

4. Assessment of Social Issues

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The following chapter presents a summary of the social context, social impacts and the integration of the social mitigation and management measures into the Project design. The social issues are presented by geographical location, which include: i) the NNT NBCA; ii) the Nakai Plateau and downstream of the Nakai Dam site; iii) the Xe Bang Fai; and iv) Project Lands.

This chapter is based on the social components of two documents: i) the Social Development Plan (SDP); and ii) the Social and Environmental Management Framework and Operational Plan (SEM-FOP). Further details for any of the issues discussed below are provided in either the SDP or the SEMFOP.

Nakai – Nam Theun NBCA

Baseline

People & Population

The population in the NNT NBCA is approximately 5,800, representing 1,092 families in some 31 villages (SEMFOP, 2003). This population is growing fast, with more than 70% of the villages experiencing a population growth rate (4%) greater than the 1995 national average of 2.4%. Since 1975, security, combined with increased provision of services and penetration of traders, have increased average longevity while birth rates remain at their previous high levels.

This indigenous population is of diverse ethnic composition, comprising of three main ethno-linguistic groups: i) Brou (53%); ii) Vietic (25%); and iii) Tai Kadai (including the Sek) (16%). These various groups have been in contact with each other over a long period of time, and there is considerable interaction between the various groups, especially between the Brou and the Vietic groups of the NNT NBCA with the Bo and Brou communities on the Plateau. Inter-marriage and shared cultural characteristics exist among these groups, but there is not the melting pot culture of the Nakai Plateau, due to its relative isolation.

Livelihoods & Income

Livelihood activities in the NNT NBCA include shifting cultivation, livestock raising, hunting, fishing and gathering non timber forest products (NTFPs), as well as sedentary cultivation. Ethnic groups have borrowed livelihood practices from each other and have demonstrated adaptability to their environment.

Upland rice production is practiced on about 350 ha each year. However, most households are able to grow rice for sustainable consumption for only two to six months per year. Like the Plateau communities, NNT NBCA communities have turned increasingly to commercial activities such as marketable NTFPs, livestock and fish. They sell the surplus for cash to buy rice and manufactured items such as clothing, household utensils, etc.

Data on cash income indicates some differences between Plateau and NNT NBCA communities. In 1996, the average annual household cash income for NNT NBCA communities was only US\$ 87 (CARE, 1996). Trade of forest and agricultural products formed the major source of cash income for NNT NBCA villages, at 44% and 38% respectively. Fish and livestock were also sold for cash.

Infrastructure

The NNT NBCA is remote and access into and within is difficult, especially in the wet season. Access is limited to footpaths (although two 3m-wide tracks have recently been constructed) and river transportation, which varies seasonally.

There are virtually no formal markets in the NNT NBCA, however, some people have begun to sell consumer goods in front of their homes. Along the Nam Noy and the Nam Pheo, itinerant Vietnamese traders sell household goods for cash or barter for NTFPs, mostly wildlife and plant products (rattan cane, damar resin, cardamom, and wild honey).

Education

The only three primary schools in the NNT NBCA are located in Ban Na Vang, Ban Teung, and Ban Na Meu/Na Meo. These are simple one-room structures which teach one or two grades. The teachers are paid irregularly by GOL and receive supplements from the villagers. School improvement plans have been carried out in a number of villages as part of the District Upland Development and Conservation Project (SEMFOP, 2003).

Public Health

Sustained health care is lacking, with malaria, respiratory diseases and gastro-intestinal diseases found throughout the NNT NBCA. Drinking water is rarely boiled and general sanitation is poor. Most people rely on local ritual specialists for cures based on a combination of spiritual intervention and herbal medicines (SEMFOP, 2003). The nearest clinics and small hospitals are located in Ban Lak Sao and Ban Oudomsouk.

Impacts

Although there is no direct impact by the Project, there are likely to be significant social implications for the communities of the NNT NBCA. The inundation of the Nakai Reservoir will improve access into and out of the NNT NBCA, providing the potential for easier logging and poaching, but also improving access to outside products, markets and health facilities for the area's communities. The influx of labourers will provide a potential market for the agricultural products, wildlife and other NTFPs. However, current resource utilisation in the NNT NBCA is not sustainable in terms of conservation management or the long-term needs of a growing population. Therefore the increased pressure of supplying construction workers, if not properly managed, will have a negative impact on both biodiversity and land use.

Communities residing in the NNT NBCA have the potential to impact the operations of the Project. Increases in inappropriate land use activities would result in greater sedimentation rates in the Nakai Reservoir and thereby reduce the lifespan of the Project.

Mitigation & Management

The Project will provide US\$ 31.5 million of financial assistance and management support for the conservation of biodiversity and improvement of livelihoods for the communities residing within the NNT NBCA. GOL is developing a management plan, the SEMFOP, for the NNT NBCA with the objectives of effectively protecting the watershed, wildlife and biodiversity values; safeguarding the well being, traditional livelihoods and culture of its human inhabitants; and improving livelihoods by focusing on poverty reduction through environmentally sustainable development. The funds will be administered by the WMPA.

Livelihood Options & Community Development

The SEMFOP will introduce livelihood development, aimed at promoting biodiversity conservation by increasing food production, diversifying livelihood options and gradually intensifying land use, thereby reducing reliance on hunting, resource extraction and shifting cultivation. Implementation consists of an approach based on interventions such as: i) domestication of NTFPs; ii) multi-species agroforestry, incorporating fruit trees; iii) livestock improvements and veterinary care; iv) enrichment of fallows, use of green manure, contour bunds, terracing; v) paddy development; vi) improved market access for cash crops; vii) improved rice storage facilities; viii) sustainable riverine fisheries, and possibly aquaculture; and ix) community forest management, and employment in biodiversity conservation and eco-tourism.

Community infrastructure will be improved, supported in the first four years by the Japan Social Development Fund Grant. Improved access to markets and services will include river transportation and some paths and tracks. Health interventions include impregnated mosquito nets, improved maternal and child health care, information on improved nutrition and hygiene, immunisation programmes, training of village paramedics, establishment of medicine revolving funds and regular visits by medical teams. Education interventions consist of restoring and improving existing school buildings, supplementing regular teachers' salaries and

training teachers to conduct non-formal literacy classes for adults, provision of teaching equipment and books, and an adult literacy programme.

Activity Framework

Under the SEMFOP, the three main technical NBCA management activities that will mitigate and manage any impacts are i) Forest and Land Use Planning, Allocation and Management (FLUPAM); ii) Participatory Protected Area Management (PPAM); and iii) Livelihood Development for Conservation (LDC). An outline of these activities is provided below, with further details presented in the SEMFOP.

Forest & Land Use Planning, Allocation & Management

FLUPAM is a participatory process of resource management planning, aimed at ensuring equitable access to forest and land resources and providing the basis for their sustainable management by local communities. It will encourage communities to make their own decisions about sustainable natural resources management, and provide villagers with the skills to solve problems. FLUPAM will promote inter-village cooperation to solve resource use conflicts and create linkages and networks between villages to facilitate mutual support and cooperation for both conservation and community development. Activities will integrate conservation with development, whereby villagers are compensated for curtailing certain resource use practices by government assistance with livelihood development activities. Teams will be made up of land use planners, conservationists, agriculturists, gender specialists and district officials who work with villagers in an interdisciplinary manner.

Participatory Protected Area Management

PPAM recognises villagers as equal partners in the management of the protected area, and gives all stakeholders an integral role in the planning and management by ensuring villagers have a focal role in the: i) definition of boundaries and zones; ii) development of rules and regulations guiding resource utilisation; iii) implementation of such regulations and management procedures. PPAM is consistent with the GOL policy of transferring rights and responsibilities regarding land and forest use and management to local villagers. PPAM aims to instil in villagers a sense of pride in and co-ownership of the protected area, along with a real understanding of and support for biodiversity conservation.

After participatory planning and collection of data, the implementation of the PPAM will include: i) sustainable forest product utilisation and management (wood, NTFPs, etc.); ii) forest use rules and regulations; iii) joint monitoring, patrolling and enforcement; iv) cooperative activities through the village network; v) extension activities; and vi) modifications to rules, regulations and boundaries as required.

Livelihood Development for Conservation

The LDC approach is a participatory process to identify appropriate livelihood development activities within the context of conservation. The process identifies major problems facing the community, and how they impact on the natural environment. Development options are then reviewed, and proposed activities are prioritized. Each activity is then analysed, using Conservation Impact Assessment procedures, to assess the potential positive and negative impacts on conservation. By this means, villagers begin to recognise the interactions of their livelihood activities with biodiversity and can modify their plans to reduce negative impacts and maximize positive ones.

Nakai Plateau & Downstream of the Nakai Dam

Baseline

People & Population

Approximately 5,684 persons, representing 1,030 households in 17 villages, reside in the inundation area of the Nakai Reservoir. As is typical in very underdeveloped areas, over 50% of the population is below 19 years of age.

The population can be classified into five main ethno-linguistic groups: i) Brou (or Makong) (40%); ii) Tai Bo (40%); iii) Upland Tai groups (11%); iv) Vietic groups (6%); and v) a few members of the Sek ethno-linguistic group (1%). However, with the area being subjected to numerous inward and outward migrations over the last 200 years, the distinctions between ethnic groups have become less clearly defined. The ethnic situation is further complicated by intermarriage and a shared culture. Most of the original distinguishing features of the ethnic minorities such as language, material culture, house design and ritual practice have merged (RAP, 2003).

Although a “melting pot” of cultures exists, there are several characteristics that qualify the original population as “indigenous”. According to the World Bank OD 4.20, these include: i) a definite sense of belonging to the Nakai Plateau; ii) the fact that people on the Nakai Plateau are economically disadvantaged; and iii) a primarily subsistence-oriented livelihood production system.

Livelihoods & Income

Agricultural Production

Communities have traditionally cultivated rice, hunted and fished, raised livestock, and gathered plant products, mainly for household use. In recent years, increases in population, problems with cultivation, and exposure to cash commodities have spawned more intensive and extensive exploitation of the forest for its marketable products. The shift from an almost entirely subsistence economy to a more commercial one is being largely caused by immigrants, some engaged in logging activities and some in search of other economic benefits. These people generate a buying market for items such as vegetables, meat and forest products.

Nevertheless, agriculture still dominates the economy with wet-season rice the main agricultural crop. In 2002, the total cultivated area on the Plateau was approximately 700 ha, with rice accounting for about 80%. Paddy rice is not a large contributor to total production (less than 20%) due to the low yields under rainfed conditions. Upland rice production also continues to decline because of poor soils, adverse weather conditions and lack of modern technology. Soils are heavily leached, susceptible to erosion, of low pH and low organic matter content with poor buffering capacities. As a result, only 17% of families are able to produce sufficient rice for a full year, while at least 50% of families have a rice deficiency for more than six months. Vegetables are mainly grown on swidden fields close to the homestead, in garden plots next to the house, or along riverbanks.

Fish

After rice, fish is the most important item in the diet. Fish are caught mainly for household consumption and usually not sold on a regular basis. Fish catch techniques vary with season, but villagers may have to supplement their catch with dried or fermented fish in the dry season.

Men usually fish with cast nets in rapids or by deep-water gill nets. Children and women make an important contribution by search-

ing the banks and shallows for frogs, aquatic insects and small fish that supplement the family's diet.

Livestock & Poultry

Livestock sales are the main cash source for buying rice and other commodities, estimated at just less than 50% of the annual cash income for households in the Project area (NTEC, 1999). The total number of buffalo in the villages to be resettled is 4,100 head, with average ownership of 4.7 per household. However, the actual distribution is distorted with some households owning over 30-40 (and up to 90) individuals, and a significant proportion not owning any.

Taking into account all possible grazing areas, stocking rates could potentially be as low as one animal to 20 ha, but are currently much higher due to the way each herd is managed at the village level.

Average ownership of pigs is reported to be six head per household. Pigs are owned by most households, mainly to recycle wastes and as a sideline income generating activity, but also for slaughter for household consumption and use on ceremonial occasions.

Chickens of local breed are owned by almost all households, with an average ownership of 15 per household. They are kept for sale, for household consumption and for use on ceremonial occasions.

Non-Timber Forest Products

NTFPs are an important source of supplemental income. Recent over-harvesting of damar resin, fragrant bark and other products has made these activities more time-consuming and resulted in incursions into the adjacent protected areas. This makes the exchange of NTFPs for rice more difficult and thereby threatens food security.

NTFPs account for approximately 12% of overall cash income, and carry an imputed value of approximately 2% of products consumed in the household. NTFPs are especially important in terms of cash for those villages on the edge of the forest. From 1996 to 1997, harvesting of damar resin increased from 17 to 80 tons, becoming one of the most valuable products. In the same period, the harvesting of bong bark decreased from 50 to 22 tons, either because priority has been given to collecting damar resin or availability has declined. The situation with rattan is less clear while cardamom harvesting remains stable (RAP, 2003).

Income

In 1996, the annual average household cash income for the 16 villages investigated was US\$ 225 (CARE, 1996). Roughly half of total income is in cash (including 20% from agriculture and livestock, 10% from wages), and the other half from imputed income (including 30% from rice production, 10% from agriculture) (CARE, 1996). In 1998, the average household total income of US\$ 450 is well below the national poverty line of US\$ 750 (RMU, 1998).

Infrastructure

Recently built electricity transmission lines run from Thakhek to Ban Oudomsouk. However, most households on the Plateau are without electricity and the more wealthy households use batteries.

On the Plateau, 5% of households use covered wells while 35% use uncovered ones, and 60% of the population indicated rivers and streams as their only source of domestic water. As in the NNT NBCA, boiling water before drinking is not common on the Plateau (RAP, 2003).

In terms of road infrastructure, Road 8b is an unsealed road of poor quality, especially as it ascends the escarpment and crosses the Plateau to the Ban Nam Nian area.

Education

In theory, each village should have its own primary school, but only in the larger villages (Ban Done, Ban Boua Ma, Ban Nakai Tai and Ban Thalang) are they functioning properly. Some schools are financed by the villagers themselves since the local government has neither the funds nor can provide the teachers. Attendance is low, either due to the need for children to support their families economically or to teachers not conducting classes regularly.

Only a small percentage of villagers are literate in the Lao language and none of the ethnic minorities languages of the Plateau are written. Except for a few women, who are mostly located in Ban Oudomsouk and roadside villages or are recent arrivals from downstream areas, the majority of women are illiterate. Literacy level for men is only slightly higher. Sixty-three percent of people on the Plateau reported no schooling at all, while only 31% had attended primary school.

Many labourers and recent male migrants are literate. Several village leaders were originally from outside the Plateau (Lao Loum areas), showing that literacy can lead to positions of influence and power in the village (RAP, 2003).

Public Health

Health statistics for the communities to be resettled on the Nakai Plateau were collected as part of the socio-economic survey conducted in 1998. The main causes of death recorded were "fever" and "malaria", accounting for nearly 50% of mortality cases in 1997-98. Other prominent causes mentioned by villagers were diarrhea and respiratory infections. Two hundred and thirty-two people reported having had malaria in 1998. However, the Lao EU Malaria Control Project has achieved very good results in significantly reducing the incidence of malaria on the Nakai Plateau. The percentage of patients testing positive at the Nakai District hospital dropped from 38% in 1996 to 1.8% in 2001.



Plate 31: Nam Theun between the Nakai Dam site and the confluence with the Nam Phao

Table 4.1: Resettlers preferences considered in the selection of prospective resettlement sites.

Factors	Details
Agricultural considerations	<ul style="list-style-type: none"> Water supply must be accessible from the reservoir, along with an elevated site for the header tank to allow gravity irrigation to farm plots; Slope for the farm plot area(s) should be as gentle as possible and ideally not exceed 15%; The soils selected must be capable of providing adequate returns with a potential for the production of paddy wherever possible; and All farm plots should form one contiguous land area wherever possible.
Social considerations	<ul style="list-style-type: none"> The resettlement sites should be as near as possible to the old village location; and Social and cultural factors must be taken into account including the village spiritual areas and customary boundaries.
Resource considerations	<ul style="list-style-type: none"> Roads or other transportation infrastructure must be sufficiently accessible to ensure access to markets and other support services; and Access to the reservoir, drawdown zone, forest and grazing areas should be convenient.

In the three districts of Mahaxai, Gnommalat and Nakai the population is served by one district level hospital and four to five health centres in each district. The ratio of medical doctors to population within Khammouane Province was one for 4,800 persons in 2001 (RAP, 2003). Although some health facilities exist, they are frequently incompletely staffed and poorly stocked with essential drugs. Most villages have a designated Village Health Volunteer (VHV), but the volunteer seldom has the necessary medicines and most need technical strengthening. On the Plateau, the average distance to the nearest hospital (located at Ban Oudomsouk) is 11 km, and for most this is only accessible by walking. Only 3.9% reported visiting a doctor in 1998.

Nam Theun Downstream of the Nakai Dam

The entire reach of the Nam Theun, from the Nakai Dam site to the headpond of the Theun-Hinboun Hydroelectric Project, is not cultivated. Between the dam site and Ban Katok (the first village, 50 km downstream), the Nam Theun is a succession of rapids and pools (Gondouin, 1996). In fact, the first reach of about 12 km to where the Nam Phao flows into the Nam Theun, has no permanent

shelters. People from villages along Road 8b between Ban Kham Keut and Ban Lak Sao use the river to fish.

Impacts

Nakai Plateau

The key social impact of the Project will be the resettlement, due to the creation of the Nakai Reservoir, of approximately 5,684 persons from 1,030 households in 17 villages, 15 of which will be fully relocated.

The communities on the Plateau will also be impacted by construction activities on Project Lands, such as the Nakai Dam, Headrace Channel, Intake Structure, construction of the relocated section of Road 8b, and some tunnel works. The impacts and mitigation of the construction activities are discussed in subsequent sections below.

The main potential public health problems are related to the influx of large groups of construction workers rather than the impact of the reservoir. HIV/AIDS is identified as a possible problem. High-risk groups are perceived to be mobile work-forces such as construction workers, truck drivers, bar hostesses and those involved in the sex industry.

It is expected that there could be an increase in traffic related and other accidents once the Project starts construction.

In the long term, with the continued introduction of adequate public health measures, no significant effects are expected on the prevalence of malaria and other mosquito-borne diseases. Although the number of breeding sites may increase, the continued implementation of protection measures will help ensure that the prevalence of malaria is maintained at its current low levels.

Nam Theun Below the Nakai Dam

Downstream of the Nakai Dam and up to the confluence of the Nam Theun with the Nam Phao, the Nam Theun will be subject to environmental changes as a consequence of significantly reduced flows. There are no permanent villages along this stretch of river, principally because the topographical features make access difficult. It is known that there are fishermen and hunters using this stretch of river. It is also known from surveys and interviews that the value of the catch is small, no more than a few thousand dollars per year in total cash and imputed value.

Mitigation & Management

Reduction of Resettlement

Numerous alternative options have been examined to minimize the number of villages requiring resettlement, including the lowering of the reservoir FSL. As most of the population on the Plateau resides along the river, just above the normal flood level of El 525 m, FSL has to be reduced to about this height before the number of people to be resettled drops significantly. Such a change renders

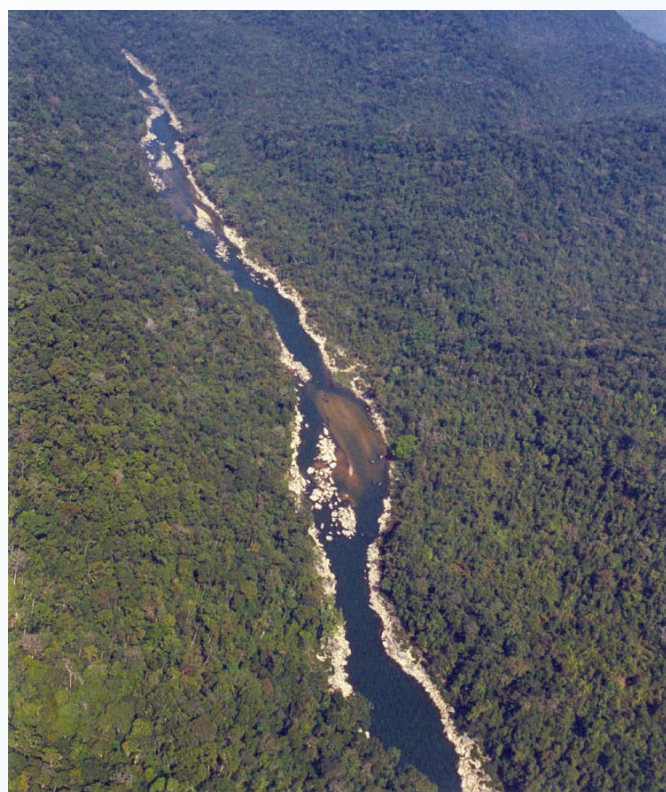


Plate 32: Nam Theun between the Nam Phao and Nam Gnouang

the Project uneconomic because of the reduction in storage volume and therefore power generation.

Resettlement Action Plan

NTPC has developed a management plan, the RAP, for the resettlement of the eligible Nakai communities. The plan allows for implementation of a range of replacement and livelihood programmes and asset compensation activities. Importance has been attached to integrating indigenous practices that are currently being carried out by villages.

Resettlement Sites

After initial assessment, potential resettlement areas were identified that included the Nakai Plateau and Gnommalat District. Public consultations and participatory activities with the communities demonstrated a very strong preference, with few exceptions, to remain on the Plateau rather than move to lowland areas. Table 4.1 presents factors indicated as important to villagers when deciding on their resettlement preferences. These factors were taken into account in the choice of potential sites.

In 2003, an assessment identified more specific sites located along the south-western shoreline of the reservoir, providing water for irrigation, and easy access to the drawdown zone, grazing and forest land. A significant proportion of the land has slopes below 15%, suitable for village sites and the establishment of individual farm plots. The majority of these potential resettlement sites fall within existing village customary use areas. The locations of potential sites for the resettlement villages are shown in Figure 3.58.

Infrastructure

The Project will provide each village with improved infrastructure including housing, electricity, domestic water supply, irrigated water supply, irrigation system, schools and kindergartens, clinics and other community infrastructure. A transformer with sufficient capacity to provide a 20 MW local electricity supply will be located at the power station. This will facilitate the use of electric irrigation pumps instead of the current diesel pumps and will provide a more economical, convenient and reliable water supply.

The Project will upgrade and construct new sections of Road 8b on the Plateau, and provide access to all resettled villages. The improvements made to roads are discussed in Chapter 3.

Livelihood Options

NTPC will be responsible for the installation, operation and maintenance of a reliable pumped water supply to the resettled villages,

and wells for drinking water will also be provided. Electricity will be supplied to houses and an all-weather road will run through the resettlement area. Each family will be provided with 0.5 ha of cleared land for vegetable gardens, fruit trees and housing. Tools, seedlings, and other essentials will also be provided. All these provisions are set out and budgeted for in the Concession Agreement (2002) and the RAP (2003).

The resettled people will have the choice of a range of supplementary livelihood activities in which the Project will fully support them, including irrigated agriculture, commercial forestry, reservoir fisheries and livestock husbandry. All resettlement villages will not be of any lower standard than the current pilot village. The following combination of enterprises for resettlement households has been selected based on studies and evaluations of the natural resource base by specialists in forestry, agronomy, agricultural economics and reservoir fisheries. The strategy also takes into account the socio-economic and cultural background of the people and the economic environment in which they will be operating. The main aspects of the livelihood model are:

- Specific sites for irrigated cropping with priority for rice production as well as vegetable gardens and forage plots. The development will also rely on: i) improvement of soil fertility; ii) cultivation of cash crops; iii) improving access to credit; and iv) institutional support through government organisation
- Introduction of the growing of forage for large livestock combined with drawdown grazing and controlled under-forest grazing. This should support the current levels of large livestock. There is also considerable potential to increase yields from small livestock with better animal health control.
- Forestry resources (of up to 13,750 ha). This will provide villagers with a base source of income and will be the safety-net occupation of the Plateau householders.
- A productive reservoir for fishery with the RAP (2002) assuming an actual annual catch of 350 tonnes per year. This allows for 250 tonnes being sold and 100 tonnes for household consumption, which is greater than the current consumption. This development will be supported through the "Preliminary Reservoir Fisheries Management Plan" (PRFMP); and
- An estimated 400 person-years of labour that will be available during the construction period and approximately 100 jobs after completion in activities such as floating log removal from the Nakai Reservoir and general outdoor maintenance (RAP 2002).



Plate 33: General layout of the Pilot Village showing house locations, farm plots and the irrigation reservoir.



Plate 34: A comparison of Pilot Village housing (left) with the current standard on the Nakai Plateau (right)

Households will be supported with basic food by the Project until incomes reach acceptable levels. It is conservatively predicted that full income potential will be achieved after eight to nine years following resettlement. Given the nature of the land, it is clear that forestry and fisheries will provide the most sustainable income. The projected income target is US\$ 1,200 (2002 value) per household, an increase of more than 160% above the current situation and well above the Lao PDR poverty line of US\$ 750.

A number of possible risks which could affect the realisation of the incomes predicted above have been identified. The most effective risk mitigation measure is the allocation of sufficient forest area to have a reserve for use in lean years. The second risk mitigation measure is the provision of basic skills and resources to the resettled communities so they develop capacity and flexibility to adjust to changing circumstances.

Pilot Village

The objective of establishing a Pilot Village to be moved in advance of the others is to provide an opportunity to test assumptions, verify predictions and work out solutions to problems in advance of the main relocation.

The three hamlets of Ban Nong Boua, Ban Sailom and Ban Paman-ton were selected for relocation as a Pilot Village. Planning for the establishment and relocation to the Pilot Village commenced in 2000 and relocation began in early 2002. Actual relocation of the three hamlets was completed in mid 2003 after house construction and completion of the necessary infrastructure (roads and electricity).

Valuable experience has been gained from the Pilot Village relocation, and has been used to modify future plans for the main resettlement process. Ongoing development and support is being provided, and further lessons are expected to be generated. The major lessons learned to date relate to topographical and soil surveys, size and location of paddy land attributed to each household, structure of the villages, and design and construction of the irrigation system. In addition, it should be noted that the consolidation of disparate villages from different ethnic groups into a single community has not posed any problems.

Resettlers Health Plan

The Project will fund a health programme for the benefit of the resettled people to compensate for any non-mitigatable adverse health effects. Health monitoring will take place twice per year per person in all resettled communities. The health programme will follow GOL national and provincial policies and targets and, in the long term, combine health care activities with GOL provincial and country-wide programmes.

Regarding AIDS, there will be concentrated campaigns (and availability of condoms) for the resident rural and town communities as well as the workforce. Training, equipment and supply will be provided to local medical staff.

Downstream of the Nakai Dam

The riparian study that will take place in 2004 will help develop the Project strategy in terms of compensation and management in the section of the river from the Nakai Dam to the Theun Hinboun headpond.

Xe Bang Fai

Baseline

People & Population

Unlike the Nakai Plateau, the downstream communities consist of Lao Loum and Lao Theung groups.

Application of the World Bank OD 4.20 indicates that the Lao Loum groups (Lao, Phou Thai, Lao Kaleung and other Tai groups) do not qualify as ethnic minorities, due to their lack of collective property, the presence of institutions that are integrated into the formal political system, exposure to market economics, Lao or similar language to Lao and identification with the main official category of Lao Loum.

The Lao Theung groups (Brou or Makong, Khamu and other small groups) exhibit considerable degrees of assimilation in relation to the dominant lowland culture but, nevertheless, have retained some ethnic minority characteristics, including less integration into market place economics and some degree of ethnic language and self-identity. However, it should be pointed out that many Brou groups strive to identify themselves with the dominant culture and there are no taboos against inter-marriages or co-habitation in the same village. The situation is fluid and all indications point to a merging with the dominant culture.

Along the upstream of the Upper Xe Bang Fai a total of 537 households are present in twelve villages. The two main groups represented are the Kaleung (36%) and the Brou (61%). In the Upper Xe Bang Fai a total of 852 households are present in twelve villages, 75% of which are Tai Lao, and 10% Brou. The twelve villages located on the Middle Xe Bang Fai have a total of 668 households, 56% of which are Phou Thai, 37% Tai Lao, and 5% Brou. The Lower Xe Bang Fai is characterised by densely settled agricultural areas within the floodplain (53 villages, 5,003 households). Ethnic groups in this region consist of lowland Lao (52%) and Phu Thai (41%), with small enclaves of Upland Tai (2%) and Khamu (4%) (RAP 2003).

Livelihoods

Agricultural Production

Food security in the lowlands is less of an issue in terms of crop production. The key to improving the economic situation of the region lies in increasing agricultural productivity, and GOL has embarked on a major programme of irrigation development along the Xe Bang Fai. Currently, only 14 of the 89 villages along the whole of the Xe Bang Fai do not have irrigation pumps (RAP, 2003). Although most of the pumps are electric, 14 run on diesel, which is inefficient and costly. In addition, some of the diesel pumps are also in bad repair, with the result that the total irrigation potential of even currently installed pumps and systems is not fully utilised.

The total area of developed paddy in the 89 Xe Bang Fai villages is about 14,120 ha, of which 10,536 ha are used for wet season paddy, and 5,306 ha for dry season paddy, with about 3,840 used for both wet season and dry season paddy. On average, the paddy area per household is 1.2 to 1.3 ha upstream of upper, upper and middle Xe Bang Fai, and 2.1 ha in the lower Xe Bang Fai. It is estimated that there is an extra 2,223 ha of dry season irrigated paddy which could be irrigated if current pumps and irrigation systems are repaired and improved.

About half of the households along the Xe Bang Fai grow vegetables in riverbank plots during the dry season, with an average size of 1,600 m² per household (RAP, 2003).

Livestock & Animal Husbandry

On average a household raises two to three head of cattle, one pig and ten chickens (RAP, 2003). Buffalo is the main source of draft power for land preparation, although power tillers are becoming more common, particularly in the larger and more prosperous roadside villages. Cattle are a form of savings, and when needed they are sold for cash to meet household expenditure requirements.

Fisheries & Aquaculture

Villagers fish intensively at the subsistence level. The only commercially active fishing village is Ban Na Kio, located on the confluence of the Nam Phit and the Xe Bang Fai. The percentage of fish caught that is sold in local markets varies along the different sections of the Xe Bang Fai and among households (over 50% in the Upper Xe Bang Fai). Fish is an important part of the diet and the main source of protein.

Rivers are viewed as a community resource which belongs to everyone, and so there are no explicit "property or exploitation rights". People use a variety of techniques, and exploit all species (not only fish, but also larvae, snakes, frogs, invertebrates) where possible, including in the Xe Bang Fai and its tributaries, in paddy fields and in other small bodies of water.

On average, households catch several kilogrammes of non-fish aquatic products monthly. The most productive months correspond with the rainy season, from April to October. This is specifically significant for the tributaries of the Xe Bang Fai. The types of equipment most commonly used during the dry season are scoop nets, 3 cm gillnets, long-line hooks and hand spears. During the wet season, single hooks, lift nets, long-line hooks, bamboo traps and catfish hooks are most commonly used.

Aquaculture is not well developed in the lowland communities. One reason might be the relative abundance of indigenous fish within the river itself. The lack of infrastructure and a well-developed market system or transport services are other explanations, as well as a lack of appropriate techniques. There is a significant opportunity to develop and expand aquaculture within the region.

Income

In 2001, household incomes were highest in upper Xe Bang Fai, and lowest in the Middle Xe Bang Fai (GOL, 2001). The average income per year of 6.1 million Kip in all downstream communities is more than three times that reported for the Nakai Plateau in 1998 (1.9 million Kip). However, because of the devaluation of the Kip between 1998 and 2001, the US\$ averages show less difference: US\$ 664 in the lowlands compared to US\$ 450 on the Plateau.

Off-farm sources account for a considerable amount of income for many lowland communities. Income from shops varied from 1.8% to 5.6% on average per household in the lowland areas and 1.4 to 8.2% for income from services. Wages in private and public sectors and pensions accounted for 28%. This reveals that the economy appears to be more diversified in relation to sources of income. Nakai Plateau households derived far less income from wages (8% to 11%, 1996-98).

Infrastructure

The recently built transmission line from Thakhek to Nakai also distributes electricity to the Mahaxai area. Recent rural electrification projects, in particular the Southern Provinces Rural Electrification Project, have been expanding the distribution grid to the Xe Bang Fai region. In the lower Xe Bang Fai most of the villages are now connected to this distribution grid.

In Xe Bang Fai and Nam Kathang communities, nearly 40% of the population obtains domestic water supply directly from the river (GOL, 2001). On average, only about 20% of the population has some type of sanitary facility.

Highway No.13 is paved and has recently been upgraded for most of the route. Highway No.12 and the section of Road 8b below the escarpment (i.e., Thakhek through Gnommalat to the proposed Power Station site) are gravel (lateritic) surface roads of acceptable quality. Most of the bridges along this route have been replaced and are now of good quality. Access tracks into the villages of the middle Xe Bang Fai are of poorer quality.

Education

Although the education status is slightly better than on the Nakai Plateau, many schools do not always function properly, due to the lack of equipment and the often insufficient qualifications and experience of teachers.

Approximately 32% of adults are reported to be illiterate, but in all probability there are more who are functionally illiterate, having attended only a few years of school and not practiced reading and writing. Only 12% have attended secondary school, and about 6% have progressed beyond secondary school (RAP, 2003). Education level on the lower Xe Bang Fai is significantly higher than in the rest of the lowland areas.

Public Health

Apart from malaria, which is suspected to have a higher occurrence rate here, dengue haemorrhagic fever and schistosomiasis, which have not yet been reported in the area, the Project Area is fairly representative of public health problems occurring in the country as a whole. Access to medical facilities, use of mosquito nets and nutritional status is in most respects better in the lowland areas than on the Nakai Plateau.

Infectious Diseases

In 2001 about 7% of the surveyed population was reported to be suffering from an illness, with acute malaria the most frequently reported. Other signs of illness included coughing, skin eruption and difficult breathing. The two groups with the highest suspicion of malaria were the age extremes: children under five (18%) and adults over 60 (12%). However, blood analysis for the malaria parasite revealed very few positive cases. Approximately 97% of the population use bed nets to prevent malarial infection through mosquito bites (compared to the rural Laos average of 78%) (RAP, 2003).

Reproductive Health

The fertility rate among the sampled population in the lowland communities was 5.6 children born per woman, (against a national average of 4.9). The crude birth rate is 32.4 per 1,000 (34.0 at national level) (GOL, 2001). The maternal mortality ratio was found to be 133 deaths per 100,000 live births, significantly lower than the national average of 530 per 100,000.

Nutritional Status

Overall, the health profile appears to be poorer than that of other rural communities. The basis for this is a generally worse nutritional profile. Though people supplement their protein intake with fish, other sources seem to be inadequate. Other components of the diet (leafy green vegetables, protein and iron-rich food and eggs) are consumed more rarely.

The problem is critical for children under 5, who when compared to the national level, are more wasted (20% versus 14%), stunted (62% versus 44%) and underweight (66% versus 42%). The situation is better for adults, who are slightly less malnourished (2%)

and underweight (3%) than the national average (respectively 3% and 4%).

Impacts

Changes in the flow of the Xe Bang Fai will have direct impacts in terms of hydraulics and water quality, which in turn will have various secondary impacts in terms of aquatic biodiversity, erosion and livelihoods.

Domestic Water Supply

A proportion of communities residing along the Xe Bang Fai obtains domestic water supply directly from the river. Therefore any negative changes in water quality highlighted in the analysis in Chapter 3 could impact the domestic water supply of these communities with possible health implications.

Fisheries

The main impact for livelihoods is expected to be on fish resource, due to the changes in water quality, hydraulics and morphology of the river. However, uncertainties in these changes and lack of knowledge on the Xe Bang Fai fish biology make the assessment of the fish losses very difficult, for both the Xe Bang Fai and its tributaries.

Loss estimates for the potentially affected area could be in the order of 400 to 500 tonnes/year for the first year, corresponding to a 33% to 37% loss (RAP, 2003). This would represent a cash income loss ranging from 0.5% (Nam Kathang/Nam Gnom areas) up to 4.6% (upper Xe Bang Fai). In terms of imputed income, the decrease would be around 5% on the whole downstream area (RAP, 2003).

Erosion

Changes in the hydrology of the Xe Bang Fai will result in an increase of the rate of erosion whilst the Xe Bang Fai readjusts its morphology. The process of adjustment to the river morphology is likely to be slow and obvious, which will give communities time to adjust without unpredicted losses to property or injury. However, there is the potential for some permanent structure to be lost or damaged as a result of this erosion.

Riverbank Gardens

In the dry season, riverbank villagers frequently cultivate vegetables in gardens on the riverbed and on banks for household consumption, and less regularly for trade. Raising the water level by up to 4 m will involve the likely loss of many of these arable areas. On the other hand, the greater reliability of irrigation water and the reduced costs for pumping will contribute to the maximization of irrigation potential in these areas.

Access

The increase in water level will also render current modes of crossing the Xe Bang Fai in the dry season no longer possible. These current modes include temporary bamboo bridges or walking across rapids.

Construction Workers

The potential impacts from the influx of construction workers and construction traffic will be similar to those identified for the Nakai Plateau.

Mitigation, Management & Monitoring

Xe Bang Fai Strategy

The objective of mitigation prior to Project Operation is to limit impacts related to water quality and erosion. The planned mitiga-

tion and compensation programme consists of the following components:

- Partial clearance of biomass in the reservoir, to mitigate against adverse impacts from water quality;
- Design and construction of a large regulating pond to mitigate against fluctuations in discharge (from the Power Station) and thus in levels of the Xe Bang Fai;
- Construction of the Downstream Channel instead of using the Nam Kathang, mitigating against erosion that would occur in the smaller Nam Kathang, which would affect both people living near the Nam Kathang, and Xe Bang Fai water quality and fisheries;
- Installation of an aeration weir in the downstream channel, and aeration structures in the Nam Kathang release, to mitigate against low oxygen water;
- River bank protection at Nam Phit (downstream channel) and Xe Bang Fai junction to mitigate against erosion;
- Compensation for any loss or damage to permanent structures where it is not economical to implement bank protection and stabilisation; and
- Agreement in the PPA to shut down the power plant during over bank flooding, to mitigate against flooding in the wet season.

To determine the impact on livelihoods, health and the fisheries of the Xe Bang Fai communities, several consultation and socio-economic surveys will be carried out prior to and during Project operations.

Details of the costs and schedules for all these activities are presented in the Xe Bang Fai Strategy in the RAP, which is designed to mitigate and compensate against adverse impacts.

Domestic Water Supply

In addition, rather than speculating on the quality of waters in the Xe Bang Fai during the early years, and its suitability for domestic use, the Project is prepared to support the development of other sources of domestic water. In those villages where it is assessed that some or all of the villages depend partly or fully on the Xe Bang Fai for household water use, then alternative sources of domestic water may have to be provided.

Fisheries

A fisheries replacement programme will be implemented, aiming at developing systems for raising fish, which could replace the loss in the Xe Bang Fai due to the Project. Alternative or replacement fish production systems could include fish ponds and rice fields (modified to provide fish refuges). The exact method developed will vary depending on: i) topography and geography, ii) the surrounding farming systems; iii) the availability of land; iv) the requirements of the villages and markets; v) the cost of operation/maintenance; and vi) a range of other factors.

Erosion

For impacts on community infrastructure resulting from increased erosion, both remedial mitigation measures, such as bank protection, and asset and livelihood compensation will be considered. NTPC will implement the most appropriate measure or combination of measures on a case-by-case basis. Where feasible, the Project will assist in the relocation of buildings. Prior to COD a survey of assets along the river bank will be undertaken and mitigation and/or compensation will be planned. Following COD regular trips will be conducted by the Project to detect abnormal erosion and impacts on previously identified village infrastructure and livelihoods. Villagers will also be able to alert the District Compensation Committees of any abnormal erosion rates and affected infrastructure and livelihoods.

Riverbank Gardens

In cases where riverbank gardens are unable to be relocated further up in response to increased water levels, then NTPC will assist in re-establishing gardening activities as requested by communities. NTPC will quantify the impact on riverbank gardens by means of: i) baseline socio-economic surveys; ii) a study of river gardens in each village, in terms of "gardening system", tenure, and income or food productivity two years prior to COD; and iii) consultation with villages. Following COD, and if required by a particular village, a study will be undertaken to assess the actual effect on riverside gardens.

Access

Since temporary modes of crossing the Xe Bang Fai in the dry season will no longer be possible, the impact on such access needs to be determined. A study will investigate objectives, means and infrastructure used to cross and prediction of the impacts will be made. NTPC has committed to the purchase of additional boats to the concerned villages.

Regional Health Programme

The Project's Regional Health Programme is designed to directly mitigate against any adverse health effects due to increased construction population and to raise the health standards of the local population. The objective is to combine the Project's health care activities with the GOL provincial and countrywide programmes. To achieve this it will be necessary to: i) inform communities on endemic diseases, control programmes and correct health care measures; ii) ensure a sufficiency in essential drugs; iii) train and transfer appropriate technology among health workers; and iv) provide support to disease control programmes.

Nam Kathang

Baseline

Along the Nam Kathang a total of 1,161 households are present in 17 villages (GOL, 2001). Communities mainly consist of Lao Loum, including eight Lao Kaleung, two Phu Thai and one Tai Bo dominated village. The Makong ethnic group is predominant in five of the villages. The district centre of Ban Gnommalat Tai has a very diverse composition of groups.

The Nam Kathang area, with its dependency on paddy cultivation and fishing, is typical of many lowland areas in Lao PDR. However, the communities are less reliant on fish than communities of the Xe Bang Fai. In addition to the importance of rice and fishing, dry-season riverside gardens supply most of the vegetables for local consumption, with over 50% of households using an area of riverside garden.

Issues concerning development of the agriculture sector are inefficiencies in land and water use, amount of fallow land and frequent crop loss due to flooding or drought conditions, compounded with the continued use of marginal land and the shifting cultivation system common to this region.

Lowland communities have started targeting other sectors of employment including commercial development of livestock and forest products.

Education and health issues are similar in type and extent to those highlighted for the Xe Bang Fai communities.

Impacts

The Project will release from the regulating dam a discharge equivalent to its natural flow into the Nam Kathang. The hydrology of the Nam Kathang will remain unaltered and therefore no

significant impacts are expected on access across the river, riverbanks gardens or flooding for the communities that reside there. Although modelling has indicated that water quality, in terms of dissolved oxygen, will be adequate in the Nam Kathang, any water of poor quality released from the power station may impact communities utilising surface water for domestic use. Adverse water quality conditions coupled with impacts on the Xe Bang Fai may negatively affect the fisheries of the Nam Kathang.

Mitigation

An aeration structure has been included in the design of the Nam Kathang release from the regulating dam to help improve water quality for the communities downstream. The Project commitments to providing the Nam Kathang communities with domestic water of adequate quality are the same as outlined for the Xe Bang Fai above. A survey will identify those communities currently using surface water as their main source of domestic water and then may provide an alternative source of domestic water as necessary.

Impacted households will be monitored using similar questionnaire base surveys as those that will be used for the Xe Bang Fai. These surveys on the Nam Kathang will focus on the fisheries catch, with a negative change triggering the implementation of compensation activities to restore cash and/or imputed income from any losses in fish catch.

The Nam Kathang communities will benefit from the Projects Regional Health Programme presented in the Xe Bang Fai section earlier.

Project Lands

Baseline

The baseline data, in terms of land/assets and livelihoods, is currently being acquired as part of the compensatory and management process.

Impacts

In total 11,536 ha of land could potentially be impacted to some degree by the construction of the Project. Lands will be leased by GOL to NTPC and will be of sufficient size to enable NTPC to carry out construction and operation of the Project. Project construction activities will require the acquisition or use of land, and this will require compensation to the current owners for the loss of land, loss of livelihoods generated from that land, or for loss (or relocation) of assets on that land. The acquisition of Project Lands for construction will result in a range of impacts including disturbance and temporary or permanent land acquisition, all of which will require compensation to project affected persons (PAP). Two main categories of Project Lands are defined: i) Category 1 – exclusive occupancy rights; and ii) Category 2 – co-existent but dominant occupancy rights.

Mitigation & Management

A "Baseline Study" will be conducted to identify and catalogue all land and assets, including man-made improvements, that will be affected by construction, excluding the reservoir area. A list of fifty-seven Project Lands, as defined in the Concession Agreement, and the areas required for construction within these Project Lands are identified in the RAP. Areas to be surveyed will be for the construction of the Nakai Dam, the saddle dams, the Power Station, the Headrace Channel, the Power Conduit Intake Structure, the SubStation, the Regulating Pond, the Regulating Dam, Residence Nam Theun, quarry areas, work camp areas, as well as the cor-

ridors for the 500 kV and 115 kV Transmission Lines, and for all roads to be upgraded and constructed.

The objectives of the Baseline Study are:

1. To produce maps and a database of land, assets and livelihoods directly affected by the construction on Project Lands, and an assessment of the extent of both direct and indirect impact on these;
2. To produce a registry of all assets and land areas within Project Lands, outside the Nakai reservoir; and
3. To make: i) an estimation of current value and/or productivity of these assets, land areas and livelihoods within the Project Lands; ii) an estimation of degree of impact on villagers' assets, land and livelihoods in relation to total villager assets and livelihoods; and iii) a compensation recommendation.

The Baseline Study will be in two phases. Phase 1 will consist of mapping and database development based on satellite interpretation and Phase 2 will consist of a field survey to confirm land/assets location, dimensions and ownership.

Initially, high resolution satellite imagery will be acquired and onscreen digitization carried out to identify and catalogue the various types of land and assets. Phase 1 for all Project Lands from Ban Oudomsouk to the Downstream Channel confluence with the Xe Bang Fai has already been completed, representing 32 of the 57 Project Lands. Starting in the dry season of 2004, prior to the commencement of the Preliminary Construction Works, a ground study will be undertaken to identify and catalogue all man made improvements on Project Lands.

Following the ground study, NTPC and GOL, in consultation with the PAPs will develop a compensation scheme applicable to the impacts and conditions for each Project Land. A value will be placed on the assets or land affected, following guidelines given in the Asset/Land Compensation Agreement. Estimation of asset/land value may be based on local market replacement value or importance of that asset/land to PAP livelihood. An agreed schedule of base asset value will be determined after consultation with NTPC, RMU and the district government. The agreement will also specify the type of compensation applicable to each PAP, whether in cash, in kind, as rehabilitation or some other form.

Further details on the interpretation of imagery, list of asset types, indicative compensatory scheme and values allocation are presented in the RAP.

Monitoring

To help ensure that the RAP is implemented successfully and livelihoods have improved after resettlement, a monitoring programme will be implemented. This monitoring will also ensure that activities for the Xe Bang Fai and Project Lands are implemented successfully. The programme will consist of two components: i) internal monitoring; and ii) independent external monitoring.

Internal Monitoring

Internal monitoring will focus on the physical progress of resettlement implementation and activities for the Xe Bang Fai and Project Lands against the schedule in the RAP. The Resettlement Office

will be responsible for monitoring of the infrastructure construction and activities, and will report quarterly to the RMU and the Resettlement Committee. By comparing progress on the ground with the implementation schedules, the RMU can identify areas of weak implementation and take remedial action. For those problems requiring decisions from higher authorities, the RMU will report to the Resettlement Committee.

External Monitoring

Independent external monitoring will be carried out by a third party, focusing on changes in social and economic conditions of individual households. Based on existing socio-economic characteristics of the villages and the type of rehabilitation and relocation schemes to be implemented, a set of indicators will be developed for affected households and villages, including income level, sources of income, food sufficiency, basic health and education conditions, women's status, etc. The monitoring and evaluation will last for the duration of the period of implementation of the RAP, which is likely to be over a period of nine years.

The Social and Environmental Panel of Experts will also support this external monitoring.

Grievance Procedure

Even among well-planned resettlement and compensatory programmes, individual or village complaints are bound to arise. To ensure that the basic rights of PAPs are protected, concerns adequately addressed and entitlements delivered, a grievance procedure will be implemented.

A Project Grievance Committee will be established and will be headed by a senior provincial official. Other members of the Committee will come from the Justice Department, the Lao Women's Union (LWU), the Ethnic Council and one member will be from the Resettlement Committee. The Committee will have the capacity to deal with complaints and grievances brought to it by claimants.

If an affected person is not satisfied with the compensation package or if, for any reason, the compensation does not materialise according to the agreed schedule, he or she has the right to make a claim. There are three steps to resolve grievances, from the local level District Resettlement Working Group (step one) to the Resettlement Management Unit (step two) up to the Grievance Committee (step three). Beyond the Grievance Committee, access to the courts is a last resort. Details of this procedure are given in the RAP (2003).

Enhancement of Capacity

Given that the RMU and District Resettlement Working Groups have been recently established in Lao PDR, and that the institutional capacity in local government, including provincial, district and village bodies needs further development, a training programme will support the implementation of the RAP. The RAP is designed to build the institutional capacity required to assist delivery of benefits from the creation and operation of the Nakai Reservoir. Provision for institutional strengthening is discussed in detail in the Concession Agreement and the RAP (2005).

