

Highland Aquatic Resources Conservation and Sustainable Development

Overview Report on Livelihoods and Aquatic
Resource Use in Upland India, Vietnam and
China



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EXECUTIVE SUMMARY

INTRODUCTION

Highland Aquatic Resources Conservation and Sustainable Development is a multidisciplinary project working in five sites across upland Asia, in Vietnam, China and India. It seeks to better understand the biodiversity situation of aquatic ecosystems in upland watersheds, identify patterns of resource use and livelihood dynamics of aquatic dependent communities, and review the policies and institutions which regulate access to these resources. It is anticipated that a detailed cross-country comparison can inform policy and planning to enable the sustainable and wise-use of aquatic resources while safeguarding both biodiversity and the livelihoods of poor and food insecure communities. The five sites were selected to reflect both the diversity in patterns of aquatic resource use in different ecological, political and socio-economic circumstances, and the diversity of highland ecosystems and trajectories of change across India, Vietnam and China. In Vietnam, research was conducted in the districts of Phu Yen in the northern highlands and Da Krong in the Truong Son range of central Vietnam. In China, the focus was on Shaoguan district of Guangdong Province. In India, research was located in the Buxa hills of Jalpaiguri district, West Bengal, and the lake system of Nainital district, Uttarakhand state.

This report focuses on Work Package 4, which explores the livelihoods of highland aquatic dependent communities. In each site three separate communities were selected for in depth analysis, including a survey on resource use and livelihoods and a series of focus groups with women, men, girls and boys. The teams spent extended periods of time in the communities to build rapport with local people and gain an insight into their lives. The historical and geographical contexts of the three communities are diverse and are outlined in Section 2.

EVOLUTION OF LIVELIHOODS AND ENVIRONMENTAL CHANGE IN FIVE COMMUNITIES

Phu Yen is home predominantly to indigenous, Muong, Thai and H'mong communities. Although this was once a region of high social stratification with an agrarian based economy, it underwent significant social and ecological transformations over the last few decades with the collectivisation and then decollectivisation of agriculture, and the flooding of the valley to create the Song Da reservoir. While rice is still farmed on the valley floor when the reservoir water is low, the fields are submerged for half of the year. Aquatic resource based livelihood activities however, offered new opportunities with households diversifying into shrimp trapping in the locality of the village and fishing from larger boats in more distant parts of the reservoir. Some also carry out pond aquaculture. However, fishing is not always enough to make up for food shortfalls and households have expanded the cultivation of maize and other cash crops in upland fields to generate cash. The reduced forest cover and over-farming has worsened soil run-off, and intensifying the sedimentation of the reservoir, with consequences for biodiversity and aquatic resource based livelihoods.

Da Krong is a sparsely populated region home predominantly to the indigenous Van Kieu community, and is one of the poorest districts of Vietnam. The local population have been less integrated into historical state formations, and were less affected by colonial era social stratification or socialist collectivisation and decollectivisation. Nevertheless, the region was badly affected during the American War, which caused extensive damage to livelihoods and biodiversity. In the post-reunification period, although there has been

extensive economic development in neighbouring regions, this has had a limited impact on the population of the Da Krong valley, whose livelihoods remain based upon upland farming, livestock raising, and the harvesting of forest and river produce. There is some limited out-migration to urban regions and wage labour in the coffee plantations. Aquatic resource dependent activities play an important supplementary role in meeting food security, particularly given the restrictions on traditional patterns of shifting cultivation by government regulations. Fish, snails and crabs are collected, and normally consumed within the household providing a valuable source of protein. The biodiversity of the river system has been under some threat due to hydro-power development upstream and pollution from the well developed Khe Sanh plateau to the west.

Shaoguan is unique in the five sites in that aquatic resource based activities are the traditional livelihood strategy of the study communities population, for whom fishing is an important way of life. The fishers of the Beijiang river had under socialism fished collectively with their farming counterparts, but now fish independently. Over a decade ago fishing was reportedly quite profitable, and they reportedly were better off than their farming counterparts. Today however, hydro power development and sand mining has permanently changed the hydrology of the river, while fish stocks are falling due to pollution from industry. In the rapidly developing capitalist economy, the younger generation is moving away from fishing and seek wage labour in urban centres. As a result fishing is becoming an increasingly unstable livelihood activity which supports to older generation who still live and work in the river side villages.

Buxa is the one site which falls within a national protected area. The region has a complex history as frontier between the Indian and Bhutanese states. Forest based livelihoods such as shifting cultivation, fishing and livestock rearing dominated the pre-colonial period. However, the establishment of administrative centres, forestry, and stone processing factories under colonialism increased the population and introduced wage labour to the region. At the same time, the much of the hills and a large tract of the plains was set aside as reserved forest, impeding both forest based livelihoods and the expansion of agricultural production. Today the collection of fish, crabs and molluscs like Da Krong, play an important role in supplementing existing livelihoods based upon wage labour for the forest department and in urban centres, and marginal agriculture. There are variations between villages however, with Jayanti at the foot of the hills and Buxa in the hills, using comparatively more aquatic resources than the remote hill community of Adma, where livelihoods are more agricultural based. Other forms of aquatic resource use include the gathering of medicinal plants from river banks and drift wood from smaller channels, and stone collecting. The latter activity however, is not carried out independently but is waged work carried out for contractors from the towns.

Nainital region is unique in that lakes form the primary highland aquatic resource, and lake based livelihoods are based less on resource harvesting and are more focussed on tourism activities. The region was part of numerous kingdoms over the centuries giving rise to multiple patterns of social stratification. Today rural parts of the region are predominantly populated by agricultural Hindu castes speaking the Kumoani dialect, while the urban centres increasingly attract settlers from other parts of India, including labourers from Nepal. The valley of Nainital lake itself was unpopulated until the colonial conquest, after which a resort was established for British officials. The other lakes, Naukuchiatal and Bhimtal were in largely agricultural regions, and tourism development only expanded significantly over the last few decades. Livelihood activities which are *directly* dependent upon aquatic resources include operating boats for tourists, and a limited amount of fishing. Most people however make use of aquatic resources *indirectly*, through for

example, utilising lake water for irrigation, or working in the lakeside tourism economy by pulling rickshaws, portering loads for visitors, and labouring in the construction sector. The sale of lakeside land has also allowed some local people to accumulate some wealth, although there are risks attached to this activity. On the whole, these activities have replaced agriculture as the primary source of income.

CLASS, LABOUR THE MARKET AND LIVELIHOODS

Understanding the basis for class stratification is complicated by the very different economic, political and cultural character of each site. Nevertheless, an analysis of theory and local wealth ranking exercises provide some key characteristics. Households considered 'poor' usually include those with limited ownership of the means of production, who are dependent on others for their subsistence, usually as labourers. Such households are also likely to be more dependent upon natural resources and have a smaller productive workforce. 'Medium' households on the whole have more secure access to productive resources, which are often enough to make a household 'self sufficient' in food. They are generally not making a 'profit' however or employing workers from outside the household. When they do work outside, with the exception of the more labour based economies such as Shaoguan, such households are more likely to have access to better skilled employment than their poorer counterparts. 'Rich' households more often have secure access to the means of production which produces more than is required for family consumption, and this sometimes necessitates employing labourers from outside the household. There are generally several productive workers in the family itself, and when outside labour is performed it is usually skilled in character. A new category was created from those classified as 'rich', the 'accumulating' households. These are households actively increasing their overall wealth through their livelihood activities, investing in high value productive assets and employing outside labourers on a regular basis.

Based upon the analysis of the data it was found that there was not significant class stratification across the five communities, although there were enough variations that one could observe differences in how aquatic resources are used according to one's wealth. In Phu Yen, the 'rich' and few 'accumulating' households generally have larger rice lands and thus display greater self sufficiency in grain staples. A greater number of 'poor' and 'medium' households however, must expand cultivation of cash crops in upland fields and catch shrimp to sell, in order to buy grain. Interestingly, although poorer households are more dependent upon aquatic resource for this reason, the richer households are actually investing more in such activities. As they have grain security they can allocate excess resources to activities such as fish culture as well as larger scale fishing from boats. There is a tendency whereby younger households are often poorer as they have less productive labour in diversify their livelihoods in both fishing and agriculture and have had less time to accumulate assets.

In Da Krong, although there were wealth differences, most households were poor with marginal livelihoods and only one could be classified as 'accumulating'. On the whole most households struggled to meet food security needs from their land, and combined agriculture with seasonal labour on the Khe Sanh plateau and other more developed regions. Fishing was particularly important to supplement livelihoods providing a source of protein, while collecting gold from the river offered households a source of cash saving that could be used at times of need. There were some differences in livelihoods however according to wealth. Richer households often had more productive labourers to engage in a greater diversity of livelihood activities, meaning that younger households are often poorer, like in Phu Yen. Some of these households owned xe

oms or motorbike taxis offering an alternative income source. Such households were less dependent on the river. However, as in Phu Yen, poorer households have a limited investment capacity, and they sometimes have to 'rent' equipment such as nets from their richer counterparts for fishing.

Unlike the more agricultural land dependent communities studied in Vietnam, for the fishers of Shaoguan, the primary source of income was labouring, especially in the urban sector. Fishing in this context, along with some very small scale agriculture, are supplementary activities for many households. In this context, patterns of class stratification are quite different from the other HighArcs sites. There is by no means a significant class with extensive ownership of the means of production for whom fishing is itself a profitable source of accumulation. The two households classified as 'accumulating' have generated their wealth through other livelihood activities (aquaculture and livestock). On the whole however, for both richer and poorer households, fishing is still a coping strategy to make up for shortfalls from what is provided by the younger generation in factories. Unlike in Phu Yen and Da Krong, the poorest households in this context are often the older households who can not secure labouring employment with limited income from sons or daughters. The primary difference in livelihoods between wealth groups is that richer households on the whole have invested more in fishing and have a higher income, while often also having sons or daughters in better paid labouring jobs.

In Buxa, like in Da Krong, most households are poor with limited ownership of the means of production. Land can not be expanded due to Forest Department regulations, meaning that for most households labouring is a primary source of income, like in Shaoguan. However, it is primarily casual labour, unlike the regulated factory labour in China. There are no households that could be classified as 'accumulating' and there are only small differences in wealth according to how much land or livestock households operate, or the ownership of assets such as guesthouses for tourists. In this context, fishing is primarily an activity to supplement livelihood strategies, offering households an additional source of protein.

In Nainital, the strong tourism based economy has led to deeper levels of class stratification. There is a large groups of wealthy and accumulating households with extensive ownership not only of land, but of small businesses and boats for tourism use. Medium households also own boats and land, but only enough to meet their subsistence needs. Poorer households have limited ownership of land and work primarily as labourers. These patterns of stratification reflect how households use aquatic resources – for example, rich and accumulating households often own more than one boat, renting them out to poor households who do not own a boat. Medium households own their own and operate their own boat, representing an important livelihood activity. Poor households work on their richer counterpart's boats, as well as in labouring in the tourism based lakeside economy.

In the context of variable investment capacity within the different communities, access to credit is an important issue if households are to fully benefit from aquatic resource based and other livelihood activities. While in Shaoguan, Buxa and Nainital there did not appear to be a strong culture of taking loans, many households in Phu Yen and Da Krong borrowed money as part of their livelihood strategy. This was creating a number of challenges. In Phu Yen poorer respondents complained during focus groups that loans are often not available when required, obliging them to seek the support of private money lenders, who charge high interest. Furthermore, loans are often taken for 'non-productive' purposes, putting households into cycles of indebtedness.

Regarding marketing relations, it is only in Phu Yen and Shaoguan whereby aquatic resources are sold in substantial quantities. In Phu Yen poor households who depend on shrimp sales sell to middlemen from the lowlands, inevitably reducing their bargaining power. In Shaoguan however, fishers fortunately sell direct to consumers, offering them a greater control over setting the price.

POLICIES AND INSTITUTIONS AND IMPACT ON AQUATIC RESOURCES

There are a series of rules and regulations which are in place to regulate the use of aquatic resources across the five field sites, with variable impact on local livelihoods. While some of these are based upon national or state level laws, other are adapted according to local conditions, while others exist on paper, but are not actually implemented locally. In Phu Yen and Da Krong, respondents had limited knowledge of policies to regulate the use of fishery resources, although forestry regulations were more strictly enforced. Only weak informal regulation regimes were evident. In Shaoguan on the other hand, policies to control pollution, and sand mining were in place, but implementation was weak, worsening the ecological decline of the watershed. Order to regulate fishing activity a licensing system is in place, but a number of fishers were unable to secure licences, undermining their livelihoods. In Buxa, a protected area, the most stringent environmental regulation policies were in place. Although fishing was technically prohibited, this was tolerated, while other use of forest resources was controlled, with the Forest Department even putting pressure on some local people to relocate. This has a severe impact on livelihoods, and renders much of the forest dwelling population dependent upon low wage labour to survive.

Nainital, although not in a protected area, has also had a series of stringent regulations on natural resource management. Fishing requires a licence in the case of Bhimtal and Naukichiatal and daily catch is regulated, while it is totally banned in Nainital. Boating has also been stringently regulated by the local authorities in recent years and requires a licence. This system has unfortunately created a market for licences, whereby extortionate sums must be paid to secure one when boatmen leave the profession. This prevents poorer communities participate in boating, a potentially profitable activity.

INTRA-HOUSEHOLD DIVISION OF LABOUR

In order to promote reconciliation between conservation and sustainable livelihoods development, it is crucial to understand not only how different communities and even wealth groups within communities utilise aquatic resources, but also the divisions within the household. Acknowledging the particularities of each site, there are some recurring themes with regards to the division of labour between men and women and how they utilise aquatic resources. Regarding gender, Nainital was probably the only site where women's direct role in aquatic dependent activities was limited. In all other sites, both men and women are involved in harvesting resources from rivers, lakes and wetlands. However, a division of labour within these activities normally exists. For example different techniques are used or species are caught. Certain considerations such as timing restrict limit women's participation in some activities, such as fishing at night in the case of Da Krong, Phu Yen and Buxa. In the case of China couples fish together catching the same species, but there are set gender roles on the boat. On the whole women's workload is greatest, not only

due to male out-migration which cause women to take full responsibility for some tasks, but due to their disproportionate role in household reproductive activities.

The distribution of resources within the household is somewhat unequal and decision making power by women is more limited, although this has been changing in more recent years, particularly with the out-migration of males in Vietnam and China. Furthermore, for households with limited disposable income, respondents in Phu Yen did not feel men cornering income from fishing (or other activities) for themselves were a significant problem. Women's control over income was most limited in India, particularly when much of the cash comes through the males who partake in wage labour.

Aside from gender, age is another often overlooked axes of inequality within the household. This is particularly important in aquatic resource dependent communities as across all sites children play particularly important role in fishing. This involved either helping their parents or more commonly, fishing independently. Young people, particularly girls, also play an important role in helping their parents with household reproductive activities, especially in Vietnam and India. However, as they get older there is a tendency for girl's responsibilities to parallel their mother's and boy's to parallel their father's. In Vietnam and China in particular, young people's responsibility to contribute to household livelihood activities is decreasing as parents place more emphasis on education, although this is less pronounced amongst the poorer households.

With regards to distribution of income, few children have the opportunity to retain the product of their labour for themselves. For example, fish caught are given to their parents, and they will not receive any payment for any assistance offered to parents, even when involved in income generating activities. Nevertheless, young people made contributions voluntarily out of a sense of obligation, as well as to increase the opportunities for resources in later life, while in some instances, informal resistance strategies allowed income to be cornered for personal use.

NON-USE VALUES, AQUATIC ECOSYSTEMS AND LIVELIHOODS

It is important to acknowledge that ecosystems not only offer economic security and wellbeing but have non-use values attached to them. For example, young people in all of the sites appreciated the natural beauty of the river resources in the vicinity of their communities. More significant however, is the fact that particular livelihood activities themselves contain non-use values, such as fishing which for young people allows them to combine work and play. This was observed in all sites except Nainital. In Shaoguan, some older fishers value the livelihood activity as a 'way of life' which stands in stark contrast to factory labour.

ENVIRONMENTAL KNOWLEDGE, GENDER AND AGE

The overall finding regarding environmental knowledge is that it is acquired both by being passed on from parents, or through the process of work itself. For this reason, it reflects the particular gender and age division of labour. For example, where men play a greater role in fishing as in Phu Yen they hold a greater knowledge of the reservoir resources, while women have a greater knowledge of agricultural and forest ecosystems. Ecological knowledge however, is declining with changing livelihood roles, particularly as young

people place more focus on education, as is the case in China, where fishing based knowledge appears to weaker amongst the younger generation.

1. INTRODUCTION

1.1 AIM OF HIGHARCS

The link between environmental degradation and increased vulnerability of poor communities is well known, particularly in the context of climate change and economic globalisation (Agarwal, 1998; Blaikie & Brookfield, 1987; Hue, 2008; Parayil & Tong, 1998). In this context however, only limited information is available concerning communities in highland areas, and even less regarding those dependent on aquatic resources and associated ecosystem services. Highland Aquatic Resources Conservation and Sustainable Development (HighArcs) is a project which seeks to better understand the patterns of resource use and livelihoods of communities who utilise highland aquatic resources in five sites across Vietnam, China and India. The interdisciplinary approach employed by this project seeks to encourage sustainable and wise-use of aquatic resources while safeguarding ecosystem services, biodiversity and livelihoods of poor and vulnerable groups.

The overall research question is therefore, *how can highland aquatic resources be sustainably managed and conserved while accommodating for the livelihoods of poor and food insecure communities?*

This is approached through answering a set of research questions which fall under four broad themes:

1) Biodiversity

- i) What is the existing aquatic biodiversity in the selected field sites?
- ii) How can these aquatic ecosystems be managed to secure the sustainable provision of ecosystem services and the conservation of biodiversity?

2) Livelihoods

- i) What are the dynamics of the multiple livelihood strategies in the selected field sites, how do these strategies utilise resources derived from aquatic ecosystems and what are the differences according to gender, age, ethnicity and class?
- ii) How can resource dependent livelihoods be ecologically sustainable and at the same time permit equitable local development opportunities?

3) Policies and Institutions

- i) In each selected field site, what are the existing institutions and legislations which mediate access to aquatic resources at multiple scales and levels of government?
- ii) What policies and institutional frameworks are needed to resolve conflicts between multiple stakeholders and ensure sustainable resource management whilst maximising local income generating activities?

4) Planning

- i) What is the best approach to facilitating interactive participation in assessment, decision-making and planning with respect to aquatic biodiversity conservation and wise-use? Is this the best

approach? How do we ensure participation includes individuals stratified by relations of gender, age, ethnicity and class.

ii) Can indicators be identified that are appropriate for local communities to assess change? What are the limitations and advantages to such an approach?

iii) How can monitoring of aquatic ecosystems, livelihoods, institutions be established and sustained locally? Who should be responsible? What to do if something changes?

This report focuses on part two. It analyses the livelihood strategies of communities across the five sites in the context of environmental and economic change, examining the economic rewards, conflicting interests, and non-use values associated with aquatic resource use. It seeks to explore further divergences in livelihoods and meanings values associated with class, gender and age divisions within the selected communities. This facilitates the provision of solutions to livelihoods diversification for all social groups, conservation and sustainable development.

1.2 METHODS

1.2.1 JUSTIFICATION OF SITE SELECTION

In total, five sites across three countries were selected for an in-depth case study. Each site shares something in common, enhancing the potential for comparative analysis, while also having unique characteristics, providing valuable 'case studies'. Two sites were selected from Vietnam, one was in Phu Yen district in Son La province in the north of the country. This region is not only mountainous, it is home to traditionally marginalised minority communities and it has a high level of aquatic resource dependence given the presence of the Song Da reservoir. The other Vietnamese site was in Da Krong district in the Truong Son mountains of Quang Tri province, central Vietnam. This upland region is representative of the culturally and ecologically different central region of Vietnam. It is also rich in aquatic resources, with two major rivers flowing through the district, and is home again to relatively poor minority communities who live alongside the rivers and depend on them for various livelihood activities. It is also a site of hydro power development, which drives many livelihood conflicts for highland communities, while the region's climate makes it particularly vulnerable to natural disasters such as cyclones and floods.

One site was selected from China, namely the district of Shaoguan city in the Southern Guangdong province. As with the sites in Vietnam, this is situated at the edge of a mountainous region in a major valley with rich aquatic biodiversity, that of the Beijiang river. A number of traditional fishing communities live in this region, and provide a fascinating case study. It is also like both the sites in Vietnam, a region of extensive hydro power development, while also being in the sphere of influence of the Pearl River Delta, a rapidly expanding industrial belt, offering insights into urban rural interactions and social transformations in an era of globalisation.

In India two sites were selected within the Himalayan foothills. The Himalayas are rich in upland aquatic resources including rivers and associated floodplain marshes, glaciated lakes, seasonal waterlogged areas and man made wetlands. These play an important role in hydrological cycle and regulation of water regimes

and livelihood of the local hill communities as well as those living in the plains. The Buxa Tiger Reserve in the foothills of the Bhutan Himalaya in Jalpaiguri district of West Bengal, is a region of rich aquatic biodiversity, and is a protected area. It is again, home to marginalised communities, many of whom are from minority groups, together representing a cross section of the eastern Himalayan population. These communities again, have used aquatic resources for multiple purposes over the generations, and their presence within a National Park adds a new angle to explore. It is also a region of growing tourism development, and like Da Krong, has a climate and topography which makes it vulnerable to natural disasters such as flooding. The final Indian site is Nainital district in the western Himalayan state of Uttarkhand. This site is unique in that the primary aquatic resources are located in a series of lakes, each of which possesses unique aquatic biodiversity. This is a region which has like Shaoguan, China, undergone rapid economic development in recent years, although in this case it is due to the significant expansion of the tourism industry, a sector focussed on the lakes. It is lake related tourism rather than resource harvesting which is the basis for aquatic dependent livelihoods in this region.

1.2.2 DATA COLLECTION

Having selected the primary sites, three communities were selected for in-depth analysis. These were either geographically clustered settlements, or in the case of sites such as Buxa and Da Krong with a dispersed population, were based upon administrative units. The criterion for site selection was that they were dependent on the same aquatic ecosystem (i.e. river basin, or lake system in the case of Nainital) and that they were close enough together to be of comparative value, while still being in different parts of the watershed to demonstrate the influence of particular geological-ecological and socio-cultural settings on livelihoods and biodiversity.

The first stage of the research involved a situational analysis (see HighArcs Situational Analysis reports). This involved a biodiversity assessment across major river basins where the project intended to work. This was followed by exploratory site visits, review of secondary data, and discussions with local stakeholders. This formed the basis for the selection of communities and offered initial insights into livelihood and conservation issues of the region. The second stage involved three parallel research trajectories, one examining biodiversity the other examining livelihoods, and one focussing on policies and institutions (See HighArcs Policy & Institutions and Biodiversity Reports). Although there were cross-overs between these three programs, this report is based upon the second trajectory, focussing on livelihoods. The separate HighArcs Biodiversity reports and Policies and Institutions report focus on data derived from the first and third programmes.

For the HighArcs livelihoods research, a combination of qualitative and quantitative techniques were used in a process of 'triangulation' (see McKendrick, 1999), in line with the projects interdisciplinary agenda. Quantitative data offers the study some 'external validity', producing data which is generalisable to the study area in ways which would not be possible through a series of in-depth qualitative case studies. It is important to emphasise however that they are used in an exploratory sense to identify complex general processes rather than to prove deductive models (Lawson, 1995; Sheppard, 2001). The qualitative data on the other hand, provides a level of 'internal validity', an indication that the reported results are actually caused by the factors the data suggests (de Vaus, 2001). This is particularly important when the study is

seeking not to just identify phenomena (such as falling income and ecological decline), but to better understand the social processes which give rise to these relationships (McKendrick, 1999).

In this context, a detailed interview schedule was produced. This began with a quantitative section which investigated aside from basic household information, levels of aquatic resource use such as fishing or fish culture yields and income over the last week, and data on water use. Further data was collected on livelihood activities such as agricultural and livestock production and income, labouring and migration. To gain an understanding of household budgets, the survey also reviewed household expenditure for both productive and non-productive purposes, while collecting data on asset ownership and employment of labourers to better understand relative wealth. This was followed by a qualitative section, which was designed around a series of open ended questions organised into themes, which could be asked with some flexibility. Topics included overall livelihood strategy, environmental change, gender and age relations, understandings of relative wealth and poverty, market relations and environmental knowledge. Further sections dealt with policies for the management of aquatic resources and respondents visions and aspirations for the future.

From each of the three selected communities in each field site, 30 surveys/interviews were carried out. We used a stratified sampling technique for the China and Vietnam sites. A village household list to use as a sampling frame was created with the assistance of village leaders. Following this we arranged a group meeting with leaders of each village to rank the households into three categories, rich, medium and poor, discussing the definitions of wealth in the process. To ensure we had a broad spread of wealth groups in the survey, 10 households were selected randomly from each category. In India however, the wealth ranking exercise was not possible, so instead a random sample was drawn directly from the village population list. It was more complicated in one 'community', that of Nainital town in the Nainital field site. As this was an urban area it was difficult even to select interviews with respondents whose lives were relevant to the study based upon a population list. Instead therefore, the HighArcs team sampled a random selection of respondents based upon their occupational, including only the core livelihoods relevant to the lake and tourism sector.

In order to gain deeper insights into the issues raised in the qualitative section of the interviews, a series of qualitative focus groups were also carried out. Focus group interviews have a number of advantages. Firstly, the group environment with is often more relaxed than that of an individual interview, something which is particularly important for children (Punch, 2002b, 2009). In the context of interviews in close-knit communities for HighArcs, the fact that group members knew each other well facilitated this. Secondly, new ideas are often triggered off by hearing the contributions of other group members, facilitating a more dynamic and spontaneous flow of information than may be possible in individual interviews (Lewis, 1992; Punch, 2002b; Valentine, 1999). In focus groups the emphasis is as much on intra-group discussion as direct dialogue with the researcher, who plays a coordinating rather than interviewing role. Thirdly, by observing who is dominant in the discussion and who plays a more marginal role, the researcher can observe power relations 'in action'.

A specific objective of the focus groups was also to understand the gender and age dynamics of aquatic resource use. In total the in country research teams endeavoured to complete 40 focus groups in each site. Out of this, an equal number (10) were carried out with women, men, girls and boys respectively. For the

focus group with women and men, open ended questions dealt with topics such as livelihood change, the use of rivers and lakes, rules and access regimes for natural resources, market relations, understandings of wellbeing, and ecological knowledge. Gender specific questions related to the intra-household division of labour, distribution of household resources and the changing status of women. Participatory techniques were also used, including community resource mapping, production of historical and annual timelines, and ranking activities, whereby respondents were asked to rank livelihood activities and problems in order of importance, often using cards. The mapping tools was also repeated for the focus groups with young people, along with the compilation of a daily time chart of activities and ranking activities focussing on different types of work. We also asked questions relating to how young people use aquatic resources, their relations with siblings, the benefits they get from their contribution to family labour, education and leisure. Thus a very goal of HighArcs is to understand the gendering and generationing of intra-household dynamics by seeking the perspectives of men, women, boys and girls.

During this report, when referring to data collected from focus groups, the acronym FG is used, with hh interview being used for data from household interviews.

1.1.3 ACCESS

Negotiating access to communities, although challenging, was accomplished with the help of appropriate gatekeepers. Research in all five sites required clearance from the district level government, although the level of official local support necessary was variable. In Da Krong and Phu Yen, Vietnam, not only did the team require clearance at a district level, but every element of the research had to be conducted through the commune and village leadership. They would be consulted both to arrange individual household interviews and to invite participants for focus groups. Acting as official gatekeepers was standard practice for village leaders when outsiders visit the community, and it made access considerably easier. However, it also meant we were automatically associated with the more powerful members of the community, perhaps impeding access to marginal voices. Furthermore, it raised some ethical concerns as local people would feel obliged to participate if requested to do so by local leaders.

In the fishing villages of Shaoguan, China, the village government apparatus was far more limited, and it was possible to visit villages freely without the necessity of official approval. However, it prove difficult in some contexts for the team to approach potential respondents without the mediation of respected local gatekeepers, including informal leaders.

In India, Nainital was probably the easiest site for the team to gain access. Being a popular tourist region, local people were familiar with dealing with a wide range of outsiders in their day to day lives. Nevertheless, it was still important to spend time with the local people over several visits to built up trust and rapport. Access in Buxa was complicated by the fact it was in a National Park while also being a sensitive border region, and researchers therefore required the clearance of both security services and the Forest Department. This process was often interpreted in different ways by different officials, particularly at the local level. Nevertheless, the partner institution, CDHI, had been working in the region for many years, and the long running relationship facilitated considerably in building rapport with respondents. There had been considerable conflict with the Forest Department in recent years over rights to reside in the protected area and use its resources, and tensions were running high, particularly in one village, Jayanti. There was

therefore some suspicion as to our motives amongst the local populous, with a fear that we may be working for the authorities. For this reason we approached households for interviews and focus groups only with the assistance of CDHI's local partners, while due care was taken to be entirely transparent and fully explain the purpose of our work.

2. EVOLUTION OF LIVELIHOODS AND ENVIRONMENTAL CHANGE IN FIVE COMMUNITIES

2.1 DIVERGENT HISTORIES AND COMMON GROUND

The historical context of each field site, and the ways in which local people have interacted with their environment over the decades is complex and unique. Nevertheless, there are some commonalities. Not only does each region share a tropical to sub-tropical climate and hilly topography, all five sites are situated within or on the edge of mountainous regions which were historically at the frontiers of government control. However, all regions had still fallen under the control of various centralised feudal state formations prior to the twentieth century, which were adapted and backed up by colonialism in the case of Vietnam and India. While these represent some of the commonalities between sites and their legacy lives on today, more recent divergences in their political histories have given each region its unique social dynamics. In particular, the ascendancy of socialism in East Asia in the mid-twentieth century set China and Vietnam on divergent development trajectories which were quite different from India which retained both elements of its colonial economy and pre-colonial patterns of stratification. In more recent years, the ascendancy of neo-liberal globalisation has been a universal trend across each study region, although the ways in which each region has been integrated into the global economy and its impact on local development and natural resource management has varied in accordance with a complex milieu of historical and geographical processes.

2.2 PHU YEN, NORTHERN VIETNAM

Phu Yen district is in the west of Son La province in the mountainous north of Vietnam, and is centred on a wide tributary valley of the Song Da (red river), which flows eastwards towards the coastal floodplains (See Figure 2-1). Two communes were selected for the core study, Tuong Ha and Tuong Tien, both of which lie on the valley floor around 25km downstream from Phu Yen town. Within these communes, three villages were selected to focus on, namely *Dan 1* and *2* and *Tam Oc 1* and *2* in Tuong Ha, and *Tat* in Tuong Tien. The valley is culturally diverse, with a predominant population of the Muong and Thai minority on the lower slopes and valley floor, while the smaller H'mong community reside in villages on the higher slopes in both Tuong Tien itself and neighbouring Kim Bon commune.

As with any site, it is difficult to construct the livelihoods of the past, but some insights can be gained from both literature and oral histories recorded locally. In Vietnam, land inequality was severe, even before the French colonization, particularly from the 1700s onwards. This appears to have shaped the historical trajectory of agrarian change in the country. As in many parts of Asia, the revenue collection apparatus by the centralized state played a significant role in driving social stratification (Wiegiersma, 1982). State functionaries such as Mandarins developed into a powerful landlord class, being granted large private

holdings as payment for their administrative role, as well as accumulating the holdings of peasants who were unable to pay their taxes (Dao, 1993). These relations were reinforced under French colonial rule, with intensified land inequality and feudal relations such as sharecropping in the countryside (Dao, 1993).

2-1 MAP OF THE PHU YEN FIELD SITE, VIETNAM



The minorities of remote Son La province however, remained at the margins of state control over the centuries with sets of villages operating as relatively autonomous units ruled over by a *phia* or chief (Sikor, 2001). The predominant Muong and Thai communities were traditionally rice farmers, cultivating rice on the fertile valley floors and maize in the upland fields. Sikor's (2001) study from Thai communities in nearby Yen Chau district, notes that the most important wet rice land was held communally, and shares of the paddy would be distributed to households. Upland fields could be claimed from the forest according to a household's need, and were cultivated as private plots. Although land was held communally, there was still inequality (Sikor, 2004). A village chief or *phia* was considered the symbolic owner, with control over the production process, rights to collect a share of paddy as tax before it was distributed, and ownership of private rice lands. It is evident that hierarchies were intensified under colonialism as the centralised state increased its influence. Sikor (2004) notes how the French demanded large taxes and *corvee* labour contributions from the Black Thai leaders in Yen Chau, a burden which was passed on to the peasantry.

This parallels oral histories in the study villages of Phu Yen. The valley was also divided into two main units administered by a Thai *phia*. One elder Thai respondent in Tuong Tien recalled that after planting crops such as rice, corn and cassava, local people were obliged to give a share as tax directly to local leaders. These intermediary tax collectors became large land owners, channelling revenue to the French colonial regime

while retaining a portion for themselves. Many landless farmers' worked as sharecroppers for these feudal landlords (HH interview in Tat village, April 2010).

Following independence from the French in the 1950s, a central agenda of the North Vietnam government was land redistribution from large landlords to landless peasants (Kerkvliet, 2006; Sikor & Truong, 2002). This was later followed by a policy of collectivization, whereby land, labour and other resources would be shared (Sikor, 2001). In Tuong Ha and Tuong Tien, each household worked together for points according to how much labour had been performed. Points in turn were converted into shares of food and money. Private upland fields could still be cleared by claiming forest land, although forest regulations limited the size of fields, and only small plots were allowed, primarily for cassava cultivation (General notes from interviews and FGs, Phu Yen, April 2010).

By 1980s, economic problems facing the cooperative farms, combined with a growing influence of neo-liberalism, led to a government policy of liberalization or *doi moi*, literally 'renovation' (Hue, 2008). Decollectivisation of agriculture was a central element of this process, leading once again to an increasingly stratified society with growing class inequalities across Vietnam (Akram-Lodhi, 2005; Hue & Scott, 2007). Owner cultivation became the predominant livelihood strategy in Tuong Ha and Tuong Tien (General notes from hh interviews, Phu Yen, 2010). The only socialist element remaining in place was that land is not privately owned, but is given to households by the state on long term 20 year leases, which can be renewed so long as the household still needs the farm (Kerkvliet, 2006). Although inequality has increased in Tuong Ha and Tuong Tien, Kerkvliet (2006) notes that officially adjustments to land holdings can be made to maintain relative equality and there remain ceilings on the maximum amount of land a household can hold.

Decollectivisation coincided with a more significant shock to the livelihoods of Tuong Ha and Tuong Tien. Between 1986 and 1989 households were compelled to move to slightly higher ground to make way for a new reservoir which would flood the valley following the construction of the Hoa Binh dam downstream (see Figure 2-2). A large portion of the most fertile rice land was lost under the water permanently for most residents, and seasonally for some of the residents of Tuong Ha, who could plant just one rice harvest. While aquatic resources in earlier periods were primarily valued as a source of water for irrigation and household use, and as a location of small scale fishing activities, they now played a far more significant role in people's lives as communities were compelled to adapt their livelihoods following the loss of their paddy lands (General notes from interviews and FGs, Phu Yen, 2010).

Fishing activities in the new reservoir were increasingly promoted and supported through the governments Project 747, although this was by no means straightforward for households who were not traditionally large scale fisher people. The first to benefit were Kinh fishers from the lowlands who migrated seasonally. They set up temporary floating homes in shallow sections of the reservoir where they would stay for a few months a year, setting up large 'lift nets' and fishing with seine nets from small boats. They continue to reside here, and over the years their fishing skills have been disseminated to local people, who now increasingly have diversified into aquatic dependent activities (General notes from hh interviews, Phu Yen, 2010).

Today the larger scale fishers from wealthier households use boats with motors, often travelling long distances to locate the best fishing grounds. A more common fishing related activity taken up by local people includes the use of traps to catch shrimp, usually using much smaller metal or fibreglass boats and fishing from the vicinity of the village. Produce is generally sold if it is a large catch, or retained for family

consumption. Larger scale techniques include the use of 'lift nets' which are lowered from a fixed location using a pulley system. Older (pre-reservoir) forms of aquatic resource use such as collecting snails and plants from rivers continue, although on the same small scale, while nearby rivers remained important sources of irrigation water. Aquatic resource based activities which are unrelated to the reservoir include fish culture, whereby some wealthier households raise species such as tilapia and common carp in small artificial ponds.

FIGURE 2-2: SONG DA RESERVOIR NEAR TUONG HA COMMUNE



Despite this, agriculture remains the predominant livelihood activity, engaging 83% of sampled respondents in the survey, whereby households cultivate rice on the remaining paddy lands, and corn and cassava on the steep hillsides. Rice is generally produced for consumption, while corn and cassava, like fish, is more market oriented. Corn cultivation has taken off in recent years, and the produce is sold to middlemen who take it down to the lowlands. Other livelihood activities include livestock raising, small scale forestry, small businesses and work for the local commune administration. Despite Vietnam's integration into the global economy and growing industrial development in cities, out-migration either to urban centers or abroad is not on a mass scale as is evident in China, and non-agricultural labour locally with the exception of construction work is limited. Nevertheless, there is growing out-migration, mostly of men, to the urban centres of the plains, and this has been increasing over the last few years. Fishing in this context is primarily a supplementary activity, offering alternative sources of income (General notes from hh interviews, Phu Yen, 2010).

The H'mong who live at higher altitudes and were outside the survey area, are generally poorer than their Muong and Thai counterparts, although they were less affected by the reservoir due to the location of their lands. Their livelihoods are based primarily on cultivating dry rice in upland fields, alongside cassava, corn and soyabean. There is limited use of the reservoir, although some households in Tuong Tien own fish ponds.

Alongside these socio-economic transformations is an increasingly unstable environmental situation. Respondents reported that from around 2007, fish stocks had begun to decline. Although the fishing has brought short term benefits and boosted the local economy, there was a perception that now there was over-fishing, with certain species such as eel, turtles, and a cat fish known as cá quật, being rarely seen nowadays. Lift nets, which caught a large number of baby fish, were viewed as particularly destructive (General notes from hh interviews and FG, Phu Yen, 2010).

Equally significant to over-fishing is the changing upland ecosystem. Sikor (2002) notes that control over forest lands was eroded following decollectivisation, opening up new opportunities for local people to expand their holdings into upland areas. The expansion of the cultivated area was further driven by population growth, coupled with expanding access to markets and demand from the lowlands for commercial crops such as corn. In interviews and focus groups it was reported that a similar process had occurred in Phu Yen, and the pressure on the uplands must have been compounded by the loss of valuable rice lands under water. Forest cover today was limited, particularly in Tuong Ha on the gentler west side of the valley which is most easily cultivated. We met one man looking after his crops in a shelter overlooking his upland fields. He spoke with animation of the richness of the forest in the past, with large trees and thick vegetation. Reportedly this had all now been cut down over the last 30 years to make way for corn and cassava cultivation. Today, regulations regarding the felling of trees are stricter, and each household has been given two hectares of upland to develop into managed forests. Nevertheless, some respondents suggested that awareness of forest policies was limited.

Nevertheless, the legacy of past deforestation has intensified soil erosion and run-off. Furthermore, the intense pressure for upland fields has led to over farming. Many of the H'mong community from above Tuong Ha had in this context, reportedly migrated to Moc Chau district to locate better agricultural land (HH interview in Dan-1, April 2010). For many other local farmers, increased soil erosion and declining fertility has actually made them more dependent upon fishing. In one household interview we were informed that given declining returns from agriculture, households would prefer to take a loan to invest in fishing which they felt offered more secure returns. Paradoxically, at the same time, increased soil erosion in the watershed has itself undermined the quality of reservoir water. Local people reported in interviews and focus groups that post-rain run-off from surrounding hillsides had caused the water which was once 'clear' to become increasingly cloudy, increasing water turbidity and undermining fish stocks.

Further discussion of aquatic resource use in these two communes can be found in the in-country HighARCS report for Phu Yen (Do et al., 2011b).

2.2 DA KRONG, CENTRAL VIETNAM

Da Krong is a mountainous district in Quang Tri province in central Vietnam, and it remains one of the poorest in the country. The research was carried out in three villages in Da Krong Commune itself, surrounding the confluence of the Quang Tri and Da Krong rivers, namely Ka lu, Ku Pua and Chan Ro (see Figure Figure 2-3). The predominant population of the valley are the Van Kieu or Bru, who are indigenous to this part of the Truong Son mountains, although if one ascends to the fertile Khe Sanh plateau to the west, the population is predominantly Kinh, many of whom have migrated over the last few decades.

The Truong Son mountains had long been a frontier region forming a defensible western boundary to both the early Hindu Champa empire and from the 15th century onwards, the Vietnamese state. The indigenous peoples of this forested region have historically lived in relative isolation and their traditional social structure is arguably of a different nature than that encountered in Phu Yen in northern Vietnam. Ngyuen (2004) notes that minority groups such as the Muong and Thai in the north, who had adopted wet rice cultivation had adopted hierarchical elements of their lowland counterparts. As was described with regards to Phu Yen, certain lineages or ‘castes’ had land, political authority and control over resources extending beyond the village, in for example, the control over agricultural production and collection of taxes for larger state formations. In contrast, the minorities of the sparsely populated Truong Son range have historically had less contact with the central state with a much lower uptake of wet rice cultivation. In this context groups such as the Van Kieu did not develop the same hierarchical structure and ‘caste’ divisions as the rice cultivators in the north, and livelihoods remained dominated by shifting cultivation and hunting-gathering throughout the pre-colonial and post-colonial period (Ngyuen, 2004).

FIGURE 2-3 MAP OF DA KRONG FIELD SITE, CENTRAL VIETNAM



Da Krong was on the main trade route between Laos and the coast during colonial times, and coffee plantations were developed around Khe Sanh in the early 20th century. Although some of the Van Kieu had taken up employment in the industry to supplement their livelihoods, local evidence suggests that the majority retained their traditional livelihood of shifting cultivation, gathering forest produce and fishing, with limited property rights to land or feudal stratification as had developed in Phu Yen. The region became part of South Vietnam following independence, and therefore did not experience the collectivization drive of the 1950s that occurred in the North. During the American War between the early 1960s and 1975, the region's location on the Ho Chi Minh trail, and as a strategic border zone between the two countries, meant it experienced extensive fighting. During interviews in the three communities, elder respondents recalled this as a period of great hardship, and the entire population of Ka Lu village relocated more than 40km away towards Laos to escape the conflict. The forest resources of Quang Tri province were damaged through

following the war following the extensive use of dioxin herbicides and other chemicals by American and South Vietnamese forces, a legacy which will take decades to wear off.

FIGURE 2-4: DA KRONG RIVER NEAR CO PUA VILLAGE



Following reunification, local people were virtually unaffected by the collectivization process in the South, which was in any case, far more limited than it had been in the North (General notes from hh interviews, Da Krong, May 2010). There was however, economic development with the upgrading of Highway 9 from Laos to the coast and the establishment of the Lao Bao Economic Development Encouragement Area on the Khe Sanh plateau nearby. With the exception of some micro-enterprises, most business activity is dominated by Kinh migrants. There has nevertheless been some further diversification of livelihoods amongst the Van Kieu of Da Krong in recent years, with household members working as temporary labourers in the Khe Sanh coffee plantations during the August-September picking season, where they can earn up to VND 50,000 (\$2.5) per day. Some also work locally as *Xe Om* (motorbike taxi) drivers. There is also limited migration to other parts of Vietnam for work – for example, some unmarried women had migrated to another province to sew clothes for the government. However, unlike Phu Yen, many were hesitant about leaving the village for growing urban centres, and many reported that they would not leave their families and homesteads, even if offered jobs elsewhere (General notes from hh interviews, Phu Yen, 2010).

The predominant livelihood strategy for the Ven Kieu however, is still the cultivation of dry rice, maize and cassava from upland fields, some of which are several hours walk from the valley villages. Farming coexists with the raising of livestock in the forest such as pigs, buffalo and poultry, which can be a valuable form of insurance at times of need. Although forest resources were damaged during the war years, in the context of agriculture, the drop in population due to war time displacement had allowed soil fertility to restore in abandoned fields, and shifting cultivation reportedly offered high yields to returnees in the post-war years.

However, today stricter regulations have sought to restrict shifting cultivation, and most households now cultivate fixed plots of former forest land, although some respondents reportedly do not have any formal lease papers with many not even aware of how much they operate. Coupled with a rising population, most respondents felt that yields were declining. Households can no longer simply move on to new land when the fields become exhausted of nutrients. Shifting cultivation was banned 10 years ago, and although it may persist in some remote regions, there was little evidence of it in the selected study communities.

Although agriculture and livestock raising remain the basis of livelihoods, the increasingly unstable resource base meant that aquatic resources of the Quang Tri and Da Krong rivers remain a particularly valuable element of livelihoods. Not only is the river a direct source of drinking and washing water, in villages with no electricity, micro-generators provide temporary lighting to houses. Furthermore, and most significantly, agricultural yields are not sufficient to give households food security for the entire year. It is in this context that fishing is an important source of food, particularly in Ka Lu and Chan Ro which have the steepest and poorest quality agricultural land. Fish, snails and crabs are caught using baskets, hand nets or even traditional cross-bows. Although catches are generally not high, at just 0.5 - 2kg per day, the fish provide households with a valuable source of protein, particularly in the season. Another interesting use of aquatic resources is the panning for gold. If a household is lucky they can earn between VND 100,000 (\$5) and 300,000 (\$15) per week, and the gold can be retained as a saving and sold when the household needs food (General notes from hh interviews and observation, Phu Yen, 2010).

Nevertheless, the biodiversity of the river system is under threat. As with agriculture, the displacement of populations during the war meant that fish stocks were very high after reunification in 1975, whereby there had been few people fishing (HH Interview in Ka Lu, May 2010). However, rising population today combined with economic development have taken their toll and stocks are now reportedly falling with some species such as *ambula* (eel) no longer present. A hydro-power dam was built around seven years ago upstream from Khe Sanh on the Quang Tri river, while another is under construction upstream of Ku Po village along the Da Krong river. Respondents in Cu Pua during focus groups reported that the dam caused water levels to fluctuate, making fishing dangerous, while many felt that the release of stagnant water from the dam, as well as sand from the new construction site and waste left by workers had undermined the quality of water in the river and worsened pollution. Other respondents suggested that the waste released from the coffee factories upstream was released into the river. Households reported skin complaints from swimming, and now had to walk for longer distances to fetch drinking water, usually from distant streams. There are also fewer of the wild animals that used to be hunted such as monkey, wild goat and wild pig.

In the context of an increasingly unstable ecological base, many felt that their livelihoods were increasingly insecure when compared to a decade ago. In addition to fishing, agriculture and seasonal labour therefore, households are obliged to pursue other livelihood activities to meet their subsistence needs. Forest products such as bamboo, grass for brooms and firewood are collected by many households. Since the abolition of shifting cultivation, as in Phu Yen, the uncultivated land around the village has been divided up between households to 'manage' as forest. A basket of firewood fetches around VND 5000 (\$0.25) per kg in the local market. Forest based livelihood activities have been hazardous since the end of the war, with mines and unexploded ordnance a persisting risk. Sadly, many households have resorted to actually searching for scrap war metal to supplement their livelihoods during the 2-4 months when they face food shortages, a task which has caused multiple fatalities over the years. In two weeks, it was estimated that a

couple could harvest up to 25kg of metal, earning them 200,000 VND (\$10), but even this only offers enough food for one week for a typical family (general notes from hh interviews, May 2010).

More information on aquatic based livelihoods is available in the in-country HighARCS report for Da Krong (Do et al., 2011a).

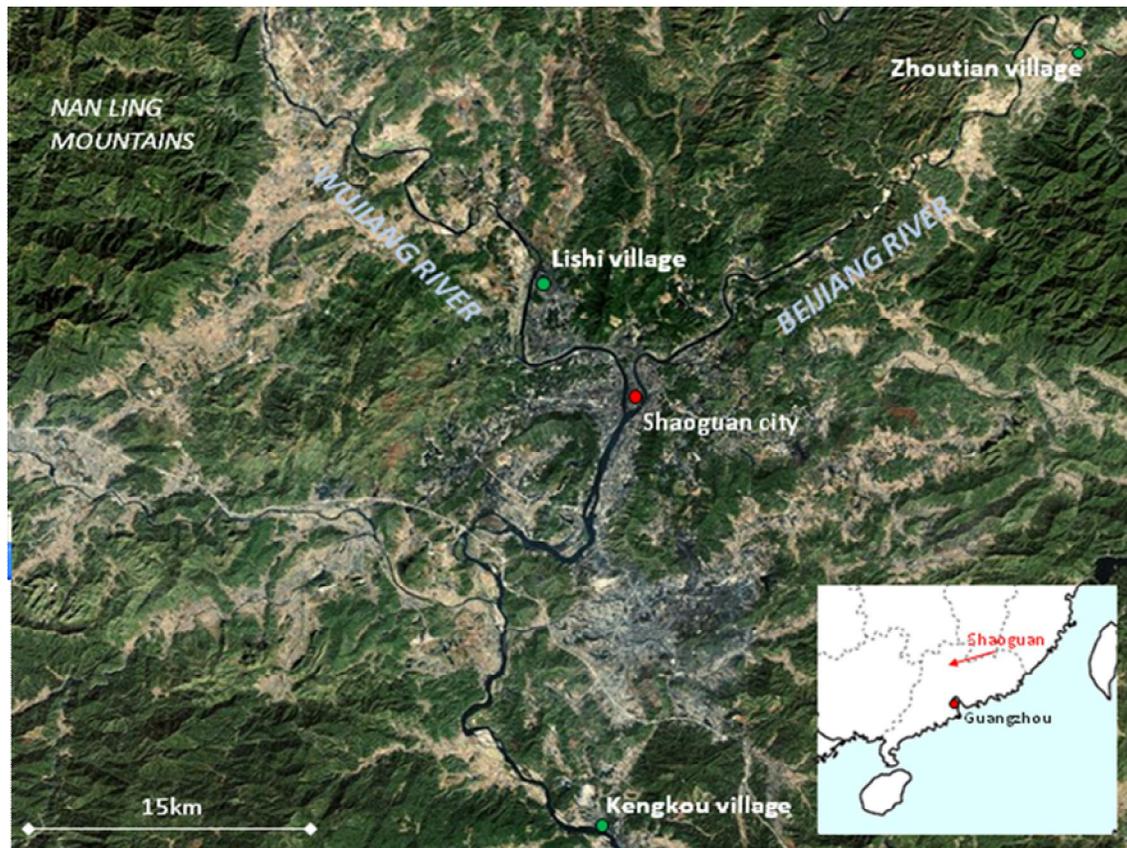
2.3 SHAOGUAN, SOUTH CHINA

Shaoguan district lies in the province of Guangdong in South China. The focus of the study was on the Beijiang river, which flows south out of the Nanling mountains into the Pearl River Delta. Unlike in Da Krong and Phu Yen in Vietnam fishing was the traditional livelihood the three communities which were selected for the study. Lishi is located at the lower end of the Wujiang River, which flows into the Beijiang River from the north-east. Kengkou is located on the Beijiang River downstream from Shaoguan city, while Zhoutian is located on the Beijiang River upstream from Shaoguan city (see Figure 2-5).

The economic history of rural China shares some similarities with that of Vietnam, although it did not have the same colonial interlude. As with Vietnam, the numerous pre-revolutionary states under the Song, Ming and Qing dynasty from the 10th to early 20th century, played a powerful role in shaping the local economy. Although it is impossible to generalize a long complex regionally diverse history, it has been suggested that private property rights to land were perhaps more developed than Vietnam. By the 18th century Feuerwerker (1984) estimates that 92% of the land was in 'private' rather than 'state' hands. Although there was an independent peasantry, a powerful class of landlords also flourished, most of whom either had a position in the bureaucracy of the imperial state or were related to government employees. The power of this class was reinforced through remuneration for administrative tasks such as maintenance of public works such as dams embankments (Feuerwerker, 1984). Through their income from landlordism, the bureaucracy, money lending and commerce, they were able to increase their wealth and buy up the private plots of individual peasants (Schwartz, 1954). From the late 19th to early 20th century prior to the Communist victory, Brandt and Sands (1990) estimate that up to a third of land was not owned by farmers but rented. Although there was a burgeoning commercial sector, this had a limited impact on the expansion of output across the economy as a whole. As with India, imported goods from European colonial empires had undermined pre-existing cottage industry, and existing factories were established primarily with foreign capital (Schwartz, 1954).

Oral histories in the study villages offer some insights into how some of the fishers of the Beijiang watershed were affected by these historical processes. Around two centuries ago, the ancestors of the fishers of Zhoutian had reportedly been tobacco farmers in Shixing county. There was an increasing population but land holdings were small, and due to poverty, they migrated to their present location for work as landless labourers. In the past the rivers were crucial routes for the transport of commodities, and large boats would be pulled upstream using ropes by groups of labourers. This offered employment to the farmers from Shixing. However, when they started families they could not support themselves with their meagre earnings, and diversified into fishing (HH interview in Zhoutian, Jul 2010). The history of the Lishi and Kengkou fishers is less clear, although it was reported that the population of both villages, most of whom have the surname Luo, also migrated here around 200 years ago from Heyuan city (HH interview in Lishi, Jul 2010).

FIGURE 2-5 MAP OF SHAOGUAN FIELD SITE, SOUTH CHINA



The Communist revolution spurred a dramatic structural transformation. Agriculture was collectivized, and as with Vietnam, the farmers gained an income through a points based system. Interestingly, in this context, the fishing sector was also transformed according to socialist principles. In 1957, mutual-aid teams were established among the fishers by the government and fishing cooperatives were established in 1958. Households would sell fish to the cooperative and receive payment from the government. Even other aquatic dependent activities such as sand mining were done on a collective basis whereby sand would be collected by hand and payment would be received according to work hours (General notes from hh interviews, Shaoguan, Jul 2010).

It was in the decollectivisation drive of the 1980s that fishing along with agriculture began to be done privately by individual families. Decollectivisation increased social stratification as rural class relations developed, although this has been more apparent in farming communities as they have moved to cash crop production such as oranges in the low valleys around Zhoutian, and tea cultivation in the highlands of Ruyen county. During the rapid capitalist industrial development which followed, poorer fishers and farmers were inevitably drawn into an expanding labouring class both locally and in urban centres. While there had been industries closer to the villages, there appears to have been a process over the last 20 years whereby small rural industries are closing, and being replaced by larger enterprises, often in urban centres, making migration the most common mechanism through which individuals could find work (General notes from hh interviews and observation, Shaoguan, Jul 2010).

Despite this livelihood diversification, fishing reportedly remained profitable and even preferable to agriculture, up until the mid 1990s. Fishing would be carried out nearly always from boats, which would be crewed by two household members who go out once a day for an extended period, much like the larger fishers on the reservoir in Phu Yen, Vietnam. However, ecological decline has had an unprecedented impact on the sector. It was recorded in Lishi that in the past households could catch 2kg of *huangjiao* per day. Now they are lucky if they can catch just 1kg per week (General notes from hh interviews, Shaoguan, Jul 2010). There are a number of explanations for falling stocks.

Firstly, the increase in sand mining which was mechanized in the mid 1990s has changed the structure of the river bed and water movement, as well as influencing the hydrological regime and sand silt characteristics. As a result, some river banks have collapsed, the water level has dropped markedly in some channels, and channels have become narrow with insufficient deep water, blocking the movement of boats (Han et al 2005; Qian, 2004). It is also reported that sand mining has had a significant impact on flooding control, inland navigation, water storage, nutrient cycling, environment purification, and soil erosion, changes which have also impacted the ecosystem of fish. In Zhoutian, the fishers said that there has been a decline in water grasses, having a significant impact on fish breeding. Secondly, pollution has increased significantly with economic and industrial development, particularly over the last 7-8 years. In the past, the fishers reported in interviews that they used to swim in the river. In Lishi, where the riverside population is high, the situation is particularly acute (see Figure 2-6). In recent years growing urban prosperity has meant people buy many more manufactured products. As a result there is now much more rubbish in the river. Pollution from iron mines is common around Kengkou, while the fishers reported that there are about 7 dirty water emission points along the river. Finally, hydropower developments have also had a significant impact on fish stocks. It has changed the ecological structure, such as the hydrology, water quality, sediment levels and, quantities of aquatic organisms. Furthermore, dams limit the migration of fish, harming biodiversity, and when the dam is opened, many fish are lost when they are washed downstream. On an economic level, the deeper water means fishers have had to change their nets accordingly, and are now restricted as to where they can take their boats as they can not always pass the dams (General notes from hh interviews, Shaoguan, Jul 2010). The primary improvement in the ecological base has been in forestry. Although forestry on the steeper slopes has prevented the problems of soil run-off as in Vietnam, plantations are dominated by eucalyptus mono-culture which use extensive ground water.

Not only has fishing has been in decline, but there have been broader changes in the river-side economy. While exploring the built up area to the north of Kengkou village, a local man living in a small abandoned apartment block informed us that many people along this part of the river, including himself, had been involved in the river transport industry. However, this sector has been in decline. There was a large river transport company that operated from there, shipping goods downstream. It was operated in cooperation with the Shaoguan government, who provided half the start-up capital. However, due to the improvements in land transport and dam building (which limited the scope of river transport), it went bankrupt around 10 years ago. The apartment block for employees was all that remained and the respondent we spoke to was the only employee who decided to stay.

FIGURE 2-6: LISHI VILLAGE ON THE DENSELY POPULATED BANKS OF THE WUJIANG RIVER, NORTH OF SHAOGUAN CITY



Today, fisher households still depend on the river resources, but ecological decline has meant that it is no longer sufficient to support a household on its own. Cash income of family members working in factories or the service sector is increasingly important, both locally, or more commonly in Shaoguan or in the cities of the Pearl River Delta. As for agricultural communities, they remain indirectly dependent on aquatic resources, primarily for irrigation water (General notes from hh interviews, Shaoguan, Jul 2010). In the past, many of the highland communities had raised fish in their rice fields. However, due to the use of pesticides, the rice paddy ecosystem is no longer suitable for this purpose. For all but the most commercialised farmers, the small holdings are generally insufficient to raise a family, and as with fishers, farming livelihoods are complemented by income from family members working outside the village (hh interview, Nanling, Jul 2010).

A more detailed discussion of aquatic resource based livelihoods in the region is available in the HighARCS in country report for Shaoguan (Liu et al., 2011).

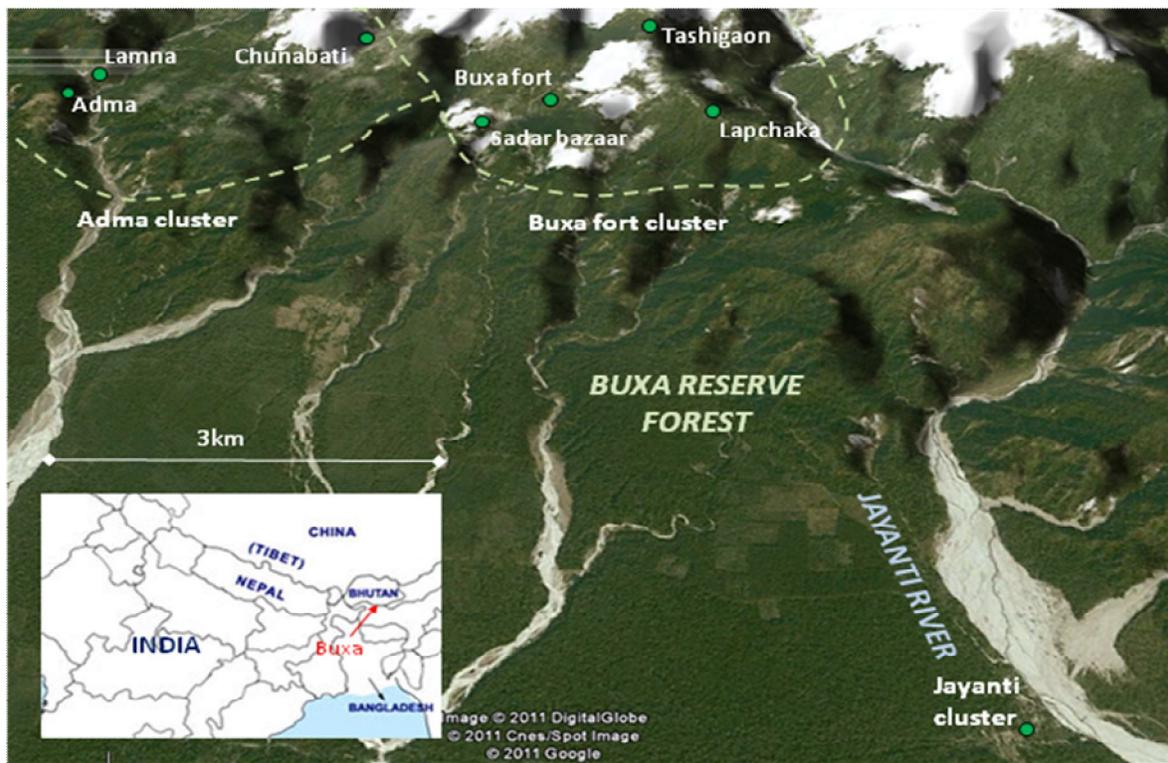
2.4 BUXA, INDIA

Buxa Tiger Reserve is a forested region on the southern foothills and alluvial slopes of the Bhutan Himalaya on the Indian side of the border. It is in the northern part of West Bengal, in Jalpaiguri district. It is today a protected area and is a region of rich forest and aquatic biodiversity, with many seasonal and perennial rivers flowing down from the hills. Three village clusters were selected for study. The first cluster, Buxa,

from which the reserve takes its name consists of a series of small settlements in the hills around the ruined Buxa fort¹. The second cluster, Adma, is a remote set of hamlets in the valleys to the west of Buxa fort cluster. The third, Jayanti, lies on the gentle alluvial slope right at the foot of the hills downstream of Buxa fort, where the Jayanti river spills out onto the plains (see Figure 2-7).

For many centuries, the Buxa region was on an important trading route between Bhutan and the plains of North Bengal (Chaudhuri, 1995). The predominant population of the plains region was of indigenous communities such as the Meche and Garo, while the hilly tract was home to Drukpa (ethnic Bhutanese) who were joined by the migration of Nepali groups such as the Limbus and Mangar (or *Magar*) and who migrated from Nepal and Sikkim, although the date of this later settlement was not known. The rocky soil made farming difficult, and the livelihoods of the forest dwelling communities were based upon shifting cultivation, hunting-gathering and fishing, as well as transporting loads for traders. As with Vietnam and China, the imposition of early feudal state formations had a lasting impact on the livelihood dynamics of the local population. One of the first significant states to enforce its authority over forest dwelling communities was that of Bhutan, when the entire Dooars region to the south of the hills was annexed in the 1700s. The local forest dwelling communities paid tribute through labour service such as the portering of loads for government officials, as well as taxes on the use of irrigation channels, on trading and plying boats, on weaving looms and on squatting in the jungle (Chaudhuri, 1995; Ray, 2002).

FIGURE 2-7 MAP OF BUXA FIELD SITE, WEST BENGAL, INDIA



¹ I will refer to this as Buxa fort cluster, to avoid confusion with Buxa, the actual reserve.

In the lowlands, the government tried to encourage settlement and land reclamation from the jungle, including the Buxa plains (Ray, 2002). Enterprising peasants from the south, or *jotedars*, were encouraged to clear the jungle (Chaudhuri, 1995). They in turn were responsible for encouraging tenants to settle, who paid rent to the *jotedars*, a portion of which was transferred to the Bhutanese land revenue officials (Chaudhuri, 1995). This process saw the slow contraction of the forest frontier.

In the aftermath of the Anglo-Bhutan war in 1846, the British colonial state annexed the Dooars from Bhutan. Although Buxa itself remained a forested frontier with limited settled agriculture and a sparse forest dwelling population, the area around Buxa fort became a strategic outpost on the northern borders of the empire, and many government officials were stationed there. There was a fort and a large cantonment (Grunning, 2007 [1911]). The predominant Drukpa and Nepali population of the village around Buxa fort was by 1901, around 581. It remained an important trading point, whereby ivory, wax, wool, musk, *endi* silk cloth, Tibetan and Central Asian wool, among other goods, were imported, many on their way to the ports of Europe (Grunning, 2007 [1911]). The economy was primarily based on trade rather than agriculture. In Adma to the west however, livelihoods were more strongly linked with shifting cultivation and herding in the forest, and there does not appear to have been a culture of outside wage labour.

Land in Jalpaiguri district was classified by the British into three categories: agricultural land, tea garden, and reserved forest (Bhowmik, 1988). A few tea gardens were set up within the Buxa forest clearings. Paralleling trends across North Bengal, the British encouraged the migration of *adivasi* groups from central India such as the Santhal to meet labour shortages, many of whom simultaneously operated plots of land. Most of the present day Buxa region however, was set aside as reserved forest. Greater restrictions were placed on agricultural activities, hindering shifting cultivation by the indigenous Rabha and Drukpa community in more remote regions. At the same time, 'forest villages' were set up to provide a labour force for forestry operations (Grunning, 2007 [1911]). These were set up either on empty land, or were established from existing villages, and their population, like that of Buxa fort, were dependent upon labour rather than agriculture. The third study village, Jayanti, was set up as one of these 'forest villages' and was also home to a dolomite mine and associated factories, served by the narrow gauge Koch Behar state railway. Nepali, Bengali and *adivasi* labourers from the surrounding estates and agricultural land were brought in to work in the mine, expanding the population of this new settlement.

On the land classified as 'agricultural' on the periphery of the reserve, the British proceeded to follow their Bhutanese predecessors in encouraging settlement to increase the penetration of markets, increase their authority in the region and maximize revenue. They continued to encourage the settlement of *jotedars*, many of whom had become powerful landlords. This pushed back the forest frontier to near the present reserve boundaries, undermining shifting cultivation by the indigenous groups residing outside the reserved forest, many of whom had by now become tenants for the new settlers (Chaudhuri, 1995; Ray, 2002).

In the post-colonial era, Buxa fort fell into ruin, although the village remained a sub-divisional headquarters with a small cantonment. However, in the early 1970s this also closed. As the livelihoods were based primarily on labouring given the limited agricultural potential and forest regulations, the local people were particularly badly hit. During this period many households in the hills relocated to the plains (interview with key informant in Buxa fort cluster, Oct 2010). Jayanti also went into decline with the closure of the dolomite mine and railway in the 1980s. It was only in Adma village which had always been heavily agricultural based, where livelihoods followed their original pattern. In the 1980s, the forest was designated as one of India's

many Tiger Reserves, to protect the dwindling number of Royal Bengal Tigers. This paved the way for even stricter policies on conservation and the use of the forest by local communities.

FIGURE 2-8: RETURNING OVER JAYANTI RIVER WITH FODDER FROM JUNGLE, BUXA RIGER RESERVE



Today livelihoods are quite diverse and vary considerably according to the locality. Before examining aquatic resource use it is useful to review the primary livelihood activities in each cluster. In Buxa fort cluster which is home primarily to Nepali and Drukpa communities, labouring remains the primary source of income, and the forest department is the primary employer, offering jobs such as maintaining roads and trails. Much of this work is available through the National Rural Employment Guarantee Act (NREGA), which ensures individuals 100 days work a year, or a compensation pay out. There is also a considerable amount of out-migration, not abroad, but to other urban centers such as Kolkata, Siliguri and Delhi (General notes from HH interviews, Buxa, Oct 2010). Some of the Drukpa community who are familiar with the language and culture regularly migrate to Bhutan for work, although they lack citizenship papers so can only secure menial employment (Interview in Lepchakha village, Oct 2010). In addition to labouring, households raise livestock in the forest, which is mostly for household use. Agriculture is limited, given the steep terrain, damage from wild animals, and restrictions from the forest department which impedes their ability to cut trees. Nevertheless, there is some maize production in most villages, and some production of cash crops such as garlic, which is sold to merchants in Santalabari at the foot of the hills.

Jayanti cluster is today home predominantly to Nepali, Adivasi Bengali and Bihari migrants who settled to work in the now abandoned mines on either side of the Jayanti river (see Figure 2-8). The livelihoods however, are somewhat similar to the Buxa fort cluster. Laboring is the primary source of income, along

with migration to urban centers. Agriculture is limited to a few fields of maize on the far side of the river, and these are often damaged by elephants.

It is only in Adma cluster, which is populated entirely by the Drukpa community, whereby livelihoods follow a more traditional pattern. Local people operate fixed fields of maize and millet, and there is even some rice in the lower valleys. The livelihood is semi-nomadic. Most households have large herds of cattle which they tend in the lower valleys at the foot of the plains during the monsoon when the upper forests are abundant with leaches, then moving up to the level of the villages in the Autumn, and then returning to villages in winter to tend the harvests of millet. In the early Spring they move to pastures on the high ridges on the Bhutan border (HH interview in Adma, Nov 2010). They produce cheese, butter, ghee and milk, and sell it to Bhutan, or locally in the surrounding hills. Although some people work as labourers, there is not the same culture of out-migration that exists in the other two clusters, and much work is simply carried out locally for other villagers.

As in the Vietnam and China field sites, aquatic resources play a critical but supplementary role in rural livelihoods. Although the overall levels of aquatic resource use are lower than sites such as Phu Yen or Shaoguan, the communities of Buxa interestingly appear to pursue the greatest diversity of aquatic dependent activities.

Fish, crabs and molluscs are a valued source of protein for many households in the region. The richest fish resources are in Jayanti, whereby large groups of people go out at night, often building a dam to seal off a braided channel, and then collecting the trapped fish from the dried out bed. The fish are either consumed or sold to supplement family income. In the hilly tract, fishing opportunities are more restricted. Nevertheless, local people collect crabs, molluscs and small fish from the pools in smaller streams using hand nets, traps or even small spears. This is particularly common as the channel dries up in the late Autumn, trapping species in pools. Fish and molluscs are reportedly an important dietary supplement to accompany the staple of rice, particularly in months when vegetables are not available. While the aquatic resources in Adma are rich, the local people have not utilised them to the same degree as in the Buxa fort and Jayanti clusters (Field observations, Buxa, Oct-Nov 2010).

In addition to fishing, other important uses of aquatic resources include the collection of plants from the river banks for medicinal use and the collection of wood, which is sometimes sold. Furthermore, in Jayanti, the river has in recent years become an important as a site for tourism. There are numerous guesthouses along the river bank, which is a site of natural beauty and a prime spot for viewing animals. The local people therefore get employment in the hotel sector, and as guides for tourists. One of the most significant use of aquatic resources however, is the collection of rocks from the river in Jayanti. This had previously been banned, but was permitted again in recent years. Unlike other forms of aquatic resource use however, this can not be considered an independent subsistence livelihood activity. Instead, stone collecting is dominated by contractors from the urban areas who use the stones for construction (Field observations, Jayanti, Oct-Nov 2010). Local people in this context work as wage labourers.

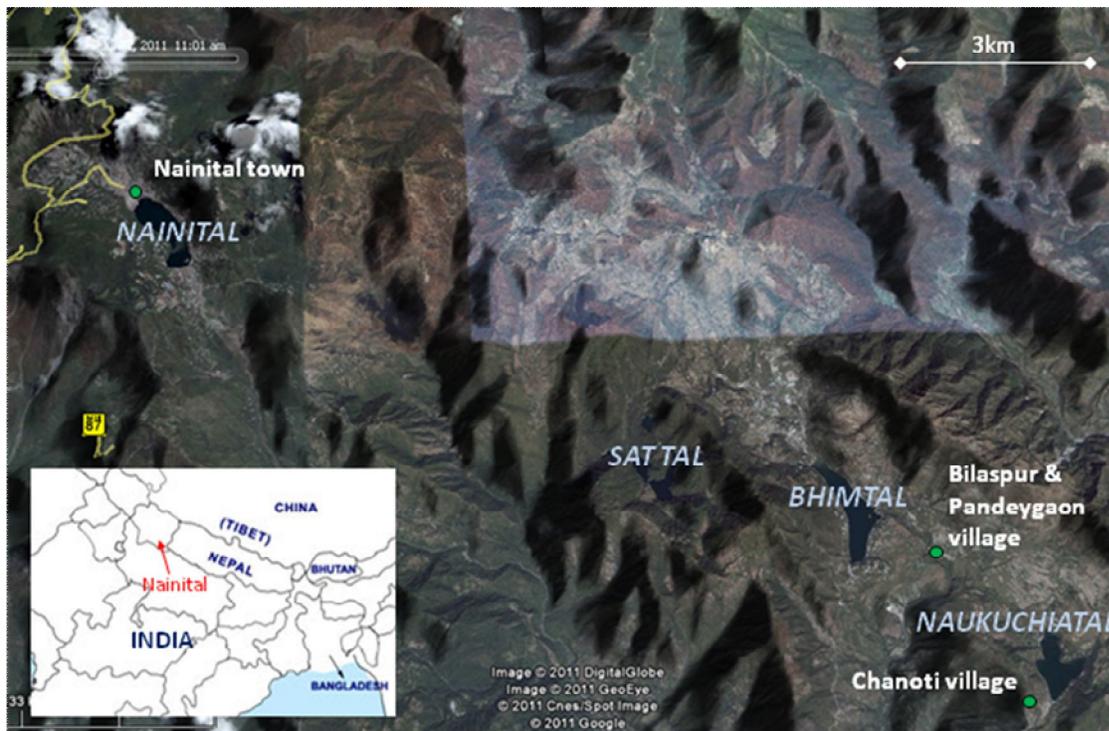
Unlike the other HighArcs sites, the water in the many rivers flowing down from the hills is relatively clean, and is the primarily source of drinking and washing water. Water is piped to some households in Buxa fort and Jayanti, although more often households are required to walk for long distances, particularly in the dry season when pipes dry up. In Adma all water has to be carried from the river (Field observations, Adma, Nov 2010).

More data on livelihoods in the region is available in the HighARCS in country report for Buxa (Mishra et al., 2011).

2.5 NAINITAL, INDIA

Nainital district lies in Kumoan in the eastern part of Uttarkhand state in the Indian Himalayas. This region can be distinguished from the other four HighArcs sites as the most significant aquatic resources are not rivers but a series of lakes. Three lakes were selected for the study. The first was Nainital itself, the largest and highest lake at an altitude of 1938m, surrounded by Nainital town which is a famous hill resort and trade centre (see Figure 2-9). The second lake is Bhimtal, which lies at a lower altitude of 1335m in a more rural setting. There are numerous villages around the lake, although Pandeygaon was selected as the focus village for the study. It lies slightly downstream alongside the river which flows out of Bhimtal. The third lake is Naukuchital, which lies at 1307m, and is surrounded by light woodland and agricultural land. Chanoti, which lies above the lake, was the focus community of the study here (see Figure 2-9).

FIGURE 2-9 MAP OF NAINITAL FIELD SITE, KUMOAN, INDIA



Kumoan region itself has a longer history of integration into centralised state formations than the Dooars frontier within which Buxa is located. Prior to the 10th century, it remained a sparsely populated hill tract and administration was largely fragmented into small scale and largely self-sufficient village units known as *mandals* headed by a clan deity (Handa, 2002). The migration of Brahmins from the lowlands set the stage for a more entrenched feudal structure. The Chand dynasty from the 10th century onwards, succeeded in bringing village level oligarchies under the control of a single ruler. As with Phu Yen, rural hierarchies were

intensified as local people were offered positions of authority within the administration, while pre-existing divisions within the community based upon vocational pursuits developed into a caste system akin to that in the plains. Although taxation and land grants to elites characterised this period, there is not evidence that the social structure developed the same extremes of feudal inequality as were present in lowland regions of India during this period (Handa, 2002).

The expansionist Gorkhali dynasty of Nepal conquered much of the western Himalaya in the late 18th century (Handa, 2002). The high levels of taxation and excesses by the conquering armies led to depopulation in some parts of the hilly tract and economic decline. A rival colonial power the British, subsequently annexed Kumaon following the Sugauli treaty with Nepal in 1815 in the wake of the Anglo-Gurkha war. Taxation and the perpetuation of rural hierarchies continued under the British rulers. As with Buxa, the livelihoods of the local people were significantly affected by the introduction of forest regulations which restricted hill communities from exploiting forest resources (Handa, 2002).

Most significant for the lake region however, was the development of sanatoriums for colonial employees. There was no house in the Nainital valley at all in 1842, and the lake was only visited by people from neighbouring villages at a festival held once a year to honour the goddess Naini (Atkinson, 1973 [1882]). It was first recommended as the site of a hill station by a British officer Mr P. Barron in 1841 (Rawat & Shah, 2007). In 1842 rules were drawn up for the granting of lands for building, whereby people could settle on payment of ground rent. Sites were set aside for a bazaar, public buildings, housing and a church, with buildings starting to spring up by 1846. Wealthy local traders such as the Sah community of Almora were offered land set up businesses (Rawat & Shah, 2007). There was subsequently a significant migration of people from neighbouring agricultural communities to take up work in the many new enterprises. The population of Nainital was 10,054 (2957 females) as of September 1880, although it was significantly lower in the dry season (Atkinson, 1973 [1882]). The area around Bhimtal lake itself was also sparsely populated after the British annexation, with only one travellers bungalow next to a temple built by a Chand king in 17th century. Nevertheless, there were agricultural lands on the route down to Naukuchiatal (Atkinson, 1973 [1882]), and thus while livelihoods around the new Nainital town were based on the urban economy, the livelihoods in the vicinity of the other two lakes were primarily agricultural. Bhimtal was also a sight of a fishing centre for British officers, representing an early aquatic based economic activity.

In the post colonial period, Nainital continued to develop as a tourist town, and the population continued to grow with migration from other parts of India expanding the labour force. One local informant reported that economic liberalization since the 1990s, and a growing wealthy class in urban centres such as Delhi, has substantially increased the number of tourists, perhaps because more people can afford to take extended holidays. The greatest changes are evident in Bhimtal and Naukuchiatal, although these have been particularly pronounced over the last few decades. A generation ago, respondents reported that unlike in Nainital town, livelihoods were primarily agricultural based. These two lakes were virtually unknown until 20-25 years ago when the tourism potential was discovered. As the visitor numbers have grown today, people pursue a far more diverse set of livelihood activities (General notes from hh interviews in Bhimtal and Naukuchiatal, Dec 2010). At the same time, enhanced education has offered greater opportunities for skilled employment, either for the government or in private business. In this context the rural labour force has changed in composition, with a large number of Nepali seasonal migrants doing the most menial work. The ancient caste system remains present in the region, and the scheduled caste *Ariya* community remain poorer on the whole than their Brahmin counterparts (Field observations, Bhimtal and Naukuchiatal, Dec

2010). Nevertheless, in recent years it has become complicated by the dynamics of class, processes which will be explored again later in the report.

FIGURE 2-10: BOATS LINE UP TO BE HIRED TO TOURISTS ON THE NAINITAL LAKESIDE



The patterns of aquatic resource use in Nainital, Bhimtal and Naukuchiatal are quite different from the other four HighArcs sites in that fishing is not an important activity. In fact, religious and cultural considerations mean there are many vegetarians in Kumoan, so it is mostly to Muslim traders in Bhimtal and Naukichiatal who like to fish, although there are a few Hindus also (who sell their catch). There is some fish culture in Bhimtal, although this is a government run enterprise with only some employment of local labour. The primary livelihood activity which *directly* depends on the lake is boating. In all three lakes, local men take tourists on boat rides, or rent out peddle boats (Field observations, Nainital region, Dec 2010) (see Figure 2-10). This activity can be quite profitable during the high season, although the start up costs and acquiring a license are difficult. Other than this, most livelihood activities are *indirectly* dependent on aquatic resources. For example, irrigation from Bhimtal is essential for agriculture in the communities in the lower valley. Furthermore, all livelihood activities related to the tourism sector can be considered as indirectly dependent on aquatic resources. The main draw for visitors after all is the lakes, and their continued ecological preservation is considered invaluable if they are to remain popular tourism sites. The predominant tourism dependent livelihood activities include rickshaw pulling along the Nainital lake shore, portering luggage from the bus stand to hotels, providing horse rides, and small scale trade along the lake shore. Work in the construction sector is also important and new hotels and guesthouses spring up each year, particularly around Naukuchiatal and Bhimtal where there is more undeveloped land (Field observations, Bhimtal and Naukuchiatal, Dec 2010).

An interesting trend in recent years has been a boom in land speculation due to demand from wealthy city dwellers and potential hoteliers. Local people can earn considerable sums from their land, encouraging sales to outsiders. 1 *nali* of land costs around Rs400,000 (\$8889), while at the roadside it can rise as high as Rs600,000 (\$13334). Although there is considerable risk involved, many felt it was worth it for the short term gain, and many had used the money productively to invest in their children's education so they could secure skilled employment, compensating for any loss of income from agriculture (General notes from interviews, Bhimtal and Naukuchiatal, Dec 2010).

These above processes have combined to reduce the importance of agriculture for livelihoods across the region. On the whole however, not all respondents felt the tourism lakeside economy had improved their livelihoods. Most tourism related livelihood opportunities are still concentrated in Nainital, despite the increased development in the other two lakes over the last generation. In the more remote villages in each valley, such as Pali, above Nainital, and Karkotak above Bhimtal, livelihoods remain dependent predominantly on livestock raising, informal labour, and agriculture on rain fed fields. Inhabitants do not even make use of lake water for irrigation. As for land sales, the location seems to play a significant role in determining how much a farmer can earn. In villages which are more distant from the lake shore, there is little profit to be made from selling their valuable property (General notes from interviews, Bhimtal and Naukuchiatal, Dec 2010).

In Nainital itself, one respondent felt that most of the business opportunities were taken up by outsiders. Fewer local people own the larger shops, and many locals operate informal stalls and smaller shops in the bazaar. There are however indirect benefits from tourism around all three lakes such as improved public services and infrastructure. There has been electricity for example in Siloti for the last 15 years, and drinking water – although it is unclear whether this is attributable to the tourism economy.

More information on aquatic resource based livelihoods in the Kumoan lake region is available in the HighARCS in country report for the region (Kundu et al., 2011).

2.6 IN SUM: USE OF AQUATIC RESOURCES TODAY

In sum, it is evident that there are significant variations in the ways in which each highland community today utilises aquatic resources, the evolution of these livelihood strategies, and the relative importance of these resources for livelihood security. The fishers of Shaoguan, China, are clearly the community who make the most use of aquatic resources, although this dependence is waning as wage labour becomes a primary source of income. The opposite process has occurred in Phu Yen, Vietnam, whereby people who did not traditionally fish have been obliged to take up fishing due to the loss of agricultural land. Fishing is probably becoming more important in the context of ecological decline in agriculture, although its importance to overall livelihood strategies are different for each household. In Nainital on the other hand, although fishing is less important, there are other aquatic dependent livelihood activities in the lakeside tourism economy. Da Krong in Vietnam, and Buxa of India are similar in that aquatic dependent activities primarily play a supplementary role, particularly in providing food to be directly consumed during periods of scarcity. Activities such as low technology fishing in both regions, stone collecting in Buxa, and gold panning in Da

Krong, are carried out alongside marginal agriculture and wage labour, which is usually the primary subsistence source.

3. CLASS, LABOUR THE MARKET AND LIVELIHOODS

3.1 UNDERSTANDING CLASS RELATIONS:

It is important to acknowledge that neither of the field sites can be considered unitary 'communities' and as with any rural setting, they are imbued with divisions and power relations (Scoones, 2009; Springate-Baginski, Allan, & Darwall, 2009). If one is to understand why households utilise aquatic resources in particular ways, and the distribution of benefits, it is important to analyse patterns of class stratification. The Sustainable Livelihood Framework asserts that one's livelihood security is dependent upon their access to different forms of 'capital'. These include natural capital (which includes wetland ecosystems); human capital; social capital; financial capital and physical capital (Scoones, 2009; Springate-Baginski et al., 2009). There are often many overlaps between these different forms of capital, so it may be more useful to talk more loosely of 'livelihood resources' or 'assets' as the material and social resources which shape livelihood options, without attempting to categorise them into a pre-ordained framework. These may include (aside from wetland resources); access to labour, the means of production (land, tools etc), education, agro-ecological knowledge, financial capital, and social networks.

Class divisions within the community will therefore tend to vary according to the livelihood resources one has at their disposal. Classical Marxian analysis, has placed a particular emphasis on ownership of one critical resource, the means of production (Marx, 1974). This includes land, machinery and tools i.e. the instruments which allow *production* to take place. Ownership of the means of production tends to affect whether individuals or households are able to receive *the full product of their labour*. In order to accumulate wealth, one needs to produce (or earn) and *retain* a surplus beyond one's minimum subsistence needs. However, one's capacity to retain this surplus is curtailed if one does not own their own productive resources. For example, if one does not own their own land and tools they may be dependent on rented assets. After they have met their minimum subsistence needs, much of the surplus is given away as rent. Similarly, they may be dependent upon menial labour for others, whereby they are paid a wage which just meets their subsistence needs, while any surplus which is produced by their labour is appropriated by the employer – what Marx (1974) terms 'surplus value'. On the other hand, those with substantial ownership of the means of production are often able to employ outside workers and produce more than they could as a household, and even rent out excess assets such as land or machinery, appropriating *other* household's surplus product. This is a source of accumulation.

Analysis of the means of production alone however, is not sufficient to understand the local complexities behind class stratification. During the focus groups in each field site therefore, we asked respondents to specify how they would define rich, medium and poor households. The inter-related factors identified in all the sites did not conflict with the description outlined above, and in fact supplements it. There were evident differences in overall wealth between the five sites, with livelihoods in regions such as Da Krong and Buxa considerably less secure than those in Nainital or Phu Yen. Nevertheless, there were also many similarities with regards to how one defines wealth.

Access to land and was considered important to defining wealth in all sites, although particularly in Phu Yen and Nainital in India, where landlessness was considered a primary cause of poverty. However, given the upland topography of all the sites, land is perhaps not quite as significant in defining class position as it may be in more fertile lowland environments (see for example Akram-Lodhi, 2005; Bharadwaj, 1985; Byres, 1981). In Buxa, India, for example, land played a slightly less significant role as most the holdings were small, and were set plots belonging to the forest department, offering households no capacity to 'accumulate' holdings. Land was also of secondary importance in Da Krong, Vietnam, as soil fertility and agricultural productivity was quite low. Nevertheless, in such sites, other productive assets were considered important such as tools to intensify agricultural productivity (e.g. machinery), and ownership of livestock, a particularly valuable resource in more marginal upland regions. Other assets included a small business, or a guesthouse for tourists in the case of Buxa. Understandably, land was also considered less important in the fishing communities of Shaoguan, China, the one site where aquatic resources were actually the traditional basis of livelihoods. As one would expect though, access to assets such as boats and fishing equipment was considered more important. Even in Phu Yen, Vietnam, although land was considered important in defining one's wealth, so was ownership of boats and fishing equipment, as well as machinery such as rice huskers and livestock.

Other factors identified locally to define wealth or poverty were related more generally to one's economic security. However, these variables are often directly linked to access to the means of production and one's capacity to retain the product of their labour. For example, those whose land could produce them enough food for the entire year were considered 'wealthy' in Phu Yen, and in Buxa, rich households included those with large savings and those who could afford good clothes. A nutritious diet was also considered important. For example, some respondents in Buxa suggested that rich households were able to afford full meals three times a day, with meat at least twice a week, and vegetables and dhal with each meal. Medium households could only afford meat once a week, and would perhaps have two main meals a day with vegetables and dhal. Poor households often could only eat once a day and would never eat meat outside festivals, with meals often just consisting of rice and pickle. They would often be directly dependent upon natural resources such as roots in the jungle for food and of course, fish from rivers.

Access to certain 'non-productive' assets was also considered important in each of the five communities. This included a well built house with its own toilet and bathroom. Another criterion raised in all five sites related to education. It was suggested that rich households could afford to give their children better education, often outside the community, while poorer households would send their children to local schools, or would not go to school at all. This also, does not conflict with the criterion outlined above. Access to the means of production, by shaping one's capacity to generate wealth, often influences the entire spectrum of livelihood resources a household has access to such as social networks, political power, knowledge and education. This in turn shapes one's capacity to accumulate productive assets. As was suggested by respondents across all five sites, if one can generate some profit from their livelihood activities, they can invest in the education of their household members, while conversely, households who struggle to even meet their subsistence needs not only face difficulties affording education but may depend upon children's as well as adult's labour to survive. It is in this context that access to skilled employment following education, was also valued as a source of wealth, particularly in Shaoguan, Nainital and Buxa, where livelihoods were the most diversified.

A factor considered important by respondents in Vietnam in particular was demographic. A family with more productive workers is considered to be advantaged economically. This was a particularly important factor in determining one's class position in socialist Asia during the collective era, as Sikor (2001) demonstrates with regards to Vietnam's northern highlands. Under collective agriculture, class differentiation between households in terms of livelihood security largely follows the family cycle. This was because labour capacity determines the allocation of work on the collective and therefore the share of the output. Very young couples who had recently separated from the family had the least disposable labor, and thus were often the poorest, echoing the thoughts of respondents in both Da Krong and Phu Yen. As households matured, the labour capacity increased and they could increase the amount of work on the collective and diversify their livelihood by working off the land. The accumulation of wealth over time allowed them to invest in livestock and housing. This is still significant given that land ownership is still relatively equal following decollectivisation with limited capacity for expansion in this highly populated upland terrain. The combined income of a large productive labour force can be used to purchase non-land productive assets. Luong and Unger (1998) identified similar processes with regards to China.

3.2 CLASS DIVISIONS AND AQUATIC RESOURCE USE ACROSS THE THREE SITES

3.2.1 THEORETICAL CLASS DIVISIONS

As described above community wealth ranking which followed this discussion was used to divide the population into three categories, rich, medium and poor in the case of the Vietnam and China sites. In India however, a community wealth ranking and stratified sample was not possible, so the criterion outlined in table 1 was used to divide households into wealth categories by the team itself following data collection. The analytical values of these categories have some limitations as there was not necessarily an equal number of rich, poor and medium wealth households (in the case of Vietnam and China). For example, respondents themselves challenged the approach in the case of Da Krong, as most people realistically were 'poor'. It was also difficult to make realistic comparisons between the five sites based upon this approach as some households considered 'rich' in Da Krong or Buxa would be considered poor in more prosperous sites such as Nainital or Phu Yen.

Nevertheless, they effectively demonstrate the relative differences between households in each context. This is particularly important when criterion of wealth such as relative ownership of the means of production, family size and educational achievement are variables which follow a continuum, making categorisation according to set criteria difficult. An attempt has been made to summarise the main observable characteristics of households from these three wealth categories, accepting that there is considerable flexibility according to geographical context. An additional fourth category has been created out of the third grouping. Table 4-1 summarises some of the key observed characteristics.

TABLE 3-1: CLASS CATEGORISATION

Accumulating households	Rich households	Medium households	Poor households
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<ul style="list-style-type: none"> • Regular employment of outside labour • Rental of excess property to others • Net expansion of the means of production over the last 10 years. • Large number of productive family members • Skilled employment 	<ul style="list-style-type: none"> • Limited use of outside labour (with the exception of labour 'exchange') • No renting out land • Ownership of means of production (e.g. agricultural land, shop, machinery) to provide a secure subsistence and some surplus. • Skilled employment outside the household. • Large number of productive family members 	<ul style="list-style-type: none"> • No use of outside labour (with the exception of labour 'exchange') • No renting out land • Ownership of means of production (e.g. agricultural land, shop, machinery) to provide at least some of the households subsistence needs • Some labour outside the household. 	<ul style="list-style-type: none"> • Dependence on: <ul style="list-style-type: none"> ▪ Unskilled labour ▪ Rented property • Common property resources • Very limited ownership of means of production (e.g. kitchen garden, small amounts of livestock) • Small productive workforce (often older average family age)
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1) Poor households generally have only an insecure or irregular source of income. The range of livelihood activities available to such households is more limited. This is often a result of insufficient ownership of the means of production, particularly land and tools. In fishing communities this also includes a shortage of boats and equipment. It is therefore difficult for them to meet their subsistence needs independently, rendering them more dependent upon others for work, either as labourers, (or occasionally as tenants) and vulnerable to surplus appropriation. However, another survival strategy for those with limited productive assets is to utilise resources which are collectively owned (see Agarwal, 1998; Beck & Ghosh, 2000; Dey, 1997; Luttrell, 2006). This includes not only forests, but aquatic resources, which often provide an important source of food and cash. In Vietnam, 'poor' households are more likely to have a large number of dependent household members and a small productive workforce. This impedes households from intensifying family labour and pursuing parallel livelihood activities to meet the family's subsistence needs.

2) Medium households mostly own land, tools or other productive assets which provide them a relatively secure subsistence using family labour. For this reason it is less common for such households to work as labourers or rent assets from others, and when this does occur, it usually supplements an already secure livelihood from one's land, i.e. they are not 'dependent' on others. The exceptions are in sites such as Shaoguan, China, whereby subsistence livelihoods are being replaced with labouring livelihoods in line with the developing capitalist economy. However, in regions such as this, 'medium' households often have access to better paid semi-skilled or skilled employment than their 'poor' counterparts, due to the greater investment in education of household members. In this context, education becomes as important as access to productive assets, as it affects one's position in the capitalist labour force.

3) Rich households have more substantial ownership of the means of production, so their land, boats, livestock and tools allow them to produce or earn not only a secure subsistence, but often a small surplus. This is however highly variable, and while rice farmers or fish raisers in Phu Yen may produce a substantial surplus to sell, yielding the household a profit, this surplus may be meagre in poorer regions such as Da Krong or Buxa. Furthermore, ownership of the means of production is rarely significant enough to

necessitate the hiring of outside labour. In all sites, work may be performed outside the household, but it is usually skilled or professional.

4) A fourth category, 'accumulating' households: In some sites such as Phu Yen, respondents suggested a fourth category of households who were very rich, with a particularly high cash income. In fact, this ties up with the Marxian discussion above, as it is possible to develop a category for those households that are developing capitalist tendencies; in other words, those that are 'accumulating'. Households pursuing an *accumulation* strategy are pursuing livelihood activities which allow them to increase their overall wealth. They have more extensive ownership of the means of production which allow them to produce or earn more than is required for their family's subsistence needs, as well as a regular surplus, the profits of which can be re-invested. This includes not only ownership of land, boats and tools but any other productive assets which offer them a source of wealth (e.g. property which can be used for a business). In this context, outside labourers are employed, and in other cases excess resources are rented out to other households. Another factor which suggests they may be accumulating wealth is purchases over the last 10 years of the means of production (land, machinery or property) – so long as these are not off-set by sales of the means of production in the same period.

3.2.2 RURAL CLASS RELATIONS IN PHU YEN

CLASS RELATIONS AND INEQUALITY IS ONLY MODERATE IN THE COMMUNITIES OF PHU YEN, WITH ONLY FIVE HOUSEHOLDS CLASSIFIED AS 'ACCUMULATING'. NEVERTHELESS, THERE ARE STILL NOTICEABLE DIFFERENCES IN WEALTH, WHICH BECOME PARTICULARLY EVIDENT WHEN ONE OBSERVES THE MULTIPLE INCOME SOURCES. THE BAR GRAPH IN

FIGURE 3-2 DISPLAYS ESTIMATED 'WEEKLY' INCOME FOR LIVELIHOOD ACTIVITIES SUCH AS FISHING, LABOUR AND AGRICULTURE. THE BOX PLOT IN FIGURE 3-3 SHOWS THE FISHING YIELD OF THOSE HOUSEHOLDS WHO HAD FISHED IN THE LAST WEEK. THE RESULTS AT FIRST APPEAR UNUSUAL. ACCEPTING THE LIMITATIONS TO THE DATA²,

Figure 3-2 suggests that poor and medium households actually have a higher cash income from agriculture than their richer counterparts, with medium households having the highest fishing income. The average fishing income over the last week is 234,655 VND (\$11.2) for poor households and 288,806 VND (\$14.9) for medium households, while it is only 189,828 VND (\$9.1) for rich households and 161,000 VND (\$7.7) for accumulating households. The average fishing catch is also highest for the medium households, and similar for the poor, rich and accumulating households (see Figure 3-3). This anomaly becomes understandable however, when one acknowledges that fishing is a supplementary activity for all households and is not a source of 'accumulation'. All fishing households it appears have a similar yield, regardless of the other livelihood resources they have at their disposal.

² Data on agriculture was most easily collected on an annual basis and livestock and labour on a monthly basis. These figures do not therefore represent the actual weekly measure, but were divided accordingly to give a rough measure for one week so the relative income in relation to aquatic dependent activities could be gauged. As many fishing activities are only carried out for 6 months, the annual fishing income when compared to agriculture is actually likely to be lower.

However, similar unusual results are evident with regards to agriculture, whereby the average 'weekly' income (estimated from the annual figure) is 214,784 VND (\$10.3) for poor households and 179,189 VND (\$8.6) for medium households, while it is only 141,495 VND (\$6.8) for rich households and 130,961 VND (\$6.3) for accumulating households. This can be explained however by the high sales by marginal households of corn and cassava from fragile upland fields to generate cash to buy rice, the main staple. While in the survey, sampled poor and medium households own on average 533 and 430 m² of wet rice land respectively, rich households own 881 m² and accumulating households own 1040m². Given the importance of rice as a staple, the inequitable distribution of rice lands allows the wealthier households to meet their grain needs on their own land with no obligation to enter the market. However, for 'poor' and 'medium' households, many can not produce enough rice on their meagre holdings to meet their minimum subsistence needs, obliging them to expand cultivation in the increasingly fragile upland slopes of low yielding cash crops such as maize and cassava, a process of 'distress commercialisation' (see Bhaduri, 1986) (see Figure 3-1). These are usually to purchase rice as well as to meet other cash needs. It is in this context that fishing is also particularly important for these households. Fishing was mostly carried out in small boats whereby shrimp would be collected in the vicinity of the village and sold to generate cash to buy rice.

FIGURE 3-1: CULTIVATING ROOT VEGETABLES IN PHU YEN. AGRICULTURE ON THE UPLAND FIELDS IS FRAGILE, AND YIELDS ARE LOW



FOR 'RICH' AND 'ACCUMULATING' HOUSEHOLDS ON THE OTHER HAND, HAVING MET THEIR GRAIN NEEDS, THE INCOME FROM FISHING OR CROP SALES EVIDENT IN

Figure 3-2 often represents the sale of the household's surplus product. In other words, interviews revealed that as they do not need to sell fish or crops such as corn and cassava to buy rice, it can be sold to generate a small profit. This cash can be used to expand the means of production. Although there was limited capacity for richer households to purchase more land, they could expand their means of production by investing in technology. Seven sampled 'rich' and 'accumulating' households owned machinery such as threshing and husking machines, while only three 'medium' and one 'poor' household had made such investments. Similarly, looking at investment in day to day agricultural expenses over the last year such as in fertiliser and seeds, the survey reveals that accumulating households have invested a substantial 8,406,800 VND (\$403.5) on average, while rich households have invested on average 2,450,034 VND (\$117.6). While 2,283,548 VND (\$109.6) has been invested by medium households, poor households on average have only invested 1,701,793 VND (\$81.60). This demonstrates that although the net sales of cash crops are smaller for the richer households, the expenditure is considerably higher as they are producing both rice for household consumption, with a 'surplus' of cash crops to sell.

PROFITS FROM RICHER HOUSEHOLDS CAN ALSO BE USED TO DIVERSIFY INTO OTHER LIVELIHOOD ACTIVITIES. THIS PERHAPS EXPLAINS WHY RICH AND ACCUMULATING HOUSEHOLDS HAVE A NOTICEABLE INCOME FROM BOTH BUSINESS AND LIVESTOCK REARING IN

Figure 3-2. Although these averages across the categories are small, estimated weekly income from some individual businesses were as higher than 300,000 VND. Involvement in business and livestock rearing is limited for poorer groups with the exception of some medium households.

What is interesting also is that while poorer households were more *dependent* upon aquatic dependent livelihood options, spending more time on their boats, interviews revealed that richer households actually *invested* more in such activities, which were as much about making a profit as meeting minimum subsistence needs. In addition to a more secure income from agriculture for example, they could also afford to invest in equipment such as motors for their boats, allowing them to travel to distant parts of the reservoir to locate the richest stocks. Households from the 'poor' category in particular, were more likely to fish only using smaller homemade fibreglass boats, using simple technologies such as fish traps. Only three poor households owned more expensive wood or metal boats, as opposed to seven households the rich category and seven from the medium category. The fibreglass boats used to lay and collect traps could be built for just 300,000 VND (\$15). For such households, fishing can only be done for the 6 months the year that the water level is high in the vicinity of the village. The poorer households who can not travel to where the stocks were highest therefore are therefore disproportionately affected by over-fishing (general notes from hh interviews, Phu Yen, April 2010).

In terms of other uses of aquatic resources, it is evident that the poor households do not benefit as much from the irrigation resources the reservoir offers primarily because they own much less wet rice land. Similarly, few of the poorer households have invested in pipe systems to bring water directly to their homes, particularly in Tat village, where drinking water has to be carried from smaller streams and washing is done in the reservoir.

Pond aquaculture also represented a form of 'profitable diversification' into aquatic resource based activities which was out of reach for many poorer households. While data on aquaculture income is not available, the

survey revealed that only one 'poor' sampled household had invested in aquaculture, six 'rich' and 'accumulating' households had done so. This requires considerable investment to build and maintain the pond and equipment. Culture species include tilapia, common carp, grass carp, mud carp, catfish and silver carp which are adaptable and can survive off available food such as cassava and banana leaf, grass etc. However, the productivity is not high. Other livelihood activities pursued by richer households include raising high value livestock species such as *nhim*, or porcupine, or small scale commercial forestry (general notes from hh interwites, Phu Yen, April 2010). Given the diversity of livelihoods, the importance of having a greater number of active family members also becomes apparent.

FIGURE 3-2 ESTIMATED INCOME OVER THE LAST WEEK IN PHU YEN (VND)

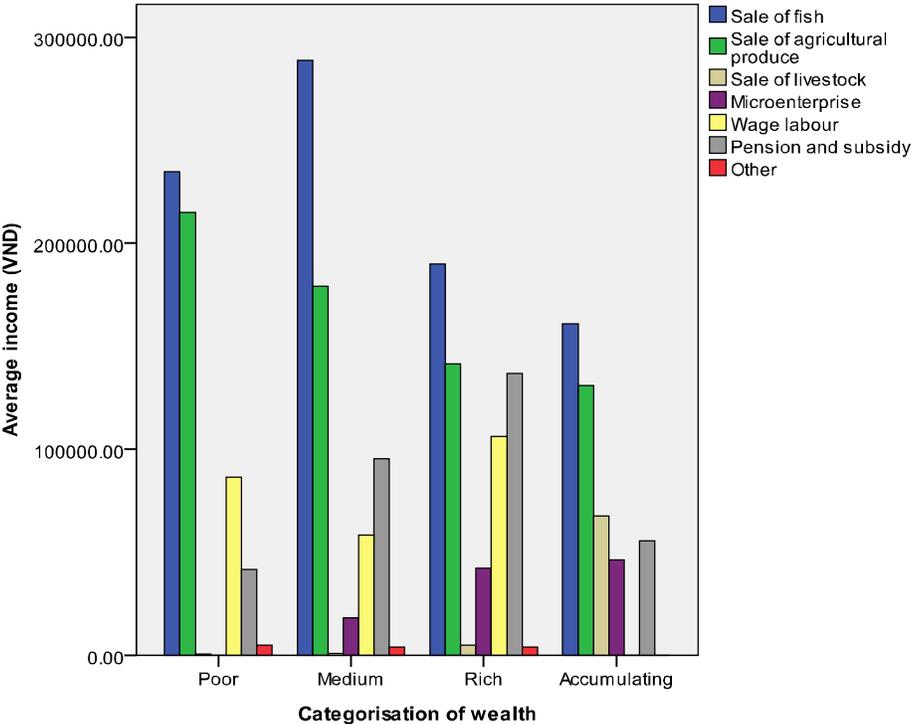
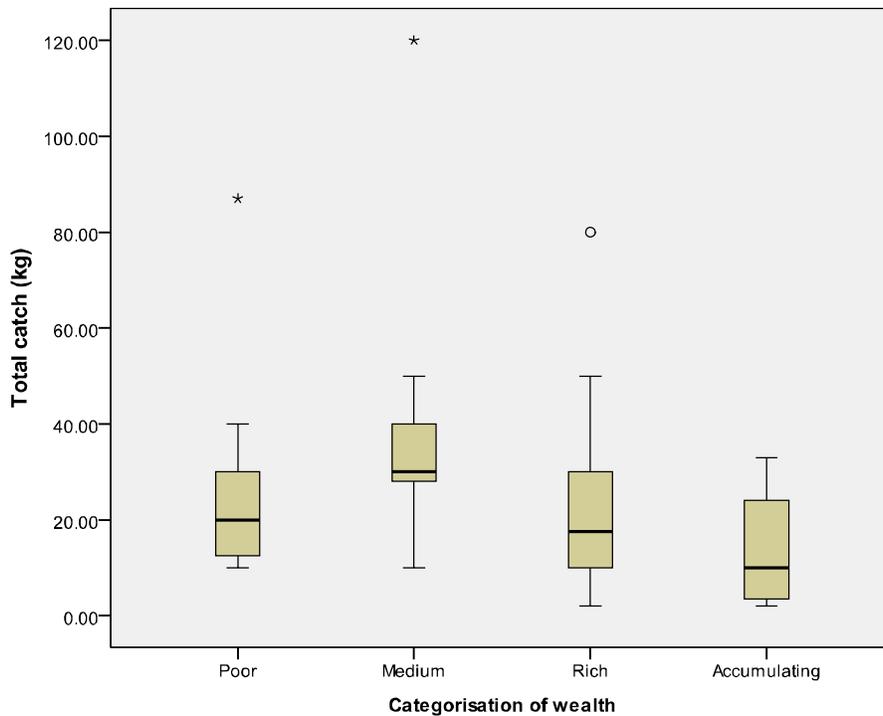


FIGURE 3-3 FISHING YIELD FOR HOUSEHOLDS WHO HAD FISHED OVER THE LAST WEEK IN PHU YEN (KG)



There was some limited use of labourers from outside the household, although this was not very common, and was mostly evident amongst the four households I have classified as 'accumulating', who would hire labourers for short term tasks such as rice transplantation or maintaining the fish pond. On the whole therefore, there were few unequal class relations between households. Much of the labour conducted for others in both aquatic and non-aquatic dependent activities was on a reciprocal basis, whereby one family member works temporarily for another household, with an informal understanding that they may be assisted in return at a later date. Figure 3-2 also shows that some household members from each wealth group with the exclusion of those classified as 'accumulating', also work for some of the year as wage labourers, often in construction. Although not all are 'dependent' on this work, it suggests that even for the richer households it is difficult to be entirely self-sufficient through agriculture, fish culture and fishing and supplementary activities are still necessary.

It is worth noting that some of the poorer households with limited ownership of productive assets and insecure livelihoods were newly married couples who had just inherited a plot of land and set up a new household, with few productive labourers to contribute to family income. However, there are also households who are poor in the first instance, independent of their life-course position. What is interesting however is that although land plays an important role in shaping livelihood security, it is not the basis of differentiation. There did not appear to be a very active market in land resources, and the primary route to accumulation appeared to be investment in assets associated with aquatic dependent activities as well as livestock.

3.2.3 RURAL CLASS RELATIONS IN DA KRONG

The Van Kieu communities of the Da Krong valley represent one of the poorest communities across the five HighArcs sites. Only one household could realistically be classified as 'accumulating'. The survey revealed that they had invested in a husking machine which they rent out to others, earning them 500,000 VND (\$20) per month. They also own a wood cutting and grass cutting machine which can be rented to neighbours, and a lot of livestock. There were also some labour relations whereby local villagers both worked in the cassava fields, and looked after the household's livestock in return for a share of the profit. They had spent 7 million VND (\$350) over the last year on labour, alongside 1 million VND (\$50) on tools. However, this household represents an exception, and the vast majority of households from all wealth categories suffered from some level of food insecurity, with their land unable to yield enough grain for the entire year, with some foodstuffs such as meat being only eaten for special occasions (general notes from hh interviews in Da Krong, May 2010).

Nevertheless, there are still noticeable inequalities which became evident during the wealth ranking and survey analysis. The first and perhaps most important axes of differentiation is once again, ownership of the means of production, although given the marginal nature of agriculture, access to land is not as important as ownership of livestock and equipment such as machinery, tools, fishing equipment and livestock. These differences are noticeable when one examines income sources. Unlike in Phu Yen, most agricultural production in the Da Krong communities is for consumption by the household and there is limited involvement in the market as either consumers or producers. Commercialised production is primarily the domain of the wealthier households with higher output, and even then, sales are very low. Rather than being an accumulation strategy, this is simply another way in which households can meet their day to day cash requirements. Figure 3-5 demonstrates that 'weekly' agricultural income (estimated from the annual figure) for 'rich' households is 50,274 VND (\$2.4), and is less than 15,000 VND (\$0.7) for medium and poor households³. Most cash income for all households comes from livestock production, although again, this is higher for 'rich' households, who earn an estimated 101,923 VND (\$4.9) per week as opposed to 72,366 VND (\$3.47) for 'medium' households and 54,761 VND (\$2.6) for 'poor' households (see Figure 3-5).

As with in Phu Yen, a small productive labour force relative to family size also impeded households from enhancing their livelihoods, as such households could not so easily clear new fields from the jungle or take full advantage of the land and livestock they do own. However, labour was sometimes 'borrowed' from neighbours in a similar process as was described above (general notes from hh interviews, Da Krong, May 2010).

FIGURE 3-4: FISHING IN DA KRONG RIVER: AN IMPORTANT LIVELIHOOD ACTIVITY IN CONTEXT OF LAND SCARCITY

³ The one 'accumulating' household was omitted from this analysis



Fishing represents an important activity which would compensate for shortages of grain staples, particularly for the poorest households with the lowest agricultural output (see Figure 3-4). In fact, Figure 3-6 suggests that 'poor' households on average have caught more far fish than their 'medium' and 'rich' counterparts. However, despite the importance of fishing, many of the poorest households could not even afford hand nets due to lack of capital (general notes from hh interviews, Da Krong, May 2010). One poor household we met was obliged to 'rent' a net from another household, giving a few fish to the owner for every 10 or so fish he catches. Other survival strategies for the poorest households include of course, collecting gold from the river, and collecting forest products such as sticks for brooms.

FIGURE 3-5 ESTIMATED INCOME OVER THE LAST WEEK IN DA KRONG

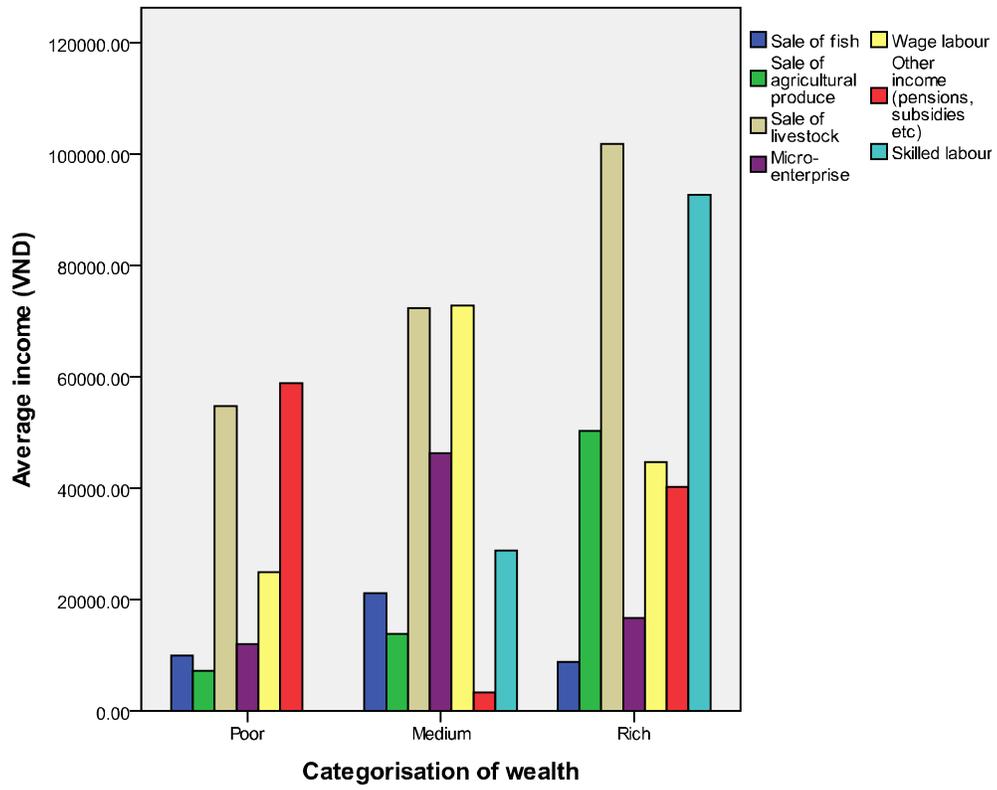
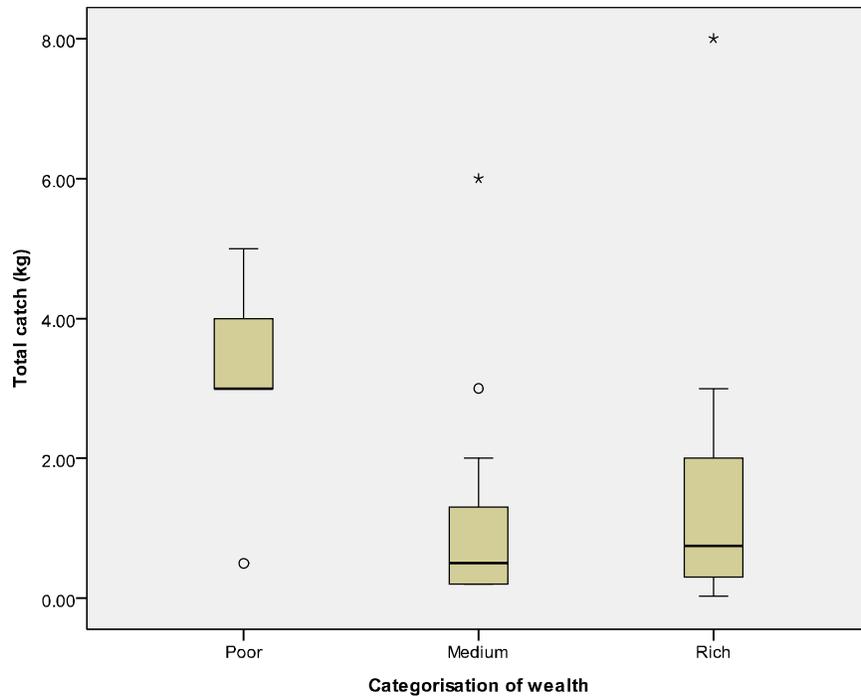


FIGURE 3-6 FISHING YIELD FOR HOUSEHOLDS WHO HAD FISHED OVER THE LAST WEEK IN DA KRONG (KG)



The marginalised communities of the Da Krong valley not only dependent upon the river and its tributaries for fish and gold to supplement their livelihoods, it was the main source of drinking water for most households. Only a small number of richer households benefited from having drinking water piped to their homes, otherwise they had to walk up to smaller tributaries like in Da Krong⁴ (general notes from hh interviews, Da Krong, May 2010).

The alternative to fishing and agriculture for food security was to take up wage labour. Although most households labour to some degree, Figure 3-5 shows that 'rich' households have significantly higher income from skilled labour, having earned on an estimated average of 92,751 VND (\$4.5) over the last week. Jobs include work in the local government and for NGOs working in the area. This is perhaps because they use their more secure economic position to invest in education for their children. On the other hand many 'poor' and 'medium' households could not afford to send their children to school.

While these intra-community divisions are important, this must not divert attention from the fact that members of the community from all wealth categories are poor when compared to other parts of Vietnam, while Figure 3-5 shows that most households supplement their increasingly fragile fishing and agricultural livelihoods with menial wage labour. Coffee pickers generally earn 50-60,000 VND (\$2.5 - \$3) per day for 10 days to two months. However, after paying for the bus to reach Khe Sanh, often only 20-30,000 is left (general notes from hh interviews, Da Krong, May 2010). Although Khe Sanh appeared to be a relatively rich settlement with a strong economy based upon trade and coffee, little of this development had impacted the rural areas in the Dakrong valley. There seemed to be a stable articulation between the urban area and rural peasant economy of the Dakrong valley, whereby they provided a flexible supply of low wage labour to the plantation economy as and when it was needed. Labourers were easily exploited, as one incident suggests. A man from a coffee plantation had come to the village to recruit labourers. The staff told them that they had already signed a contract with the local government in Dakrong. He and five other villagers were offered a salary of 1.2m VND (\$60) per month to pick coffee in Bak Lak, Da Long province. There were people from many provinces, (many ethnic groups, Muong, Thai and Kinh). They worked for 3 months, but when he went to collect his pay, nobody was there. They had worked for free, and the only money they had received was the cost of the bus ticket (hh interview in Co Pua, May 2010).

3.2.4 RURAL CLASS RELATIONS IN SHAOGUAN

Unlike the more agricultural land dependent communities studied in Vietnam, for the fishers of Shaoguan, the primary source of income was labouring, especially in the urban sector. Fishing in this context, along with some very small scale agriculture, are supplementary activities for many households. Patterns of class stratification are therefore quite different from the other HighArcs sites. Although the profitability of fishing varies according to the asset ownership of the household, the survey shows that there is by no means a significant class with extensive ownership of the means of production for whom fishing is itself a profitable source of accumulation. The two households classified as 'accumulating' received their income from large scale fish culture. One household also owned a large pig farm, explaining the particularly high income from agriculture, livestock and fish culture for 'accumulating' households in Figure 3-5. They also own some land from where they sell bamboo. The other household had a shoe business in the town. Both these households displayed capitalistic tendencies and employed outside labour.

⁴ The one communal tap which was installed by an NGO in Chan Ro was not operational during the dry months.

FIGURE 3-7 ESTIMATED INCOME OVER THE LAST WEEK IN SHAOGUAN (RMB)

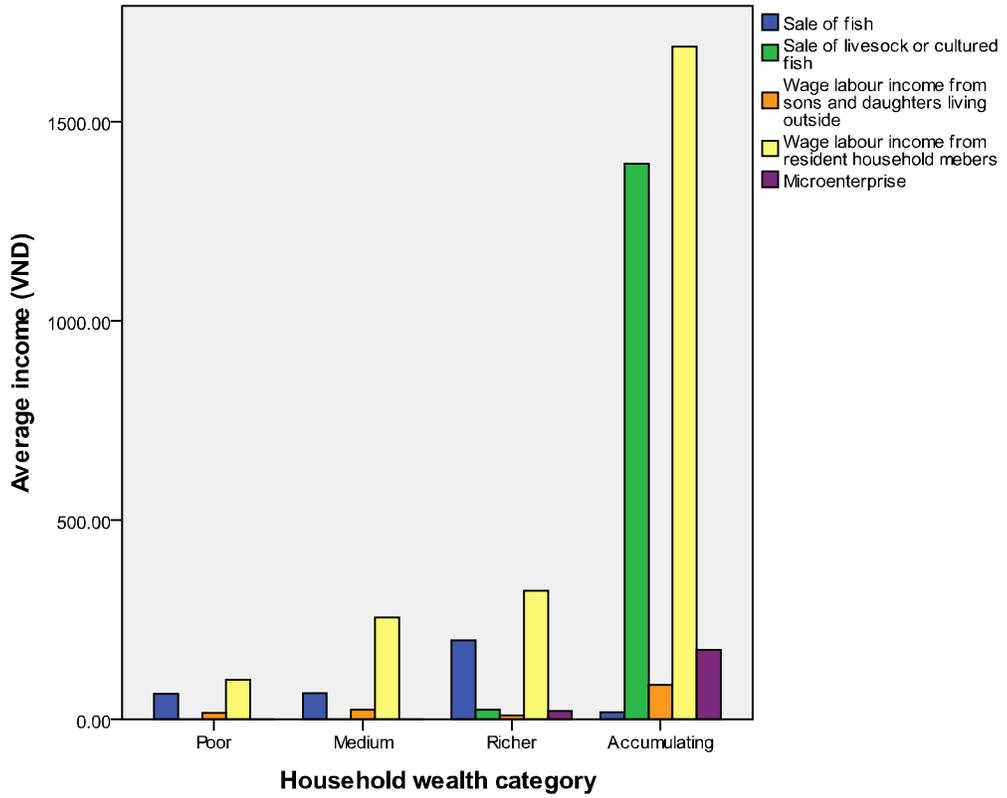
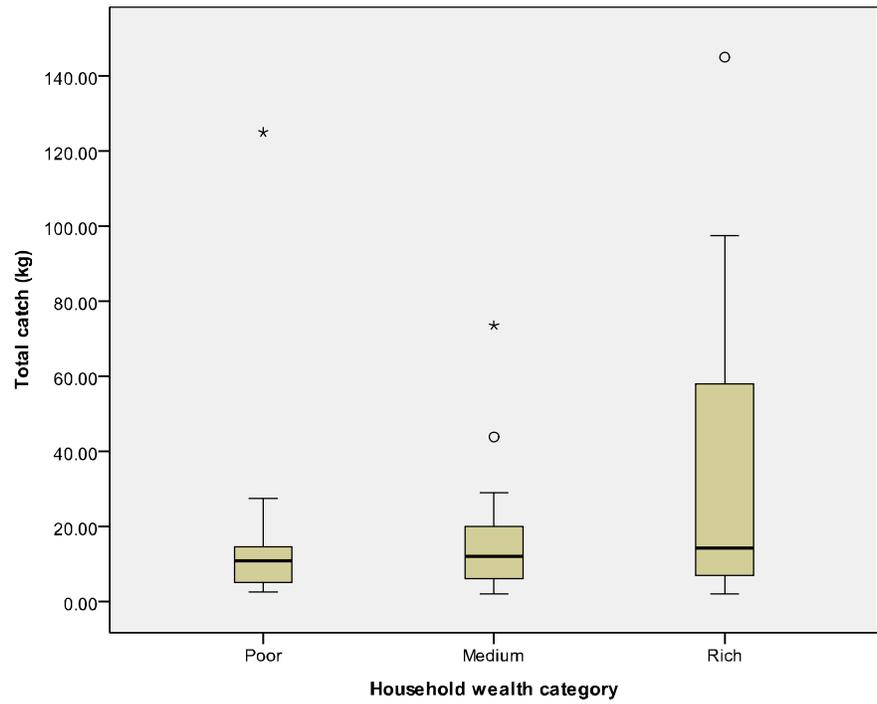


FIGURE 3-8 FISHING YIELD FOR HOUSEHOLDS WHO HAD FISHED OVER THE LAST WEEK IN SHAOGUAN (RMB)



The majority of the population in the study villages however, even those classified as 'rich', could be considered part of a single labouring class, some of whom supplement their income with fishing. There were still differences in relative wealth, but unlike in the other field sites, wage labour was not a 'last resort'. Households would turn to it if they could not support themselves through traditional natural resource based activities. In fact, access to different types and levels of wage labour was itself an axes of differentiation between households. Figure 3-7 demonstrates how the estimated weekly⁵ income from wage labour for accumulating households is a substantial 1688 Rmb (\$248.8), which probably included skilled work. For rich households on the other hand, it stands at 322 Rmb (\$50.5), while it is 256 Rmb (\$40.1) for medium households and 64.51 (\$10.1) for poor households. This is most likely because wealthier households with better education can access better paid skilled or semi-skilled employment, while poorer households take up lower paid unskilled and menial work. Unlike the other field sites, work for others is a source of prosperity in this context. At the other end of the scale, some of the poorest households had no labouring income at all, and were dependent upon marginal fishing incomes and support from friends and relatives (general notes from hh interviews, Shaoguan, 2010).

As with Vietnam, family cycle is an important determinant of one's relative prosperity in this context. However, in the context of a labouring economy, it is not the younger but the *older* households who are weakest economically. From the survey, it was found that the average age of the household head of the poor group is 59 years old, as opposed to 50, 48 and 44 for the medium, rich and accumulating group respectively. Many of the older generation perceive themselves as too old to find wage labour, and if their sons or daughters move to urban areas, they are dependent upon fishing to survive. Often the younger generations who are no longer present in the household send money back, but given the costs of raising a family in the city, the amounts are not always sufficient. Wage labour income therefore supplements fishing, unlike their wealthier counterparts where sons or daughters have local employment, for whom fishing supplements wage labour (general notes from hh interviews, Shaoguan, Jul 2010).

There were a number of explanations for older household members remaining in the village. Some elders felt they did not have the necessary skills to find work in the city (HH interview, Kengkou, November, 2009). They also worried that even if they could find a job in the city, but they would lose the job soon when they get older, and thus there is limited job security for them. One of the older men said during an interview: "*We are old and do not know anything, no body need us (in the city)*" (Focus group of men, Kengkou, 2010). When we asked some elder women whether they hope to have a job in the city, they also said: "*Of course we do, but nobody needs us*" (Focus group of women, Zhoutian, July, 2010).

Whatever the work, it is worth noting that respondents perceive the life of unskilled industrial workers to be difficult, both locally and in distant urban centres. Payment for such factory work is around 1000-1200 RMB (\$152-\$181) per month for a 9-10 hour day (hh interview in Lishi, Jul 2010). Most concurred that this was not enough to support a typical nuclear family (i.e. husband, wife and children), particularly when additional funds need to be given to the extended family (i.e. parents), so households usually combine factory labour with other livelihood activities. When the family resides within the village this of course includes fishing. However, for families who have migrated to distant urban centres this may involve the other partner, normally the wife, who seeks other work to supplement their income (general notes from hh interviews,

⁵ As in Figure 3-1 and 3-3 this is again calculated based upon *annual* labouring income, so it is comparable to the data on fishing which was for the last week.

Shaoguan, Jul 2010). Alternatively, one respondent suggested that by extending the working day to up to 12 hours they can maybe earn 1600 Yuan RMB (\$242) per month which is just sufficient (hh interview in Lishi, Jul 2010). Usually the amount of money migrant couples are able to send to their parents back in the community is low, as can be seen in Figure 3-7.

The importance of labour income does not mean that access to the means of production is not important. Figure 3-7 shows that wage labour income not only falls as one goes from rich to medium to poor, but so does fishing income, even though the poorer households are most dependent on this activity. Although the few 'accumulating' households have invested in non-fishing activities such as aquaculture and livestock farming like their counterparts in Vietnam's Phu Yen, the remaining richer households in the Shaoguan sample still invest in fishing, but can afford a far greater investment than their poorer counterparts in productive assets such as boats, engines and nets⁶. Figure 3-8 shows that the top quartile of rich households in terms of fishing catch in the last week preceding the survey ranges from 15.7kg to a substantial 145kg. The bottom quartile of poor households on the other hand have only caught between 2.5 kg and 5kg.

This higher catch can be understood when one observes asset ownership. The average number of fishing nets, creels, fishing boats and motors of the 'rich' group are 17.63, 106.88, 1.125, and 1.08 respectively, higher than those of the 'medium' and 'poor' group (see Table 3-2). Differences are particularly noticeable in Lishi and Kengkou. Table 3-2 also demonstrates that fishers also have their own fishing boats, most of which have a motor. The average number of fishing boats in the poor group is about 1.06 which is only slightly less than that of the medium and rich group. Nevertheless, there are three households who do not own a motor-boat in the poor group while there are only two and one households in the medium and rich group respectively without motor boats. Furthermore, the richer households on the whole have larger fishing boats and larger motors⁷.

Although there clearly are divisions within fisher communities, there was little evidence of 'exploitative' relations between households or of richer fishers buying up the assets of their poorer counterparts. In the survey for example, there was only one incidence of households renting out land to others, and there is little evidence of poorer households labouring for other fishers. In fact, cooperative relationships are more common. Sometimes brothers from different families go fishing together, while wives stay at home. This is reciprocal rather than exploitative relationship (general notes from hh interviews, Shaoguan, April-Aug 2010). This reinforces the argument that they represent a single social 'class', integrated to a greater or lesser extent into the urban capitalist economy as labourers⁸. Between fishers and their more prosperous

⁶ While this capacity for greater investment in part is due to higher labouring income, it may also be the case that a higher asset base and income from fishing in the first instance allowed the household to invest more in education to ensure the younger generation secured higher paid employment.

⁷ Diesel subsidies are offered on the basis of the engine size. Given that the average subsidy for poor, medium and rich is 2020, 2311 and 2510 respectively, thus suggests the wealthier fishers operate larger engines.

⁸ There was however, far more evidence of unequal relations within the neighbouring farming communities, whereby many large farmers could be classified as 'accumulating', particularly in commercialised pockets such as the orange growing valley near Zhoutian. There is also more agricultural labour by poorer households within the village and comparatively less out-migration.

farming neighbours, there was also not evidence of unequal relations whereby fishers depend on their wealthier farming counterparts for their livelihoods. However, there are clearly significant disparities in wealth and in access to government resources. Furthermore, the gradual undermining of fishers livelihoods due to environmental change suggests some level of differentiation at a society wide level, whereby fishers are gradually alienated from their livelihoods, only to enter the urban and rural working class.

TABLE 3-2 FISHING ASSETS OF THE WEALTH GROUP IN THE THREE SELECTED COMMUNITIES IN SHAOGUAN, CHINA

Fishing assets	Wealth group	Lishi	Kengkou	Zhoutian	Average
Number of fishing nets	Poor	28.86	8.78	7	16.17
	Medium	31.18	9	4.89	16.67
	Rich	22	16.44	11	17.63
Number of creels	Poor	28.57	72.78	0	47.50
	Medium	32	35	3.44	23.26
	Rich	21.50	261.11	0	106.88
Number of fishing boats	Poor	1.29	0.89	1	1.06
	Medium	1.09	1.29	1	1.11
	Rich	1	1.44	0.8	1.125
Number of motor for fishing boats	Poor	1	0.67	1	1
	Medium	1.09	0.67	1	1
	Rich	1.1	1.22	0.8	1.08

3.2.5 RURAL CLASS RELATIONS IN BUXA

In the three clusters there are no households that could be characterised as ‘accumulating’. Opportunities for accumulation are limited firstly, because the primary means of production, land, belongs to the forest department. Local people therefore have no way of increasing their holdings. They only retain their land holdings as they have been here for generations, so they are allowed to stay. Most people do not even have any formal papers to confirm their rights as tenants, and there is no buying and selling. Secondly, given the difficult terrain, there is little scope to boost yields through investment in agricultural machinery. Fields are small and dispersed, and are often difficult to reach (general notes from hh interviews, Buxa, Oct-Nov 2010).

It is however still possible to differentiate ‘rich’, ‘medium’ and ‘poor’ households according to how self-sufficient they are, the potential for a ‘surplus’ or profit, and the degree to which they are dependent upon others, or common property resources such as fish. An observation of income only offers some insights into patterns of class stratification. While most households have some cash income, mostly from wage work, the average income over the last month in the survey was found to be Rs 2931 (US\$ 59.85), only Rs 698 (US\$ 14.25) per week, far below what is sufficient to support a household. It is clear therefore that a significant portion of households subsistence needs comes from activities outside the cash economy, notably through small scale subsistence agriculture. Households were often not aware of how much forest land they operated or were unwilling to disclose this information, making it difficult for a quantitative analysis of wealth differences in Buxa.

Nevertheless, qualitative testimonies suggest that households who have access to larger holdings of forest land for cultivation generally have a more secure livelihood than those with only marginal holdings who are more dependent upon labour. This was one of the primary criterion against which households were

classified as 'rich', as opposed to 'medium' or 'poor'. These differences are most evident in Adma, where agriculture is more central to livelihoods (see Figure 3-9). We observed some use of outside labourers in Adma, so there may be limited 'accumulation'⁹, although again households are only allowed to cultivate the land which had been cultivated in previous generations, and clearing of new fields is strictly prohibited (Adma hh interview, Nov 2010). There is also a tradition of livestock raising amongst the Drukpa community. This can be quite profitable, and some households own up to 10 cows. The semi-nomadic nature of the job is however difficult, whereby they must spend long periods in the jungle with their herds in temporary encampments or *Goths*.

FIGURE 3-9: FIELDS OF MILLET IN ADMA. FOREST DWELLERS ARE ONLY ALLOWED TO CULTIVATE SMALL PLOTS OF AGRICULTURAL LAND



⁹ We met one labourer for example, on his way to work on someone else's garlic field for a week, after which he would return to his own field. However, it appears that there may be some reciprocity to these labour relations. Although they work for cash, not as an exchange, employing outside workers may be to make up for labour deficits during the busy harvesting periods. Other households who work as labourers may even employ labourers at other times (general notes from Adma hh interview, Nov 2010).

FIGURE 3-10 ESTIMATED INCOME OVER THE LAST WEEK IN BUXA (RUPEES)

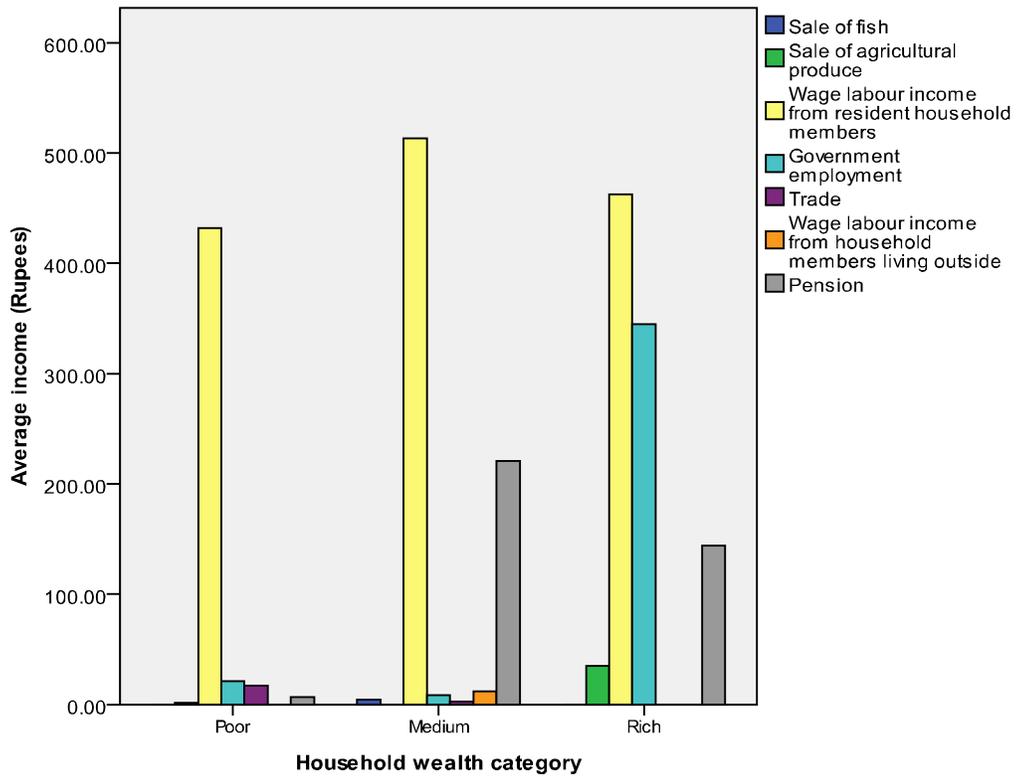
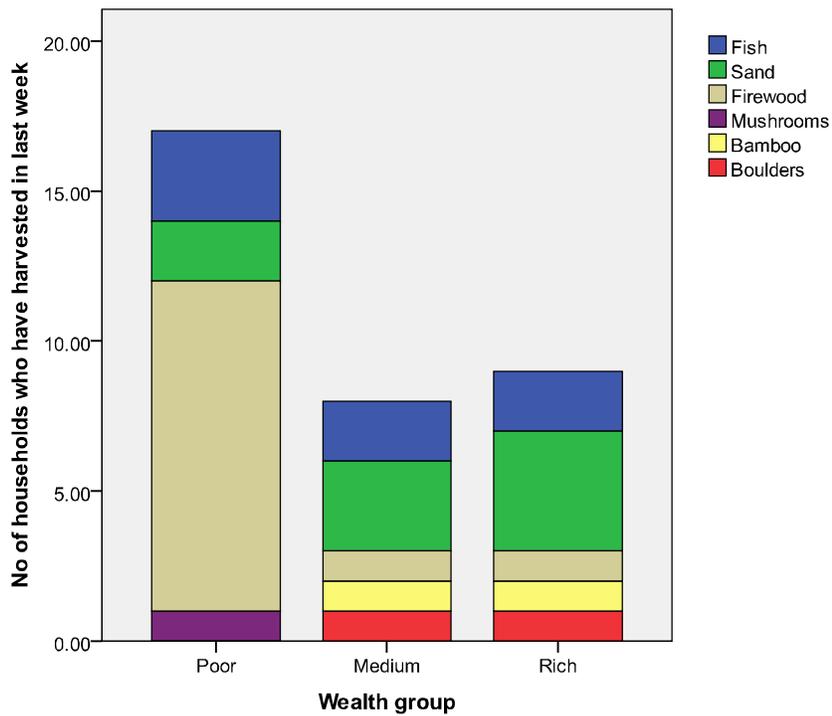


FIGURE 3-11 NO OF BUXA HOUSEHOLDS ENGAGED IN HARVESTING OF AQUATIC RESOURCES BY CATEGORY OVER LAST WEEK



A significant source of wealth which is quantifiable is income from better paid skilled or semi-skilled wage work. Households who have a more secure livelihood from access to land or other resources usually have a greater capacity to invest in the education of their children. Figure 3-10 shows that rich households earn an estimated Rs 344 (US\$ 7.23) over the last week through government employment, most of which requires skills. The relatively high income from pensions also reflects this. Figure 3-10 suggests that ordinary wage labour is still important for rich households' income, although observations in the field revealed that this often includes skilled and semi-skilled wage work, while poorer households were more likely to be engaged primarily in more menial, unskilled professions. The greater propensity for skilled employment may be a result of their higher investment in education as is discussed in more detail in the in-country HighARCS report for Buxa (Mishra et al., 2011).

Harvesting from common property resources such as through fishing, like in all the sites plays a supplementary role, although 'poor' households rely on this more (general notes from hh interviews, Buxa, Oct-Nov 2010). Fish are rarely sold, as the low income from fishing over the last week suggests in Figure 3-10. It is with regards to some of the non-fishing related aquatic dependent activities that these differences are most apparent. Households were asked during the survey to list which aquatic species had been collected over the last week. Figure 3-11 shows that more households classified as 'poor' had collected aquatic species than those classified as 'rich' or 'medium'. In particular, nearly eleven poor households had collected driftwood, in contrast to only one rich and medium household respectively.

Given that there are few sources of accumulation, the primary 'class relations' are therefore between the forest dwelling populations and their outside employers, with the few exceptions of poorer household members working for others. There was little evidence however, of households achieving the level of wealth that they can rent out land or property to poorer households.

3.2.6 RURAL CLASS RELATIONS IN NAINITAL

Across the three surveyed communities in the Nainital region, there were 14 accumulating and rich households, 47 medium households and 30 poor households identified in the survey. As a result of the tourism economy, there were many economic opportunities locally, meaning also that this region probably has the greatest level of class stratification. In this context most 'rich' households appeared to be also accumulating wealth, and it was not possible to separate them into two separate classes.

Opportunities for accumulation lie primarily in business enterprises. Ownership of cars was probably the most common. Wealthy households would take loans to purchase cars, and one household owned three cars, which could then be rented out to others. Another household owned a garment shop. Although agriculture alone was not the primary source of wealth, the rich and accumulating households have larger land holdings, often from 60 to 100 Nali per household. Like Phu Yen, this offers them their grain needs, allowing them to invest any surplus in other livelihood activities. Some of the households however, with larger holdings would sharecrop their land. In the case of sharecropping the tenant keeps a certain portion of the produce with them and gives the rest to the owner of the farm. In some cases also, the land owner employs paid labour for farming while also sometimes employing unpaid labour in exchange for some other benefits. For example, a person who is staying in someone else's house does not pay rent, but works in their land as an unpaid labour.

The survey also reveals that aquatic based activities are of secondary importance to the livelihoods of rich households. As tourists are the main source of their earning through business, and tourism itself is derived from the beauty of the lakes, they can be considered indirectly dependent on aquatic resources. However, for cultivation of the large amount of the lands that they possess they require the irrigation water which comes mainly from the lake which is then channelled through the canals.

Some of these households do also possess boats. What is evident from Figure 3-12 is that although seven rich, 9 medium and 5 poor households are involved in boating, the rich households are accumulating additional wealth by owning more than one boat. Four rich household own extra boats which can be rented out to their less prosperous counterparts. Even when they own only one boat, these are still rented to others in some instances allowing household members to pursue other livelihood activities.

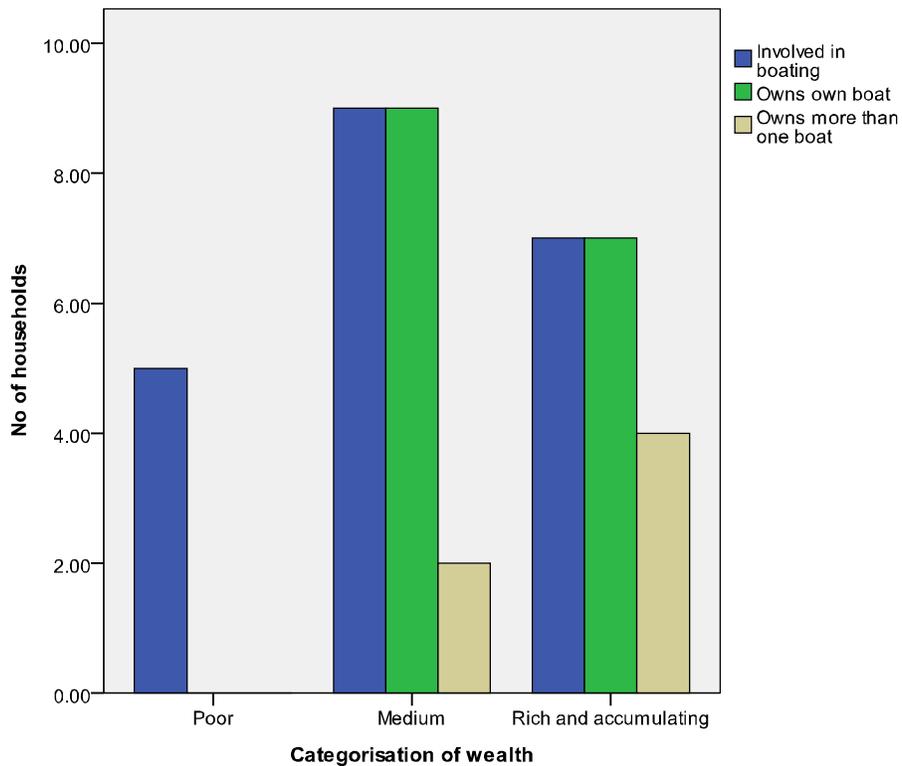
Sampled households belonging to the medium category possess some amount of land which is mainly used for home own consumption. They generally cultivate this land on their own and with the help of family labour. Along with agriculture however, most of the subsistence income families are engaged in other activities to earn income. A few households have family members who are engaged in different types of government services, such as in the army or in lower grade staffs in colleges or offices. Consumer goods possessed are mainly TV and mobile. Again, they have some level of direct dependence on the lake through ownership of boats and fishing equipment. Nine of the sampled medium wealth households were involved in boating, and all had their own boats which they operated themselves (see Figure 3-12).

The sampled poor households have extremely limited means of earning livelihood. They possess very little land for cultivation and little livestock, particularly in Nainital where they are entirely a labouring class. Those that do have land have no market participation as they do not produce any surplus from their agricultural production. They mainly work as labourers in others farms or in construction and other unskilled sectors.

It was found out that, the poor households are dependent on the accumulating households for various services. At times, the richer household may employ labourers for certain works such as for agriculture or for boating labour. Also the poor households work mainly as construction men and in the hotel, resort or road construction sites. The people here pursue different types of occupations, so there is no absolute dependence on the richer households. In terms of aquatic resource dependence, few can afford to be boatmen as they lack the financial capability to invest in a licence or boat, which can be very expensive. As Figure 3-12 shows, although five households are involved in boating and this is a significant income source, none of these households actually own a boat and work for wealthier households who rent out their boats. The boatmen in this context considers the owner to be their *Malik* (a term of respect for a person of authority). Whatever they earn from their work, half must be given half of that to the owners and keep the rest is retained as their wages. While this represents the one direct use of aquatic resources, most poor households are dependent on the lake resources indirectly through working as labourers in the lake side economy.

There is little evidence of extensive differentiation, or the emergence of capitalist class relationships within communities. For example, most of the land which was possessed by households were not 'purchased' or acquired by an accumulating class but was inherited by them. Nevertheless, there are clearly growing inequalities, with richer households buying more boats, and entering other business opportunities while their poorer counterparts remain dependent upon labour.

FIGURE 3-12: INVESTMENT IN BOATING BY HOUSEHOLD WEALTH GROUP IN NAINITAL, NAUKUCHIATAL AND BHIMTAL



At the same time, the phenomena of rising land prices, points to a new set of unequal class relations which are emerging. Farmers increasingly prefer to sell their lands at hiked prices to businessmen from outside rather than farming on this land which fetches them lower income. However, when sellers lack the means to pursue alternative livelihood strategies, they often find themselves alienated from their means of production and obliged to depend on menial wage labour to survive (general notes from interviews, Nainital, 2010).

Aside from class relations it is important to acknowledge associated axes of social stratification such as caste and ethnicity. In India for example, both early capitalist and feudal forms of land inequality have historically been reproduced through the deeply entrenched ideologies of caste. Historically, landlords could legitimate their control over resources by setting up a status order against the reality of class relationships. Caste acts an “ideological screen” which hides the social reality which has evolved over Indian history with shifts in the character of class power (Meillassoux, 1973; Singh, 2008).

While in Buxa, there is only limited evidence of caste relations as much of the population are from *adivasi* (tribal) communities who are either indigenous, or who have migrated from Nepal and other parts of India and are traditionally ‘outside’ the caste system. The caste system in Uttarkhand however, the state within which Nainital is located, has historically been quite strong and there is still a correspondence between material inequality and one’s position in the caste hierarchy. Many of the scheduled caste¹⁰ (SC) households

¹⁰ Traditionally marginalised communities are termed ‘scheduled castes’ in India. This status offers enhanced social support and a quotas for government jobs and educational institutions.

are located highest up the valley at the greatest distance from the lake, and many can be considered 'labouring' (general notes from observations and interviews, Nainital, 2010). For example, Karkotak village is far up on the ridge above Bhimtal, at an altitude of around 1800-1900m. It is home to about 11 scheduled caste families. They are primarily dependent upon laboring, agriculture and animal husbandry and benefit little from either the lake or the tourism economy it supports. Many children do not attend school (Observation from Karkotak, Dec 2010).

However, there is evidence that with the development of the lake as a tourism center, caste is increasingly becoming complicated by the more entrenched structures of class. The scheduled caste (SC) households of Sanguri for example, still have very small landholdings with their homes were higher up on the steeper unirrigated slopes, far from the road. However, many SC households in this village are now more prosperous, primarily due to the new sources of income and the declining importance of agriculture around Bhimtal. Despite the marginal agricultural land, many households had concrete homes and satellite dishes, and sons and (to a lesser extent) daughters, were studying in University. Only 5 out of the 13 SC households in the village were classified as Below Poverty Line. It was education which was allowing many SC households to generate new sources of income (general notes from Nainital, Dec 2010).

3.3 CREDIT RELATIONS

It is clear from the above discussion that lack of capital impedes the poorest social groups from investing in productive assets which can enhance incomes either from existing aquatic resource dependent activities or from new activities such as fish culture. Access to credit is one mechanism through which they can facilitate investment. In Vietnam in particular, accessing loans has become a lot easier compared to 10 years ago, and there are several microfinance banks operating in both Phu Yen and Da Krong, not to mention state affiliated institutions such as old people's and women's unions. The Vietnam Bank for Social Policy (VBSP) offers collateral free loans to the poor on a short, medium or long term basis for productive purposes at 0.65% per month interest. In Vietnam, ethnic minorities such as the Van Kieu, Muong and Thai present in the field sites, have the advantage of being allowed to borrow more than Kinh people, as per government rules. Credit is also available in Buxa through self-help groups, and through both banks and self help groups in Nainital. It is only amongst the fishers of Shaoguan that there is not a borrowing culture, and loans are usually taken on a small scale, often from family and friends, usually to pay school or healthcare fees, or to rebuild houses.

However, there are a number of challenges. During focus groups, some households in Phu Yen reported problems accessing loans. For example, loans were not always available when required, for example to buy fertiliser or shrimp traps, and if a loan is not repaid on time, an individual may be prevented from taking future loans. In Shaoguan, many of the fishers noted in focus groups that even if they wanted a loan, it was not granted as they lack sufficient collateral in land or property.

These constraints have in the case of Phu Yen, led to a profusion of private money lenders. Poorer women in Tuong Ha in particular, would borrow money from private lenders or *onghu* to buy seeds for corn. After the harvest they sell the corn to the middleman and then repay the money lender. Interest is particularly high, at 5-7% per month, and this rate can increase if the loan is not repaid within a year, causing the borrower to suffer an overall loss. Ironically, the money lenders themselves often borrow money from the bank and then

lend it out at higher interest to villagers who for various reasons can not secure a loan themselves (FG with women in Tuong Ha, Apr 2010). One household we met had borrowed money from the bank to invest in chickens. However, the chickens died and she could not repay the loan. As she was barred from taking further loans she was obliged to seek the assistance of a money lender (FG with women in Tuong Ha, Apr 2010).

Even when households can access institutional credit, this is not always advantageous to their livelihoods, with many falling heavily into debt. There seem to be a number of primary reasons. Firstly, there is a tendency for households to take loans for non-productive purposes (observation from Phu Yen and DaKrong, Mar-May 2010). Spending on family and community events are a considerable burden for households, particularly in the Vietnamese and Indian sites. One man we interviewed in Phu Yen was politically active, so felt obliged to attend many weddings in the village, spending up to 6 million VND (\$300) per year on gifts. Furthermore, in an expanding market economy, households in all the sites displayed a desire to invest in luxury consumer goods such as TVs, fridges and expensive mobile phones which are often beyond their usual purchasing power. These were arguably bought as much for the social status they offer rather than their direct utility to the household, and loans were often used for this purpose (observation from Phu Yen and DaKrong, Mar-May 2010). In Vietnam, the combination of easily available low interest credit and high non-productive expenses has intensified cycles of indebtedness, often to microfinance banks themselves. Loans were sometimes taken to service other loans. One household head in Da Krong we interviewed had taken a loan to arrange his daughters wedding, and then had taken a further loan from another bank to repay the first loan. The taking of loans for non-productive purposes in Vietnam was noted in a study by Rankin and Shakya (2007). A second reason for growing indebtedness is livelihood shocks. In 2007 in Da Krong, there was an outbreak of Foot and Mouth disease. Many households who had taken loans, some up to 20 million, to buy pigs or buffalo, lost their livestock and were unable to repay their debts (general notes from hh interviews, May 2010).

It was interesting to note that indebtedness to banks and money lenders in Vietnam was reported during focus groups to be a recent phenomena associated with the transition from a subsistence to a market economy, which in part is due to the rise in fishing as a source of livelihood. In Phu Yen for example, prior to the building of the dam, households could meet their subsistence needs through rice farming. However, with the flooding of the valley families have been 'forced' into the market, and must meet their subsistence needs through fishing and the production of corn, the produce of which is sold to buy grain. In the context of a more monetised economy, not to mention the need for fishing inputs, the demand for loans has increased (general notes from hh interviews, Phu Yen, April 2010).

3.4 MARKET RELATIONS

Aquatic resources in Da Krong and Buxa are predominantly collected for household consumption, with only limited 'sales'. Even agricultural sales are comparatively limited in these two regions. In Nainital, Phu Yen and Shaoguan however, aquatic resource use is more market dependent, and with it come a unique set of exchange relations, which affect the utility of particular aquatic dependent activities.

In Phu Yen, the primary aquatic product which is sold is shrimp, and sales are particularly high amongst the poorer sections of the community. Middlemen come to the villages directly in a van to transport the produce to the urban centres of the plains. There is however, some evidence of inter-linked contracts, which can potentially limit the sellers' bargaining power. Traders often give fishers shrimp traps in advance for no money. When the shrimp is sold, they are expected to pay them back for the traps at the same time. This impedes sellers' capacity to find a buyer offering the best price (general notes from Phu Yen FGs, April 2010). Although they were not obliged to sell the entire catch to the same trader, respondents expressed that the trader would 'get angry' if they sold to someone else, and there would perhaps be a risk they would not be given traps up front again (FG in with women, Tuong Ha, April 2010).

In Shaoguan however, almost all sales are directly to consumers or restaurant owners, which increases the bargaining power of fishers as it removes the middle-man. The price of fish caught from the river is usually a bit higher than that for cultured fish, as they are perceived to have a "better taste". To identify the value of their catch, fishers find out the price of cultured fish in the market first, and use this as a benchmark (general notes from hh interviews, Shaoguan, April-Aug 2010).

In Nainital, the primary use of aquatic resources which is oriented to the market is boating. Unlike the users of aquatic resources in the other sites, there is a boatman's union that presents a fixed list of rates. This guarantees the boatman that the activity remains profitable. There is even a queuing system in place in Bhimtal and Naukuchiatal, which ensures business is not cornered by those with the best ability to attract prospective tourists. Similar rates are fixed for other livelihood activities along the lake side such as rickshaw pulling and horse riding (general notes from hh interviews and observation, Nainital, 2010).

4. POLICIES AND INSTITUTIONS AND IMPACT ON AQUATIC RESOURCES

4.1 LOCAL GOVERNANCE REGIMES FOR NATURAL RESOURCES

There are a vast series of rules and regulations which are in place to regulate the use of aquatic resources across the five field sites. While some of these are based upon national or state level laws, other are adapted according to local conditions, while others exist on paper, but are not actually implemented locally. For more information on national wetland regulation legislations and policy see the HighArcs in-country reports on Policies and Institutions (Jiang et al., 2011). The following discussion focuses on the local implementation of policies and regulations to manage aquatic ecosystems in each region which have a bearing on local livelihoods.

In Phu Yen, regulations on the use of natural resources are disseminated from the central to district governments, and from there to the commune and village heads, who pass on the information villagers. There did not appear however, to be many enforced rules regarding the use of fish resources in the Song Da reservoir. In fact, respondents expressed limited knowledge of policies, aside from that they were not allowed to use explosives or electricity for fishing, a practice which in the past has been highly destructive. Some households mentioned that they had been given a ruler to measure the minimum size of mesh they were allowed to use in the nets, to ensure immature fish were not caught. However, it was stated locally

that nobody was really aware of this law, or knew if this was a 'law' or just a 'recommendation' (general notes from FGs, Phu Yen, Apr 2010).

As was discussed above, forest laws were slow to be implemented following decollectivisation, precipitating the severe deforestation which has been held partially responsible for declining water quality today. Nowadays however, regulations are more strictly enforced by the commune, and households found to be cutting new areas of forest have to pay a fine and have the tools confiscated. Natural forests are listed as national assets that are entrusted to local communities for protection, while each household has been given approximately two hectares of 'private forest' land to plant trees and manage (general notes from FGs, Phu Yen, Apr 2010).

In Da Krong, there was also just limited evidence of formal management regimes for fishing which were enforced. However, informal rules sought to prevent fishers from one village using the waters of another, unless they had a 'contact' or 'friend' to facilitate access. Rules for agricultural and forest management on the other hand, were more evident. Shifting cultivation was technically illegal, and most local people were aware of this (general notes from FGs, Da Krong, May 2010). As in Phu Yen, households were allocated plots of forest land to manage.

In Shaoguan, the Guangdong provincial government enacts a series of policies and measures to regulate the use of the resources of the Beijiang watershed including pollution control, regulating fish biodiversity, wetland protection and regulation of industrial activities. To regulate fish stocks 'conservation areas' have been established in parts of the river. There are no protected areas around the three study villages, although the hydro companies prohibit fishing immediately below the dams. To enhance fish stocks, breeding centres in Shaoguan city periodically release fish into the river (observation in Shaoguan, Aug 2010), although out of the study communities, this primarily benefits households in Kengkou which is downstream. There is also a licensing system for fishers, whereby they require a sailors' basic training certificate, the ownership certificate for fishing boats, and inland river boat certificates are required by the local government. This however, has created numerous problems for fishers. In 2004, the government had a policy to register all fishers. However, the fishers had to pay 200 RMB (\$30) each year to extend the license, and many therefore did not renew it. Now however, the government has stopped issuing new licenses, making it too late for those without one. Such unregistered households risk fines and are not entitled to valuable diesel subsidies (general notes from hh interviews and FGs, Shaoguan, Apr-Aug 2010).

With regards to other, primarily industrial, users of the river, there are a number of further policies, but insufficient implementation of rules has been responsible for the ecological decline of the watershed, with a devastating effect on fisher's livelihoods. As water levels have risen with the building of hydropower stations, the varieties and amounts of fish in the river have decreased, with some lands along the riverbank submerged into water, while riverside houses are at risk of collapsing. The slowdown in the river current has also changed the essential environmental conditions for certain fish species and has harmed traditional fishing patterns. Government regulations oblige companies involved in hydro power dam construction to compensate the damaged parties such as fishers, but there are no specific standards now and many fishers had not received compensation to the same levels as farmers who had lost land (general notes from hh interviews and FGs, Shaoguan, Apr-Aug 2010).

There are also requirements that waste water emissions should meet the regulated standards and there are charges for emitting businesses. However, waste discharged by boat restaurants and other polluters has

persistently contaminated the drinking water and brought damage to fishing. Licenses for sand mining are also required for sand companies and there are some detailed requirements to protect the banks and the ecological environment of the river such as ensuring that mining takes place 40m from the bank of the river. However, again, there is reportedly a weak implementation of these rules and extensive sand mining around the study communities has polluted the aquatic resources when oil and waste have been discharged in the process, ruining the spawning habitats of fish, while causing continued damage to the channel (general notes from hh interviews and FGs, Shaoguan, Apr-Aug 2010).

Buxa in India, represents a quite unique case with regards to natural resource management, as it was situated in a protected area, with quite stringent rules forbidding certain livelihood activities. These were particularly pertinent in the core zone, where all of the study villages were located, and were enforced by the Forest Department. Regulations in this context have fundamentally shaped the patterns of livelihoods in the region. For example, unlike in Da Krong, limits on clearing new fields are strictly enforced, as are bans on cutting timber. This has impeded households from developing agricultural based livelihoods, with the exception of Adma, where the larger fields had already been cleared many generations previously (general notes from hh interviews, Buxa, Oct-Nov 2010). It is for this reason that aquatic resources are particularly important to local people, namely stones and dry wood from the Jayanti river and fish and molluscs from the small streams in the hills, not to mention tourism along the river courses.

FIGURE 4-1: COLLECTING BOULDERS FROM THE JAYANTI RIVER



The local people in Buxa reserve reported that 'officially' they were not allowed to fish. In the past, they were fined and reportedly even beaten by forest guards for fishing. However, it they claimed that it was

informally 'tolerated' nowadays (FG with women in Jayanti, Nov 2010). Nevertheless, there were some regulations relating to aquatic resources which had a more immediate affect on household livelihoods. For example, restrictions had been placed on the collection of medicinal plants such as *totala* and *pipla*, many of which are found along river banks, although these were a potentially valuable source of income. Restrictions on some river based activities such as boulder collection meanwhile, had been enforced and lifted at different points over the last few years (see Figure 4-1). At present, contractors do not need permission to collect stones from the vicinity of Jayanti, but they require clearance if they want to go deeper into the forest. Although the profits are drained to urban centres by contractors, it was still a source of labour income for the local people. Most damaging in the context of Jayanti in recent months has been the limits placed on tourism, with the closing down of many roads that safari vehicles would once pass. Tourism along the Jayanti river is central to the livelihoods of many of local people who work as guides (general notes from observations and hh interviews, Jayanti, Nov 2010).

Nainital, although not in a protected area, has also had a series of stringent regulations on natural resource management implemented by the Irrigation Department, the Tourism Department, and the Lake Development Authority (LDA), the authority responsible for the day to day management, planning and conservation of the lakes in the district. Nainital Lake Conservation project was undertaken by the LDA to clean the water of the main Nainital Lake. This involved the installation of an oxidisation plant, a sewage control program and the paving of the pathways around the lake to prevent the run off of muddy water from the shore area. Furthermore, fishing has not been allowed at all for some of the time. Pant Nagar University collects the fishes from the lakes when they grow large in number, and they plant fish seeds for culture. Fishing requires a licence in the case of Bhimtal and Naukichiatal. However, to maintain the bio diversity of the lake there are restrictions put in place by the fisheries department in Nainital, and each fisherman can withdraw just 4 kg of fish per day (general notes from hh interviews and FGs, Nainital, 2010).

Boating has also been stringently regulated by the local authorities in recent years. The number of boats has increased a lot in recent decades, and now no more are allowed on to any of the lakes, making it particularly hard to secure a license (general notes from hh interviews and FGs, Nainital, 2010). If a newcomer wants to begin boating they first need to wait until another person leaves the profession, then they must pay Rs5000 to the municipality to transfer the license into their name alongside the fee of Rs1000 per month. Given the high demand for boating licenses, a boatman can earn a considerable sum by selling their boat and license together when they want to leave the profession. Apparently a new prospective boatman must pay up to Rs 355,000 (\$7886), another factor which hinders poorer households from entering the profession. They need to pay Rs 5000 (\$112) to municipality to transfer the license, and Rs350,000 to the boatman, despite the fact that a boat is only worth Rs 40,000 (\$889) (discussions with boatmen, Nainital, Dec 2010). Most other livelihood activities along the lake shore such as rickshaw pulling and horse riding were subject to similar licensing restrictions, and a fee had to be paid to the government even to operate a small stall on the lake side.

4.2 CONFLICTS BETWEEN STAKEHOLDERS AND POWER RELATIONS

Given the diverse range of natural resource management regimes and demands by multiple stakeholders, the potential for conflict and unequal power relations between users was always present, particularly in Phu

Yen, Shaoguan and Buxa. In Phu Yen, there is competition for the fishery resources of the reservoir between lowland Kinh fishers and the local population. Despite this however, there were few reports of any open conflict between different communities, although once a young person from outside was asked to pay “tax” to some local boys for fishing near their village (hh interview, Tuong Ha, Apr 2010). On the whole though the relationship was one of mutual respect, and this may have been due to the reciprocal benefits for both sides. For example, while lowland fishers could exploit the rich resources of the reservoir, local people could benefit from the custom they provided to local shops and could earn money looking after their nets and equipment in the lean season when they returned to the lowlands. Furthermore, the itinerant fishers were a primary source of fishing related knowledge (general notes from hh interviews and FGs, Phu Yen, Apr 2010).

However, in some contexts, the power relations between stakeholders are highly unequal, particularly between resident rural populations, private businesses and government authorities. This fosters both conflict, and biased development and implementation of management regimes. This was particularly evident in the case of Shaoguan and Buxa, where tensions between stakeholders are most visible.

The fishers of Shaoguan have limited political power, which in many ways reflects their marginal class position. There was an overall feeling of powerlessness, and a perception that the state pays limited attention to their problems, particularly when compared to their farming neighbours. The respondents noted in interviews that when there is a flood, the government expects the fishers to help by providing their boats and skills, but the rest of the time they are overlooked. One of the critical barriers in this context was the limited organization and leadership within the fishing communities. Although social networks within the villages are strong, and facilitate the dissemination of knowledge and ideas, only Zhoutian actually has a formal committee who can lobby the government to solve collective issues¹¹. Lishi and Kengkou have more informal leaders who primarily take responsibility for the transfer of information from the local government. However, when they need government support they do not have the capacity to organise and protect their rights. They reported that they often do not even know who to contact in the authorities at times of need¹². The relationship with private companies is of a similar nature, and it is very rare for the fishers to ‘confront’ sand mining or hydro power corporation officials to voice their concerns (general notes from hh interviews and FGs, Shaoguan, Apr-Aug 2010). One woman told us in an interview that they were simply compelled to ‘accept’ whatever the outcomes are of state policies or changing industrial practices. Only members of one village, Zhoutian, have been able to talk to companies and the government, given that they are the only village with a fishers’ organization/committee.

A similar sense of powerlessness pervaded the forest dwelling communities of Buxa. Despite the potential for reserve rules to significantly affect their livelihoods, local people felt entirely powerless in relation to the Forest Department with a lack of trust towards the institution and resentment of its policies. The sentiments

¹¹ This was partially possible because that Zhoutian has some forest land as collective assets. The committee rent the land to their neighbouring farming village and the rent can be used to fund the committee.

¹² The weak political position of the fishers renders them vulnerable to abuses of power, even within the communities themselves. In Lishi village for example, the nearby dam decided to compensate some of the fishers whose houses were flooded to build a block of flats behind the village. However, the son of a former leader had left the community with a large sum of the compensation money before the block was finished. There was no money to pay the contractor the rest of the money and the building was not yet livable. It now lies empty and they have had no support from the authorities. The person who had taken the money now lives in a house in Shaoguan.

were echoed by one respondent during a focus group in Buxa cluster, who said *“we love nature, we love the forest, but we do not need the Forest Department”*, following which he was greeted by a round of applause.

Tensions have surfaced recently with the forest department putting pressure on the local people of Bhutia Busti in Jayanti cluster to relocate. They are promising to pay Rs 100,000 (\$2224), but the local people do not trust this assertion. Respondents in a focus group in Jayanti cited the example that they were supposed to receive compensation after elephants destroyed their homes a few years ago, but have received nothing so far, responding that *“...they [Forest Department] are supposed to protect us, but instead they just sleep and do nothing.”* Similarly, the government is supposed to provide local people with 100 days work per year through the NREGA scheme, but locals in both Jayanti and Buxa fort clusters stated that many had not received this work, and even then, did not get the required compensation which they are entitled to.

The local people also had little trust in the conservation agenda of the government. Despite it being a ‘tiger reserve’, female respondents reported in a focus group in Jayanti that they had not seen tigers in years, saying that *“we are the only tigers here”*. There was a clear perception that the state sought to pretend there were tigers, and evict people from their land with this justification, in order to continue receiving the additional funds that a ‘tiger reserve’ is entitled to. It was also interesting that while the government was being stringent in restricting the livelihood activities which directly involve local people, larger scale operations which involve private companies such as stone collecting are still permitted. This suggests the local people have perhaps less bargaining power with the authorities.

5. INTRA-HOUSEHOLD DIVISION OF LABOUR

5.1 DIFFERENTIATION OF LIVELIHOOD ACTIVITIES (GENDER)

5.1.1 CHANGING ROLE OF WOMEN

In order to promote reconciliation between conservation and sustainable livelihoods development, it is crucial to understand not only how different communities and even wealth groups within communities utilise aquatic resources, and the associated power relations, but also the divisions within the household. The first and most well documented axes of differentiation is that of gender.

Firstly, it is important to acknowledge that in all the sites, there was a perception that inequality between men and women had decreased, and the position of women had improved. Interestingly, it was also suggested in focus groups in Vietnam and West Bengal that women were in a stronger position than their counterparts in the plains. This may be due to the quite different cultural ideologies in upland areas such as that of the Van Kieu, Muong and Thai communities in the Vietnam sites, and the Nepali and Drukpa communities in West Bengal. The predominantly Buddhist Drukpa in particular was considered a relatively ‘egalitarian’ community when it came to gender, as opposed to the Nepali and Bengali communities who were more often Hindu¹³. In Shaoguan, relative gender equality was reported to be grounded more in

¹³ It must however be noted that there is a growing community of Christians in all communities.

material practices. It was perceived that women from fisher communities were more 'valued' than in farming communities as both men and women were deemed capable of working on a boat (focus group). However, farmers traditionally favour boys as they are perceived as better farm labourers, a trend compounded by the government's strict policies on family size (General notes from focus groups with women, Shaoguan, Jul-Aug 2010).

Uttarakhand is a region known for somewhat entrenched gender inequalities (see Agarwal, 1992; Gururani, 2002). However, there was still a perception around Nainital and the other two lakes that the position of women had improved over the last generation. The primary development is the improvement of women's education status and literacy. It was reported that in earlier generations women did not participate much in outside activities but now they are participating in many different work activities outside the home. There is more female employment – particularly skilled employment, with jobs including work as a teacher or in the local integrated child development centre. Some women have their own restaurants or small shops around the lakes. Women now are also found to have even taken up jobs such as that of bus conductors which were traditionally the male domain. According to women in the focus group discussions, the numbers of women headed households are increasing in number. However, while marked improvements have been noticed in urban areas around the lakes, in more remote villages further from the tourism centres, gender relations were reportedly far more unequal, with many girls not still attending school and marrying at an early age of 15 to 16.

5.1.2 AQUATIC RESOURCE HARVESTING: SAME JOB, DIFFERENT ROLES

While women's status in the household has arguably improved across all of the field sites with greater access to resources and education, on a material level, the distribution of labour still remains highly unequal. The dominant gender division of labour in the majority world, whereby women bear the burden of both productive and reproductive tasks but do not retain an equal share of household income, has been well documented (Agarwal, 1998; Benholtd-Thomson, 1982; Deere & de-Janvry, 1979; Deere & Leon de Leal, 1982; Folbre, 1982; Gibson-Graham, 1996; Gibson-Graham, Resnick, & Wolff, 2001). It is crucial however, not to view women and men as stand-alone homogenous categories with pre-defined socio-economic roles. Instead, a contextual approach is necessary, which is aware of historical-geographical specificities in how gender groups relate to each other, to the environment, and to broader structures of power (Elmhirst & Resurreccion, 2008).

Acknowledging the particularities of each site, there are some recurring themes with regards to the division of labour between men and women and how they utilise aquatic resources. Nainital was probably the only site where women's role in direct aquatic dependent activities was limited. No women were involved in boating, and the few fishers were entirely male (general notes from hh interviews, Dec 2010). In all other sites however, both genders participated in aquatic resource dependent activities, although they appeared to focus on particular tasks. In Phu Yen and Da Krong for example, the methods of fishing varied. In Phu Yen, it is primarily men who fish using larger boats, travelling out to distant parts of the reservoir to locate the richer fish stocks. Fishers would generally go out in late afternoon and return in the early morning. By staying the night the nets can be left out for a long period, while saving fuel that would have been wasted had they returned to the village before drawing them in. Although it was felt that gender equality was better than in the plains, respondents stated that it was considered 'dangerous' for women to travel out on

the lake, particularly when it involved a night on the water. Furthermore, it was reported by some respondents that this would disrupt their responsibility in household reproductive tasks such as looking after the children. On the whole, women focussed on fishing from the locale of the village, such as laying out shrimp traps, a task which men also participated in, a particularly important activity for poorer households who can not afford a motor boat. A job that was entirely the domain of women was fishing from the smaller streams nearer the village, often for molluscs (general notes from hh interviews and FG, Phu Yen, Mar-Apr 2010).

In Da Krong, there was also a variation in the fishing methods between men and women. For example, fishing with a crossbow or hand net was more often considered men's work. This may have been, as in Phu Yen, linked to timing. Fishing with a hand net was carried out in the middle of the river at night, whereby men would go out in the late afternoon with torches, and return at 3am. The fish reportedly came out for food after dark. Women on the other hand, more often fished using basket nets (an activity which is carried out close to the shore during the daytime), as well as panning for gold. This was again as in Phu Yen, associated with perceptions of 'safety'. Female and male respondents in Co Pua and Chen Ro village attested that it was too dangerous for women to stand out in the river to fish with hand nets, particularly in the case of Chen Ro where the channel was dominated by rapids. Another activity which was considered a women's task, was the making of the small bamboo traps used to catch fish (general notes from hh interviews and FG, Da Krong, May 2010).

In Buxa fort cluster, fishing was primarily carried out by men and often boys. In the case of Jayanti, this may have been linked again, to it being an 'after-dark' activity where local people dam the river and collect the fish at night with torches. Although it was primarily a male affair, we did see women taking part as well. This could yield big harvests – often up to 20kg of small fish per person. An aquatic resource dependent activity which women and girls are almost entirely responsible for was the collection of drift wood from the rivers, a particularly important task in a reserve where the cutting of wood is strictly regulated (general notes from hh interview and FG, Oct-Nov 2010).

Shaoguan was the one site where fishing was entirely a joint venture between men and women (see Figure 5-1). Fishing needs two people to help with the many activities such as piloting the boat, placing bait and fishing nets, setting shrimp cages, and taking in fishing nets and shrimp cages. Fishing trips are normally carried out therefore by husbands and wives, although a division of roles has still developed. In general, men work in the front of boat, and are in charge of putting down and taking back fishing nets, and women sit on the rear and are in charge of manoeuvring. For most families, it is considered a men's job to repair the fishing nets. The selling of fish however, was usually done by women, based on the assertion that women were better at bargaining (general notes from FG in Shaoguan, Jul-Aug 2010). The trend for women to take control of marketing was also raised in focus groups in Phu Yen.

In all the sites, women and men are responsible for agricultural and animal husbandary activities, although there are again, variations in roles. Interestingly, watching livestock was considered more of a men's task in Da Krong, while in Buxa and Nainital, it was considered very much a women's job. As for agriculture, women invariably work for longer hours and have greater responsibilities, particularly in the three sites where agriculture was most central to livelihoods, namely Phu Yen, Da Krong and Buxa. Certain time consuming tasks in particular such as transplanting rice and planting cassava in Phu Yen, and husking in Da Krong, are primarily done by women. In both sites they would travel up into the hills for considerably distances to tend

the upland fields. One female respondent in Phu Yen noted how she would travel far up the steep slopes on a nearly daily basis to reach her fields of corn and cassava with other women from the village. Sometimes even she would stay the night in temporary huts (informal FG in Phu Yen, Mar 2010). It was interesting that although women reportedly could not go out on overnight fishing trips, they could still go to the upland fields and stay overnight. This may have been due to the perceived 'danger' of the reservoir, or the fact that it was easier to bring children with them to the high fields, allowing them to continue their household reproductive responsibilities. Men did also travel to the fields for long durations, although it was less frequent.

FIGURE 5-1: FISHING IS OFTEN CARRIED OUT IN MEN AND WOMEN PAIRS IN SHAOGUAN



It is not easy to understand the processes underlying women's disproportionate role in agricultural activities, and many respondents simply replied that it is our 'custom', or in several instances both male and female respondents would joke that men and boys are more 'lazy'. However, the unequal agricultural division of labour in some instances may be linked materially to changes in the system of production as a result of both ecological and institutional change. In Da Krong for example in the days of shifting cultivation, one respondent told us how men would go to the forest to cut the big trees and would sow the seeds in the new field. Women would then go in to cut the small trees and grass to prepare the fields, and both men and women would harvest together. Men did not help with collecting small trees and clearing grass as their work cutting the big trees was deemed a sufficient contribution to household labour. However, when the rules against shifting cultivation and forest clearing became stricter, then men's work burden had decreased, leaving women to do most of the work preparing the fields. Fields were now fixed and cutting big trees was

no longer allowed. The only work which remained therefore was cutting the small trees for firewood and preparing the fields. This had remained as women's work.

5.1.3 THE WAGE LABOUR ECONOMY: CHANGING GENDER DIVISIONS OF LABOUR

One of the most significant changes in all of the field sites has been the rise in opportunities for wage labour as capitalist development continues in lowland urban regions. Long distance migration invariably facilitated access to the labour market. It was only in Da Krong, where many respondents expressed a strong desire to remain in the village, although even here, migration was increasing. It was invariably men who are taking up new labour opportunities, particularly when this involves migration. There are still instances of females migrating, particularly in China, where women would often seek work in the service sector. In the other four sites female migration is less common. However, daughters from wealthier households in Phu Yen and both Indian sites with a good education do sometimes seek skilled work in private businesses or schools.

The rise in wage labour is invariably increasing the workload of women in all the sites as males take up employment often outside the community. This is not only increasing women's agricultural responsibilities, but it is changing how both men and women relate to aquatic resources. For example, in Phu Yen, many women were taking over shrimp farming entirely as more men from Phu Yen migrate to lowland provinces both on a temporary and permanent basis. We met one woman whose husband was working in southern Vietnam. She collects shrimp for three months of the year, and farms corn and cassava for the remainder. Given her double work responsibilities involving her traditional roles and tasks her husband would once have carried out, she has to pay some labourers to help preparing the fields. She felt that migration was an increasing trend, whereby one person moves away, and others follow, although she joked that they did not go for work, only for "site-seeing"¹⁴!

In Shaoguan, this transition underway in Vietnam is already complete. In the pre-reform era in Shaoguan, father and sons would often fish together from boats, a trend which was still common for the overnight fishing trips in Phu Yen¹⁵. However, with young men migrating to cities, wives have come to replace sons in assisting men on the boats, creating the present situation whereby fishing labour is shared. Given that agriculture amongst the Shaoguan fishers is far more limited, male out-migration has not had the same impact on women as it has in Vietnam.

¹⁴ It was not only labour migration which encouraged women to take up a greater role in aquatic activities. For example, another woman had taken over shrimp farming entirely after her husband moved to neighbouring Moc Chau district to help his parents who live there. It seemed not unusual for parents and sons to live quite far away.

¹⁵ Even in Phu Yen, we heard of women occasionally helping husbands on their boats due to labour shortages. This could be linked to out-migration of sons, and may well increase in Vietnam in later years.

5.1.4 HOUSEHOLD REPRODUCTION AND THE GENDER DIVISION OF LABOUR

While the tendency for males to find waged employment has certainly increased women's labour burden, the primary factor across all sites behind an unequal distribution of labour hours is women's responsibility for household reproductive activities. In China, Vietnam and India, women bear a far greater responsibility for tasks such as washing clothes, cleaning and cooking.

Even when men help with some reproductive work, women were almost always responsible for the most time consuming of these tasks such as collecting firewood. In Buxa, of course, this involves collecting drift wood from the river beds. This was difficult work, involving long spells of walking out on the vast open gravel flats on the edge of the river. The heat can become severe under the sun, and the loads are heavy. In Da Krong, Phu Yen and Nainital women often had to climb high into the surrounding forests on the valley sides beyond the cultivated area (see Figure 5-2). In Da Krong focus groups, we were informed that this was linked to women's agricultural responsibilities. After completing their work in the upland fields, they would collect firewood on the way home.

FIGURE 5-2: COLLECTING FIREWOOD NEAR BHIMTAL: WOMEN BEAR RESPONSIBILITY FOR THIS TIME CONSUMING REPRODUCTIVE TASK IN ALL OF THE FIELD SITES



The collection of water, an aquatic dependent activity that can be considered 'reproductive' was also more often done by women. In Buxa, Da Krong and Phu Yen in particular, this also involved long walks, particularly in the dry season when clean water sources close to the village dry up. This burden is particularly acute for the poorer households, who often can not afford to pipe water directly to their homes.

However, we did see promising examples of roles reversing. For example, within the Drukpa community of Buxa, it was reported that men assist with a range of reproductive tasks such as cooking. In Da Krong we were told by respondents in focus groups that given the many programs by the government and NGOs for women's welfare, men are beginning to realise that they should take up some of their labour burden to ensure the wellbeing of their wives and children. Now it was reportedly more common for men to do jobs such as cooking and collecting wood, and in Da Krong we met one man who was looking after the children as his wife was away working in the field.

5.1.5 DISTRIBUTION OF RESOURCES AND DECISION MAKING

In order to address equity issues, it is important to not only look at the distribution of *labour* hours between men and women, but how *resources* are actually distributed within the household, a process which is often linked to decision making power and the broader position of women. With regards to distribution of income, there was a perception in Phu Yen that women had some control over deciding how money is spent. However, the question of men (or women) 'cornering' income for personal use was not considered a serious issue by respondents given that disposable income was not high. After earning a sum of cash from the sale of cassava or shrimp, this will be used often immediately to purchase rice for family consumption or other day to day costs such as electricity or fuel. Women in one focus group noted how there is not enough cash in the household at any one time for husbands to retain any income for themselves. Nevertheless, it is clear from the discussion above, that the distribution of family labour is by no means equal.

In Da Krong, respondents informed us that their husbands normally look after the money, but they consult him if they need anything. This inevitably reduces their bargaining power to decide how cash is spent. However, the situation is improving when compared to previous generations. For example, they joked that if their husbands spend too much money on alcohol, they can normally take control over the money in the household. One respondent in a focus group even said that if a man earns 100000, they will give women 30000 to manage. This is due to a perception that men will waste the money smoking and drinking, so women should at least take care of some. Whether this was decided by the woman or the man in the households however, was not clear. Women's financial independence has also been facilitated by their access to cash through credit schemes, despite the shortfalls which were discussed in section 3, and through their participation in the labour market, for example, picking coffee.

In Shaoguan, money from fishing was reported during interviews and focus groups to be shared relatively equally, and money would be earned and spent together. Nevertheless, when it comes to accessing savings in the bank, women have more limited economic independence in many instances, as is often kept in the husband's name. They would normally have to therefore ask their husbands for cash for large expenses, for example, to pay school fees or buy gifts (general notes from focus groups, Shaoguan, April-July 2010). Furthermore, in the focus groups, when respondents were asked which livelihood activities they were able to control income for, the women only reported fishing, while men generally reported that they have control over remittances from family members, pensions and money from pensions and subsidies. The fishermen told us that the reason that men have more control over money is that expensive production assets were normally bought by husbands, and for this reason. It was reported that big decisions regarding spending are usually made together by husband and wife together, although there are some families where the big decisions are only made by men.

In India, the position of women to make decisions and retain an equal share of family labour was the most limited. According to Agarwal (1998), this stems from the fact few own immovable property, and can lay a claim to its income. Their lack of ownership renders them more dependent upon resource harvesting from common property, as this is often the only income they are able to *personally* control (Agarwal, 1998). This appeared to be true to some degree in Nainital, although it is forests and pastures rather than aquatic resources that women primarily depend on. Livestock raising for example, was considered an important source of personal income for women. This is perhaps more important in light of accusations in some households that men waste the household money gambling and drinking.

Women in Jayanti in Buxa fort also stated that they were entirely dependent on their husbands, and many did not have any personal source of income. Although women participate in fishing activities, this is primarily for subsistence purposes. Some women who have income from labouring do retain some income for themselves, although they also have to share this with their spouses. It did appear however, that women in the hills of Adma appeared to have a somewhat greater role in household economic affairs.

5.2 DIFFERENTIATION OF LIVELIHOOD ACTIVITIES (AGE)

5.2.1 DIVISION OF LABOUR BY AGE

Individuals from different *age* groups may also pursue different livelihood activities, encouraging unique 'generation specific' interactions with ecosystems. In rural majority world contexts, young people make an important contribution to household livelihood strategies in both productive and reproductive tasks. However, like the work of women, it is often undervalued (Panelli, Punch, & Robson, 2007). As with men and women, it is essential for this project to understand the dynamics of young people's livelihood activities. This is important firstly, so as to better understand how aquatic ecosystems are used; secondly to uncover how these livelihood activities contribute to (or undermine) the wellbeing of different age groups; and thirdly, to understand the impediments (or opportunities) within the household to strengthening particular livelihood activities.

Children played a role in aquatic resource harvesting to some degree in all the field sites with the exception of Nainital. However, as with gender, the nature of their contribution was different from that of adults. The first way in which they participated was helping their parents with larger scale fishing activities. For children up to the age of fourteen in Vietnam this was not common due to safety concerns. However, as boys in Phu Yen enter their later teenage years, they would often go on to help their fathers on long distance overnight fishing trips (general notes from FGs, Phu Yen, April 2010). In Shaoguan this had also been the case in the past, although today the assistance offered to parents by teenagers is decreasing. As they aspire to find work outside the community and parents no longer see the need for them to acquire relevant knowledge and skills, many have stopped accompanying their parents on fishing trips. Aside from this, the actual number of children in the communities is falling. Young couples migrating to urban areas often take their children with them, leaving only the oldest generation (grand parents) in the village. Most who remain in the village are the children of the younger families who have remained, but in many of these cases also, the father is working outside, while the wife stays with her in-laws. Nevertheless, for those who remain, we did meet a teenage girl who helps her parents put out the fishing nets and another who helped steer the boat. Some

other tasks children participate in are on the shore such as helping to empty the nets (general notes from FGs, Shaoguan, April – Aug 2010).

The second and most common aquatic dependent activity in which boys and girls participate is the independent harvesting of resources by children, usually on a small scale. In Da Krong and Buxa where most fishing activities are on a relatively small scale, boys and girls often caught fish alongside their parents, alone, or with their friends, using hand nets or baskets. In Buxa, boys in particular, would catch small crabs from under rocks, usually using a simple spear. It was a time consuming process, but provided an essential source of protein for the poorest households. They also collect *paha*, a particular type of frog, which people eat as medicine. Even in Phu Yen where adults pursue larger scale fishing activities, girls would collect snails from smaller streams, while both boys and girls would catch fish from the reservoir using hand nets or lines. Similarly in the farming village next to Zhoutian in Shaoguan, we saw young boys catching fish from one of the small irrigation canals using small nets.

FIGURE 5-3: CHILDREN COLLECTING FODDER NEAR CHUNABATI, BUXA



In addition to aquatic dependent activities, it is important not to understate young people's contribution to activities such as looking after livestock and collecting fodder (see Figure 5-3), and perhaps most importantly, their role in reproductive activities. Almost all the boys and girls across the five sites helped their parents with housework such as washing, cooking, sweeping, cleaning, shopping and looking after their younger siblings. It was felt that as with women, girls do comparatively more work than boys, with girls in Shaoguan for example, joking about the 'laziness' of their brothers. In focus groups here, while boys and girls both

listed jobs such as cleaning, sweeping, and washing dishes as 'important' livelihood activities they participate in, only girls appear to have listed food preparation activities. In Da Krong, Buxa, and Nainital, girls in particular would regularly assist their parents with some of the most time consuming reproductive activities such as collecting firewood and water, preparing them for their adult lives. Nevertheless, boys still contributed. For example In Nainital, boys in a focus group from ages 9 – 13, recalled how they helped with household activities such as bringing in water, as well as activities such as selling milk and helping in the fields. However, girls were responsible for the most time consuming tasks such as collecting wood, a job carried out with their parents.

While young people and women play an important role in reproductive activities, a very interesting phenomena in the Shaoguan site in recent years is the tendency for the older generation to play an increasingly important role, particularly with regards to child rearing. When adults find work in the city, it is common for them to leave their children in the village in the care of their parents. In Zhoutian, the leader of the fishing community told us that his children all have job in the city and two grandchildren were in the village with him (Focus group of men, Zhoutian, July, 2010).

5.2.2 AGE, EDUCATION AND CLASS

There appeared to be a pattern in Shaoguan and Phu Yen whereby young people's role in day to day household livelihood activities would decrease as they entered their teenage years, and education began to be considered more important. In Phu Yen, education was really valued by parents, and young people expressed satisfaction that their parents allow them to reduce their work contribution as they get older and advance with their schooling. Similarly, in Shaoguan, young people are excused from work during term time, although most households can not afford to send children to school beyond the age of 14-15. Beyond the nine year compulsory-education, the households have to afford all the fees for education as well as added expenses such as transportation. However, now families really do prioritise their children's education as it is one of the only ways they can get a skilled job outside with higher economic rewards. This is particularly acute amongst the Shaoguan fishers, whereby they perceive there is no future in fishing. As one fisher attested, *"I hope my children can find a good job in the city. I do not hope them to be fishers again any more. Fishing is toilsome and there are no fish for fishing now"* (HH interview, Kengkou, November, 2009).

In Nainital and Buxa, there was also evidence that parents were prioritising their children's education, although it appeared to be gender biased. Many boys in Uttarakhand hope to join the army – a prestigious occupation – as well as seeking opportunities for skilled work in urban centers such as Delhi. However, parents did not appear to prioritise girl's education to the same degree. Nevertheless, things are changing, as is evident when one looks at shifts in the dowry system. While in the past families were expected to give large sums of gold or money to in-laws during their daughters' marriage, now there is a perception that it is a better investment to ensure daughters are educated in order for them to secure a suitable partner.

However, despite these developments, there is clearly a class dynamic to young people's contribution to family labour. It was clear that boys and girls from poorer households had a far greater workload than their richer counterparts, with less time to devote to studies. The shortage of productive resources drives households to maximise family labour, including that of their children, in order to subsist. For example, in

the H'mong settlements above Tuong Ha commune in Phu Yen, many children did not attend school at all, and were obliged to remain with their parents in herders huts looking after the livestock. In Da Krong as well, which is arguably the poorest of the five sites, a large number of children did not attend school. Many children spent long hours working alongside their parents in fields, fishing or collecting forest produce, leaving them with little time to go to school. In Nainital district, many of the children from scheduled caste households in Karkotak village above Bhimtal did not attend school at all, and were responsible for a large share of family labour. In some of these contexts in India, parents work as labourers during the day, leaving young people in charge of many of the agricultural activities as well as caring for their siblings who are too young to work.

While the reasons for non-attendance of school amongst the poorer strata of the population can be explained by such economic considerations, there are also more complex social factors. For example, in Da Krong where lack of school attendance was the most acute, we were informed that when parents themselves have not been to school they do not see the benefits in sending their children to school. Access was also a considerable constraint. Given that villages were often spread out, and separated by the river, it was not always practical to get to school, particularly at a senior level when they had to reach Krong Klang, the district headquarters, paying for a boat and transport on the way. Unlike in Phu Yen, many households own no motorbike or even bicycle.

Some households also lacked awareness of their entitlements or bureaucratic procedures, which impeded access to education, a factor which is particularly acute in communities with a history of marginalisation and limited political power. In Da Krong, one respondent stated that he did not send his children to school not only because he required them to work in the fields, but because he had lost the birth papers for his children which are necessary for enrolment. When we asked him why he did not make new papers, he said that it took a long time, and he would have to take a long bus journey to do this. It would cost him 50-100,000 VND (\$2.5-\$5) (hh interview in Co Pua, May 2010).

There was of course, also a class aspect to the quality of education that young people could acquire. In Buxa for example, wealthier households sent their children to private schools, often far from the village in regions such as Kalimpong. Poorer households depended on the village schools which in some contexts such as Adma, were understaffed. In Shaoguan, although all children would go to the same state run schools as their wealthier farming counterparts, and complete the 9 years compulsory education, there was a perception that the quality of the education they receive was low. Many of the children from fishing families could not pass through the national examination necessary to go on to higher education, which was why so few went on to University (general notes from hh interviews and FGs, Shaoguan, April – Aug 2010). The day to day time schedule of fisher households made it not conducive for parents to help young people with their studies. One woman told us that: *"We do not have enough time to take care our children. At night, my husband I have to go fishing and leave the children at home alone or with their grandparents. In the morning, the children have already gone to school when we come back from fishing"* (Focus group with women, Shaoguan April, 2010).

Even with access to education, there was an underlying perception that it would not necessarily offer households a stronger livelihood. For example, in a household interview in Da Krong, a respondent informed us that although, education would enhance their children's knowledge of agricultural techniques there were few job opportunities, questioning the effectiveness of an investment in schooling. Furthermore, although

there was much less of a tradition of migrating outside for skilled work, while in the community itself, there were few opportunities apart from the very limited positions available in the commune and village governing committees. Similar sentiments regarding lack of opportunities also discouraged fishers in Shaoguan from pursuing higher education for their children. One of the respondents said *"It is no use to study more. You see even the undergraduates are also difficult to find a job in the city."* (HH interview, Kengkou, November, 2009)

5.2.3 AGE, DISTRIBUTION OF INCOME AND DECISION MAKING

Despite the important contribution young people make to family labour in all the field sites, few have access to a personal source of income. This partly stems from the fact that much of their work involves helping their parents with pre-existing livelihood activities. In Da Krong for example, the children we spoke to said that they would like money to buy new clothes, but have no source of income. If they need to make an important purchase such as a school book, they have to ask their parents. These sentiments were echoed across all five sites. As in most societies, even when young people helped parents with market oriented livelihood activities such as producing cassava for sale, they would rarely receive any cash 'reward'.

As small scale fishing activities are often done independently or with friends, this does have the potential to offer children some personal income. However, even then, children usually appeared to feel obliged to give the entire catch to their parents. In Ka Lu village of Da Krong for example, some girls reported that larger fish are given to their mothers to sell, while the smaller fish are cooked with the family meal. A boy we met in Buxa fort cluster stated that he catches crabs from the small stream, but only when his parents need something to supplement their diet when they are short of vegetables, as was noted above.

Nevertheless, Punch (2002, 2007) notes how children in majority world contexts can exercise some 'agency', through for example, cornering some of the income for themselves. For example, in a study in rural Bolivia, some children were able to claim limited control over the harvest of a particular piece of their parents land or asking parents for their own animal in return for looking after the household livestock or crops (Punch, 2002, 2007). There was also evidence in the study sites of children retaining something for themselves, although this was rarely of significant value. Children in Da Krong and Buxa, the two most heavily forested sites, would regularly go deep into the jungle to forage for wild fruits. Although this was considered a livelihood activity by parents, children in both sites reportedly enjoyed this activity as they could eat some of the fruit at the same time or share it with their friends. Children rarely have a source of cash, although a group of respondents in Chen Do in Da Krong reported that when they pan for gold in the river, their parents let them retain some of the money themselves as a reward and incentive. For example, we were told that if they collect 500,000 VND (\$25) worth of gold dust, they are given perhaps 100,000 VND (\$5) by their parents to buy clothing or new shoes. This is possibly the only aquatic dependent activity which appeared to offer a direct source of income to children, although there may have been other instances which remained unreported.

Other than these above examples, the only other instance of children earning their own money was in Buxa, where some children reported keeping a little of the change after buying groceries for parents in the local market. An almost identical process was reported in focus groups in all the villages of Shaoguan. While ranking livelihood activities into those they most and least enjoy, one child explained that *"the best thing I*

like to do for my parents is 'purchase' [referring to visits to shop to buy household goods], because I can keep the change after. I can use the money to buy what I like". All the other children laughed and agreed to him. This could be considered an opportunistic, informal payment for their errand. In one focus group in Lishi, Shaoguan, payment for work was reportedly more formalised, with one respondent stating that their parents gave them a little money after helping with housework.

In terms of decision making power, there were striking similarities across all sites. On the whole, children had limited decision making power, particularly for the jobs considered 'most important' by parents, such as boiling water, preparing food and washing clothes, which unfortunately were the jobs considered 'least enjoyable' by children in ranking exercises. In these contexts, the children have little power to negotiate. There were however, power relations between siblings, and some children in Da Krong and Phu Yen informed us that they could ask their younger brothers or sisters often to help with household chores. One small boy in Phu Yen even said that if he does not do the work his brother tells him to do, the brother 'hits him'!

Nevertheless, our researchers often detected a strong sense of willingness from children to contribute to family chores. Indeed, jobs such as small scale fishing were not always ranked as 'important' by parents, so parents did not ask their children to go do this. However, children would go out anyway when they have free time. One boy in Tuong Ha, Phu Yen, even claimed he enjoyed cooking rice, even though most other children did not enjoy it. This because he liked to see his parents happy when dinner is ready when they return from a long day's labour in the upland fields. A similar response arose in a focus group in Zhoutian, Shaoguan. With regards to activities children carry out alone or with friends also, many expressed satisfaction at being able to contribute to family earnings and being able to please their parents. This echoes Dyson's (2008) research which examines children in India's Uttarakhand Himalayas who are responsible for the collection of lichen from high altitude forests. By passing on income to their parents, young men could project an image of responsibility and success, while the income they kept for themselves could be used to purchase consumer goods.

It may also be that a sense of obligation to contribute to family labour is also based on the premise that they are both repaying their parents for their younger years when they were less economically active, while expecting repayment 'in kind' through provision of land and resources by parents as they get older. In Phu Yen for example, the eldest son normally stays with the father after marriage and uses his land, while the next sons settle in their own house, often inheriting some of the father's land. This inevitably however, is heavily gender biased. At a time when education is so highly valued, this may also be a significant incentive to work hard at home. Chant and Jones' (2005) study from Ghana and The Gambia for example, suggested that young people feel a compulsion to contribute to family income if they are to make a legitimate claim to an education.

6. NON-USE VALUES, AQUATIC ECOSYSTEMS AND LIVELIHOODS

6.1 CULTURAL VALUES ATTACHED TO ECOSYSTEMS

It is important to stress that a sustainable livelihood should not only offer economic security and resilience, but overall wellbeing, including access to *non-material*, or 'non-use' values (Scoones, 2009). This is important for planning the management of aquatic resources for two reasons. Firstly, aquatic *ecosystems* themselves can have 'non-use' values which are important to the lives of users. Secondly, livelihood *activities* themselves can contain non-material benefits

Beginning with the first point, it was clear from the research that river and lake ecosystems are endowed with cultural values to residents regardless of their role as an economic resource. In the discussion of ecosystem services, this refers to the 'cultural' services rather than the 'provisioning', 'supporting' or 'regulating' services (Millennium Ecosystem Assessment, 2005).

The values attached to ecosystems however, varied with age and gender. For example, in Phu Yen, the older generation still had fresh memories of the fertile rice lands which lie under the water. The Muong and Thai are traditionally wet rice cultivators, and the submersion of many of their fields was a significant economic and cultural loss for the communities along the valley. It can be frustrating as the water levels are unpredictable and they can only harvest one season of rice, having to combine this with fishing in the high water season to survive. Many find this life difficult and would prefer just to be full time rice farmers. These sentiments however, were not so strong amongst the younger generation. Many expressed their appreciation of the reservoir's natural beauty, while it was also a site of leisure, whereby they could play and swim in the water.

In Shaoguan also, children appreciated the river's natural beauty, even though they did not consider it would provide them any future in terms of livelihoods. They enjoyed travelling out on their parents boats so they could see views and birds. The Beijiang river was also a site for cultural events such as the Dragon Boat Festival. In Buxa, children also used the rivers for leisure activities such as swimming, while some aquatic sites had spiritual significance, such as a *pokhari* (pond) above Jayanti which is sacred to both Buddhists and Hindus. Although the wetland was home to large fish, harvesting them was strictly forbidden. Similarly, Nainital is the site of an important lake side temple dedicated to Naina Devi. The presence of this temple had actually discouraged lakeside development and settlement prior to the colonial era. Today locals as well as tourists use the lakeside in all three wetlands as a site of recreation, where young people play and enjoy its natural beauty, and elders play cards and socialise.

6.2 LIVELIHOOD ACTIVITIES AND NON-USE VALUES

As was noted above, livelihood activities themselves can contain non-material elements which are significant for individuals. This is prominent particularly with young people in their aquatic resource harvesting activities. Although young people's responsibility to labour is like that of women, embedded in unequal structural power relations, the discussion above has shown that they are not 'passive' actors, and can exercise some agency. However, this does not only entail control over income, but includes instances where

they negotiate their work so as to attach it with particular meanings and values (Dyson, 2008; Klocker, 2007; Punch, 2002, 2007; Robson, Bell, & Klocker, 2007).

Fishing provides an interesting case study as the activity has a significant 'leisure' component. Boys in Phu Yen noted that when they have to help with chores such as washing and cooking, they must stay in one place, it is boring, and they get 'scolded' from their parents if their contribution is not satisfactory. With fishing however, they can get away from the village and play at the same time (see also Punch, 2000). Similar jobs that also offer this kind of freedom include washing and herding the buffaloes. Children in Da Krong echoed these sentiments, noting that fishing and shrimp collecting can be combined with swimming in the river. In this way, children could enjoy themselves, while also 'working'. In many ways it was the one means through which they could negotiate their labour contribution. On the way back from Chen Do village once, we were joined by a small group of girls on a fishing trip, carrying basket nets and woven reed containers for fish. It was a short walk of about 1km to the river from the village, through light woodland and maize fields. When we reached the river, the girls immediately jumped in and swam, while the nets and equipment were left abandoned by the side. For similar reasons, children enjoyed foraging for wild fruit in the jungle. On one occasion while visiting upland fields, we observed a large group of children coming out of the lush forest, stopping to play in the stream on the way. They bathed and ate some of the recently collected mangoes before returning to the village where they would inevitably face a range of household chores. The fact that fishing and fruit collecting were a form of resource harvesting that could be carried out alone or with peers meant they had a comparative freedom not present during activities carried out with parents such as collecting firewood, a job that many girls disliked. They had to carry heavy loads in uncomfortable wicker baskets and were constantly monitored by their superiors.

FIGURE 6-1: GIRLS FISHING IN THE DA KRONG RIVER IN QUANG TRI: FISHING IS A LEISURE ACTIVITY AS WELL AS BEING IMPORTANT FOR HOUSEHOLD LIVELIHOODS



Interestingly, many children valued fishing primarily for its leisure component rather than as a contribution to family income. During focus groups In Da Krong and Phu Yen, young people were asked to rank the work activities they consider most and least 'important' and those they feel are most and least 'enjoyable'. Key agricultural tasks such as helping with rice plantation, and reproductive tasks such as collecting wood and water, cooking and looking after siblings, were considered as 'most important'. These tasks were felt to be far more important to the overall livelihood of the household than fishing, which was merely a supplementary activity. When doing a livelihood activity ranking exercise near Buxa fort, we were surprised that fishing had not been included. However, it later transpired that this was because it was considered as much a *recreational* as a *labour* activity for many children. The low technology character of fishing when carried out by young people in all the sites is likely to contribute to these sentiments. Catches using lines or spears (in the case of Buxa) for example, are considerably smaller than what can be caught from a boat using a net.

There is also evidence that fishing by young people is not considered as important by adults. For example, Chen Do community in Da Krong has the best agricultural land of the three selected villages, and thus is the least dependent upon aquatic resources. During initial interviews here we were informed interestingly that *nobody* fishes. However, it was only in repeated visits that we regularly saw children going down to the riverside with their nets. The parents had not considered this as a livelihood activity. This was also apparent in one instance where we witnessed children going fishing against their parents' wishes. We met some children out on the Jayanti river at night to collect fish from the channel recently blocked by the elders for this purpose. When we asked if their parents minded, they laughed saying "*lukera gayo*" (we went secretly). The children in Jayanti also enjoyed washing clothes in the river, as this gave them the opportunity to escape from their parents gaze and play. Children in Jayanti said that they can bathe at the same time, an activity which their parents normally forbid as it is considered too dangerous.

This capacity for young people to combine work with recreation has been highlighted also by Punch (2003) in a study from Bolivia. Katz (1991) identified similar processes in a study from the Sudan. Certain livelihood related tasks such as the trapping of animals were equally important for their entertainment aspect. The fact that fishing and other activities in the river were valued by children as a form of play shows the crucial importance of including young people's voices in research such as this. It also points to fundamental problems with the labels which define some activities as 'leisure' and others as 'work' (Punch, 2003). It is important to note however, that the degree to which fishing and related activities are considered to have a leisure component in the five sites, are likely to depend on the class of the household in question. For example, for poorer households in Da Krong and Buxa for whom fishing is an essential 'coping' strategy, children's contribution is likely to be far more important, although more data is needed on this class component.

It is worth noting that 'enjoyment' from fishing is not only restricted to the children. Overnight fishing trips on the Song Da reservoir in Phu Yen are arduous and tiring. Nevertheless, while accompanying a young man in his twenties on one of these overnight excursions, we witnessed how fishers find time to enjoy themselves while out on the water. At nightfall our boat was roped up with another belonging to a friend of the young fisher, alongside a stretch of remote forested slope. A fire had been lit on the stern, and we barbequed some of the recently caught fish. Before long, a bottle of local wine came out, and a small party started. The atmosphere was relaxed, and the young men joked and chatted until late. As with the children, the atmosphere may not have been as relaxed had the father also been there, as was normally the case.

To the fishers of Shaoguan, there were mixed sentiments about whether or not their key livelihood activity was enjoyable. Some men in Lishi and Zhoutian complained that as fishers they had an exhausting life. They were always tired and had no time to think about 'happiness'. Some men felt that fishing was not only boring and difficult, but was harmful to their health. Their clothes would usually get wet when fishing, even in the cold winter, and they could change only after returning home. According to respondents, around 80% of the fishermen in the area suffer from rheumatism. Many men in Zhoutian hoped to leave fishing and live ashore. These views were shared by some women, and in the case of Kengkou and Lishi, a group of respondents told us bluntly that there were no benefits from fishing, apart from 'fish'.

These views were not however widespread, and an equal number of respondents in Shaoguan felt that fishing was a valuable 'way of life', that contributed overall happiness and wellbeing. For example, some men said that fishing had advantages when compared to the alienation encountered working in a factory. Fishing activity was still their own business, and they could fish as and when they liked and rest when they needed to. Employees in a company on the other hand, had to obey the orders from their boss. The work of fishing also was not considered as difficult as many jobs in factories or construction sites and offered them freedom. Fishing was also considered a suitable way to maintain a good relationship with family and friends because it offered much more free time to socialise with other community members. This contrasted starkly with factory work, whereby we met one man who had not even been able to visit his ill son in the factory workers' quarters to provide him medicine. The values attached to fishing by some were particularly evident when we spoke to a woman whose husband had a good government job in the city. She joked that when he comes back home during the holidays he goes out fishing with his father for fun. However, again, there was probably a class element to these sentiments. Poorer households, for whom fishing was the primary mechanism of survival, seemed less appreciative of it as 'a way of life', and were faster to point out the struggles this livelihood strategy demands.

7. ENVIRONMENTAL AND PRACTICAL KNOWLEDGE, GENDER AND AGE

A final question to address is that of environmental *knowledge* of aquatic ecosystems and resources and the skills to sustainably utilise these resources. Given the multiple ways in which men, women, boys and girls from different socio-economic groups utilise aquatic ecosystems, it is clear that a unique set of environmental knowledges exist. It is crucial that these are valued and utilised when planning the management of aquatic resources. A number of studies for example, have demonstrated how women have unique environmental understandings not possessed by men given their additional dependence upon ecosystems such as forests (Agarwal, 1992, 1998; Jewitt, 2000). Katz (1992) also demonstrates how children's interactions with the environment through their every day contribution to livelihood activities can endow them with unique environmental knowledges which can be mobilized in later life. Agro-ecological knowledge is acquired practically through the combined process of work and play and is passed on from older to younger children.

This is reflected in some ways across the five sites. It appeared that ecological knowledge was acquired as children, particularly through working alongside their parents in the forests, rivers or fields of communities.

Children's work was not only to increase production and ensure families achieve food security. It was an essential part of their socialisation process, endowing them with the ecological knowledge and practical skills essential for the reproduction of family labour power. During focus groups in Buxa for example, young boys and girls displayed a rich knowledge of the forest ecosystem where they lived; knowledge which had been acquired through years of work with their parents collecting fodder, tending livestock and fishing.

However, as boys and girls get older, and the livelihood activities they participate in become more gender specific, one can also observe a divergence in the body of knowledge they possess. During a series of mapping exercises with teenagers in Phu Yen, the girls appeared to have a much greater situational awareness of the uplands, and charted in detail the different types of forest, the location of rivers and irrigation canals. This perhaps reflects the greater amount of labour they do with their mothers, who play a more significant role in agriculture. Boys on the other hand produced a less detailed map, although there was more detail of aquatic species and fishing grounds. Although women also are involved in fishing, as boys get older they are more likely to accompany their fathers on long distance fishing trips¹⁶.

Even when children do not help their parents, but fish alone, they learn techniques from observing their elders. Young boys in Da Krong noted that they learned to fish from copying their older brothers and their fathers. This shows that knowledge not only passes from parents to children, but between siblings. We observed a girl from the H'mong community in the upland pastures of Tuong Ha, Phu Yen, supervising her two younger siblings while watching the livestock, and giving instructions. In Shaoguan, children had also acquired ecological knowledge of the river, although less from 'work' and more from living by the river, observing the changes over the years, and listening to adult discussions. Children in Kengkou village were aware that erosion and waste water from paper mills and mines had polluted waters and could kill fish. School children in Nainital also expressed a good understanding of the causes of pollution which have changed the ecosystem since they were young.

Certain life transitions can however, affect the ecological acquisition process. For example, the survey in Shaoguan revealed that many of the women were from agricultural backgrounds. This was from a time when fishing was considered a more secure livelihood than farming, and it was common for farming women to marry into fisher families. It was often a difficult transition, as one woman explained, "I even dared not stay on the boat at the beginning of the years when I married here." While men in focus groups in all the villages generally reported that their fishing knowledge was acquired from parents or grandparents, according to women in Kengkou and Zhoutian villages, knowledge was acquired from husbands. As a result, their knowledge of the river and fishing techniques was more limited often than their husbands who had resided in the community and fished for their entire lives. In one focus group for example, we found that men appeared to know more about the changes in the river environment, and could map for example all the pollution emission points along the river channel (Focus group, Kengkou, April, 2010). In Zhoutian village, during focus groups the women divided fish into two categories *xiaoyuzai* (small fishes) and *rouyuzai* (big fishes), while the men were able to name them by species including *huang jiaoyu*, (Yellow cartfish), *jiyu*, (

¹⁶ In a similar vein, the map from the focus group with men was on a much greater scale than the women's map, and included distant mountains. This may be because they travel for much longer distances on their boats than women, who more often fish and conduct agricultural work closer to the village.

common carp), *liyu* (silver carp). However, in Lishi and Kengkou both men and women were aware of the names of different species.

It is not only marriage and relocation which can upset the acquisition of ecological knowledge. There is evidence, that both ecological and economic transformations are also playing a significant role amongst the younger generations. This is evident particularly in Shaoguan, whereby ecological knowledge is declining as fishing becomes less profitable with environmental decline, and young people seek wage work outside the community. There are clear differences between different age groups. Most of the teenagers knew where their parents' fishing tools were placed and where the good fishing sites are, while respondents in younger age groups knew little about that. A number of these respondents reported that they learned to fish working alongside their parents on their boats while they were young (general notes from FGs, Shaoguan, April-Aug 2010). However, parents themselves stated that nowadays they saw little point in taking their children fishing, and preferred to focus on allowing them to succeed at high school or college, so they could find better paid skilled or semi-skilled outside employment. Given that both fishers and their children expressed pessimistic prospects for the future of fishing, it is likely that environmental and fishing related knowledge will decline extensively over coming years.

Some children in our focus groups did know the names of most of the fish. However, what was interesting was that their geographical knowledge of the surroundings did not seem as rich as the young people in Vietnam we met during focus groups. The map of the community was somewhat limited. This probably reflects the fact that parents rely less on children here for contribution to livelihood activities when compared to poorer households in central Vietnam. Furthermore, many of the fishers children lived with their parents in the small town, not in the village itself. Interesting additions to the maps included a JCB digger and cars – which are now part of the landscape for them! It seemed that young people's ecological knowledge is declining though. During another focus group, while some of the children whose parents still went fishing, knew the names of the fish species, there were some whose parents no longer go fishing due to the poor returns. They did not know the names. (*General notes from interviews/discussions in the 3 villages, 27/7-4/8*)

8. LIVELIHOOD ACTION PLANS

8.1 INTEGRATED ACTION PLANNING

From the report above, it is evident that access to livelihood resources, including those derived from aquatic ecosystems, and overall wellbeing are mediated by structural power relations of class, gender and age. However, it is also evident that multiple livelihood strategies and the power relations which shape them are also grounded in particular ecosystems, both aquatic and non-aquatic. Livelihood activities impact ecosystems while ecosystem change feeds back to shape livelihood options. At the same time, policies and institutions which have the capacity to regulate natural resources while enhancing as well as limiting access to livelihood resources, play a critical role in mediating this relationship between communities and their environment.

In this context, it is clear that any action planning which seeks to strengthen livelihoods while protecting biodiversity, must take an integrated approach, combining livelihoods, institutional and biodiversity issues. Drawing together data from this report as well as the HighArcs Policies & Institutions and Biodiversity reports,

a series of integrated action plans have been developed for each site to meet this strategic goal of the HighArcs project.

Below is a summary of some of the initial action plans being developed at the time of writing, although only participatory action planning which will proceed in the next phase of this project can identify final interventions to reconcile sustainable livelihoods with biodiversity protection.

8.2 INTEGRATED ACTION PLAN FOR PHU YEN

A summary of the Action Plan for Phu Yen is as follows:

- To reduce soil erosion and ground water retention, arrange training on enhanced forestry practices. This could also involve building and maintaining water tanks to store rain water in the rainy season. Suitable plants could also be planted on the high slopes, and training in terraced agriculture could be offered.
- To enhance agricultural livelihoods, communes and schools can be encouraged to trap and catch rats which damage crops. Each household should have at least one cat.
- To enhance non-aquatic or agrarian livelihoods and reduce ecological pressure, communes should organize annual training courses on planting, animal husbandry and aquaculture to improve knowledge for local people. Establish farmer groups to share experiences of different livestock breeds and plants in the village. Offer annual vaccines for cattle and livestock.
- To enhance livelihoods, the government should be lobbied to ease access to low interest loans.
- To improve aquatic biodiversity in the reservoir training should be offered to communities on sustainable fishing techniques. Fishing households could also into a group or fishing union and enforce fishing regulations. This also requires the good cooperation between communes, villages leader and police and army.
- To enhance non-aquatic or agrarian livelihoods and reduce ecological pressure, training should be offered addition occupations such as make brooms and handicraft in order to increase household's income.

8.3 INTEGRATED ACTION PLAN FOR DA KRONG

A summary of the Action Plan for Da Krong is as follows:

- To enhance fish stocks, introduce efforts to improve local people's knowledge about government environmental regulations for rivers through training, poster campaigns and a contest for school children. Campaigns can also be launched on the Khe Sanh plateau on the appropriate use of pesticides and disposal of household waste.

- To reduce soil erosion and raised water turbidity, introduce efforts to improve local people's knowledge about government environmental regulations for forests through training, poster campaigns and a contest for school children.
- To provide a more appropriate source of drinking water, set up user groups to construct water tanks using locally available materials.
- To facilitate households in accessing information through television and radio, to facilitate young people's study, and to make better use of the river resources, the use of mini-hydro power devices can be promoted. This can perhaps be achieved through creating user groups to invest in devices and maintain them.
- To enhance livelihoods and reduce soil erosion (through agriculture) and pressure on fish stocks, arrange training on the production of medicinal plants.
- To enhance livelihoods and reduce soil erosion (through agriculture) and pressure on fish stocks, support households in improving livestock production through training programs.
- To enhance livelihoods and reduce soil erosion (through agriculture) and pressure on fish stocks, support households in production of handicrafts through training programs. These can be sold to tourists who pass through the region, particularly around Ka Lu village.
- Provide training and set up a cooperative for production of brooms, and industry which is already developed in some of the other villages. This will in the process, also enhance the organisational capacity of the village.
- To protect livelihoods and improve aquatic biodiversity by cutting down pollution, lobby the local government to introduce stricter regulations for coffee factories and hydro companies to reduce pollution levels.

8.4 INTEGRATED ACTION PLAN FOR SHAOGUAN

A summary of the Action Plan for Shaoguan is as follows:

Short term action plan - mostly involves enhancing/supporting existing government initiatives:

- To maintain ecosystem biodiversity and enhance fishing livelihoods, the recent policy of the government to set aside Shaoguan as an ecological buffer zone with limits on industrial activity should be actively encouraged.
- Increase support for existing forestry initiatives in the region with the anticipation of increasing forest cover and protect existing reserves. This by implication will reduce soil run-off and maintain

the biodiversity of the watershed. However, eucalyptus mono-cultures remains a problem and should not be encouraged.

- Lobby government to enhance the effectiveness of the “aquatic protective zones” set up by the local government to enhance fish stocks and improve livelihoods. These initiatives are under resourced at present and illegal sand mining continues in these zones.
- Lobby government to better implement controls on local industry.
- Collaborate with Shaoguan Bureau of Agriculture to expand the provision of biogas tanks and support users of existing tanks. This will enhance livelihoods for farmers who keep livestock, reducing the labour burden for those who collect wood from forests (also reducing degradation of woodland) and reducing the expenses for those who rely on non bio-gas for cooking. It will most significantly, reduce the run off of livestock waste into the river systems and improve aquatic biodiversity.
- Increase the number of fish fry which are released from the stations in Shaoguan city.
- Continue to support the local government in prohibiting cage culture in reservoirs to protect aquatic biodiversity of the watershed.
- Support government efforts to better control unregulated sand mining to improve aquatic biodiversity.
- Lobby government to continue to offer welfare to poorest fishers,
- Lobby government to continue the provision of diesel subsidies to fishers, including those who have been deprived of subsidies at present.
- Continue to support compulsory nine year education for children to enhance livelihood opportunities outside fishing.
- Provide enhanced vocational training and more low wage housing to fishers

Medium term action plan (next 2-3 years):

- Lobby local government to increase the allocation of financial resources for the protection and conservation of aquatic resources.
- Begin efforts to re-introduce and expand the presence of aquatic plants which play a crucial supporting and regulating role in the aquatic ecosystem. This can increase fish stocks and enhance livelihoods.
- Implement a no-fishing season from 2011 onwards to improve the natural regeneration of fish stocks, enhancing livelihoods and protecting aquatic biodiversity in the long run. Support government plan to offer subsidies to fishers during this period if the plan goes ahead.
- Lobby local government to reduce the pollution from Iron mines in the Kengkou area, to better protect aquatic biodiversity.

- Prohibit establishment of new livestock farms within 1 km along Beijiang River. Alongside the provision of biogas tanks, this will reduce run-off of animal waste into the river. Expand the production of 'green food' or 'organic food' which uses less fertiliser and fetches a higher price in the market. More effective extension and
- Education process like training class, poster, and handbook and TV programs can be used to promote this.
- To protect natural forest and native tree species, the development of eucalyptus plantations in Shaoguan should be controlled. More dialogue will be taken place in the next two year with Shaoguan Forestry Bureau and more reasonable development strategy of eucalyptus will be formed in the next two years.
- Increase the number of public educational activities to raise awareness of issues of aquatic biodiversity. This may include public media including newspapers and local television programs, education materials such as CD, poster, booklets, training activities including short introduction course and technical training.
- Improve mechanism to notify fishers of water release times from hydro stations. The sudden drop of water level and strong current caused by gate opening operation for irrigation or flood control could cause severe lost of fishing tools, and sometimes even threatened the lives of fishers working in their small boats.
- Develop fishing as a recreational activity. This can offer new livelihood opportunities for fishers.
- Give rewards to volunteers who report illegal fishing.
- To strengthen government management organization for fishing communities. This will enhance the fisher's capacity to raise their voice as a stakeholder in the management of the aquatic ecosystem.

8.5 INTEGRATED ACTION PLAN FOR BUXA

A summary of the Action Plan for Shaoguan is as follows:

- To enhance agricultural livelihoods on the limited plots, and reduce pressure on the forest and aquatic ecosystems, the use of non-conventional crops will be encouraged and training will be offered with appropriate follow up. This will involve creation of linkages between communities and the government agriculture department, the Panhayat raj institutions and the forest department.
- We want to strengthen local institutions such as the village based self-help groups. This will both increase local people's organisational capacity to stand up for their rights, while also offering income generation activities. Groups can also be used to manage natural resources in some contexts. It is hoped that this can be combined with other interventions such as offering agricultural training or construction of water tank.

- Work with the local Panchayat to improve the operation of the National Rural Employment Guarantee Scheme. We could work with the Panchayat to implement some of the proposed HighArcs interventions through this scheme – e.g. construction of water tanks.
- Explore opportunities for fish culture. This can involve offering training to local people while also looking at feasibility of pond construction or even dam construction.
- Bee keeping has good potential in the reserve forest. Although few are doing this we need to create awareness about the possibilities. From this we can develop micro-enterprises which can be run by the VDC like a cooperative.
- Develop kitchen gardens which can be run by student groups. By offering training at school this will improve livelihoods in the future. Garden committee will be organised by teachers and senior students. 50% of vegetables will be used by the school and 50% will be distributed amongst the community.
- For Jayanti particularly. Most of the villagers are working just as labourers in the collection of sand and stone. We want to develop a system where they will have the control over the resources so they will all get benefits while cutting out the middleman.
- There are some medicinal plants which are being sold in an informal and unorganised way. We can organise a small herbal committee that will operate in a systematic way to share the benefits.

8.6 INTEGRATED ACTION PLAN FOR NAINITAL LAKE REGION

A summary of the Action Plan for Shaoguan is as follows:

- To conserve aquatic biodiversity, projects for conservation of the germplasm of endemic fish species will be undertaken by the Department of Fisheries, Govt. Of Uttarakhand. The directorate of coldwater fisheries, who are already working on similar projects, can be encouraged to take up more such projects. Projects may also include alteration in the fish gene sequence for better growth and survival.
- More regular and stricter monitoring of the lake area to look after the environment is necessary to improve the aquatic biodiversity and retain the tourism appeal that provides livelihood opportunities for local communities. Local people can be employed to look after the lake and prevent the disposal of garbage in the water.
- To conserve aquatic biodiversity and offer new livelihood opportunities, a fish release programme could be started, involving local people as workers.
- To offer more livelihood activities in the Nainital and Bhimtal region, efforts should be made to promote tourism, and further spread its benefits beyond Nainital town. This could involve

mechanisms such as better developing the aquarium in the middle of Bhimtal lake to encourage more visitors.

- To strengthen livelihoods of poorest groups, agriculture should be enhanced to promote the production of marketable crops. Vegetables mainly come from Haldwani and the local markets are expensive. So if vegetables are produced locally and marketed then that problem could be solved. Training schemes could be used to achieve this goal.

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ANNEX 1: HOUSEHOLD INTERVIEW FORM

STATISTICAL DATA

INTRODUCTION TO BE GIVEN BY INTERVIEWER

The purpose of this survey is to collect information on how people use aquatic resources, so the findings can be used to better inform policy makers of the importance of aquatic resources in highland areas, how they may be protected, and how income generating activities can be strengthened.

1 INTERVIEWEE DETAILS

Name of respondent _____

Date _____

Gender of respondent (tick): F ____ M ____

Ethnicity of household _____

Village _____

Interviewer _____

Household code _____

Wealth category (please select) *Poor* [] *Medium* [] *Wealthy* []

2 HOUSEHOLD HEAD DETAILS

Name of household head	
What is the age of the household head?	
Contact information (Tel/add)	
Gender of household head?	M ____ F ____

3 DETAILS OF HOUSE:

[To be filled in by interviewer themselves].

What are the <i>wall</i> construction materials? (please tick)	Wooden	Brick	Concrete	Earth	Bamboo	Other
What is the quality of wall construction	High quality		Medium quality		Low quality	
What are the <i>roofing</i> construction materials? (please tick)	Wooden	Tile	Metal	Thatch	Leaf	Other
How many floors? (please tick)	1 floor		2 floor		3 floor	
What is electricity supply? (please tick)	Mains electricity		Solar cell		Diesel generator	
Other comments (e.g. material goods)						

4) HOUSEHOLD BACKGROUND INFORMATION

4.1) Tell me about the people who normally live and eat in this household.

What are the names of the immediate family members?	What is their relation with the hh head?	Gender	Age?	Up until what level have they studied? (please tick)				What is their main occupation?	Have any migrated in the past?
				Primary	Secondary	High school	University		
1.									
2.									
3.									
4.									
5.									
6.									

4.2) When did you build this house? _____

4.3) Was household head born in community? _____

4.4) I will quickly ask about your households' main income source over the last year?

What are your three main income sources? (please tick)	Approximately what percentage of your income comes from each source	Can you rank these activities according to their importance?
Fishing		
Fish culture		
Agriculture		
Labouring		
Migrant remittances		
Other		

5.3) Are there any other products you collect from the lake/river/wetland? (e.g. aquatic plants) (If no, go to question 5.4)

What has been Collected over the last <u>year</u> ? (state species if applicable)	What times of year were they collected?	What was the total quantity collected over the last <u>week</u> ? (kg)	For each product collected in last <u>week</u> , where were they harvested?	What form was each product collected? (e.g. was the whole plant/species removed, or only part)	What was each product collected in last <u>week</u> used for? (e.g. for consumption, for housing materials)	Over the last <u>week</u> , how much of each product have you sold (kg)	What was the price for each product you sold? (thousand VND per kg)

5.4) Do you culture fish? (If no, go to question 5.6)

Which fish have you cultured over the last <u>one</u> year from now?	Source of fish for culturing? (please tick)		Which system did you use to culture each species of fish? (please tick)			
	Wild caught from river/lake	Captive bred	Cage	Pen	Pond	Other

5.5) I would like to ask you some more about your recent fish culture activities

Over the last <u>week</u> , what quantity of cultured fish have been consumed? (kg)	Over the last <u>week</u> , what quantity of cultured fish have been sold?	What was the price for each species you sold over the last <u>week</u> ?

5.6) I would now like to ask some questions about your agricultural production.

What crops you planted in the last year from now?	What was the area cultivated? (ha/m ²)	What was the yield for each harvest?		Over the last <u>week</u> , how much of each crop have you sold? (kg)	Over the last <u>year</u> , how much of each crop did you sell? (kg)	Average price per kg
		Harvest 1 (kg)	Harvest 2 (kg)			
Wet rice						
Dry rice						
Cassava						
Maize						
Sweet potato						
Vegetables						
Soya bean						
Aquatic plants (e.g. morning glory)						
Sesame						
Forestry						
Other						

5.7) I will now ask some questions about the livestock you own.

Which animals / birds do you own?	How many of each species do you own?	How many have you sold over the last month?		How many have you bought over the last month?		How many have you used for home consumption over the last month?
		Qty.	Price	Qty.	Price	
Chicken						
Duck						
Pig						
Cattle						
Buffalo						
Goat						
Other						

5.8) Does anyone in your household operate a non-farm or fish related business? (If no go to question 5.9)

What is the business?	Approximately how much do you earn in a typical week?	Approximately how many months a year does this business operate?

5.9) I would like to ask you about your water use. For each of the following purposes, what is the water source?

Purpose	Water source				
	Tap or well in household	Tap or well in village	River or stream (specify where along the river water is collected)	Canal (specify where along the canal water is collected)	Lake (specify where in the lake water is collected)
Drinking					
Washing clothes					
Bathing					
Irrigation of rice fields					
Irrigation of upland fields (e.g. maize, cassava)					
Irrigation of kitchen gardens					
Other					

6) HOUSEHOLD INPUTS AND EXPENSES

6.1) I would now like to ask you about the inputs over the last year from now for fishing, agriculture and livestock?

Input		How much of each input have you used over the last year from now? (e.g. kg / no. of items)	Typically how much would you pay for these inputs? (in <i>local currency</i>)
Category	Input item		
Fishing inputs (e.g., fuel for boat, bait)			
Fish culture inputs (e.g. fish food, medicines)			
Agriculture / Livestock inputs (e.g. fertilisers, pesticides, fuel for irrigation pump, animal feed)			
Other aquatic resource dependent activity			

6.2) I would like to ask about any other expenses over the last year for fishing, agriculture and livestock

Expense item	Expense
Maintenance of fishing equipment (e.g. repairing nets)	
Maintenance of farm equipment (e.g. repairs to machinery)	
Tax on agricultural / aquatic activities	
Other	

6.3) Approximate non-food household expenses over last year from now

Expense	Amount (local currency)	Who bears expense		
		Men	Women	Both
House maintenance				
Electricity				
Fuel for cooking				
Fuel for motorbike				
Transport (bus etc)				
Education				
Clothes				
Health/medical				
Transport				
Cultural/religious				
Family events (e.g. wedding)				
Gifts				
Other				

7) ASSET OWNERSHIP

7.1) Now lets talk about the land only your household owns or rents at present (not community land).

How much land do you operate and what type of land is it?	How much is both <u>owned and cultivated</u> by the household (appropriate local unit of measurement)	How much is owned by household but is <u>rented to others</u>			How much is <u>owned by others</u> but rented by household		
		Amount	Payment	Who is rented to?	Amount	Payment	Who is rented from?
Irrigated land (e.g. for rice)							
Rain-fed (e.g. for maize)							
Kitchen garden							
Fish pond							
Forest plantation							
Uncultivated forest/scrub							
Land for house							

7.2) Now lets move on to other economic resources you own

Which of the following items do you own?	What is both <u>owned and used</u> by the household (state quantity)	What is owned by household and <u>rented to others?</u>		What is <u>owned by others</u> but is rented by the household?	
		Quantity	What is the rental payment?	Amount	What is the rental payment?
Fishing / Fish culture apparatus	Boat (state size)				
	Boat motor				
	Fish nets (state types)				
	Fish cages				
	Fish hooks and line				
	Other				
Agricultural assets	Irrigation pump				
	Tractor				
	Thresher				
	Husker				
	Other				

7.3) I would like to ask you about property which has been acquired in the last 10 years?

Asset	How much of each form of property has been <i>bought</i> in the last 10 years?	When were they bought?	Who was the seller?	How much of each form of property has been <i>given to household as gift or inheritance</i> in the last 10 years?	Who was the giver?	When was it received?
Land						
Agricultural machinery						
Boat (state size)						
Boat motor						
Other assets						

7.4) I would like to ask you about property which has been *lost* over the last 10 years?

Asset	How much of each form of property has been <i>sold</i> in the last 10 years?	When were they sold?	Who was the buyer?	How much of each form of property has been <i>given away by household</i> in the last 10 years?	Who was the recipient?	When was it given?
Land						
Agricultural machinery						
Boat (state size)						
Boat motor						
Other assets						

7.5) Let us talk briefly about other goods you own at present.

Which of these goods do you own?	How many?	How many years have you owned these goods?
TV set		
Fridge		
Motorbike		
Bike		
Other		

8) LABOUR RELATIONS AND INCOME

8.1) Think again of your household members (those who normally eat and sleep here). Did any members of this household work for others (e.g. other households, businesses, the government) during last month, if no go to question 8.2.

What kind of work did your family members do?		How many days in the last month has each household member worked on these tasks? What was the wage (or was it unpaid), and approximately how many months a year do they work?					
		1 (state name)	2 (state name)	3 (state name)	4 (state name)	5 (state name)	6 (state name)
Work for other household in <i>fishing</i>	No of days in last month						
	Wage paid						
	No of months per year						
Work for other households in <i>fish culture</i>	No of days in last month						
	Wage paid						
	No of months per year						
Work on other household's <i>farm</i>	No of days in last month						
	Wage paid						
	No of months per year						
Work on <i>construction/road maintenance</i>	No of days in last month						
	Wage paid						
	No of months per year						
Work in <i>factories</i>	No of days in last month						
	Wage paid						
	No of months per year						
Other work	No of days in last month						
	Wage paid						
	No of months per year						

8.2) Did any people from outside the household work for your household over the last week: If no, go to *question 8.3*.

Production system	How many workers from outside household were employed over the last week?		How many days did they work over the last week?		What is the daily wage for paid workers? (<i>local currency/day</i>)
	Paid	Unpaid (as exchange)	Paid	Unpaid (as exchange)	
Fishing					
Fish culture					
Livestock					
Agriculture/ Aquatic plants					
Other					

8.3) Do you have any family members who once lived in this house, but are now living outside the community?

Name of family members who are living away from the village right now?	Where do they live?	Why did they move away?	How long have they been away?	How many times did they visit in last year and how long for?		When they return, do they bring any goods back apart from money?	How much money have they given the family in the last year?
				No of visits	Length of stay		

8.4) *What are the benefits of household members working outside, as opposed to working within the community?*

8.5) What other sources of income does your household you have?

Income source	Approximate income in last year from now
Subsidies	
Pension	
Any other sources we have not yet considered?	

QUALITATIVE SECTION

NOTE: It is essential to complete the entire quantitative section of the form for the 30 households in each community. The qualitative section is however, more flexible. While we would endeavor to cover all sections and questions, respondent fatigue or time constraints may mean this is not possible. Some issues are also covered in the focus groups, so if one is short of time or the rapport with a particular respondent is weak, the interviewee can focus on a particular section of the form. The section of focus can be chosen according to: (i) the relevance to the household being interviewed, e.g. it will not be important to speak about agriculture to a household that engages primarily in fishing; (ii) The level of data already collected on a particular topic e.g. if there is little data on certain issues from the interviews and focus groups already completed in a given community, one may choose to focus on related questions for the household interview.

1) LIVELIHOOD STRATEGY

1.1) How have your income generating and food producing activities changed over the past 10 years?

1.2) Do you feel your family was poorer or wealthier during your grandfather/grandmother's time

2) ENVIRONMENTAL CHANGE

2.1) Think about the river/lake 10 years ago and beyond. How has it changed today?

Have certain parts of the river/lake changed more than others?

2.2) Think back 10 years ago and beyond, are there *more* or *less* fish than are present today?

...What types of fish have *declined* in numbers in the last 10 years (note species names)?

...What do you think are the causes of the decline?

...How have you adjusted your livelihood practice to cope with the decline in fish catch and fish types?

...What types of fish have *increased* in numbers in the last 10 years (state species names)?

... what do you think are the causes of this increase?

2.3) Think about fishing today. Are there any areas of the river/lake you do not fish?

Why?

2.4) Are there any times of year you do not fish?

Why?

2.5) How do the fish populations change over the seasons, in terms of species, quantity and size?

2.6) Do you know why they change?

2.7) Have there been any sudden environmental or economic changes which have put pressure on your income generating and food producing activities over the last 10 years? How did you respond?

2.8) What would you lose if the lake / river was no longer present?

3) CLASS RELATIONS AND LIVELIHOOD CHANGE

3.1) Over the past 10 years and beyond, have you invested in more fishing /fish culture equipment and boats than was previously owned?

... If not, what constrains you from investing?

Have the fishing gears you use changed? If so, how have they changed and why?

3.2) What do you think needs to change for you to increase your catch and achieve a better income from fishing or fish culture?

3.3) Is fishing or fish culture viewed as a good way to increase one's wealth? *[or other aquatic resource dependent activity]*

... Would you like your children to be involved in fishing or fish culture? Why?

3.4) Are there any income generating activities you would like to engage in but are unable to? What are the constraints?

3.5) Have you increased agricultural production in the last 10 years?

... If not, what do you think needs to change for you to increase production for the market and achieve a better income from agriculture? What prevents you from increasing production?

3.6) How easy is it to increase your ownership of land?

4) MARKET RELATIONS, CREDIT AND CLASS

4.1) How do you decide which species to sell and which not to sell?

4.2) Do you ever sell fish to traders or middlemen? (If no, go to question 4.4)

...When selling fish to traders and middlemen, how do you decide which particular trader to sell to?

...If the price is poor, can you easily move to sell to a different trader?

...How many traders do you normally sell to?

...Do you have a strong relationship with one particular trader (for example, one who gives you a particularly good price)?

4.3) Are you satisfied with the price you receive for your fish? If not, what prevents you from achieving a more favorable price?

4.4) Does anyone in your household borrow money?

... What for?

... How has access to credit changed over the last 10 years?

... Is it easier than before to get loans?

... Has access to credit improved your economic situation?

... Are there any constraints to accessing credit?

5) KNOWLEDGE

5.1) How did you learn to catch/culture fish?

5.2) When did you learn to catch/culture fish?

5.3) Do you know the names of all the fish? How did you learn?

5.4) What are the main information sources which contribute to your knowledge of fishing and agriculture?

5.5) Have you taken any training over the last 10 years in either agriculture or fishing/fish culture?

6) SOCIAL NETWORKS, POLITICS AND NON-ECONOMIC STRUCTURES

6.1) How are your relations with other people in the village?

6.2) Are you a member of any community organizations?

... If yes, what is your role? ... What benefits does it bring you?

... If no, why? Are there any constraints preventing you from becoming a member

6.3) Out of all the community organizations, which are the most helpful in improving economic security?

... Why are these organisations helpful?

... And which are the least helpful?

... Why are these organisations not helpful?

6.4) Are you a member of a political party?

... If yes, what benefits does it bring?

6.5) Do you receive any form of assistance from government or local institutions to improve your livelihood practices?
What kind of assistance?

6.6) Think of your close friends or relatives that you meet regularly?

... What kinds of things do you do together?

... Can you get help from each other (e.g. financial, or sharing of information)?

... Which kind of obligations do you have towards each other?

... Are there any social groups in the village which you are excluded from?

6.7) Do different families in the village have set fishing areas?

7) POLICIES AND INSTITUTIONS GOVERNING NATURAL RESOURCE USE

7.1) Are there any income generating activities which require special permission or a licence?

... For these activities, who grants permission or licence?

... What are the costs involved, both official and unofficial?

... Are there any income generating activities you would like to do, but can not because these costs are too high?

7.2) Are there any rules which determine where fish (and other aquatic produce) can be collected and the quantities?

... Is there a different rule making process for both the village and for the district government?

... Who makes these rules?

... What influence do you have over the rule making process?

... If influence is limited, what prevents you from influencing the rule making process?

... How are rules policed? What are the penalties for breaking them?

... How have rules changed over the last 5 – 10 years? Do you know why these changes have taken place?

7.3) Who else uses the lake/river resources apart from people in this commune?

7.4) Are there any difficulties and disagreements as many people are using the water resources?

8) CONCLUDING QUESTIONS

8.1) What are the biggest problems facing your household?

8.2) What are the biggest problems facing the river / lake?

8.3) What would you like to change in your life in the future?

8.4) What would you like your children to be doing in the future?

8.5) Do you have any other comments on the issues we have discussed above?

8.6) And finally, do you have any questions for us?

8.7) Can we revisit you in next 4 months? Yes/No

...If yes: when should I visit : evening/morning/afternoon....

Thank you very much for your time. Good luck with your crop and see you soon!

ANNEX TWO: FOCUS GROUP SCHEDULES FOR MEN AND WOMEN

INSTRUCTIONS FOR INTERVIEWEE

SAMPLING FOR FOCUS GROUP: There should be a minimum of 40 Focus Groups completed in each site. The format should be as follows: 10 with men; 10 with women; 10 with boys; and 10 with girls, across the three villages. Within these subgroups we could hold discussions with different livelihood groups, or in the case of boys/girls, with younger children and teenagers. We would also like to include some extra focus groups with additional stakeholders of interest (for example farmers living upstream who use aquatic resources indirectly; market traders who buy or sell aquatic produce). These additional focus groups will be used to compliment household interviews and the gender/age focus groups, to fill in gaps and to better understand the needs of all stakeholders.

CONDUCTING THE INTERVIEW:

- Divide roles within the group. One team member should take notes and one should concentrate on asking the questions and interacting. If a third team member is present, then they may observe social interactions within the group (e.g. who is dominating, who is coming/going, what is the mood of participants, who is not participating).
- These questions should only be a rough guide, and the interviewers should be flexible, according to the direction of the discussion. Some questions may have already been answered.
- The same essential questions will be asked for both women and men, but there should be flexibility to add new questions if interesting issues arise in the process of fieldwork.

MATERIALS REQUIRED

- 3 large sheets of paper
- 5 large pens (different colours)
- 30 beans
- 15 blank cards

1) LIVELIHOOD STRATEGY AND INTRA-HOUSEHOLD RELATIONS

1.1) What is your main income source?

[PRA Tool 1] Livelihood activity ranking:

1. *Ask participants to brainstorm all of the livelihood activities they participate in. Write as 'spider' diagram with box for each activity*
2. *Rank these livelihood activities in order of importance*
3. *Give out 30 beans, or any other small objects (e.g. Pebbles)*
4. *Ask respondent to distribute them in the boxes to indicate the level importance of each activity.*

1.2) Look at the livelihood activities from the ranking which were ranked as most important.

...For these activities, who controls how the income or product is used?

... Are there any livelihood activities where you control the income?

1.3) Out of the most important livelihood activities discussed above, what is the income or product used for?

1.4) What were your main livelihood activities 10 years ago?

...How have your livelihoods changed?

...Are there any new livelihood activities which were not present 10 years ago?

1.5) *[For China and Vietnam]* How did your income and food security situation change since the decollectivisation of agriculture? Is it more or less secure?

1.6) [PRA Tool 2]: Livelihood problems and benefits.

1. Openly ask group to list what they feel are the major problems they have faced over the last 10 years with earning money and producing food.
2. Write each problem on a card and assign them a picture or symbol. Put each card in one of three piles, listed 'big problems', 'small problems' and 'minor difficulties'.
3. Create a chart and ask respondents to list benefits and problems of each strategy. For example:

Problems	Benefits

1.7) How has your ability to produce food and earn money improved in the last 10 years? Why?

2) FISHING QUESTIONS AND ENVIRONMENTAL CHANGE

2.1) What species do you collect from the river / lake?

... Where do you collect these from?

... What technologies do you use?

... How long have you been involved in these activities?

... How did you learn how to do them?*[if not already answered above]*

2.7) What are the peak months and low months for fish catches?

... Do you know the reasons for these seasonal changes?

... How do you cope during the low season?

2.8: [PRA tool 5: Community mapping]

1. With participants, draw a map of the river or lake with major landmarks and village names marked.
2. Ask them to indicate where they go to catch certain species/products.
3. Are there any places near or on the river/lake of cultural or religious importance? Ask them to mark them on the map.
4. Are there any places where they go for recreational activities? Ask them to mark them on the lake.

2.9) What would you do if the lake/river was no longer there?

2.10) What other benefits do you gain from fishing aside from food for the household and income?

3) RULES AND ACCESS

3.1) Are there any income generating activities which require special permission or a licence?

... For these activities, who grants permission or licence?

... What are the costs involved, both official and unofficial?

... Are there any income generating activities you would like to do, but can not because these costs are too high?

3.2) Are there any rules which determine where fish (and other aquatic produce) can be collected and the quantities?

... Is there a different rule making process for both the village and for the district government?

... Are there conflicts as a result of these differences?

... Who makes these rules?

... What influence do you have over the rule making process?

- ... If influence is limited, what prevents you from influencing the rule making process?
- ... How are rules policed? What are the penalties for breaking them?
- ... How have rules changed over the last 5 – 10 years? Do you know why these changes have taken place?
- ... Do you know how the rules have changed since your grandparents time?

3.3) Do rules and regulations mean that some social groups have permanent rights to use the river/lake resources while others are excluded?

3.4) Are there any difficulties when different users use water or catch fish from the same river/lake?

3.5) Have people from outside been using the river/lake resources of your community?

... If so, what effect have they had on the resource (abundance, distribution and ease of harvest)

3.6) Which of you in the group are members of community organizations? Please note in table.

Community organisation	Number of people

3.7) Out of all the community organizations, which are the most helpful in improving economic security?

... Why are these organisations helpful?

... And which are the least helpful?

... Why are these organisations not helpful?

... Are there people in the village who are disadvantaged by these organizations? Why?

4) MARKETS

4.1) Where do you sell your fish (or other aquatic products)?

4.2) How is the price set for fish?

4.3) When selling fish, how do you decide which trader to sell to?

4.4) If the price is poor, can you easily move to sell to a different trader?

4.5) Do you have a strong relationship with a particular trader?

4.6) Are you satisfied with the price you receive? If not, what prevents you from achieving a more favorable price?

4.7) How has access to credit changed over the last 10 years?

... Is it easier than before to get loans?

... Has access to credit improved your economic situation?

... Are there any constraints to accessing credit?

5) STATUS OF WOMEN

5.1) How has the status of women changed in this village over the last 10 years?

... Are there more women headed households than before?

... Are there activities women do now that they did not perform before?

... Are there any livelihood activities women are not permitted to do?

... Are there any livelihood activities women only can do?

6) Knowledge

6.1) How did you learn to catch/raise fish?

6.2) When did you learn to catch/raise fish?

6.3) How did you learn the names of all the fish?

6.4) What is your main source of agricultural and fishing related knowledge? How did you learn?

6.5) Have you taken any training over the last 10 years in either agriculture or fishing/fish raising?

6.6) Do you discuss any of the following issues with neighbors and friends

... Agricultural and fishing techniques with neighbors and friends?

... Environmental issues such as the best fishing areas?

... The market situation, such as prices for produce

6.7) If you needed legal advice, would you know where to go?

7) Division of labour

7.1) Tell me about who does what in your household. What are the men's tasks, what are the women's tasks, what are the boys tasks and what are the girls tasks? See table below if necessary.

Activity		Who does what?			
		Men	Women	Boys	Girls
Fishing					
Repairing nets					
Sowing crops					
Transplanting rice					
Ploughing fields					
Weeding					
Harvesting					
Tending kitchen garden					
Travelling to market to <i>buy</i> produce					
Travelling to market to <i>sell</i> produce					
Cleaning					
Cooking					
Maintaining house					
Collecting firewood					
Looking after babies					
Cleaning house					
Washing clothes					
Other					

8) WELLBEING AND NON-USE VALUES

NOTE: Much of this will be gathered informally through participant observation, and will emerge throughout the discussion in interviews. However, there are some questions below which can maybe stimulate debate.

8.1) What does happiness [appropriate local term] mean to you?

8.2) What do you think is necessary to live a good life?

8.3) When do you feel really happy with your lives?

8.4) What else would you like to improve in your lives apart from improved economic security?

8.5) **[PRA tool 5: Wellbeing]**

1. Draw the following table:

Measure of wellbeing	Ranking
Economic security	
Protection of traditional culture and values	
Maintenance of good relations with family and friends	
Maintenance of good health	

2. Give respondents 30 beans. Ask them to place beans next to each measure to state how important they consider them.

9 Concluding questions

9.1) What are your dreams for the future?

9.2) How would you like to be in the next 5-10 years?

9.3) Do you have any other comments on the issues we have discussed above?

9.4) And finally, do you have any questions for us?

ANNEX 3: FOCUS GROUP SCHEDULES FOR BOYS AND GIRLS

INSTRUCTIONS FOR INTERVIEWEE

CONDUCTING THE INTERVIEW:

MATERIALS REQUIRED

- 2 large sheets of paper
- 5 large pens (different colours)
- 15 blank cards
- 30 beans

1 *Young peoples contribution to work*

1.1 **[PRA Tool 2] Job ranking:**

1. *Ask children to think of all the jobs they carry out, ask them to write them out on the sheet*
2. *Put each job on a card*
3. *Ask them which jobs they feel are most important. Ask them to place the cards into three piles, 'most important', 'quite important' and 'not so important' for the family.*
4. *Ask them why these jobs are important*
5. *Ask them to rank which activities they 'most enjoy', and which they 'least enjoy'.*
6. *Ask them why they like/dislike particular activities.*

2) YOUNG PEOPLES USE OF AQUATIC RESOURCES

2.2) We would now like you to think about your work in the river and lake.

a) do you participate in any fishing activities?

b) do you use the river for any other purposes?

2.3) How has the river/lake changed over the last few years? *Already asked*

2.4) Do you know the names of the different fish? How did you learn? *Already asked*

2.5) Do you know where the best sites are for fishing? How did you learn?

2.6) If the lake/river is no longer there, what would you miss/lose? *Already asked*

This could also be asked as- Would you be sad if the river/lake disappeared? Why?

3) WORK AND RELATIONS WITH OTHER HOUSEHOLD MEMBERS

3.1) Think of the work you help your family with. Who tells you which jobs to do? *Already asked*

3.2) Do any of you have brothers or sisters who help you with these jobs? *Already asked*

4) Benefits of work

4.1) When you work, do you get the chance to retain the product or income for yourself? *Already asked*

... do you have any control over how the product or income is used?

4.2) when you earn some money, what do you like to spend it on?

5) Education and leisure

5.1) Do you like school? *Already asked*

5.2) Why / Why not?

5.3) Do you think you will study until University/High School/Secondary School? *Already asked*

...Why / why not?

5.4) What would you like to be doing 10 years from now? What are your dreams for the future? *Already asked*

5.6) What would your parents like you to be doing 10 years from now?

5.7) [PRA tool 3: Activity Chart]

Provide the group with a large sheet of paper with a chart for the day, for example:

Time	Activity
Morning	
Afternoon	
Evening	

Provide the group with pens and ask them to list on the chart, the activities they do in a day from when they wake up to when they sleep.

6) Concluding questions

6.1) What do you think are the biggest problems in your lives? *Already asked*

6.2) What do you think the solutions are?

6.3) Is there anything else you would like to tell us about?

6.4) Do you have any questions for us?