inaccuracy.

In the Lao PDR the overall contribution of fish to total meat protein intake is generally accepted to be around 75% (e.g. Sverdrup-Jensen 2002). The survey found a slightly lower proportion of 59.8% fish and OAA of total meat protein intake (Table 6-4 and Table 6-5). A considerable proportion of this was comprised of native fish or OAA whereas culture fish only contributed 16% of all IFF and OAA. The frequency of culture fish in all meals surveyed is also small, whereas native fish are eaten in most meals.

Table 6-3 Per capita consumption by village (kg/per/yr)

District	Outhomphone		Chumphone		Khantabouli		Average for all villages
	Ahung Nyay	Nong Kham Het	Phone Muang	Kadan	Gngang Soung	Keng Hin Soung	
Capture Fish	17.6	22	19	40.7	12.5	24.6	22.7
Culture	6	25.9	0.8	25.2	10.5	22	15.1
Processed Fish	3.5	16.9	3.4	33.5	4.1	7	11.4
OAA	33.2	52.8	23.1	91.5	11.2	56.7	44.8
IFF and OAA	60.4	117.5	46.3	190.9	38.2	110.3	93.9
Import	4.8	3.2	0	0	1.1	8.7	3
Total Fish and OAA	65.2	120.8	46.3	190.9	39.3	119	96.9

Note: Calculations for these figures are given in Appendix C

Table 6-4 Consumption of other meat (kg/person/yr)

Meat Classification	Outhomphone		Chumphone		Khantabouli		Average for all villages
	Ahung Nyay	Nong Kham Het	Phone Muang	Kadan	Keng Hin Soung	Gngang Soung	
Dried meat	0.0	0.3	0.0	0.6	0.4	0.1	0.2
Beef	9.6	15.0	5.8	21.2	20.0	11.1	13.8
Buffalo	3.8	11.1	4.1	15.6	6.0	3.4	7.3
Goat	0.0	2.1	0.0	0.0	2.8	0.0	0.8
Pork	8.2	6.0	0.5	8.1	11.8	3.6	6.4
Insect	7.4	5.8	1.7	12.2	2.3	1.7	5.2
Poultry	20.0	9.5	5.1	9.9	23.3	12.3	13.3
Sausage	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Native Fowl	0.5	0.0	0.3	30.4	0.7	0.3	5.4
Reptile	0.9	7.6	0.0	3.3	1.7	0.0	2.3
Rodent	0.5	0.0	0.0	0.0	0.0	0.0	0.1
Meat (unidentified)	9.5	5.0	0.7	7.8	3.2	5.8	5.3
Total	60.6	62.6	18.1	109.0	72.1	38.3	60.1
Total Meat (including total fish and OAA)	125.8	183.4	64.4	299.9	191.0	77.6	157.0

Table 6-5 Relative composition of diet

District	Village	%Aquaculture fish of IFF	% Culture fish of IFF and OAA	% OAA of IFF and OAA	%Inland Fish and OAA
	<i>Grand Total Kg</i>	39.8	16.0	46.2	59.8
Outhomphone	Ahung Nyay	25.4	9.9	51.0	48.0
	Nong Kham Het	54.1	22.0	43.7	64.1
Chumphone	Phone Muang	3.8	1.6	49.9	71.8
	Kadan	38.2	13.2	47.9	63.6
Khantabouli	Keng Hin Soung	47.2	19.9	47.7	57.7
	Gnang Soung	45.7	27.4	28.4	49.3

6.4.3 Variation between communities

The diversity of aquatic resource use between villages supports the diversity of consumption in each of the surveyed villages. In the predominantly dry district of Outhomphone, two very different scenarios are represented. It appears that households in Ahung Nyay consume more capture fish than in Ban Nong Kham Het. However, Nong Kham Het has a higher overall consumption of culture fish (Table 6-3). The villages in Khantabouli show even higher variation between consumption of culture and capture fish with consumption in Ban Keng Hin Soung 80 kg/person/yr higher than in Ban Gnang Soung.

The pattern of consumption reflects the geography of each village. The low consumption in Ban Gnang Soung is a surprising result as the village is found on a floodplain. The result possibly reflects the higher affluence of that village, as compared to Ban Kheng Hin Soung which is poorer and possibly more dependent on living aquatic resources. In comparison, Chumphone has high levels of consumption in both villages. However, the two villages differ in the proportions of IFF and OAA consumed. For example, Ban Kadan, a wealthy village which has had exposure to aquaculture extension and training, has a relatively high level of culture fish consumption relative to native fish consumption. Despite being located next to the most abundant fishery in the district - Souie reservoir - Ban Phone Muang has relatively low native fish consumption. Nevertheless, fish are still very important in this village, comprising the highest proportion of total meat protein intake at 88% and being eaten in all meals. The low consumption may be explained by the higher level of large fish to markets in Savannakhet, while smaller fish are consumed locally.

The variation in consumption between villages and the prominence of OAA highlights three important points:

- Current official estimates of fish consumption are low,
- OAAs are as important (if not more important) than fish for nutrition, and
- The contribution of culture fish does not conform to assumed patterns of deficits and abundance of living aquatic resources.

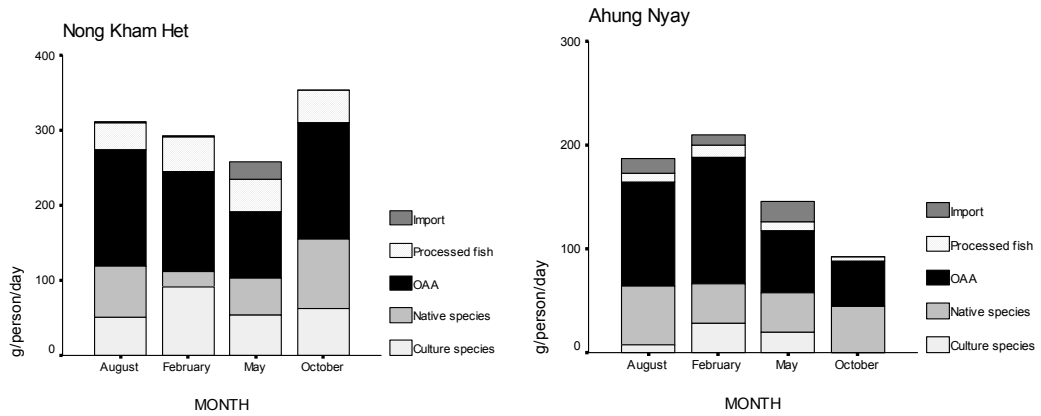
The complexity inherent in these consumption figures are further compounded by seasonal variation.

6.4.4 Seasonal variation

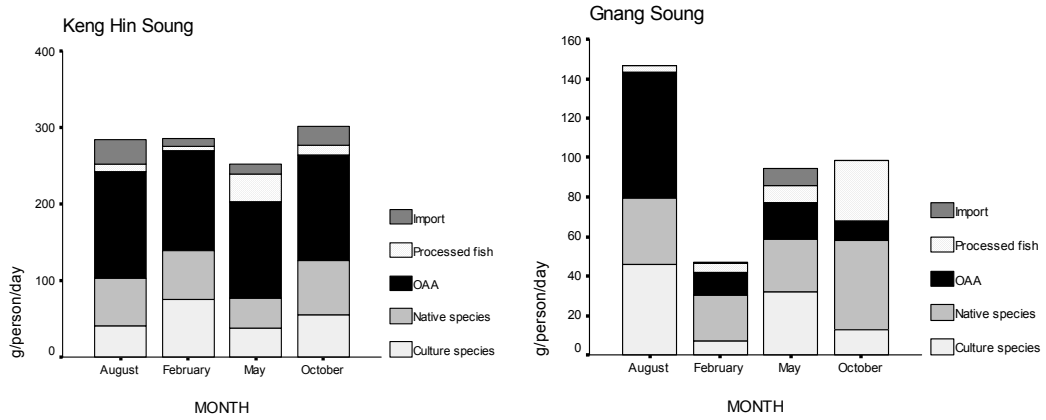
Living aquatic resources are a highly seasonal resource. This is implicit in literature outlining the importance of migratory fisheries and the benefits from stocking of fish ponds and community water bodies (e.g. Roberts 1993; Roberts and Baird 1995; Garaway 1999; Noraseng *et al.* 1999). Aquaculture ponds, in particular, are noted as providing supplementary protein at times when native fish are low in abundance. Seasonal patterns of fish and OAA consumption, however, these patterns do not conform with this widely prescribed model.

There is some indication that consumption between seasons is most stable in the two dry villages Nong Kham Het and Keng Hin Soung (Figure 6-7). Villages with abundant resources, such as Gnang Soung and Phone Muang, appear to have highly variable consumption between seasons. Overall there is no clear pattern as to which month has the highest consumption of culture fish.

Outhomphone



Khantabouli



Chumphone

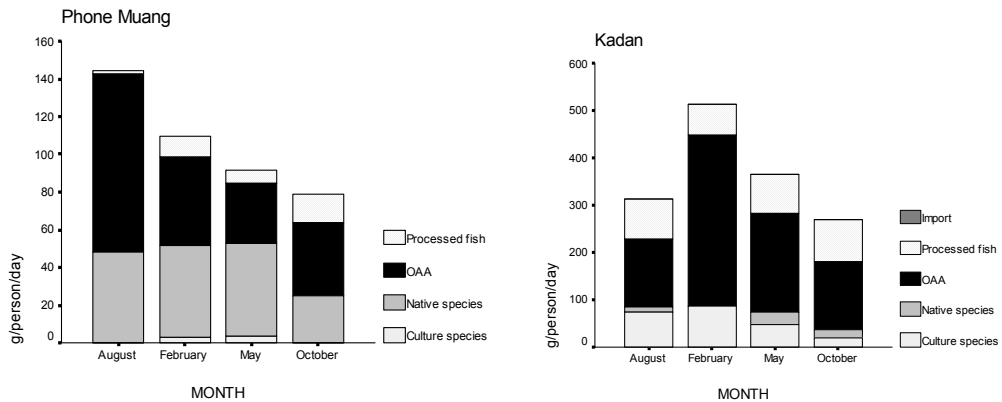


Figure 6-7 Seasonal variation in consumption in each study village.

Note: Study ran from August 2002 to October 2003

6.4.5 Comparison of families with and without fish ponds

Consumption figures both between and within villages in families with fish ponds and those without ranges from 24.4 to 253.1 kg/person/yr (Table 6-6 and Table 6-7).

Families without fish ponds in villages with abundant aquatic resources have a higher consumption of IFF than families with fish ponds. This reflects the strong tradition of capture fisheries in these villages. In all other villages the opposite is found – households with fish ponds have a higher overall consumption of IFF.

The pattern of culture and capture fish consumption is not uniform between villages. For instance, in Ban Phone Muang culture fish make up less than 2% of IFF consumption in both families with and without ponds. In Ban Gngang Soung, families without fish ponds consume more fish per capita. However, families with ponds have a far higher reliance on fish consumption than those without ponds. In the drier villages, and Ban Kadan, families with fish ponds have a much higher reliance on fish as a source of protein (between 21 and 59% of IFF consumption) than families without ponds. However, families without fish ponds in these villages have a low proportion of their overall diet from IFF and OAA. This indicates, with possibly the exception of Ban Kadan, that in poorer villages, with less access to natural living aquatic resources, fish ponds make a more significant contribution to the diet of families. Therefore, as income increases from fish ponds in areas with low aquatic resources, there appears to be higher consumption of alternative meat sources. Nevertheless, an important distinction remains: the largest overall proportion of fish in the diet of families comes from wild caught fish and OAA, not culture fish.

6.4.6 Summary

The results of the survey show that the consumption of fish and OAAs is locally contingent and highly complex. This is in terms of both the differences in availability of natural aquatic resources between villages and the internal diversity of families with and without fish ponds. There is some indication that consumption is related to the availability of natural aquatic resources. Although no clear patterns emerge there is some indication that capture fish consumption in villages with a lack of aquatic resources

Table 6-6 Comparison of per capita consumption between families with and without fish ponds

Village	Ahung Nyay		Nong Kham Het		Gnang Soung		Keng Hin Soung		Phone Muang		Kadan	
	NFP	FP	NFP	FP	NFP	FP	NFP	FP	NFP	FP	NFP	FP
Family¹												
Native species	32.2	51.7	21.5	37	27	12.8	24.4	33.7	188.5	68.1	111	63.7
Culture species	2.2	4.9	11.6	53.6	11.3	2.8	6.9	27.4	1.2	1	13.1	17.3
IFF	34.8	56.6	35.5	90.6	39.1	15.6	32.7	61.1	189.7	69.1	129.9	80.9
Processed Fish	4.4	6.8	8.7	22	6.2	5.5	6.8	18.2	12.9	3.5	25.5	42.6
OAA	36.5	21	55.2	67.8	14.7	3.1	33.4	56.9	12.5	14.3	97.7	55.4
Total IFF and OAA	75.6	84.4	99.4	180.4	60.1	24.2	73	136.2	215.1	86.9	253.1	178.9
Import	4.8	0.5	4.3	0	1	0.2	2.8	9.2	0	0	0	0
Total Fish and OAA	80.4	84.9	103.7	180.4	61.1	24.4	75.7	145.4	215.1	86.9	253.1	178.9

Note: FP – Families with fish ponds, NFP – Families without fish ponds

Table 6-7 Proportion of fish and OAA to total meat protein consumption

Village	Ahung Nyay		Nong Kham Het		Gnang Soung		Keng Hin Soung		Phone Muang		Kadan	
	NFP	FP	NFP	FP	NFP	FP	NFP	FP	NFP	FP	NFP	FP
% IFF and OAA of all meat	58.1	57.5	65.9	19.9	52.3	50.2	79.6	23.6	95	78.4	85.1	35
% Culture fish of IFF	6.3	8.7	32.7	59.2	28.9	17.9	21.1	44.8	0.6	1.4	10.1	21.4
% Culture fish of IFF and OAA	2.9	5.8	11.7	29.7	18.8	11.6	9.5	20.1	0.6	1.2	5.2	9.7
% Culture of all	2.7	5.8	11.2	29.7	18.5	11.5	9.1	18.8	0.6	1.2	5.2	9.7

Note: FP – Families with fish ponds, NFP – Families without fish ponds

is more uniform than in villages with abundant aquatic resources. Within these communities families with fish ponds gain a larger portion of their diet from the fish they grow. Overall it appears that those with fish ponds eat less capture fish. However, these families still obtain the majority of their animal protein from the capture fish. In some communities there is considerable redistribution of culture fish to families without fish ponds while in others there is very little. This is again dependent on the aquatic geography of the village.

6.5 Aquaculture and fisheries in rural livelihoods

As set out in Chapter 2, there is a need for a broader understanding of inland fisheries, beyond simplistic statements of consumption, within an ecologically based geography of living aquatic resources. The following addresses this need by analysing the complex relationship of people with their environment, drawing attention to both the instrumental and hermeneutic roles of aquaculture and capture fisheries in the composition of rural livelihoods. By critically comparing the role of both activities in the six communities, analysis builds a systematic assessment of the wider orthodoxies of aquaculture as a panacea for poverty alleviation and as a tool for rural development. The following addresses the influence of wealth and relative importance of capture fisheries and aquaculture to other livelihood activities. The diversity of specific roles of aquaculture and capture fisheries are then analysed separately.

6.5.1 Wealth, aquaculture and fisheries

Wealth is widely considered a factor that influences the use of living aquatic resources. Meusch *et al.* (2003) recently found that poorer households in Attapeu Province placed more importance on collecting aquatic resources than better-off households. They define better-off households as those that own land and actively engaged in agricultural production, have more options in quantity and type of food consumed as well as having cash to spend on food items. The use of living aquatic resources is, however, never as straight forward as this suggests. Béné (2003) challenges the idea that fisheries are an activity of last resort. Using evidence from Africa he argues that fishers have to invest a certain amount in fishing which is prohibitive to poorer people. Garaway (In Prep.) found similar patterns of acquisition and utilisation of fish between rich, middle and poor groups in Savannakhet Province. They also found that fishing for income was not an activity of poor groups alone. Rather it was similar across all groups. Although rich

households bought more fish, poor households received more fish from gifts which evened up their overall consumption. The complexity of capture fishery resource use between wealth groups is now better understood, yet a similar critique of the role of aquaculture has not been carried out.

Wealth classification

Strong patterns across all six study villages emerged as to what constitutes rich, middle and poor households. The main characteristic of wealth identified by respondents from all villages can be grouped as productive assets, consumer goods, personal characteristics and alternative income sources (Table 6-8).²⁵ Rich families were characterised by material possession of items such as motorbikes, tractors and furniture. They also had a large area of rice paddy, alternative sources of income from shop ownership and/or remittance payments from overseas. Respondents also identified productive assets such as a large number of livestock, an ability to sell rice and ownership of multiple fish ponds as indicative of richer households. Middle and poor groups were characterised by small or poor quality areas of land and less consumer goods. Criteria specific to poor households included food insecurity, a lack of rice paddy or, especially in the case of Phone Muang, rice paddy subject to flooding. Poorer households were also characterised by subjective indicators commenting on people's ability and willingness to work. Aquaculture ponds were used as an indicator of wealth in all villages. Rich families were identified as owning up to six ponds whereas poor households were defined by their lack of pond ownership. Capture fisheries, like all natural resource based activities, was not used as an indicator of wealth as it was carried out by all groups.

Aquaculture adoption

The adoption of aquaculture is associated with access to financial capital. Those with access to cash from remittances, or small business were more able to dig ponds. The difference between these rich and poor farmers is best illustrated in Phone Muang. *Than Kham*, a farmer with family in the United States, receives monthly remittance payments from which he has invested US\$800 in the construction of two fish ponds next to his house (Interview 13, 16/03/02). He has rice paddy however has lost part of his land when Souie Reservoir was flooded. He believed that the investment he made in the pond

²⁵ These classifications were adopted from Garaway (In Press.)

compensates his lost income from selling surplus rice. His ponds were not very successful due to the lack of water and saline soils in the area. However, *Than Kham* was identified as rich because he owned a pond, regardless of his success with aquaculture. In comparison, *Than Souk*, a village committee member of Ban Phone Muang, was identified in the wealth ranking exercise as poor, based on his dependence on fishing in Souie Reservoir. He commented that despite only having lost a large proportion of his rice paddy he has benefited from the extension of the reservoir as he now has the opportunity to sell more fish than he ever did before (Interview 15, 18/03/02). His family gains an income of around 10000kip (US\$1) from the sale of about two thirds of the 2 kg of fish he catches each day. Interestingly, however, he aspires to owning a fish pond to supplement this catch but states that he does not have the financial capital to do so.

A number of farmers liquidate other assets to fund pond construction including cattle and buffalo. Farmers in materially poor communities such as Ban Keng Hin Soung commonly used their livestock as a means of paying for large capital investments such as pond construction. One farmer paid 7000 baht for his first pond, while paying the equivalent value of two cows for his second pond (Interview, 24/03/02). A number of farmers interviewed constructed fish ponds on land adjacent to road or irrigation canals, paying contractors with small cash sums, livestock or food to take soil in specific locations. Conversely other farmers have been restricted in their efforts to build fish ponds as their land is not located in suitable areas. For example, *Than Lieng*, a village elder of Ban Gngang Soung, lamented he has no opportunity to dig a fish pond because the land that he owns is located in an area that experiences intermittent flooding. He is therefore not able to construct a pond despite having enough money.

There is some indication that investment in fish ponds by poorer households is possible, but involves more human capital, including knowledge and labour. Nevertheless, farmers made no reference to role of human capital as important in fish pond investment. There is a degree of ambivalence among farmers that have had ponds bestowed on them from irrigation or road construction. For example, a number of farmers in Phone Muang have had ponds built in close proximity to a major irrigation canal but have not invested in aquaculture. Alternatively, poor households that invest their own labour in the construction of ponds appear to be more likely to succeed in the adoption of aquaculture.

This is true of *Than* Phuut, in Ban Phone Muang and *Than* Phone in Kadan who, despite being classified as poor, are both regarded as the most successful aquaculturalist in their villages (Interview 12, 15/03/02; Interview 11, 07/03/02).

Table 6-8 Criteria identified to determine wealth ranked groups

Rich	Middle	Poor
Productive assets	Productive assets	Productive assets
<ul style="list-style-type: none"> • Rice >5 ha (38) • Sells rice (36) • Many livestock (>5) (34) • Tractor (33) • Few livestock (<5) (27) • Fish pond (1-2) (17) • Trader (16) • Rice <=2 ha (13) • Food secure (10) • Tuk Tuk (9) • Rice storage (7) • Rice Mill (6) • Fish pond (>2) (5) • Government worker (5) • Mechanic (2) • Rice > 2ha (2) • Rice husker (2) 	<ul style="list-style-type: none"> • Few Livestock < 5 (49) • Rice < 2 (27) • Food secure (26) • Rice > 2 (20) • Fish pond (1-2) (14) • Many livestock > 5 (9) • Tractor (8) • Rice flooded (7) • Bicycle (1) • Cash crop (1) • Trades fish (1) • Dry season rice (1) • Fish pond >5 (1) • No livestock (1) • Rice Husker (1) 	<ul style="list-style-type: none"> • No Livestock (25) • Rice < 2 (24) • Few livestock (<3) (22) • Rice floods¹ (2) • No rice (8) • Rice > 2 (6) • Dry season rice (2) • Sells vegetables (2) • Dry land rice (1) • Fish pond (1) • Many livestock (>3) (1)
Consumer Goods	Consumer Goods	Consumer Goods
<ul style="list-style-type: none"> • Motorcycle (21) • New house (1) • Bicycle (1) • Furniture (2) • Sewing machine (1) 	<ul style="list-style-type: none"> • Motorbike (1) • New house (1) 	<ul style="list-style-type: none"> • Motorcycle
Characteristics	Characteristics	Characteristics
<ul style="list-style-type: none"> • Small family (1) • Few children (1) 	<ul style="list-style-type: none"> • Sells rice (9) • Food insecure (11) • Money from overseas (3) • A lot of children (2) • Can work well (1) • Can't work well, is old (1) • New Family (1) • Likes to work (1) 	<ul style="list-style-type: none"> • Food insecure (41) • Many children (16) • New Family (6) • Widow (6) • Can't work (3) • Labourer (3) • Lazy (3) • Can't work, old (1) • Catch fish to sell (1) • No Children (1)
Other income	Other income	Other income
<ul style="list-style-type: none"> • Overseas remittances (12) 	<ul style="list-style-type: none"> • Trader (5) • Builder (2) • Government worker (1) • Remittances (1) 	<ul style="list-style-type: none"> • Overseas remittances (1)

Note: Number in brackets is frequency of response. Total number of respondents was 48

Access to capture fisheries

Capture fisheries are carried out by all members of communities independent of wealth. This is because major investments in fishing are human and natural capital rather than financial or physical capital. This is highlighted by the range of people who held important knowledge of capture fishery use and had access to a number of fishing grounds.

Widows, for example, were classified as poor by all communities. Some of these women were extremely poor while others were materially wealthy. However, regardless of circumstance each of the widows were reliant on the capture fishery to some degree. Each of the women, regardless of wealth, showed a strong connection with the fishery resource. Two of these women highlight the human capital they possess and use in exploiting living aquatic resources. *Mae Tao Phet* in Ahung Nyay comes from a relatively wealthy family. Despite this she is regarded as poor as her son-in-law recently passed away however has a range of assets including vegetables, livestock and a large house (Interview 37, 12/04/02). Before he died he dug a pond and her family has set up a lift net with which she can easily obtain fish on a regular basis. She supplements this with regular use of the capture fishery in nearby streams. Another old widow, *Mae Tao Baan*, has a congenital disability and lives on her own in a small house near her relatives (Interview 32, 11/06/02). She does not own any rice fields having given them to family members. Her main source of food is from a small vegetable patch and the collection of fish and OAA from a small stream near her house.

The above examples support Garaway's assertion that living aquatic resource use is not significantly different between wealth groups within communities while also highlighting the complex relationship between aquaculture and wealth. Fish pond ownership is a characteristic of wealthy households based on their ability to invest financial capital into a productive asset. However, there are a number of ways in which poorer households can invest in aquaculture through human capital. This supports the findings of Gupta *et al.* (2002) in a study of rice fish farming adoption in Bangladesh. They found that the benefits of aquaculture accrue to relatively prosperous not marginal farmers. However, they argue that, similar to the orthodoxies of the Green Revolution, small farmers will adopt aquaculture when the profitability of an activity is established. This is a simplistic view. The following therefore presents a more nuanced

understanding of the role of capture and culture fisheries in rural communities that is locally contingent and based on specific livelihood portfolios.

6.5.2 The importance of living aquatic resources

In rural development and assessments of poverty the importance of fish and OAAs are placed solely in terms of consumption. Few quantitative studies have been compared with a substantive analysis of the perceived importance of fisheries at the community and household level and, particular to this thesis, the comparative importance of aquaculture and capture fisheries. As outlined in Chapter 2, diverse sustainable livelihoods are recognised as risk adverse, providing a strong base of activities to carry a household through environmental or social upheaval. Allison and Ellis (2001), for example, argue that fisheries based livelihoods should not be seen in simplistic terms of inflexible full-time fishing families. Instead they argue that

When the diverse livelihoods of artisanal fisherfolk are properly taken into account it becomes apparent that fishing for many such families is an opportunistic endeavour, the effort devoted to which varies flexibly according to the effort that are made (p. 386)

Living aquatic resources are investigated in terms of their specific role in a wider livelihood portfolio. Building directly on the work of authors such as Amartya Sen, Bebbington (1999) argues that understanding livelihoods is based on more than material benefit but also on the perceptions of well-being and poverty and related to their livelihood decision. He argues that

... people's assets are not merely means through which they make a living: they also give more meaning to the person's world ... and this meaning will then be one of several influences in subsequent decisions people make about their livelihood strategies. (p. 2022).

The following argues that the perception that people hold about the importance of their natural resources is a contributing factor to not only how they compose a livelihood, but how they translate the perceptions into management of these resources.

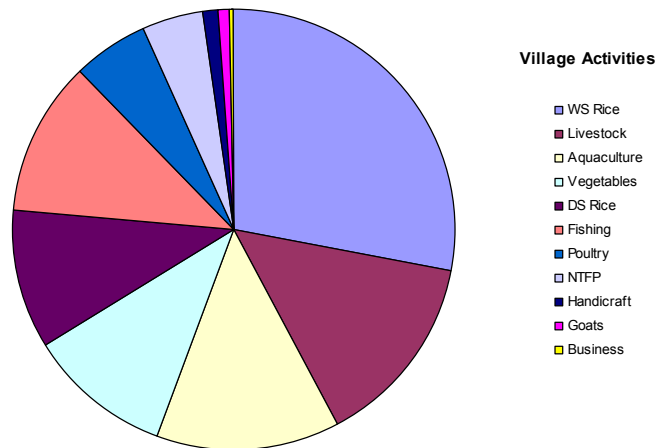


Figure 6-8 Overall importance of activities

Interesting patterns of ranking livelihood activities emerged across all villages. There is a clear divide between productive and natural resource assets such as fisheries. The community focus groups in each village positioned aquaculture as the third most important livelihood activity behind wet season rice and livestock (Figure 6-9). Capture fisheries is the fourth most important activity behind vegetables and dry season rice. Activities ranking lower than capture fisheries include handicraft, non timber forest products and small business (shops and trading). A clear divide is evident between productive agricultural activities, natural resource collection and business. Participants argue that the high rank of fish ponds is indicative of their multiple use value including water storage. As shown in other studies capture fisheries consistently ranks lowly. For example, Foppes and Dechaineux (1997) found that fish ranked as the second most important non timber forest project collected by the community, an activity that ranks lower than fishing in the results presented in this thesis. The perception is that capture fisheries is not as important to the village economy as most other agricultural activities including aquaculture. The consistency of these low rankings is shown in Figure 6-9 with the importance of activities such as dry season rice is contingent on the location of communities such as Phone Muang and Kadan. However, it appears that perceptions surrounding the importance of both fishing and aquaculture are consistent across all villages.

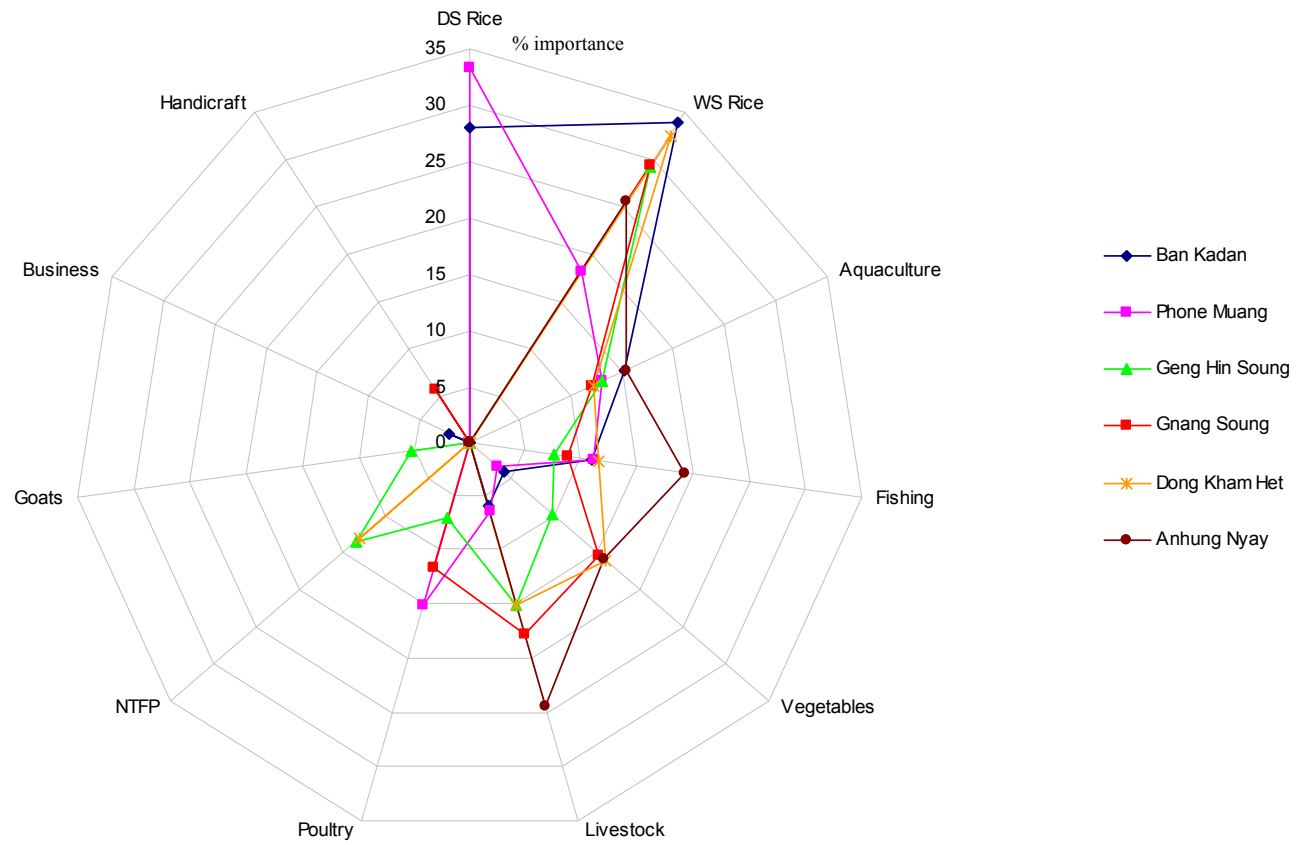


Figure 6-9 Activity ranking and importance by village.

Note: Axis is calculated from matrix ranking exercise and then converted to percentage.

Meusch *et al.* (2003) found that within communities there is an important distinction in the perception of the importance between richer and poorer households. They concluded that the collection of aquatic animals was ranked lower by better-off households and higher in worse-off families. Although their finding conforms to the wider narrative of the importance of fishing to poorer households further examination of shows a more complex picture. Figure 6-10 and Figure 6-11 show the frequency of capture fisheries and aquaculture as they were ranked by households. These results indicate that the importance of capture fisheries is specific to each household. There is some indication that poorer families rank capture fisheries lower than middle and rich wealth ranked groups. There is also some indication that rich and poor households are less likely to go fishing compared to middle wealth group households. This supports both the assertion of Béné, that poorer families are restricted by high levels of investment, and also that of Meusch *et al.*, that richer families are less dependent on living aquatic resources than poorer families.

The contrasting results at the village and household level indicate that there are two narratives of ‘importance’. Aquaculture is grouped with productive rural assets and as such is given a relatively high level of importance. At the community level aquaculture fits into the notion of agricultural modernisation that is prevalent throughout much of Southeast Asia (Rigg 1997) and supported by ‘Blue Revolution’ rhetoric. At the household level the importance of aquaculture is contingent on the ownership of a fish pond. Capture fisheries, on the other hand, are assigned a low rank at the community level, but slightly higher at the household level. Capture fisheries do not confirm to perceptions of rural modernisation but are instead perceived as a culturally embedded resource within the natural economy that is highly abundant. Although often the subject of elaborate management systems the perceived importance of capture fisheries is tied to the relatively low level of investment needed to look after the resource. The ambivalence shown towards capture fisheries was evident in many responses to the importance of fisheries. It was also implicit in responses surrounding the role of fishing in the family, bound up in their own cultural prejudices of classifying people as ‘fishers’.

A fundamental distinction between the importance assigned to aquaculture and capture fisheries is made when people talk about their occupation (*asseep*). Not one of the

individuals within any household interviewed identified themselves a fisherman (*haa pa pen asseep*), instead they referred to themselves as farmers, housewives, teachers or police who also fished. For example, *Nang Khao*, a widow in Ban Keng Hin Soung stated that capture fishery resources are not important at all to the family. However, she recognised that her son-in-law goes fishing on all free days that he has throughout the year (Interview 17, 23/03/02). Even households who were most dependent on capture fisheries in Phone Muang such as *Than Souk*, referred to themselves as farmers, who also fished (Interview 15, 18/03/02). This is tied to the perception of modernisation in rural communities. Aquaculture is perceived as a modern technology, which in Lao is translated as *Thansamai*. Whereas aquaculture is seen as *Thansamai*, capture fisheries within the natural economy is seen as the antithesis of *Thansamai*, rather associated with a difficult (*Lambaak*), poor (*Tuk Nyak*) lifestyle of people living in remote rural areas.

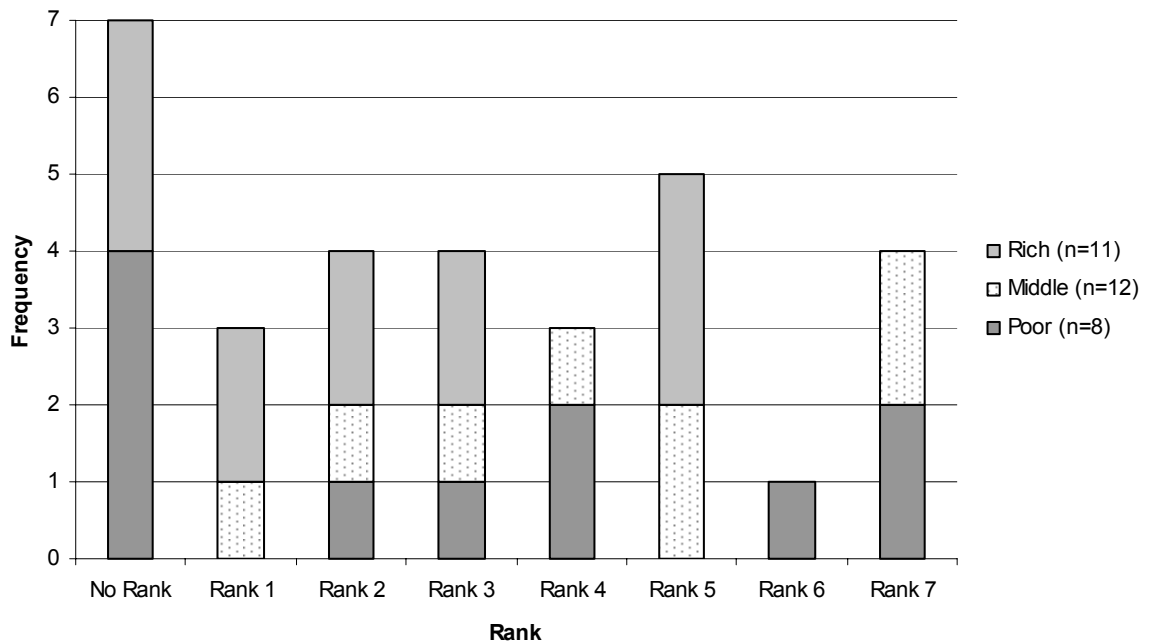


Figure 6-10 Activity rank of capture fisheries across wealth groups. n=32

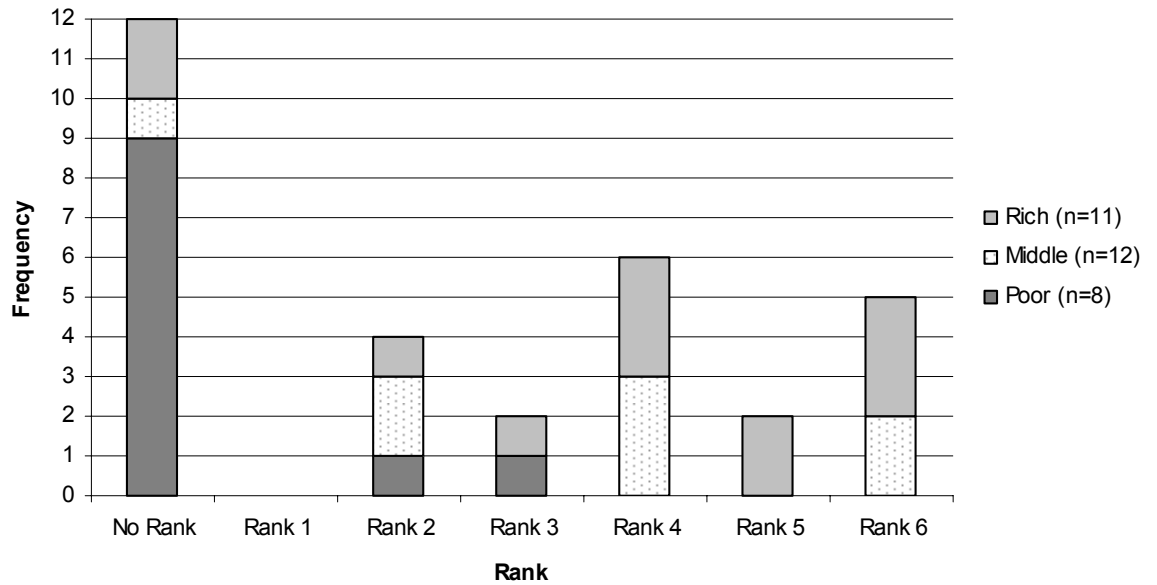


Figure 6-11 Activity ranking of aquaculture across wealth groups. n=32

Despite the different perceptions of the importance of aquaculture and capture fisheries, both activities are carried out in parallel in all communities. Both contribute differently to the collective livelihood of communities and the livelihood of households. As such contrasting perceptions of the importance of aquaculture and capture fisheries emerge in parallel. A good example of this is the case of *Than Lam*, a young man with a new family who depends strongly on the capture fishery. He possesses a wide local knowledge regarding the aquatic resources including streams, seasonal water bodies and wetlands which he fishes at different times of the year. He ranks fishing as the second most important activity for his household. However, recently he has invested in the construction of a fish pond which he plans to stock in the coming year. Lam does not see the ponds as a replacement of the capture fishery, instead he sees different roles for both. The family will eat the culture fish and will sell the capture fish to market. He concluded this based on his observation of other families with fish ponds that provide a readily available source of fish to eat. However, he draws upon his own experience in understanding the value of capture fish. The instrumental role of aquaculture and capture fisheries is therefore important in providing diverse, and more sustainable livelihoods.

The different perceptions of aquaculture and capture fisheries in each of the villages are representative of wider narratives of the importance of both in Laos. Despite the higher priority assigned to aquaculture over capture fisheries in reality both activities are carried out in parallel, contributing to rural livelihoods in different ways. The importance of living aquatic resources is best described through a discussion of the specific role that both aquaculture and capture fisheries play in rural livelihoods.

6.5.3 Rural livelihoods and capture fisheries

Moving beyond the assertion of Allison and Ellis, that artisanal fishers have multiple occupations, the following argues that capture fisheries themselves provided complex diversity of activities. This complexity incorporates not only the instrumental role in the provision of nutrition and income but also the cultural and social basis of rural livelihoods. The multiple divisions of labour and knowledge used to exploit living aquatic resources reflect the range of aquatic resources and the variety of species caught with a number of fishing gears. How this multiplicity within the activity collectively known as ‘capture fisheries’ fits into a better understanding of the diverse role of capture fisheries in contributing a households livelihood is now discussed.

The contribution of living aquatic resource to a household’s livelihood is best looked at in terms of how individuals exploit different aquatic resources at different times. The division of labour between men and women in Lao communities is well documented. For example, Ireson (1991) in her study of forest use argues that traditionally Lao women are responsible for gathering non timber forest products while men are more likely to be in charge of paddy labour. This takes into consideration the division of labour between genders but does not take into consideration the complex diversity of demographics within genders. Combining gender and age creates a mosaic of old and young men and women, as well as boys and girls simultaneously exploiting a range of aquatic resources at different times of year, using different fishing gears to target different species for different uses.

A comparison of Ahung Nyay in Outhomphone and Gngang Soung in Khantabouli reveals a range of groups fishing different resources forming a complex mosaic of seasonal living aquatic resources. In Ahung Nyay different exploitation patterns are identified for men, women and children of all ages (see Figure 6-12). The relative emphasis given to

each group indicates the location of the resource relative to the village, the type of gear able to be used as well as the social responsibility of some groups over others. For instance, Huay Tahaw and Nong Louam are both the domain of men. Huay Tahaw is fished at the end of dry season when only gill and cast nets (both gears used specifically by men) are used to catch fish in the shallow waters. In comparison Huay Thoop and Huay Ahung, two small streams running near to the village, are fished from March to August by both young and old men and women using a variety of gears. These streams are more accessible to the elderly and children due to their close proximity to the village and their suitable environments for a range fishing gears. This is also the case for the communally managed Nong Salaa that is fished once a year on an annual fishing day.

In Gnanng Soung, a community with more abundant aquatic resources, respondents divided the use of different aquatic resources by gender but also by season (Figure 6-13 and Table 6-10). The division of labour between different aquatic resources was referred to according to the ability of different demographic groups in catching fish. For instance, at the end of the wet season, when the small streams have been dammed, Huay Somphoie is fished by all groups. Access is gauged by the ease with which fish are caught (*haa ngai*). This is also the case with children fishing the rice fields. Fish are again easy to catch, *haa ngai*, as the water is shallow and close to the village with abundant small fish that can be caught with hooks. In comparison, men fish areas in which both physical strength and technical knowledge are needed to target larger species regarded as difficult to catch (*haa nyark*). For example, the wetland area, Beung Leuk, is a deep area in which fish are difficult to catch, *haa nyark*, requiring gears such as gill nets and long line hooks and cast net all of which are used exclusively by men.

The diversity of capture fisheries is widely recognised at the community level, however at the household level this diversity is challenged by the very notion of fishing. As Ireson pointed out, male activities have social and political precedence. She found that the contribution of women in collecting non-timber forest products was not widely recognised as an important activity within the household economy. Similarly, the contribution of women and children to fishing and collection of OAAs is not deemed important. 'Fishing' is what men do. This was especially evident in the elevated dry village of Ban Keng Hin Soung. Nang Khao reported that fishing contributes least to food and income of the household (Interview 17, 23/03/02). However, her young son

and daughter both go fishing whenever they have spare time. This equated to every second or third day throughout the year. *Nang Khao* also collected a range of molluscs and crustaceans from the rice fields during the wet season but she did not recognise this as contributing to the household's livelihood. This perception of capture fisheries is common to all villages. Two prominent fishers, *Than Souk* in Ban Phone Muang and *Than Ere* in Ban Kadan, both identified catching fish as a primary activity. However, both limit the importance of fishing to their own involvement which provides a source of income from the sale of larger riverine species.

Where and when people go fishing is a function of the proximity of other activities of a family. This is supported by Garaway (In Press.) who argues that fishing is almost always combined with other activities. The location of family rice fields, for example, influences where wet season fishing takes place. *Than Somboun* in Ban Kadan, for example, noted that where and how long he goes fishing is determined by agricultural activities at that time of year (Interview 7, 05/03/02). For example, if they are working in the rice fields then they go fishing in the closest lake, or stream. He explained that this is a way of reducing the time spent travelling between areas of work. As such, fishing is always a secondary activity, but an activity that is prevalent across all seasons. Families with fewer livelihood activities or less capital are more likely to go fishing in water bodies further away from the village. This has also been seen in other areas of Southern Laos where people were found to travel long distances to fish in seasonal backswamps (Tubtim 2001). For example, in Chumphone district people travel up to 20 km to go fishing in Souie reservoir in the wet season.

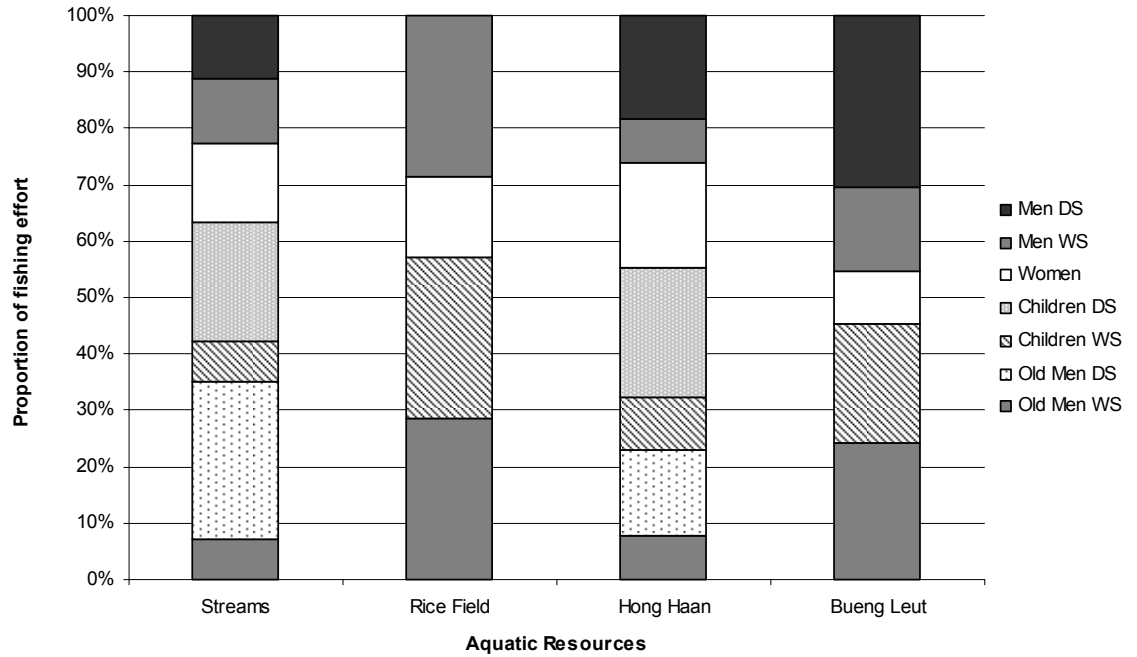


Figure 6-12 Fishing patterns in Gngang Soung

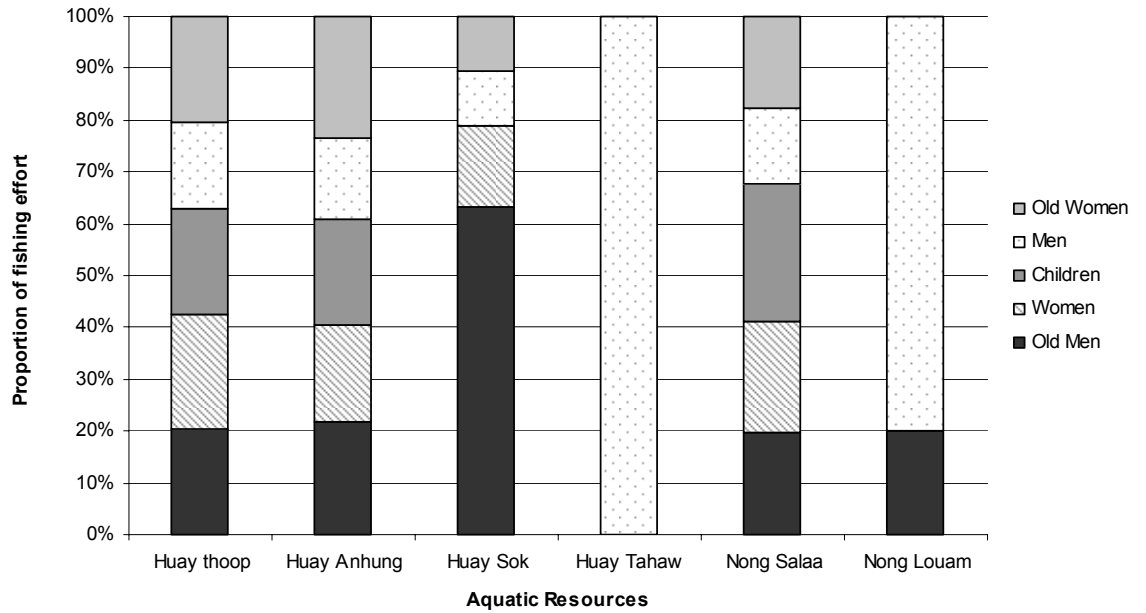


Figure 6-13 Fishing patterns in Ahung Nyay

The diversity of capture fisheries, in terms of both aquatic resources and exploitation patterns, means that the resource is a form of social security. This is seen in Ban Phone Muang where the community as a whole recognises the increased importance of the fishery as rice fields are increasingly salt affected from the extension of Souie reservoir. Farmers, such as *Than Souk*, report that despite the loss of their rice fields they are now able to go fishing every day. Fishing has become an important source in of cash with which they purchase food. *Than Souk* recognises that, despite the loss of his rice fields, his family is better off because of the high monetary value of the capture fishery (Interview 15, 18/03/02). The fishery is therefore an important common property natural asset. This does not contradict the assertion of Béné, by arguing that fisheries are a resource of last resort, but rather recognises artisanal fisheries provide an important resource base on which the natural economy of semi-subsistence communities depend.

The importance of the resource is also evident in participation of older members of the community. These people are not regarded as ‘fishers’, however as seen above, they make up a large proportion of the people fishing in different resources at different times of the year. *Mae Tao Baan*, the widow from Ban Nong Kham Het is a good example (Interview 32, 11/06/02). As outlined above, she has little, financial or physical capital, and relies heavily on the collection of living aquatic resources. She is able to access these resources because she possesses human capital: knowledge about capture fisheries. Furthermore, she, unlike *Mae Taw Phet*, is disempowered from access to technologies such as aquaculture as she has no financial capital or land (Interview 37, 12/04/04). She is wealthy and well connected in the village including the ownership of a fish pond. She reported that her household does not go fishing since she lost her son-in-law to cancer two years previously. Despite this she described how she clearly exercises her knowledge regarding living aquatic resources to go fishing in a nearby stream with a lift net (*sadung*) at specific times of the year.

Table 6-9 Fishing calendar Ahung Nyay Village, Outhomphone

Water Body	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Huay thoop			A B C D E G										
Huay Anhung			A B C D E G										
Huay Sok							A B C D F						
Huay Tahaw				B C									
Nong Salaa		Fishing Day											
Nong Louam				Visitors, Work									

A. Hook (*Bet*) B. Gill Net (*Mong*) C. Cast Net (*Hee*) D. Scoop Net (*Sawn/Saawing*) E. Lift Net (*Sadung*) F. (*Nyeng*) G.(*Chan*)

Table 6-10 Fishing calendar Gnang Soung Village, Outhomphone

Water Body	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Huay Somphoie	A B C D G											
Rice Fields								A D I				
Other water bodies										H		
Hong Haan						B C E G I						
Beung Leut								A B C				

A. Hook (*Bet*) B. Gill Net (*Mong*) C. Cast Net (*Hee*) D. Scoop Net (*Sawn/Saawing*) E. Lift Net (*Sadung*) F. (*Nyeng*) G.(*Chan*) H. (*Thone*) I. (*Sai*)

Fishing is also determined by the species caught and what the fish are used for. Different species require specific gears designed for specific aquatic resources. The fish caught by different people in a household are valued differently based on the importance attributed to the different forms of 'fishing'. For example, the fishing that young men take part in often involves travelling to water resources that are further from the village, containing larger marketable species. An example is that of *Than Ere*, a young man with a new family in Kadan (Interview 10, 08/03/02). He uses the different aquatic resources available to the community to target different species for different purposes at different times of the year. He explained that the lakes in the rice fields provide a source of food during the rice harvest and planting. Later in the year he uses the Chumphone River to target migratory species such as *Wallago attu*, *Mystus microthalmus*, and Pangassid catfish. *Than Ere* also goes fishing with a group of seven other young men from the village in Huay Gio, a small reservoir seven kilometres away during the dry season. The fishing gear they use includes seine nets, gill nets and cast nets which require more than one person to operate and specifically target large fish such as *Channa spp.*, *Notopterus spp.*, *Chitala spp.* and the eel *Anguilar marmorata*, all of which are highly prevalent in markets (Chapter 4). At the end of a trip the group classifies their catch into two categories. The larger fish are sold to a trader in the village who then sells the fish on to Khengkhek and Savannakhet. The smaller fish are divided up for consumption for their families. The fishing group is therefore an important activity for families such as *Than Ere* who recognised these trips as forming the largest source of income for his family.

In comparison, the fishing activities of children, women and older people usually involve small-scale fishing gear such as hooks (*bet*), scoop nets (*sawing*) and lift nets (*sadung*). These are often used in still water such as rice fields, small streams, canals and community water bodies in close proximity to the village. The fish caught are often more abundant, low value species including *Anabas testudines*, *Danio spp.*, from canals and small streams, and small *Mystus spp.* and *Clarius macrocephalus* from rice fields. The 'fishing' activities of these demographic groups are not regarded as important, even though the fish they catch were noted as most prevalent in household consumption.

There is a complex mosaic of uses and users of living aquatic resources in composing rural livelihoods. Capture fisheries play an instrumental role as one of many occupations. However, 'fisheries' cannot be classified as one activity. Instead, they

provide a complex combination of activities for a range of people in a household. As Allison and Ellis point out, the effort afforded to capture fisheries cannot be seen as a homogenous activity but rather as a flexible activity that is undertaken by different people at different times. This involves a range of gears being exploited by different groups of people to catch a range of species at different times of the year. Collectively this provides not only income but also protein, and a complex relationship between humans and their environment. Therefore, despite the low importance given to fisheries by the communities, 'fishing' is ubiquitous across all aspects of rural life, independent of wealth and position. In this way it is the resource of last resort as expressed in wider narratives, but it is also an activity that forms the basis of daily nutrition and income for all members of communities.

6.5.4 Rural livelihoods and aquaculture

Aquaculture plays a strong supplementary role in the composition of rural livelihoods. This is contrary to the rubric of the blue revolution where aquaculture emerges as a fix-all for rural development and poverty alleviation providing improved food supply, employment and income (Edwards 1999). The variety of uses and levels of investment in fish ponds is outlined in Chapter 4. In some cases fish ponds are actively stocked and exploited throughout the year, while in other cases farmers harvest their ponds once a year. Others may not stock instead using the pond as a trap pond, while others still use ponds as a source of water. As such, a fish pond serves specific purposes at different times of the year and is an important resource for those that own one.

Chapter 4 showed that aquaculture in drier areas appears to play a more significant role in the provision of nutrition than in areas with abundant aquatic resources. In villages such as Ban Keng Hin Soung fish ponds play a key seasonal role in supplying fresh fish. *Than Boulai*, a farmer who has constructed a dam on a small canal, explained that members of his household do not go fishing at all, but rather invest a great deal of time in their fish pond (Interview 19, 21/03/02). They stock the pond at the start of the wet season and invest time collecting termites from the surrounding forest to feed the fish. The pond has two specific roles. Firstly, as a source of fish during times of increased work. This is noted as an especially important role because the family's rice fields are 4 km from the village and so they have little time to return to the house to eat during harvest and planting times. *Than Boulai* identified a different role for culture fish.

Whereas the aquaculture fish provide a source of food, the pond also provides an important source of native species at the end of the dry season. This is important for two reasons. Firstly, his wife sells most of the fish they harvest to the markets in Savannakhet. The main species sold are *Clarius macrocephalus* and *Channa* spp. which both have high market prices (see Chapter 5). Secondly, aquaculture fish are an important seasonal source of income when traded in the village for Lao New Year celebrations. It therefore appears that in this dry village the fish pond has two benefits one involving the provision of nutrition from culture species and the second providing a source of income from native species in the dry season.

Most culture fish is sold within the villages. Some farmers still sell fish to market but receive little income. For example, *Than* Sing, a pond owner from Ban Gngang Soung, recognised that aquaculture was only able to supply income at the end of the dry season when the pond is harvested (Interview 24, 07/05/04). At this time his wife goes to Savannakhet market with the harvest from the pond over four days and sells the fish for about US\$30. This is much lower than the annual income from selling vegetables of about US\$300. Despite being a smaller sum, the fish provide an important injection of financial capital after the Lao New Year Celebration. Like *Than* Boulai in Ban Keng Hin Soung, *Than* Sing also catches a number of native species from the pond. His family does not sell these fish but instead freezes them to consume when guests visit or there is a shortage of food. This shows the dichotomy between the two types of fish. It appears that in some cases large culture species are sold while small indigenous species are consumed. This has been shown elsewhere with small native fish identified as an important source of nutrition to farmers (Roos *et al.* 2002). It therefore appears simple models of nutrition from aquaculture are confounded by the multiple uses of ponds and the mixed composition of capture and culture species.

Only one fish pond owner was successful in trading enough culture species to fund a fish pond and invest in other activities. *Than* Somlit in Ban Kadan was ranked as one of the poorer households in the village. He invested in the construction of a fish pond in 1994 after borrowing money from the Lao Mai Bank in the district capital at an interest rate of 17% per annum (Interview 8, 04/03/02). He managed to pay the bank back in three years through the sale of fish from the pond to people in the village. The fish he sells are *Tilapia nilotica*, *Puntius goniotus* and *Cyprinus carpio*, the three most common culture

species throughout Laos. The reason for his success is the location of the pond. His family owns rice paddy adjacent to the village. This enables him to easily collect fish when people come by his house. This is in direct contrast to another successful farmer in Ban Kadan, *Than Phone*, who reports never selling fish from his pond located just over 1 km from the village (Interview 11, 07/03/02). He never sells his fish – *T. nilotica*, *C. carpio* and *Cirrhinus cirrhosus* - because traders are not interested in culture species. *Than Somlit* is therefore the main supplier of fish because of the location of his pond. He uses the funds to invest in a small business and sewing service in the village. The family also eats fish from the pond but supplements this harvest with small capture fish such as *Danio spp.* and *Mystus spp.* purchased from local fishers at the end of the day when the price is lowest.

Fish ponds and aquaculture also supplement the wider social economy of rural communities, supplementing the diet of people with work obligations that limit their involvement in agriculture. For example, *Paw Tao Vong*, the head of the elders committee in Ban Keng Hin Soung described the benefit of the fish pond in terms of supplying a source of fish when they have a lot of work (Interview 16, 24/03/02). His family therefore benefit greatly from their fish pond as a readily available source of fish. This situation was also found in Kadan where *Paw Tao Hin*, also a member of the elders committee in the village, uses his fish pond as a means of filling his social obligations in the village (Interview 9, 02/07/02). He estimated that 10% of the fish that he harvests are contributed to festivals, work parties and visitors to the village. As such, his pond plays an important social function for the community as a whole. Through social obligation the pond is a reserve of food for the village rather than a direct source of food for his family. This fits in with the Lao concept of social welfare or *sawatigaan*: a process whereby private resources are redistributed through the wider moral economy of the village, to poor or needy people. This is also seen in Ahung Nyay with the use of fish ponds dug on the side of the road as a community resource used for festivals and work parties. The integration of this role of stocked ponds into fishing based rural communities is discussed in the next section.

In each of the above examples above there is a strong indication that stocking and maintenance of fish ponds are mainly the job of the male heads of the household. In the case of the elders in Ban Kadan and Ban Keng Hin Soung this is associated with their

specific roles as officials in the village. However, most other people interviewed indicated that men were primarily responsible for fish ponds as well as other significant productive assets such as rice fields. This supports the findings of Ireson that men's work is often associated with their social and political dominance in the village. This is similar to what Pritchard (cited in Setboonsarng 2002) found in Northeast Thailand. In a survey of farmers in Sisaket province he found that men are far more likely to control all aspects of production involved in aquaculture. Setboonsarng (2002) argues that although it appears that aquaculture is the domain of men, in integrated agricultural systems women are more likely to involve themselves with feeding and pond maintenance. This may well be true, however as discussed in the next section, there is also a division of benefits from the pond beyond the instrumental role of aquaculture involving social and cultural capital of fish ponds which accrues almost exclusively to men.

As argued in the GIS survey conducted in Chapter 4 the presence of fish ponds does not automatically mean that aquaculture is practiced. It was found that around 4% of ponds across the three districts have no culture species stocked in them, while a further 9% are used as trap ponds for native species. Looking at ponds as an asset with multiple uses beyond aquaculture may better fit within a model of risk adverse livelihoods. The role of integrated aquaculture is well documented in various parts of Southeast Asia and the Mekong Basin. For example, in Vietnam the integrated pond-farming system, VAC, has been heavily promoted by the government as a means of improving rural livelihoods (Luu *et al.* 2002).²⁶ Similar promotion is also found in Northeast Thailand and in the highlands of Laos (Edwards 1998; Pravongviengkham 1998). Although not as developed, or even labelled as integrated farming in Southern Laos, there are many examples of ponds being an important source of water for agriculture, beyond the practice of aquaculture. In Ban Nong Kham Het *Than Sai* explained that the importance of the pond is not only for fish culture but also as a source of dry season water, especially for livestock (Interview 30, 07/06/02). He also said that the pond is more valuable as a water source than aquaculture due to high level of investment of time in finding termites for feed. This is also seen in Ban Keng Hin Soung where numerous dams have been built on small streams to retain water for rice irrigation and duck farming. In wet areas

²⁶ The acronym VAC comes from the Vietnamese *vuon* (garden), *ao* (pond), *chuong* (livestock stalls).

the presence of ponds is also related to dry season refuges for native species, especially *Channa sp.* and *C. macrocephalus*.

Aquaculture plays an important instrumental role in the livelihoods of families with fish ponds. Households without ponds do not share any of the benefits from aquaculture. This is contrary to Edwards' (1999) claim that poorer households receive benefits of fish ponds both directly or indirectly. Farmers that have adopted aquaculture benefit in terms of increased income and increased supply of fish. However, the role of aquaculture is specific to each household. Where some households use cultured fish as a source of income throughout the wet season, others sell them at the end of the dry season. Other families do not eat cultured species but rather sell them and then purchase capture species.

Aquaculture fish appear to have a specific role in supplementing periods of high food demand such as Lao New Year, a festival that celebrates the end of the dry season with a water festival. It is at this time that fish are at their most scarce and aquaculture appears to play an important cultural role that is often mistaken for the importance of the 'fish pond'. A fish pond is an important asset for those families that can afford to construct one. Although built for aquaculture, a pond may be used for a range of activities. So, despite being seen as a more important resource than capture fisheries, it appears its role is context specific, specific benefits to a small number of people in a village. Again this contradicts Edwards' (1999) statement that aquaculture provides direct and indirect benefits to people in rural communities. Although there is a role for aquaculture in the provision of nutrition and income these are not transferred beyond the household.

6.5.5 Summary

At the community level aquaculture and capture fisheries are carried out in parallel. Both activities provide important instrumental roles for those who undertake them. However, the role of each is dependent on the specific circumstances of the community and each household. Instead of being an activity of last resort, capture fisheries are used by all members of communities regardless of wealth. In contrast to the main protagonists of aquaculture for poverty alleviation and rural development, who argue that aquaculture is accessible to poor households, this research shows that fish ponds are an indicator of wealth. It was found that aquaculture is only adopted by those farmers who

have the financial means and acquired knowledge to dig and stock ponds. Although financial capital is not exclusive to wealthy households, they are more likely to have access to funds. Despite this apparent wealth-based limitation aquaculture is regarded as a more important activity than capture fisheries in contributing to rural livelihoods. On further investigation capture fisheries emerge as a diverse activity. Community members, regardless of age and gender, showed remarkable diversity in the use and knowledge of capture fishery resources. In contrast aquaculture supplements primary production activities including capture fisheries. Both aquaculture and capture fisheries contribute to diverse and complex livelihoods in different ways.

6.6 *Social and cultural value of living aquatic resources*

A geography of living aquatic resources not only focuses on the instrumental role fish and other aquatic animals but also on the social and cultural influences that give meaning to decisions over resource use and rural livelihoods. The previous section describes capture fisheries as having a greater overall importance than aquaculture in the composition of a rural livelihood across a number of environments. Despite this, aquaculture is perceived as a more important activity in communities, and one that should be targeted for further extension. It therefore appears there are wider influences over management and development decisions at both community and households levels. The following discusses the specific cultural, social and political influences over resource use in each of the six villages. More nuanced understandings of the ‘importance’ of capture and culture fisheries are explored by uncovering some of the hidden meanings and motivations that guide decisions in rural livelihoods as well as wider influences of power and politics. Attention is first given to the political and social dichotomy between modernisation and the natural economy. Analysis then turns to social and cultural understandings of Lao rurality and the male dominance over living aquatic resource use including collective action and village solidarity. Social influence at the household level is then discussed in terms of the emergence of fish ponds as class based aspirational assets. Finally, attention turns to the provision of technical support for living aquatic resources, focusing specifically on local politics and power influencing agricultural extension services.

6.6.1 Modernisation vs. nature

The importance of fisheries and aquaculture in rural communities is influenced by notions of modernisation. This is expressed through either modern production systems (*het gan paliit bep thansamai*) or nature based food collection (*haa kin bep thamasaat*). Agricultural modernisation has been a dominant policy area since the revolution in 1975 (Chapter 3). The government implemented policies that supported a socialist philosophy of production based around the ‘scientific revolution’. It was thought that this transformation would be supported by scientific and technical revolution as well as an ideological and cultural revolution. This was a strong statement suggesting that the Lao population, with the help of eastern bloc development assistance, should move away from subsistence agriculture production. Emphasis has since shifted to the development of a market oriented socialist economy. Each of the development plans that emerged from 1981 onward placed little emphasis on natural resources. Instead food security and market integration focused on the modernisation of agriculture production.

The overall instrumental role of capture fisheries is greater than aquaculture in rural communities. Aquaculture appears to be less important as an activity that provides income and nutrition beyond the household. The construction of ‘importance’ appears to be built around the separation of agriculture and natural resources. Because aquaculture fits with private, technically based mode of production it is perceived as modern and, as such, perfectly suited to the government rhetoric of rural development. In contrast capture fisheries is firmly aligned within the natural economy, and therefore seen as the antithesis of *het gan paliit bep thansamai*.

The notion of *haa kin bep thamasaat*, relying on the natural environment for subsistence, is a deeply entrenched cultural ideal that goes beyond notions of food and income. Aquaculture draws on this cultural significance of native fish within the subsistence economy while also fulfilling wider notions of modernisation. While sitting around ponds eating culture fish farmers in all villages continually refer to the primitive, difficult nature of capture fisheries. However, these same farmers, usually under the influence of rice whiskey, argue that they have a strong connection with the surrounding nature (*thamasaat*) for food, drawing explicitly on the abundance (*oudom somboun*) of their natural resources and the importance of *haa kin bep thamasaat*. The concept is also used

to distinguish a *Lao* culture, distinct from Thailand, who (ironically) are distinguished by modernisation.

The importance of the natural economy has also been coopted by the government to promote nationalist rural propaganda. A good example of this is in the song *Yen Sabaay Saonaa* - the Cool and Content Farmer (Box 6-1). This song was written by the LPRP after devastating floods swept the lowland areas of the country in 1978-79. It was designed to raise the spirits of people in supporting the agricultural collectivisation program based on traditional notions of subsistence-based rural Lao culture to promote socialism. It begins by reiterating the rural consciousness of Lao people as the hard working children of farmers, the proletariat, who are dependent on rice and natural resources for food. Emphasis is given to the contentment drawn from rural community's reliance on "rice and fish". This reference is a central identifier of rurality in Southeast Asia. In both Thailand and Cambodia too, the basis of agrarian society has been summarised into fish and rice. In both cases fish refers to native species, and as explained in the song, is part of a wider reliance on natural resources. The central message of the song is national development through agricultural intensification. It is into this mode of production that aquaculture fits while drawing upon capture fisheries for cultural legitimacy.

6.6.2 Rural solidarity

The notion of solidarity (*kwam samakhey*) is an important notion of the moral economy in rural Lao communities that is also coopted into rural development. Within government rhetoric the term is used to describe the socialist work ethic. The notion of *kwam samakhey* is also central to capture fisheries, like many other rural activities in Laos built around collective action (Ireson 1996, 1992). In fisheries this is highlighted by fishing day management systems called *phaa paa* or *phaa nong* – dividing the fish or dividing the pond. This was seen in Ban Gngang Soung and Ban Ahung Nyay. All groups, men and women of all ages, go fishing together on these days. After fish are caught they are eaten together in groups of family and friends. Fishing groups travelling to distant resources, as seen in Ban Kadan and Ban Phone Muang, is another example. Capture fisheries therefore play an important role as social security by poorer households. In comparison aquaculture is a privately owned resource that only usually wealthy families can adopt. It is therefore apparent that social capital built up through

fishing is more prevalent than through aquaculture. The development of aquaculture has drawn upon these notions of social capital for cultural legitimacy.

Aquaculture draws upon the cultural perceptions of collective action evident in the *Phaa Paa* system and group fishing. However, whereas capture fisheries are collective, aquaculture is often the domain of men. This draws in strong notions of what Ireson (1991) talks about in regards to the male social and political dominance. This is built upon notions of solidarity seen in traditionally communal activities. Men invite visitors and friends to their ponds to eat fish and drink whiskey. Because of the private ownership of ponds political and social capital is limited within existing power structures in villages. It is the ease of how fish are caught that promotes the value attached to aquaculture ponds. A fish pond is therefore emerges as a strong indicator of social and political capital within a village that reinforces power of wealthier households which is not accessible to poorer people in the village.

Box 6-2 The cool and content farmer

Yen Sabaay Sai Na

*Haw pen luuk sao naa, maa bek khun tai lai kwai long thong
Haa kin yu tham pa dong
Meua faa kham long, kor vay naa pay haa heuan*

*Pay waa yu ban na, nun seun chit jay leu waa piew ka-nyay
Ban na mii khao mii pa, ban na mii khao mii pa
Theung thiang naa mong yaa, lom pat yen sabaay*

Yen sabaay yen sabaay sao naa, yen sabaay yen sabaay sao naa

*Nyam suay nang long kwai bac don
Lam kap lam on fawn lam pao ken
“O-ah nong eu! Sai phu king khum kiang, sao viang chan tii leu seu
maa hua meu kap ai, kanyay ban beng meuang, na nong nang!”*

*Suk kor suk leut lam, neiw thong pen tham sang sivit sao na
Piew ai dam tham peua sat pasaa, ok heng thang na dtan pay eut hiew*

Yen sabaay yen sabaay sao naa, yen sabaay yen sabaay sao naa

The cool and content farmer

We are children of farmers, with ploughs over our shoulders we take buffalo to the field
We get food from the forest,
When the sky turns dark we turn our faces to home

Who ever said living in a village brings contentment or loneliness
Our village has rice and fish, our village has rice and fish
Even if the roof of our hut is thatched the wind still blows cool

The cool and content farmer, the cool and context farmer

In the middle of the day riding on the back of a white buffalo
Singing stories and dancing with the *Ken**
“Hey! little sisters so slender and beautiful. Even those Vientiane girls cooperate with me,
their brother, to develop and build our country. Come along and join us!”

Happiness and overwhelming joy, this path builds and farmers life
My tanned skin works for our nations people, strength expanding fields to resist the
struggle of hunger

The cool and content farmer, the cool and content farmer

*The *Ken* is a traditional Lao musical instrument

6.6.3 Class distinction

Fish ponds are an aspirational asset that is used as an indicator of wealth and class. This distinction can be made between rural and urban areas as well as within rural communities. The emerging rich in urban areas of Laos are increasingly visiting the large number of beer gardens (*suan bia*) that are emerging in the capital and in large provincial centres. These often have a fish pond at their centre stocked with sex reversed tilapia. Richer families are also buying blocks of land in the rural-urban fringe to establish gardens. Although some cultivation of fruit trees and vegetables is observed, the gardens centre piece is often a fish pond with a small *sala* or hut. As such these gardens are regarded as a place of rest and relaxation and are often regarded the domain of *Phou Nyai*, people with recognised social and political connections. A good example of this phenomenon was seen in Ban Kheng Hin Soung where a wealthy land owner from Savannakhet bought a large tract of land from the village and has developed a number of fish ponds. Although he sells these fish to market he also uses this garden as a place to conduct his business. As such he is highly regarded, attracting technical assistance from a range of DLF staff from Savannakhet and labour from Ban Keng Hin Soung.

In rural areas gardens have not traditionally been seen as a place of relaxation. In the subsistence economy they are production based. This is however changing. Reflecting the *Suan Beer* in urban areas fish ponds in rural communities are emerging as a key aspirational asset and also a space of power within the village. Owners are able to contrive gatherings based on *kwam samakhey* to drink *lao khao* and eat fish at any given time, drawing much respect from other community members. This was especially seen in the wealthier villages. For example in Ban Kadan *Than Phone* is highly regarded for the two ponds he hand dug, one of which is larger than one hectare. Next to his pond is a large tree under which is an eating area. The area around the pond becomes a space of power as visitors are invited to socialise there with senior males on the village committees. As such power structures within the village are reinforced and the owner of the pond earns respect from hosting the event.

There is also a shift in the importance of fish pond in rural areas away from a purely instrumental asset to an important social asset. Because of the private nature of fish ponds they are also a basis for social exclusion and building of social networks which once were perhaps the realm of communal fishing activities, such as seen at community fishing days. This does not deny the fact that some farmers still obtain important income and nutritional benefits from a fish pond. What it indicates is that the decision to adopt aquaculture, predominantly made by the male head of the household, is embedded within wider social and political aspirational goals. The role of such aspirations has not been given any recognition in planning, policy or extension.

6.6.4 Projects and local politics

The overarching extension model for aquaculture in Laos is to supply services to areas of the country which are deemed vulnerable (see Chapter 4). This assumes that government staff will not only accurately identify vulnerable areas, but also vulnerable villages and households within those areas. However, communities are not passive recipients in the extension process. Instead, the extension process, whether under the control of government or non government sector, is facilitated through the Department of Livestock and Fisheries who collaborate with village committees to identify households. At each level there is a degree of political capital exerted. The extension process therefore operates within existing social and political relationships that influence who, how and where people participate. The role of political capital within villages is therefore important in influencing the extension process (Scoones 1998). At the household level political capital determines the level of involvement in development activities. These patterns are not well understood but are important factors in the development and extension of rural activities such as aquaculture.

Individuals within communities can exert influence that attracts projects, or alternatively provide skilled advice to people. The best example of this was in Ban Gngang Soung. There a retired government worker was instrumental in attracting technical assistance for aquaculture development in the community. Before he left the Provincial Livestock and Fisheries Office he worked closely with the second phase of the FAO/UNDP provincial aquaculture project. He now operates a fingerling hatchery in the village and sells to a number of villages in the area. Importantly for Gngang Soung he also offers advice on fish farming which the community recognise as instrumental to the development of

aquaculture. He has also been instrumental in attracting the large number of government departments and officers to Gngang Soung. Such horizontal extension of skills is an important process in Lao PDR (Pravongviengkham 1998). Agents such as found in Gngang Soung become key figures in the identification and attraction of projects to villages as well as sources of information themselves. However, Ban Keng Hin Soung, a more vulnerable community than Ban Gngang Soung, is by all accounts less adept at attracting projects.

Individual farmers can exert a degree of influence in being selected by District officials for training. Agriculture officials actively identify ‘model farmers’, those most likely to successfully adopt aquaculture, to participate in training. This was seen in Ban Kadan where *Paw Tao* Hin was selected to participate in the spawning and nursing networks set up by AIT, and also the spawning training conducted by UNDP, because he was widely known in the district and also known to have stocked a pond with capture fish in the past. He was an enthusiastic member for three years. He then stopped his involvement as he has felt it took up too much time and he did not have a lot of success.

Other models of extension within the villages highlight the criteria for the development of ponds in the villages. In Nong Kham Het UNICEF introduced an aquaculture bank to the village. The project works by lending start up funds to four members chosen by the village community. They chose people who are most likely to succeed and pay back the funds to the community fund. The next year they offer the loan at 5% interest, using their land certificate as collateral. As the development fund grows they will offer loans to more people. This relies on the ability of people to raise capital from the ponds to pay back the loan. A lot of people are cynical as to whether this project can be successful because of the limitation of ponds drying up in the dry season. In the first year of operation the fund, administered by the village committee, lent money to three farmers, each of whom was selected because they had already had a pond and some experience in fish culture. Such low risk lending means that the fund supports those more likely to succeed rather than the poorest or most vulnerable households in the community. Like the political capital seen in Gngang Soung, the ability of households to capture these funds is dependent on existing wealth or social ties within the village. In a dry village such as Nong Kham Het there is a real need for the extension of activities such as aquaculture, especially for households that are most vulnerable.

In each example a degree of political capital is used to identify and influence involvement in development projects. Poorer communities with less social connectedness are excluded from these processes. This means that the social and political value of aquaculture is not only created but also used as a means of attracting assistance. As ponds become aspirational assets, and there is more attention drawn away from the instrumental role, richer farmers are increasingly more likely to adopt aquaculture.

6.6.5 Summary

Living aquatic resources play an important hermeneutic role in rural Lao communities. Capture fisheries are embedded within the natural economy on which Lao rural society and culture is based. However, the social and cultural values associated with capture fisheries have been coopted by aquaculture. Aquaculture fits both the government rhetoric of rural modernisation developed through the socialist focus on production while also drawing from rural Lao imaginations of dependency on nature. In other words, aquaculture has drawn on capture fisheries for cultural legitimacy while also fitting into wider development agendas of rural modernisation and socialist production. Fish ponds have a wider social function that does not fit into rigid categories of rural development or poverty alleviation. These influence the role of aquaculture in rural communities, beyond a narrow vision of instrumental, green-revolution-like benefits of nutrition, direct income and employment. The perceptions of importance attributed to aquaculture are also supported by wider notions of social and political power that influence the development and extension of aquaculture. Through their goals of agricultural modernisation the government has drawn upon notions of capture fisheries to extend aquaculture. Capture fisheries have been reduced to fish, and fish has become synonymous with aquaculture in policy, as discussed further in the next chapter.

6.7 Conclusion

This chapter has shown how the role and importance of living aquatic resources can be represented in different ways, ranging from material measures to social and cultural perception. Looking beyond simple, linear representations such as consumption reveals the complex and diverse role of both culture and capture fisheries in the composition of rural livelihoods. The specific role of both activities is locally contingent. However, the

perceived and actual importance of both capture and culture fisheries appear to differ. Capture fisheries are accessed in diverse and complex ways by a range of people within rural communities but are not represented as an important activity. Aquaculture is represented as more important to the development, well being and livelihoods of rural communities, while contributing relatively little in terms of material benefit. The difference between these representations highlights the politicized nature of culture and capture fisheries.

The three empirical studies presented in this chapter highlight the difference between the real and perceived importance of living aquatic resources. As analysis moves from single to multiple representations of culture and capture fisheries a more complex picture of the politics of living aquatic resources development emerges.

The results from the consumption survey indicate that capture fish and other aquatic animals are more important to overall consumption than culture fish. The results show that families with fish ponds consume a comparable amount of capture and culture fish. However, families without fish ponds consume only a small amount of culture fish. In addition, the role of native, wild caught OAAs is not considered in major orthodoxies of either aquaculture extension or fisheries management. It appears that there is little distribution of culture fish outside those families who own a fish pond. As such, culture fish provide an important supplementary source of protein but do not contribute to the wider food security of the communities surveyed.

The results of the livelihood analysis show that communities consider aquaculture to be more important in contributing to their livelihood than capture fisheries. This perceived importance is not commensurate with the actual importance they described through the specific role of capture fisheries. Native fish and OAAs form a complex resource that is exploited across different aquatic resources by all demographics within the communities throughout the year. For these communities fisheries not only form a resource of last resort, they form a basis on which all members of a community can subsist, regardless of wealth. Instead of a panacea of poverty and rural development aquaculture instead plays a very specific role in rural livelihoods. Capture fisheries, on the other hand, provide a 'mosaic' of activities that form the basis of natural resource based subsistence livelihoods.

Culture and capture fisheries are also represented in terms of their wider social and cultural importance. Fish ponds have become an aspirational asset that has proved to be an important source of cultural and social capital within rural communities. In comparison, capture fisheries are represented as playing a central role in rural Lao culture but not contributing to the development of the community. Aquaculture has drawn on the social and cultural values associated with capture fisheries to be legitimised within both communities and government planning. The outcome is that living aquatic resources has been reduced to 'fish' and fish is increasingly becoming synonymous with aquaculture.

The three studies highlight the diversity of ways in which aquaculture and capture fisheries are perceived, measured and then framed. Consumption reflects a simple linear (quantitative) representation. In addition, livelihood analysis also provides a simplistic description focusing on culture and capture fisheries as single and separate activities within a wider portfolio of activities. Aquaculture is as a single activity that is used to spread risk and reduce vulnerability but in reality is usually more associated with social and cultural capital of relatively richer farmers. Capture fisheries does not fit into this livelihoods model in the same way. Instead it is based on natural and human capital. Capture fisheries are important in providing a basic activity that all people within a community, rich and poor, can partake in and as such fits into a widely perceived multiple equilibrium model.

The division between culture and capture fisheries as separate activities shows a fundamental division in the relationship of farmers with their environment. This division is drawn along the lines of agricultural production and natural resource use.

Aquaculture, as a productive asset, is considered more important because of the high level of input required. The ubiquitous nature of capture fisheries means that it is not highly regarded. Capture fisheries do not fit into perceptions of modernisation. This reinforces the notion that the 'blue revolution' rhetoric, like the green revolution before it, shows that technologically based development is perceived as more important within rural communities without any real consideration of the implications of adoption.

The perception of importance lies with aquaculture. This is because of its wider role in the social and cultural landscape of rural Laos. As fish ponds become aspirational assets and forge a space of power within the village development narratives of living aquatic resources are skewed toward aquaculture. Furthermore, aquaculture draws directly on the strong cultural perception of rurality and dependence on nature that is entrenched in capture fisheries. By co-opting these important cultural and social signifiers of natural living aquatic resources villagers reduce these diverse and complex resources to the term ‘fisheries’ and the simpler notion of ‘fish’, and ‘fish’ is increasingly synonymous with aquaculture.

The outcome is the production and reproduction of the importance of aquaculture with little supporting evidence of the instrumental role of culture and capture fisheries. The perceived importance is not challenged as there is little empirical information to base decisions upon. Aquaculture therefore has greater political capital than capture fisheries. As such, aquaculture has become a surrogate for capture fisheries as it is perceived as an appropriate technology for rural development and poverty alleviation which meets the aspirations of rural communities. However, this chapter has shown that it is, in fact, a supplementary activity with specific importance to certain people. It is these values that are transmitted both to policy from the communities and also from wider narratives to policy. The contribution of capture fisheries is therefore continually understated. It is therefore necessary for development policy and planning to discern between (and understand) the difference between the perceived and actual importance of living aquatic resources.