

CHAPTER - 2

RESETTLEMENT CONTEXT & BACKGROUND

2. RESETTLEMENT CONTEXT & BACKGROUND

2.1 SOCIAL & ECONOMIC BACKGROUND OF PROJECT AREA

2.1.1 LOCATION

The NNHP is located on the Nam Ngiep River, a Left Bank tributary of the Mekong River. The Nam Ngiep River joins the Mekong River at Pakxan, a small city located only 120km by asphalt road from Vientiane. The Nam Ngiep River originates in Xieng Kouang Province and runs for about 160km before joining the Mekong River, 1,300m lower in elevation.




The western and northern edges of the basin form a vast cirque with very steep sides due to headward erosion, while only outliers remain of the eastern rim which separates this basin from that of the Nam Xane River. The maximum altitude of the ridge separating the two basins is 2,819m, in the middle of the western edge of the Nam Ngiep catchment area.

At the confluence with the Mekong River, the Nam Ngiep catchment area is 4,510km². The 55km of river stretch are located in a narrow valley, with a steep slope as the river loses about 1000m in elevation. Then the valley widens for about 70km, with large, partly cultivated alluvial terraces. Then the valley narrows again over a few km before joining the wide alluvial plain where it eventually joins the Mekong River. The proposed dam will be located in a narrow gorge just before the river enters this alluvial plain, about 24km upstream from the Nam Ngiep's confluence with the Mekong River.

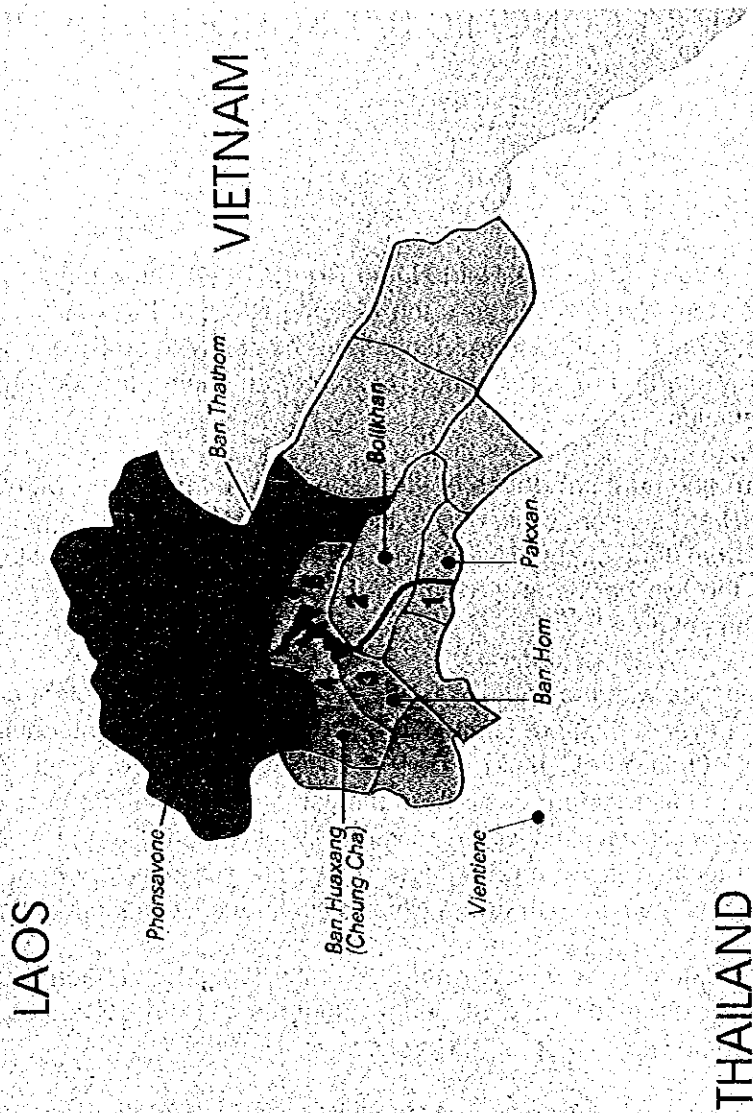
Most of the 70km of wide valley, where several villages have been established, will be flooded by the reservoir, at FSL.360m. Figures 2.1 and 2.2 present a boundary orientation and a sketch map of the study area.

At the dam site, the controlled catchment area is 3,700km² or 82% of the total catchment. Downstream of the dam site, the largest tributary of the Nam Ngiep on its Left Bank is the Nam Xao River, with a catchment area of 310km². The remaining 500km² catchment consists of a smaller tributary, the Nam Tak River, and the drainage of the plain near Pakxan.

The river is intensively used for fishing and transport of goods and peoples by boat in its lower 50km, until rapids located a few km downstream the dam site impede any navigation.

-  Bolikhamxay Province
-  Xiengkhouan Province
-  Xaysomboon Province

- 1 Pakxan District
- 2 Bolikhan District
- 3 Hom District
- 4 Xaysomboon District
- 5 Thathom District
- 6 Khoune District

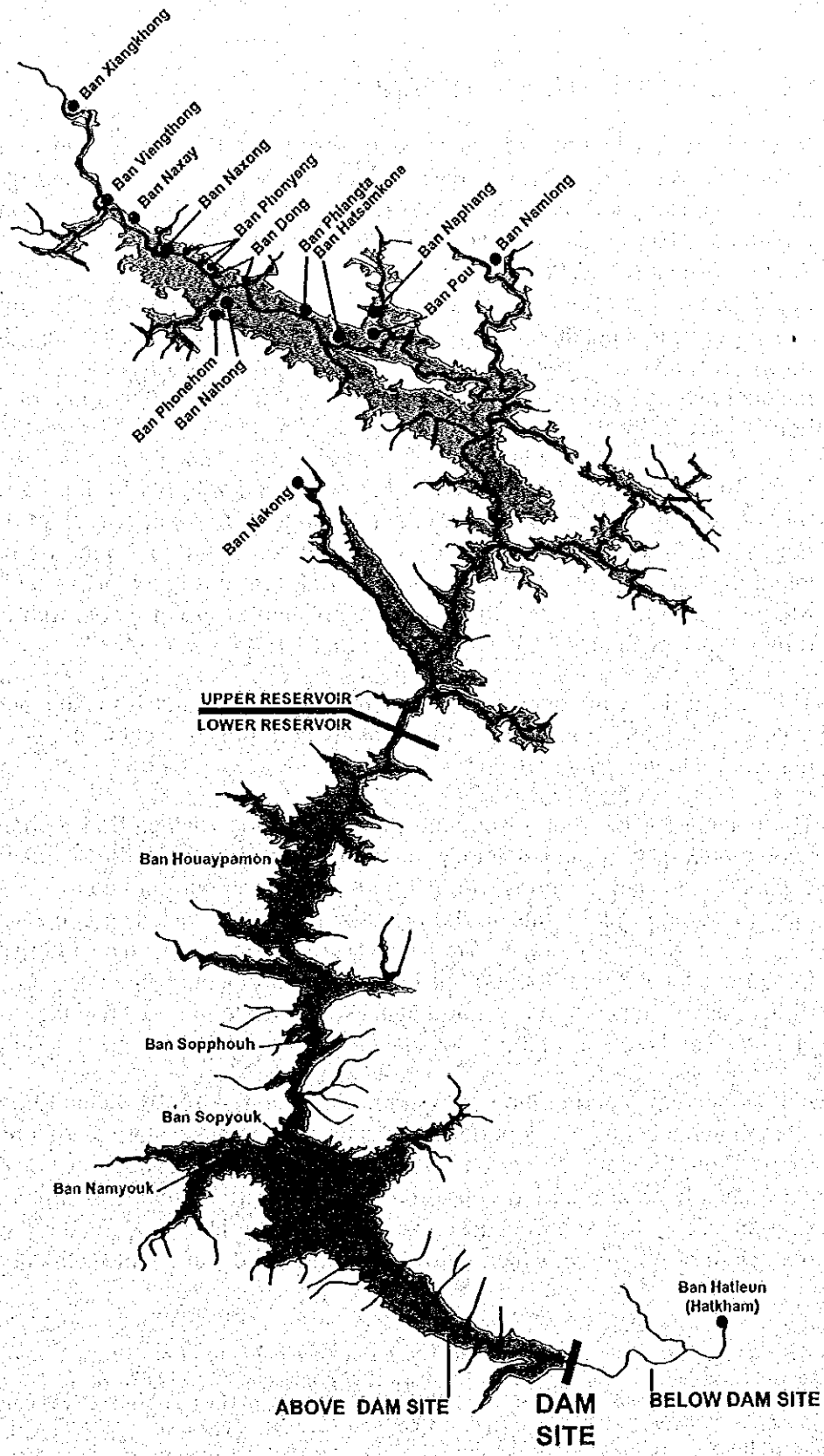


FEASIBILITY STUDY
 ON THE NAM NGIEP-1 HYDROELECTRIC POWER PROJECT
 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
 JAPAN INTERNATIONAL COOPERATION AGENCY




First Environmental Impact Assessment

Figure 2.1

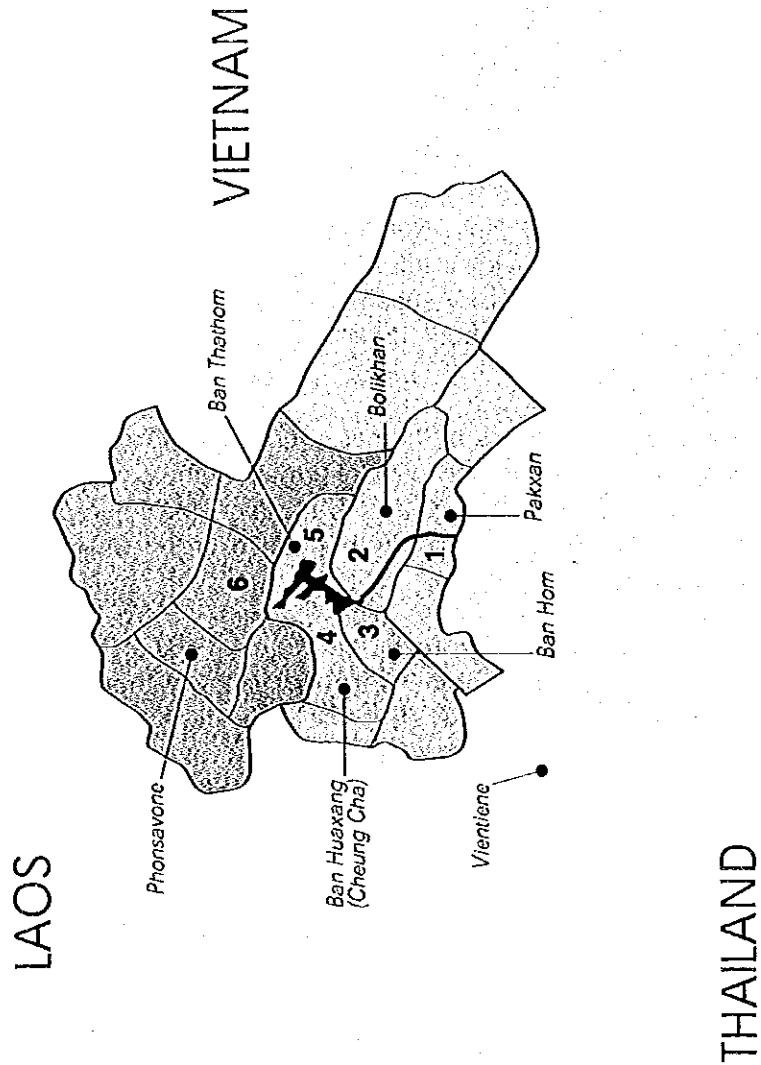
Boundary Orientation Map



<p>FEASIBILITY STUDY ON THE NAM NGIEP-I HYDROELECTRIC POWER PROJECT IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC JAPAN INTERNATIONAL COOPERATION AGENCY</p>	<p>First Environmental Impact Assessment</p>	<p>Figure 2.2 Study Area Map</p>
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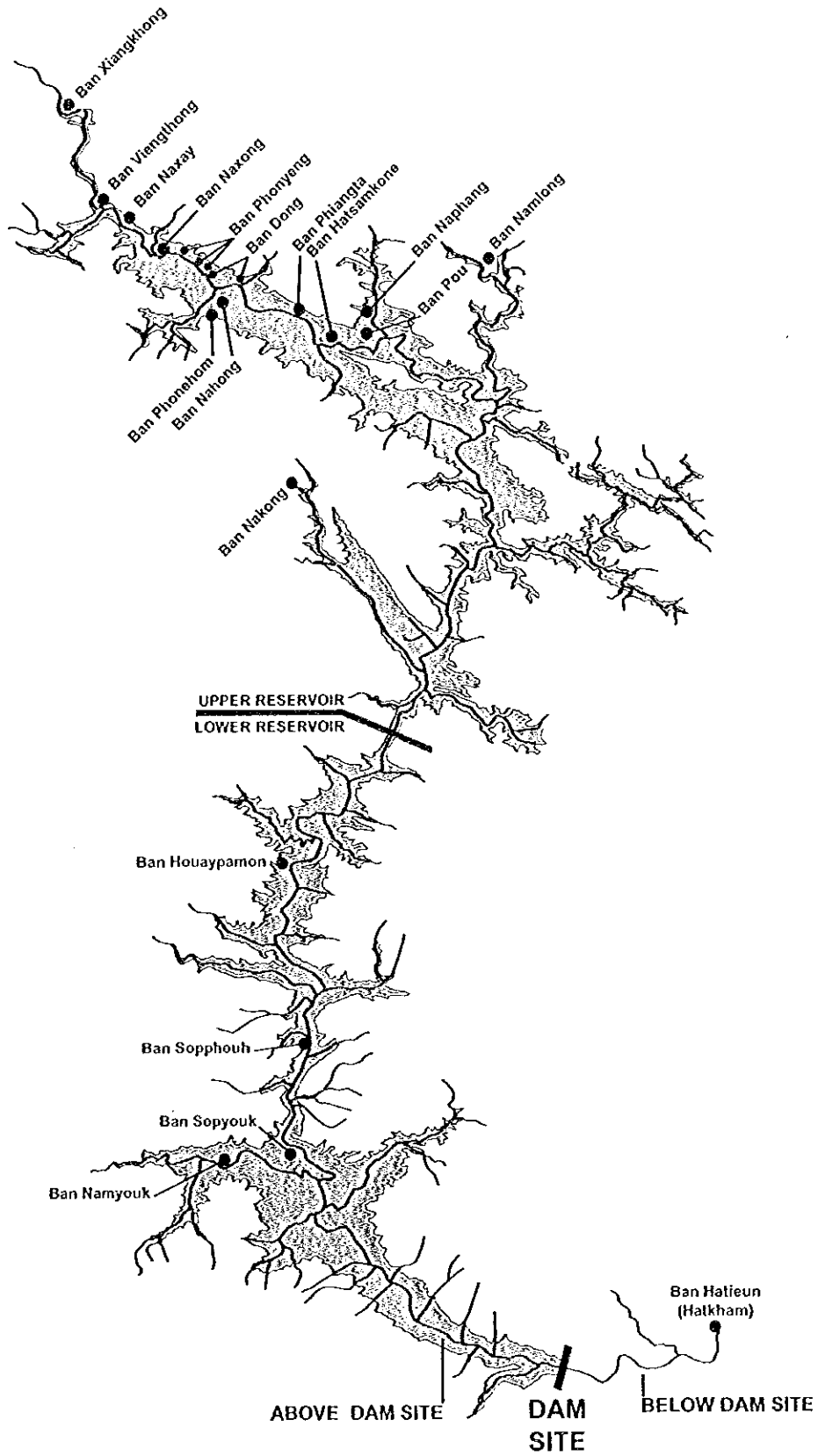
-  Bolikhamxay Province
-  Xiengkhouan Province
-  Xaysomboon Province

- 1 Pakxan District
- 2 Bolikhan District
- 3 Horn District
- 4 Xaysomboon District
- 5 Thathom District
- 6 Khoune District



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First Environmental Impact Assessment Figure 2.1
Boundary Orientation Map



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Figure 2.2

Study Area Map

2.1.2 XIENG KHOUANG PROVINCE

Most of the catchment area is in Xieng Khouang Province, north of the proposed reservoir. Xieng Khouang is divided into seven (7) districts (Paek, Kham, Khoun, Phoukood, Nonghet, Mork, and Phaxay), five (5) of which are located on a mixture of lowland and hilly areas, and two (2) within mountainous areas. Lao Loum (Phuan), Lao Theung (Khamu) and Lao Soung (Hmong) are respectively 60%, 8% and 30% of the population. There has also been a large influx of Vietnamese since the Revolution. The province's population of approximately 200,000 people ranks Xieng Khouang 11th out of 18 provinces, and its low population density of 13 persons/km² is less than national average 20/km².¹ This population is in around 500 villages, of nearly 30,000 households.²

Xieng Khouang has a total fertility of 6.3 compared with 5.4 for the Lao PDR; a birth rate of 40.0, the same as the national rate of 40.0; a death rate of 14.0 compared to national 15.0; a 2.6 rate of natural increase of compared to 2.5 for the nation; and an infant mortality rate of 121.0, compared to 104.0 for the Lao PDR as a whole.³ Xieng Khouang also has a low distribution of population in urban areas, with some 7.0% in urban areas, compared with 17% for the Lao PDR as a whole.⁴

The altitude is at an average of 1,200m in central Xieng Khouang and "means an excellent climate – not too hot in the hot season, not too cold in the cool season and not too wet in the rainy season."⁵

The original capital, Xieng Khouang (now in Khoune District, Ban Siphom, the district headquarters), was almost totally bombed out during the Indo Chinese War, so the capital was moved to Phonsavan (57,000). On some current Lao maps, Phonsavan is labeled 'Muang Pek.' Outside the province most Lao, including Lao Aviation, still call the capital 'Xieng Khuang.'⁶ Traditionally, the area surrounding Phonsavan and the former capital of Xieng Khuang has been a center of Phuan language and culture. The Phuan, although classified as Lao Loum like the lowland Lao, have their own language of 'phuan' and are part of the Tai-Kadai family, like Lao, Siamese and Tai tribals.⁷

Although briefly a part of the Lan Xang Kingdom in the 1500s, Xieng Khuang has more often than not been an independent principality or a vassal state of Vietnam called Tran Ninh. From the early 1800s until 1975, central Xieng Khuang – including the Plain of Jars – has been a recurring battle zone. In 1832 the Vietnamese captured the Phuan king of Xieng Khuang, publicly executed him in Hué and made the kingdom a prefecture of Annam, in which the people were forced to adopt Vietnamese dress and

¹ Lao PDR. 1998. *Basic Statistics About the Socio-Economic Development in the Lao PDR*. Vientiane: State Planning Committee, National Statistical Centre. Xieng Khouang's 1997 population was 212,500. p. 18.

² UNDP. 1998. *Socio-Economic Profile of Xieng Khouang Province*. Vientiane: United Nations Development Programme. There were 506 villages and 29,298 households in 1997. Lao PDR. 1998. p. 22.

³ Lao PDR. 1998. p. 18.

⁴ Lao PDR. 1998. Table 14, p. 20.

⁵ Cummings, Joe. *Laos*. 1998. Hawthorne, Victoria, Australia: Lonely Planet. p. 223.

⁶ Cummings, Joe. *Laos*. 1998. p. 224.

⁷ Cummings, Joe. *Laos*. 1998. p. 224.

customs. Chinese Haw⁸ also ravaged Xieng Khuang in the late 19th century, which is one of the reasons that Xieng Khouang accepted Siamese and later French protection later in the century.⁹

During the Indo Chinese War the province was a major battlefield and underwent almost daily bombing by American planes as well as ground combat between the US-trained and supplied Hmong army and the forces of the North Vietnamese and Pathet Lao. A single 1969 air campaign annihilated at least 1,500 buildings in the town of Xieng Khuang, along with some 2,000 more on the Plain of Jars, erasing many small towns and villages off the map permanently. Continuous saturation bombing forced virtually the entire province to live in caves. An enormous amount of war debris and unexploded ordnance (UXO) spread across the central and eastern areas of the province "are a deadly legacy that will remain for generations."¹⁰

In Nam Ngiep Project Area, Xieng Khouang is ranked second (after Savannakhet) among provinces contaminated by UXO, Xaysomboon is 7th, and Bolikhamsay is 13th out of the Lao PDR's 18 provinces. Defoliants were also used in these provinces. More than 1,100km² land estimated is estimated contaminated by UXO in Xieng Khouang, about 645km² of low land rice fields, 250km² of upland rice and 220km² of pasture. Unfortunately, while nationally the area under irrigated rice land production expanded dramatically 1995 to 1997, and (below) the same is shown to be the case for Xaysomboon and Bolikhamsay, figures for Xieng Khouang are not published in the 1997 census data.¹¹ So it is difficult to know the extent to which UXO contamination may have held back expansion of irrigated rice lands in the province.

A British NGO, the Mines Advisory Group (MAG) has worked in Xieng Khouang in the three districts of Pek, Kham and Khoun in Xieng Khouang since May 1994 through support of the Mennonite Central Committee (MCC). The MAG roving teams visited some 53 village in 1996, for instance, many more than once, and by 1997 had cleared 23.9ha and destroyed a total 11,800 pieces of ordnance.¹²

While Phonsavan is without good road access, leaving the Xieng Khouang plateau relatively isolated and remote, currently a major road reconstruction program is underway to remedy this situation; and an ADB-financed Power Transmission and Distribution Project is bringing electrification to Phonsavan for the first time.

Both of these developments have implications for the development of the NNHP's proposed Upper Reservoir area, since the upgrading of National Road 1 will

⁸ Also called the "Ho" this was actually a loose Chinese affiliation of looting mercenaries of various ethnicities, including Yunnanese, Black Thai and French Army deserters. Cummings, Joe. p. 15. "From the 1870s northern Laos increasingly was beset by invading bands of Chinese (Ho, or Haw) freebooters and bandits." *Encyclopedia Britannica* 1997 CD. The ethnic group itself, the Ho (or "Haw") is comprised of eleven Tibeto-Burman communities that arrived in northern Laos in the 1900s. Chazée, 1999. p. 133.

⁹ Cummings, Joe. *Laos*. 1998. pp. 223-224.

¹⁰ Cummings, Joe. 1998. p. 224. By the end of the War, the bombing throughout the country "amounted to approximately 1.9 million metric tonnes in all, equaling 10 tonnes per sq. km, or over half-tonne for every man, woman and child living in Laos." *Ibid.* p. 21.

¹¹ Lao PDR. 1998. *Basic Statistics about the Socio-Economic Development in the Lao PDR*. Vientiane: State Planning Committee, National Statistical Centre. Table 24, p. 37.

¹² Handicap International. 1997a. *Living with UXO, Final Report: National Survey on the Socio-Economic Impact of UXO in Lao PDR*. Report prepared for the Lao National UXO Programme (UXO Lao), Ministry of Labour and Social Welfare. Vientiane: UXO LAO, p. 11.

incorporate the old National Route 4 that passes through the villages in the proposed Upper Reservoir. The transmission line route for the above electrification project, from the Nam Leuk HEPP, will pass through the Upper Reservoir Area and extend rural electrification the Upper Reservoir villages as well.

Currently maize and a small quantity of rattan are exported to Vietnam. However, as pointed out by the recently published Watershed Management Study for the Nam Ngum Catchment Area, Vietnam presents an excellent potential as a future market for Xieng Khuang and the surrounding areas.¹³ This potential derives from its close proximity, historical political alignment, and high population density relative to cultivable land area. Another factor is in the Vietnamese consumer's culinary preference for a number of niche market items grown at high tropical elevations in addition to more common place products such as cattle and beef. These factors offer encouraging opportunities for upper watershed agriculture.

China is also a huge potential market for Lao produce, including all of the items demanded in Vietnam. Presently, for instance, dry season transport costs from Phonsavan to the nearest point in Yunnan Province are less than to Vientiane.¹⁴

A number of efforts are underway, and more can be expected, that might tap the comparative advantage of the region, given an upgraded transportation system. IFAD is introducing fruit and nut trees – macadamia, Japanese apricots, pears, grapes, and Japanese chestnuts – through planting of tree rootstocks in Xieng Khouang Province. Also the Xieng Khouang International Farm Ltd., a private concern, has introduced a dairy cattle farm, where it provides silage for cattle stock and is producing and selling milk.¹⁵

Phu (Mountain) Bia Mining Ltd. has a mining concession that extends over a 5,000km² area centered around Phonsavanh. The area takes in most of Xieng Khouang Province and the northern part of Xaysomboon. Phu Bia is currently exploring for copper and gold, taking sediment samples from streams, ridges or other potential sites for these minerals.¹⁶ Another concession in Xieng Khouang is held by Mekong Mining, about which the project has so far not learned much.

2.1.3 KHOUNE DISTRICT, XIENG KHUANG

This is a proposed resettlement site for the Upper Reservoir populations, many of whom have come from Xieng Khouang and specifically from Khouné District. It is north of the proposed reservoir area and in the south east of Xieng Khouang Province. This is the fourth most populated of Xieng Khouang's districts, with nearly 30,000 people, mostly *Lao Soung* (Hmong) and *Lao Loum* (Phouan). The district used to be site of the old royal capital of the Xieng Khouang Kingdom, now the district headquarters of Ban Siphom.

¹³ BCEOM. 1999. *Final Nam Ngum Watershed Management and Development Strategic Framework*, April 15. For Ministry of Agriculture and Forestry, Center for Protected Areas and Watershed Management. Asian Development Bank TA 2734-Lao, Nam Ngum Watershed Management. In Association with SEATEC and SEMED. p 58

¹⁴ BCEOM. 1999. p 58

¹⁵ BCEOM. 1999. pp. 170-171.

¹⁶ Handicap International. 1997a.

The present National Route 4 to be upgraded to National Road 1 passes through Khoune District following the Nam Ngiep River through the proposed Upper Reservoir area. The government plans to extend the national network with a center spine road National Road 1. This road is strategically important for the social economic development of the country and will run from the northern-most point of Lao's border with China to Cambodia in the south, adding another 1,000km to the network.¹⁷ The district will also benefit from the transmission line route for the ADB-financed Power Transmission and Distribution Project, since line is along National Route 4.

2.1.4 XAYSOMBOON KHETPISET (SPECIAL ZONE)

The entire NNHP reservoir will be within the *Khetsiset* (Special Zone) Xaysomboon. Formerly part of Vientiane and Xieng Khouang Provinces, Xaysomboon was set up on July 23, 1994 to give the area special preference for community development. This was felt necessary because the area, with a largely minority ethnic population of about 57,300, its geography of some 7,105km² is very rough and mountainous, and it has the lowest population density in the Lao PDR, about 8 persons/km² compared to about 20 persons for the Lao PDR.¹⁸ The development budget, which comes directly from the central budget, in 1998 was around 5 billion Kip, whereas income, derived mostly from taxes, generated from Xaysomboon itself was only around 450 million Kip.¹⁹

The steep and rugged terrain of the area has been largely stripped of its primary forest cover, and extensive grass lands and bush fallow mixed with active swidden plots prevail on the hillsides. A proliferation of narrow river valleys supports irrigated rice production on terraced fields.

Lao Soung (mostly Hmong) represent the majority of the population in the area (45%) followed by Lao Theung (mostly Kamu, 35%) and Lao Loum (20%) but these populations are well-integrated in confined roadside settlements.²⁰

During the Indo China War, Long Chen and Samthong in northern Xaysomboon were centers of a 10,000-man division of the Royal Lao Army made up of mostly Hmong under General Vang Pao, himself a Hmong. At that time the air base there made Long Chen 'the second-largest city in the country and one of the busiest airports in the world.'²¹ Tens of thousands of Hmong were encouraged to settle in Xaysomboon to clear more than 100,000ha of forest for cultivation and to remove cover of the Pateth Lao forces. Since then there has been a considerable out migration of Hmong to the Nam Xan River valley. Lao Loum and Lao Theung displaced by the war have made limited attempts to occupy some of the former Hmong settlements.²²

¹⁷ Sommad Pholesena. Director, Communications Department, Ministry of Communicant, Transport, Posts and Construction, 'Infrastructure,' in Economist Conferences, The. 1997. *The First Roundtable with the Government of the Lao People's Democratic Republic*, April 23-25, Vientiane, Lao PDR. Pp. 51-55.

¹⁸ Lao PDR. 1998. Table 12, p. 18.

¹⁹ Personal communication with Mr. Sombdy Keodalaven, General Director Cabinet Office, Xaysomboon Special Zone.

²⁰ BCEOM. 1999. *Final Nam Ngum Watershed Management and Development Strategic Framework*. April 15. For Ministry of Agriculture and Forestry, Center for Protected Areas and Watershed Management. Asian Development Bank TA 2734-Lao, Nam Ngum Watershed Management. In Association with SEATEC and SEMED. p. 46.

²¹ Cummings, Joe. 1998. pp. 19-21.

²² BCEOM. 1999. p. 46.

However, persistence of the banditry of the *chao pha*, the purported remnants of General Vang Pao's forces, has kept settlement largely confined to the perimeters of Highway 13-B. This highway, usually open during the dry season only, transects Xaysomboon and connects the administrative center Nam Chia²³ with National Road 13 at the market town of Houai Mo Tai in Vang Vieng District.²⁴ As an indication of the security uncertainties in the area, local insurance companies invalidate all policies on vehicles travelling in the Nam Chia area.²⁵ The following map shows Thaviang as the conjunction of planned National Roads 1 and 5, Highway 94 to pass through the Lower Reservoir villages at B.Namyouk and B.Namsouk, and a planned highway between National Road 94 and National Road 5 that would be within the reservoir area half of its length as shown in Figure 2.3.

Xaysomboon has five (5) districts, given below. There is a discrepancy between the total population figure in this table, obtained at Xaysomboon's Headquarters (52,456), and the census figure published by the National Statistical Centre (57,300):²⁶

Table 2.1: Xaysomboon Special Zone, Number of Villages and Population 1998

District	From Former Province	No. Villages	%	Population	%
Thathom*	Xieng Khuang	29	22%	7,934	15%
Thathom**	Xieng Khuang	29	22%	7,934	15%
Xaysomboon	Vientiane	26	20%	12,200	23%
Lang Xan	Vientiane	38	30%	17,480	33%
Poun	Vientiane	25	19%	8,830	17%
Total:		129	100%	52,456 ²⁷	100%

*NNHP Upper Reservoir is in this District

**NNHP Lower Reservoir is in this District

GOL has invested considerable resources in building up the administrative capital at Nam Chia with the improvement of roads and construction of offices and housing for civil servants, schools, health facilities and a central market.²⁸ Development in Xaysomboon is extremely limited, although a Taiwanese timber company is reported logging sandalwood trees in Xaysomboon district. Xaysomboon district (below) also contains part of the Phu Bia Ltd. mining concession for copper and gold, though exploration has not turned up commercial possibilities as yet.

Xaysomboon, which has 129 villages and 8,264 households, stands very low in most social indicators. Xaysomboon has a total fertility of 6.8 compared with 5.4 for the Lao PDR; a birth rate of 46.0 compared to nationally 40.0; a death rate of 16.0 compared to national 15.0; a 3.0 rate of natural increase of compared to 2.5 for the nation; and an infant mortality rate of 138.0, compared to 104.0 for the Lao PDR as a whole. In all these categories, Xaysomboon has the second least favorable ranking in each category among the other 18 Provinces that constitute the Lao PDR, with the exception of infant mortality, for which it has the highest mortality ranking among all the Provinces.²⁹ Xaysomboon also has a low distribution of population in urban areas, with some 8.5% in urban areas, compared with 17% for the Lao PDR as a whole.³⁰

²³ There are also references to the administrative center as 'B. Huaxang' and 'Cheung Cha'.

²⁴ BCEOM. 1999. pp. 45-46.

²⁵ BCEOM. 1999. pp. 57.

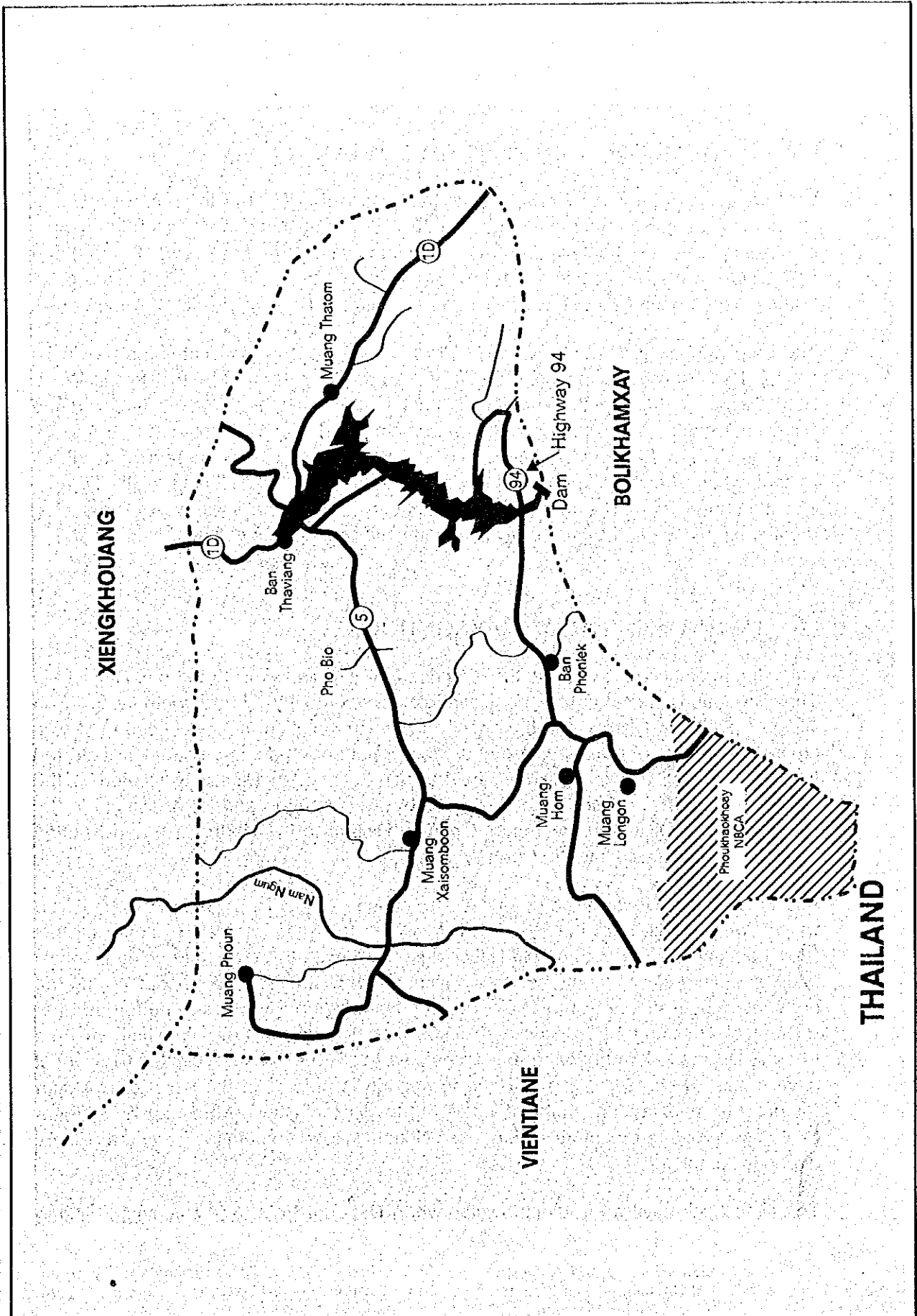
²⁶ Personal communication, *Ibid.* Lao PDR. 1998. *Basic Statistics. Ibid.*

²⁷ Total population as given by the Zonal Headquarters, differs from the National Statistical Centre's *Basic Statistics, Ibid.* Which also has two figures – 57,300 and also 54,068.

²⁸ BCEOM. 1999. p. 46.

²⁹ Lao PDR. 1998. *Basic Statistics. Ibid.* Table 15 & 16, pp. 21-22.

³⁰ *Ibid.* Table 14, p. 20.



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	Road Map in Xaysomboon Special Zone	

2.1.5 XAYSOMBOON DISTRICT, XAYSOMBOON

While not within the Project area, this district just to the West of the proposed Upper Reservoir Area could become a resettlement site. The district has about 11,600 people in 23 villages. The majority is *Lao Soung* (Hmong), with some *Lao Thung* (Khamu) and *Lao Loum*. It was formed in 1994 from a part of Vientiane province, and some of its villages were transferred to the administrative control of Phoune District, Xaysomboon.

The District is in the central northern part of Xaysomboon and includes the provincial capital, Ban Huaxang (Cheung Cha). It is bordered by Phoune District to the West, Hom District to the South, Thathom District to the East and Phaxay and Khoune Districts (Xiengkhuoang) to the North. One major road, National Route 13B, traverses the District West-East and provides access to the Thaviang sub-region of Thathom District, where the NNHP proposed Upper Reservoir is located. It is in relatively good condition and is used in both wet and dry seasons. However, security problems in N. Vientiane province and Eastern Xaysomboon itself limit access at times.³¹

2.1.6 THATHOM DISTRICT, XAYSOMBOON

The Upper Reservoir Area of the proposed NNHP is within Thathom District, in Thaviang Sub-District. With a population of approximately 7,500 people living in 33 villages, Thathom District has the second lowest population in Xaysomboon. It was created in 1994 from Mokmay District in Xieng Khouang and some villages transferred from Bolikhan District in Bolikhamsay Province. Thathom District is located in the North East of Xaysomboon. It is bordered by Xaysomboon and Hom districts in the West, Bolikhan District in the South, Mokmay District to the North East, and Khoune District (Xieng Khouang) to the North West.

Access to the District headquarters of B.Thathom, located on the Nam Xan River, which runs parallel to the Nam Ngiep River to East, is via Bolikhan District (Bolikhamsay) in the South on old National Route 4, with travel by road being possible in dry season and by boat in the wet. Xaysomboon District can be reached during the dry season by National Route 13B, when the Nam Ngiep River has to be forded near B.Dong of Thaviang Sub-District. At times it is possible to travel to Thathom from Khoune District in Xienghouang, but access via this route is usually limited to 6-wheel drive trucks. Access also limited due to security problems in the north of Bolikhan District (Bolikhamsay) and in the south of Khoune District (Xieng Khouang).³² Thathom District soon opened up more as proposed National Road 1 south is built and a military airport is completed.³³

The district will have a strategic location when National Road 5 is completed, linking

³¹ Handicap International. 1997c. *Province and District Report – Saysomboune Special Zone: National Survey on the Socio-Economic Impact of UXO in Lao PDR*. Report prepared for the Lao National UXO Programme (UXO Lao), Ministry of Labour and Social Welfare. Vientiane: UXO LAO.

³² Handicap International. 1997a. p. 11.

³³ Handicap International. 1997a, p. 17.

Thailand through Vientiane to Vietnam as shown in Figure 2.4. The junction of NR 5 and NR 1 will be in the Thaviang Sub-District of Thathom, the Upper Reservoir Area of the NNHP. While NR 5 is planned as the main east west link, the access road to the proposed Nam Ngum 3 HEPP is likely to be a parallel or even a substitute link. The Ministry of Transport has already spent approximately US\$3 million, with the military carrying out the construction, to link Vientiane via Highway 13B near Viangivang to the proposed site and by a pilot track further eastward. The pilot track connects to old National Road 4 (the to be upgraded National Road 1), just north of Thaviang. The road may be upgraded further through a \$50 million grant, though this is not as yet confirmed.

A 158km, 115kV transmission line from the ADB-financed Power Transmission and Distribution Project (Loan No.1558-LAO(SF)) is bringing rural electrification to Thaviang's villages in the Upper Reservoir Area as shown in Figure 2.4. The transmission line is bringing power from the Nam Leuk HEPP to the Xieng Khuang Municipality (Phonsavan). The final completion date of the Project is scheduled in December 2001.

Thathom District overall has also been targeted as a 'Priority District For Development,' with population in the district is increasing due to the relocation of people from Xieng Khouang and Houaphan provinces. In addition, some of the local villagers are resettling in areas they know will be near services, such as the proposed major new highway, National Road 1, which runs through Thaviang Sub-District, and along which most of the villages that would be resettled in the proposed Upper Reservoir are located.³⁴

As in Xieng Khouang Province, it may be that efforts to tap the comparative advantage of the region, given an upgraded transportation system, could have some success in Thathom District. The Edukan Company, for instance, is developing commercial timber production by developing new tree species through cross-fertilization.³⁵

The old National Route 4 was a militarily important route during the Second Indochinese War. The road ran, as it does today, south from Phonsavan in Xieng Khouang, crossed south-east to Xieng Khouangville (The Khoue District headquarters of B.Siphom), then continued down through present day Thathom District to Bolikhamsay Province and the Mekong River.

The US and Royalists wanted to protect the lowland areas along the Mekong River where the Royal Lao Government had their political and administrative power base.³⁶ Because troop and supply movements were along this site of the proposed National Road 1, almost all villages in Thathom District affected by the war were along this road. The ground offensives and aerial bombing was intense, and all the existing villages were seriously affected. By 1972, the Pathet Lao and People's Army of Vietnam had complete control of Thathom District. There were large royalist military bases located at B.Thathom, the current district capital, and the Pathet Lao had a military base at B.Thaviang, presently named B.Dong, the administrative headquarters of the Thaviang Sub-District.

³⁴ Handicap International. 1997a. pp. 10, 17.

³⁵ Handicap International. 1997. p. 17.

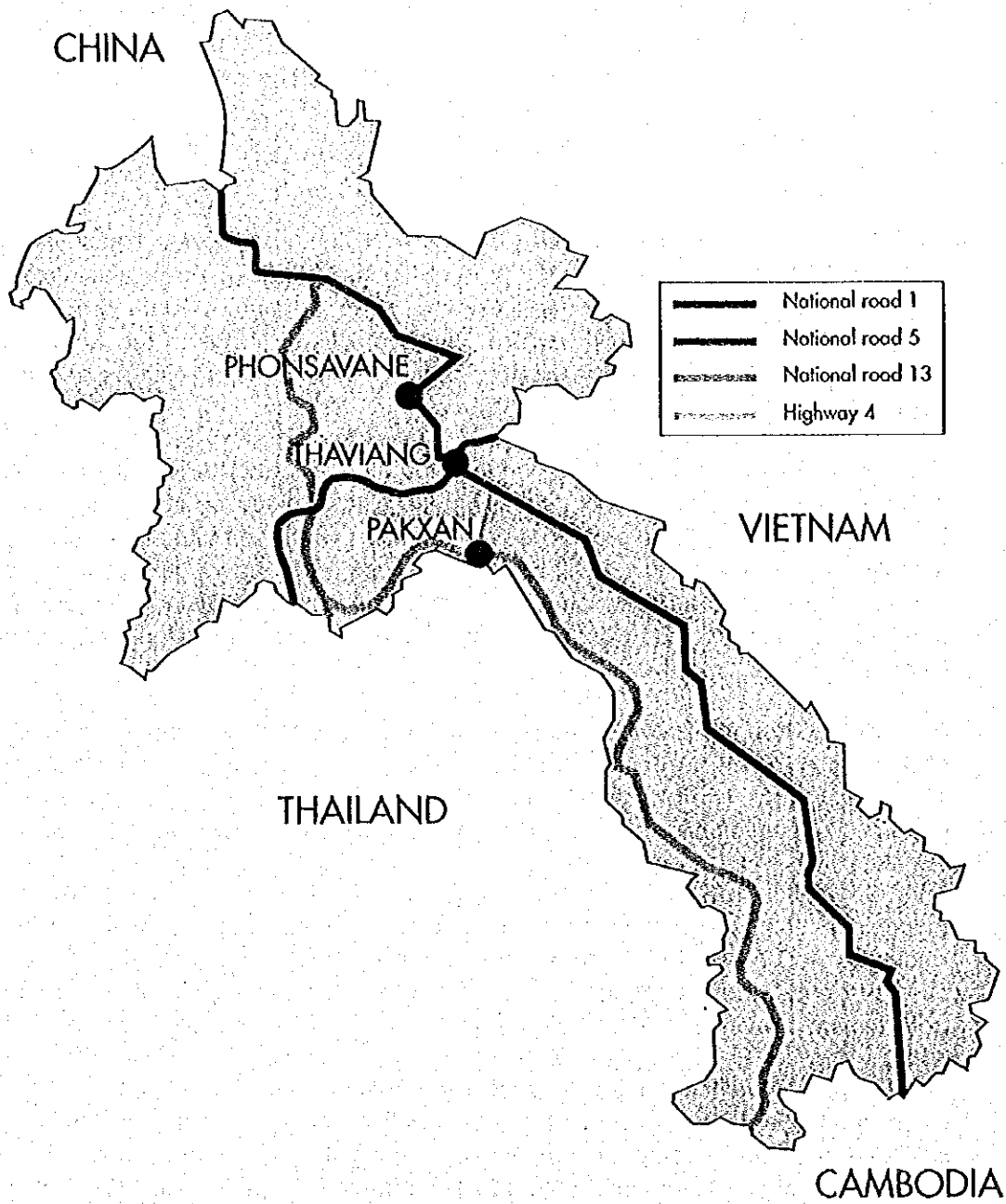
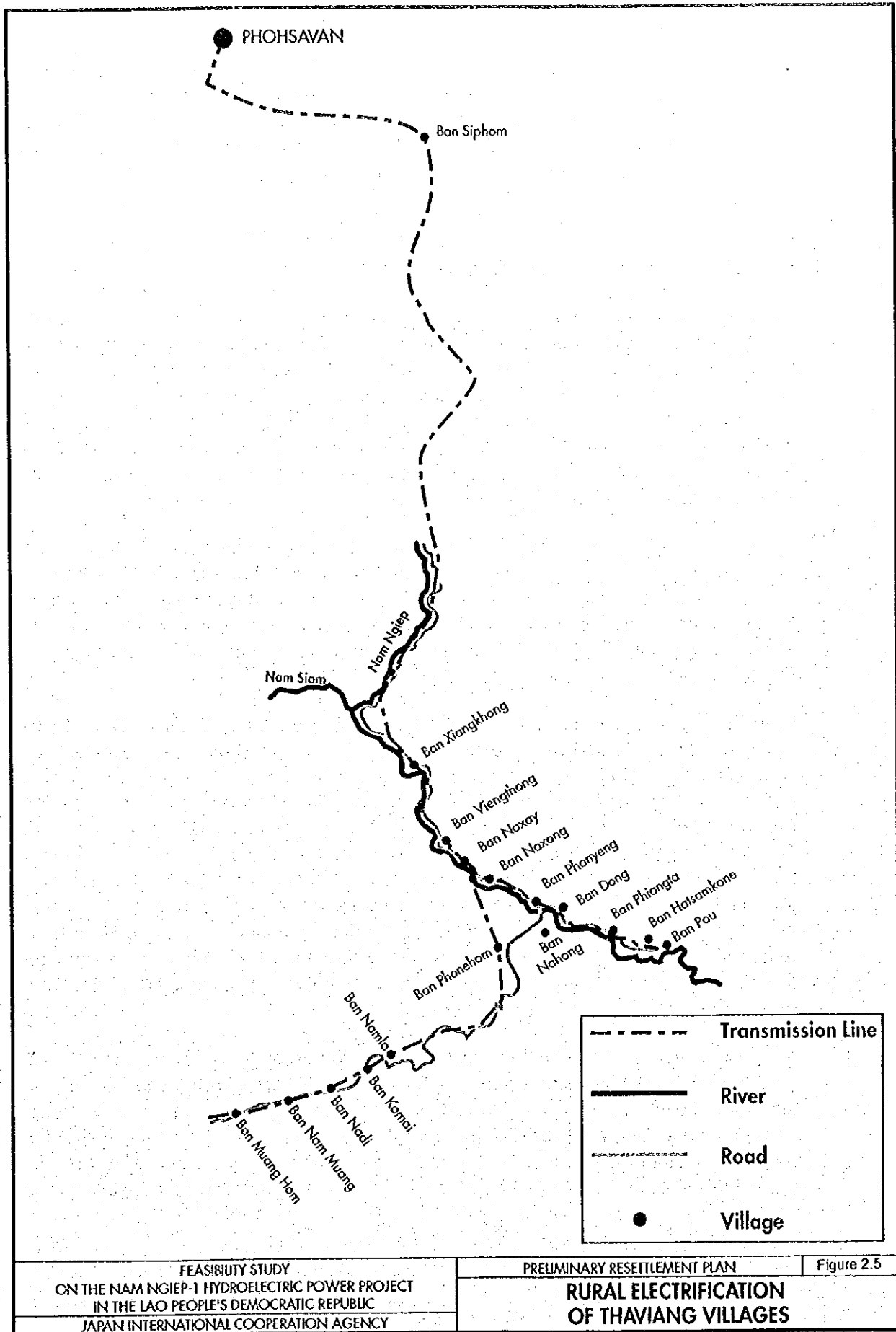


Figure 2.4 Upgrading of National Roads 1 and 5 with Junction at Thaviang

³⁶ Handicap International. 1997a, p. 15.



Because of this wartime history, and considering Thathom District in relation to its population and current accident figures, it is among the most impacted areas by Unexploded Ordnance (UXO) in the Lao PDR. Thathom District is overwhelmingly the most affected district in Xaysomboon and has been recommended as a high priority area for UXO clearance and community awareness programs.³⁷

2.1.7 HOM DISTRICT, XAYSOMBOON

The Lower Reservoir Area of the proposed NNPP is within Hom District, Xaysomboon. The District's population is approximately 6,600 people living in 31 villages, making it the least populated district in Xaysomboon. The District, with its headquarters at B.Hom, near the larger B.Palavek, is 90% *Lao Soung* (Hmong), some *Lao Theung* (Khamu), with *Lao Loum* making up balance. Before 1994, Hom and Longxane District were under one district administration within Vientiane Province. At that time they were made into separate districts with present boundaries, within the newly created Xaysomboon Special Zone.

Hom District is located in the south central part of Xaysomboon and is bordered by Longxane District to the South West, Thaphabat and Bolikhan Districts (Bolikhamsay) to the Southeast, Thathom District to the North East and Xaysomboon District to the North. A road links Hom District with Longxane and Xaysomboon Districts. It is often washed away during the wet season and unsafe to travel north of B.Palavek along it due to sometimes severe security problems.³⁸

Development activities have apparently been going on the villages of Hom District within the Lower Reservoir Area for some years. B.Namyouk and B.Sopyouk and B.Sopphouh of Hom District have been part of the Muang Hom Integrated Agricultural Development project funded by UNDP in the late 1980's currently located in the XSZ and the Phalavek Alternative Development Project funded by United Nations Drug Control Programme (UNDCP). These projects consisted of road construction, agricultural development, hospital improvement, school construction, boat services and technical assistance to these sectors. There were achievements in all these sectors, but the management capacity of the local authorities was not strengthened sufficiently to allow for the sustainability of the project activities. The Japanese Government funded primary schools are also in evidence in two of these communities, B.Namyouk and B.Sopyouk.

A major objective of the UNDP Muang Hom Integrated Rural Development Project (1986-1989) was the establishment of sawmills to provide the population with alternative cash income earning opportunities to poppy cultivation. A recent socioeconomic study of the Nam Ngum watershed noted for Lanxan District, neighboring Hom District, that "The proliferation of saw mills combined with the ready market in Vientiane for sawn timber, firewood and non-timber forest products, provides

³⁷ Handicap International. 1997a, p. 3-4.

³⁸ Handicap International. 1997c, p. 19

growing opportunities for subsistence farmers to increase household incomes.³⁹ A sawmill observed at B.Sopyouk was very likely part of this program. Currently the only aid project working in Hom District is a United Nations Drug Control Programme (UNDCP: Lao 89/550) for drug control and rural development.

During the Indo China War the district was under the control of the Pathet Lao and a large camp was very near B.Palavek, the district capital at that time. Consequently, there were a number of air strikes in the district starting in 1968, mostly targeting local Pathet Lao camps. The UXO LAO national survey was unable to visit villages in the district due to poor access and security problems. However, they did obtain information on 20 villages, and B.Namyouk (one of the 4 villages in the NNHP Lower Reservoir) is listed as one of only 2 villages that was considered 'highly effected' by UXO contamination.⁴⁰

2.1.8 BOLIKHAMSAY PROVINCE

The proposed dam site itself, access roads, and transmission lines will be for the most part in Bolikhan and Pakxan Districts of Bolikhamsay Province as shown in Figure 2.6. Bolikhamsay Province and its neighbor Khammuan Province to the south straddle the narrow, central 'neck' of the country, an area of moderately high mountains sloping southwest to meet the Mekong Valley. Lowland Lao, who speak a dialect peculiar to these two provinces, dominate the population followed by lesser numbers of tribal Taï's, Phuan, Ta-oy (Tahoy), Kri, Katang, Maling, Tri and Hmong.⁴¹ The largest National Biodiversity Conservation Area (NBCA) in Laos, the 3710km² Nakai Nam Theun covers a large area of east Khammuan on the Vietnamese border as well as a smaller section of Bolikhamsay.

Bolikhamsay has a population of approximately 170,000 and a population density of 12 persons/km² is less than national average 20km²,⁴² in around 420 villages, of nearly 27,000 households.⁴³ Bolikhamsay has a total fertility of 5.8 compared with 5.4 for the Lao PDR; a birth rate of 42.0, compared to the national rate of 40.0; a death rate of 17.0 compared to national 15.0; the same 2.6 rate of natural increase as that for the nation; and an infant mortality rate of 136.0, compared to 104.0 for the Lao PDR as a whole.⁴⁴ Bolikhamsay also has a low distribution of population in urban areas, with some 6.2% in urban areas, compared with 17% for the Lao PDR as a whole.⁴⁵

³⁹ English, Richard. 1998. *Socio-Economic Profile of the Nam Ngum Watershed*. Vientiane: Ministry of Agriculture and Forestry, Department of Forestry, Center for Protected Areas and Watershed Management (CPAWM). Asian Development Bank TA 2734-LAO. Nam Ngum Watershed Management. May. p. 16.

⁴⁰ Handicap International. 1997c. *Province and District Report – Saysomboune Special Zone: National Survey on the Socio-Economic Impact of UXO in Lao PDR*. Report prepared for the Lao National UXO Programme (UXO Lao), Ministry of Labour and Social Welfare. Vientiane: UXO LAO. p. 22. The other village was B. Beuang Bo. Information was gained on 20 out of 31 villages in the district.

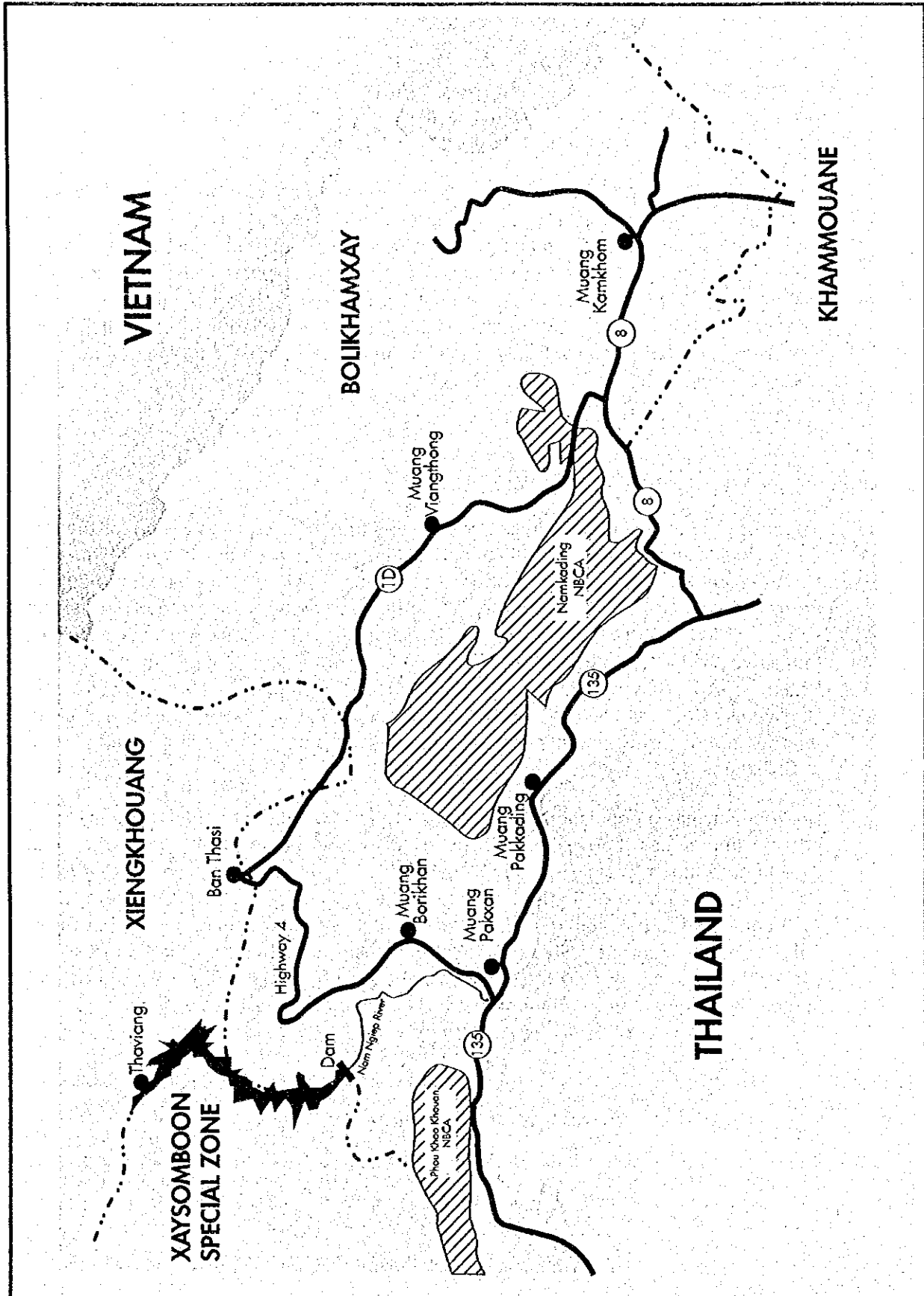
⁴¹ Cummings, Joe. 1998. p. 269.

⁴² Lao PDR. 1998. *Basic Statistics About the Socio-Economic Development in the Lao PDR*. Vientiane: State Planning Committee, National Statistical Centre. p. 18.

⁴³ Bolikhamsay's population was 173,300 in 1997, and there were 420 villages and 27,308 households in 1997. Lao PDR. 1998. pp. 18, 22.

⁴⁴ Lao PDR. 1998. p. 18.

⁴⁵ Lao PDR. 1998. Table 14, p. 20.



<p>FEASIBILITY STUDY ON THE NAM NGIEP-1 HYDROELECTRIC POWER PROJECT IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC JAPAN INTERNATIONAL COOPERATION AGENCY</p>	<p>PRELIMINARY RESETTLEMENT PLAN ROAD MAP BOLIKHAMXAY</p>	<p>Figure 2.6</p>
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The province has 6 districts, Pakxan (where the provincial capitol is located, as well as downstream villages of the NNHP), Bolikhan (also with NNHP downstream villages), Thaphabath, Pakkading, Khamkheuth, and Viengthong.

Pakxan (35,000) is the capital of Bolikhamsay Province, near the mouths of both the Nam Ngiep and Nam Xan Rivers, where they feed into the Mekong River, and about 145km along National Route 13 southeastward from Vientiane. It functions as a commercial center as well as an army base (the military village of Komsipchet is on the Nam Ngiep River). On the opposite bank of the Mekong from Pakxan is the Thai town of Beung Kan. The local population is predominantly Phuan, a tribal Tai group, many of whom are Christians.⁴⁶

The JICA Study Team noted a good deal of agricultural development underway in Bolikhamsay Province. According to the Provincial Division of Industry and Irrigation, there were some 74 pumping stations in Province in 1998, and this was to increase to 120 by 1999. In Pakxan and Bolikhan Districts, most of the development in irrigation was using the Nam Xan River waters, through provision of electric pumps situated on floating platforms in the river itself. From maps at the provincial offices the JICA Study Team could count about 11 pumps along the Nam Xan River and two on the Nam Ngiep River.

This was in conjunction with provision of electricity in 1999 along Highway 4, running north south between the Nam Ngiep and Nam Xan Rivers and through Bolikhan's district headquarters. Provision of irrigation pumps was considerably more limited along the Nam Ngiep River, though also taking place. The rural development strategy in villages along the Nam Ngiep River was to relocate them when feasible eastward along Highway 4 and nearer the newly developed irrigated paddy fields. Highway 4 is a priority road for upgrading in the Province and will link Pakxan (and hence Vientiane) with the Upper Reservoir Area at Thaviang via B.Thasi on National Road 1 D when completed.

This expansion of irrigated paddy in Bolikhamsay Province takes place within a national context of an effort to break away from subsistence semi-natural resources economy towards market-oriented economy.⁴⁷ Persistent rice supply problems prompted the GOL to initiate a rice self-sufficiency high-cost and high priority national program to enlarge rice-growing areas. Financing of the first phase of this initiative included purchasing pumps worth US\$24 million (1997 exchange rates) and extending Bank of Lao (BOL) loans to farmers in areas suitable for paddy expansion.⁴⁸ While the national expansion of irrigated rice went from 17,962ha in 1965 to 26,645ha in 1967, and from 71,500t to 113,500t, that for Bolikhamsay went from 80ha to 444ha in the same period and from 310t to 1,620t.⁴⁹

From field observations, another area where much development appears to be taking

⁴⁶ Cummings, Joe. 1998. p. 269.

⁴⁷ Economist Conferences, The. 1997. *The First Roundtable with The Government of the Lao People's Democratic Republic*, April 23-25, Vientiane, Lao PDR. p. 25.

⁴⁸ UNDP. 1999. *Development Co-Operation: Lao PDR, 1998 Report*. Vientiane. March. p. 13.

⁴⁹ Lao PDR. 1998. Table 24, p. 37. The yield went from 3.88 tons per hectare to 3.65 tons, compared nationally with a rise from 3.98 tons in 1965 to 4.26 tons in 1997 for irrigated rice. Maize went from 135 hectares to 940 hectares in Bolikhamsay, whereas the hectareage remain about the same nationally from 1995 to 1997.

place is in expansion of fishponds. This has been followed as a mitigation measure for the Nam Leuk Hydropower Project in downstream villages located in Thaphabath District.

Reaching Bolikhamsay and the Mekong River was a major strategic objective of the Pathet Lao during the Indo China War, and this made the old National Route 4 south from Phonsavanh in Xieng Khouang which crossed south-east to Xieng Khouangville and then continued down through present day Thathom district (and through the NNHP Upper Reservoir at Taviang Sub-District) a militarily important route.

The US and Royalists wanted to protect the lowland areas along the Mekong River where the Royal Lao Government had their political and administrative power base.⁵⁰ Consequently, Bolikhamsay Province was the site of some intense ground warfare. However, the province is not listed among the most heavily affected by UXO contamination. B.Hateun, just below the NNHP damsite is, however, shown on UXO LAO maps as having been bombed and as a UXO contaminated area.

2.2 DESCRIPTION OF THE REGION

2.2.1 GENERAL

The NNPP is located on the Nam Ngiep River, a Left Bank tributary of the Mekong. The Nam Ngiep River joins the Mekong River at Pakxan, a small city located only 120km by asphalt road from Vientiane. The Nam Ngiep River originates in Xieng Khouang Province and runs for about 160km before joining the Mekong, 1,300m lower in elevation. The river is intensively used for fishing and transport of goods and peoples by boat in its lower 50km, until rapids located a few km downstream the dam site impede any navigation.

The western and northern edges of the basin form a vast cirque with very steep sides due to headward erosion, while only outliers remain of the eastern rim which separates this basin from that of the Nam Xan River. The maximum altitude of the ridge separating the two basins is 2,819m, in the middle of the western edge of the Nam Ngiep catchment area.

At the confluence with the Mekong, the Nam Ngiep catchment area is 4,510km². The first 55km of river stretch are located in a narrow valley, with a steep slope as the river loses about 1,000m in elevation. Then the valley widens for about 70km, with large, partly cultivated alluvial terraces. Then the valley narrows again over a few km before joining the wide alluvial plain where it eventually joins the Mekong River. The dam is located in a narrow gorge just before the river enters this alluvial plain, about 24km upstream from the Nam Ngiep's confluence with the Mekong River.

⁵⁰ Handicap International, 1997a. *Living with UXO, Final Report: National Survey on the Socio-Economic Impact of UXO in Lao PDR*. Report prepared for the Lao National UXO Programme (UXO Lao), Ministry of Labour and Social Welfare. Vientiane: UXO LAO. p. 15.

Most of the 70km of wide valley, where several villages have been established, will be flooded by the reservoir, at FSL.360m.

At the dam site, the controlled catchment area is 3,700km² or 82% of the total catchment. Downstream of the dam site, the largest tributary of the Nam Ngiep on its Left Bank is the Nam Xao River, with a catchment area of 310km². The remaining 500km² catchment consists of a smaller tributary, the Nam Tak River, and the drainage of the plain near Pakxan.

2.2.2 CLIMATE

The Project area is under the influence of the southwest monsoon, with a wet season from May to October, which yields some 91% of the annual rainfall. The dry season from November to April yields only the remaining 9%. Some of the months may be completely devoid of rainfall.

The particular layout of the catchment explains why rainfall is so high in the area. Cyclonic disturbances coming from the China Sea usually run up the Mekong valley. When they reach the Nam Ngiep basin, they cannot pass the high ridges (up to 2,819m) to the west and north and remain stationary until the depression disappears.

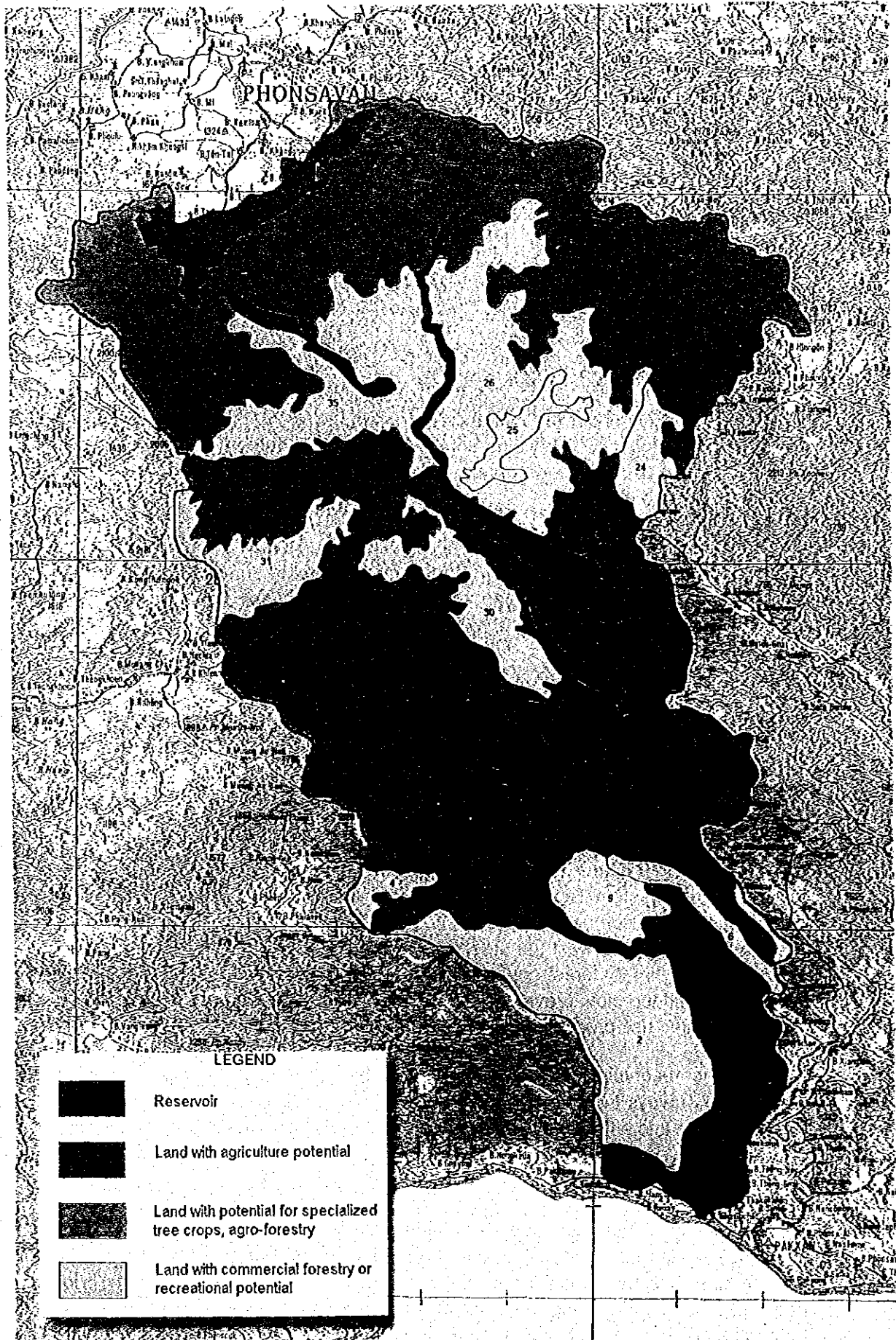
Hence, rainfall is close to 3,000mm/year, as against less than 2,000mm/year everywhere else in the region. The showers are concentrated into a short summer period, and run-off is particularly high in spite of the vegetation cover.

2.2.3 REGIONAL LAND USE

Much of Xieng Khouang is mixture of lowland and hilly or mountainous areas and includes a large plateau region in the center of the Province, with an altitude averaging EL.1,200m. In Xaysomboon Special Zone, the areas surrounding the reservoir are hilly or mountainous, to the west the steep and rugged terrain of the area has been largely stripped of its primary forest cover, and extensive grass lands and bush fallow mixed with active swidden plots prevail on the hillsides. A proliferation of narrow river valleys support irrigated rice production on terraced fields throughout the region.

Most of the reservoir area itself is covered by secondary dry dipterocarp forest. Preliminary surveys indicate a high level of human influence of the forest, with dense bamboo cover and a tree layer of generally small trees. The forest to be inundated has probably a low to very low value for commercial logging and a low habitat value for species that require continuous canopy.

As part of the JICA Study, the catchment area was analyzed using 1:50,000 and 1:100,000 scale maps and divided into 40 land systems that might show potential for commercial forestry, specialized tree production (agro-forestry), and irrigation development. The following map indicates these areas and will be a useful reference for evaluating resettlement sites already identified through a reconnaissance survey.



FEASIBILITY STUDY
 ON THE NAM NGIEP-1 HYDROELECTRIC POWER PROJECT
 IN THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
 JAPAN INTERNATIONAL COOPERATION AGENCY

FIRST ENVIRONMENTAL IMPACT ASSESSMENT

Figure 2.7

**POTENTIAL FOR DEVELOPMENT
 IN THE CATCHMENT AREA**

2.2.4 REGIONAL ECONOMY

The NNPP is in a region consisting of the southern portion of Xieng Khouang Province, primarily Khoune District; Eastern Xaysomboon and Hom District and Western Thathom District in Xaysomboon Special Zone; and Bolikhan and Pakxan Districts in Bolikhamsay Province.

The population of this region, upstream and downstream from the proposed dam site is over 110,000 persons in 250 villages.

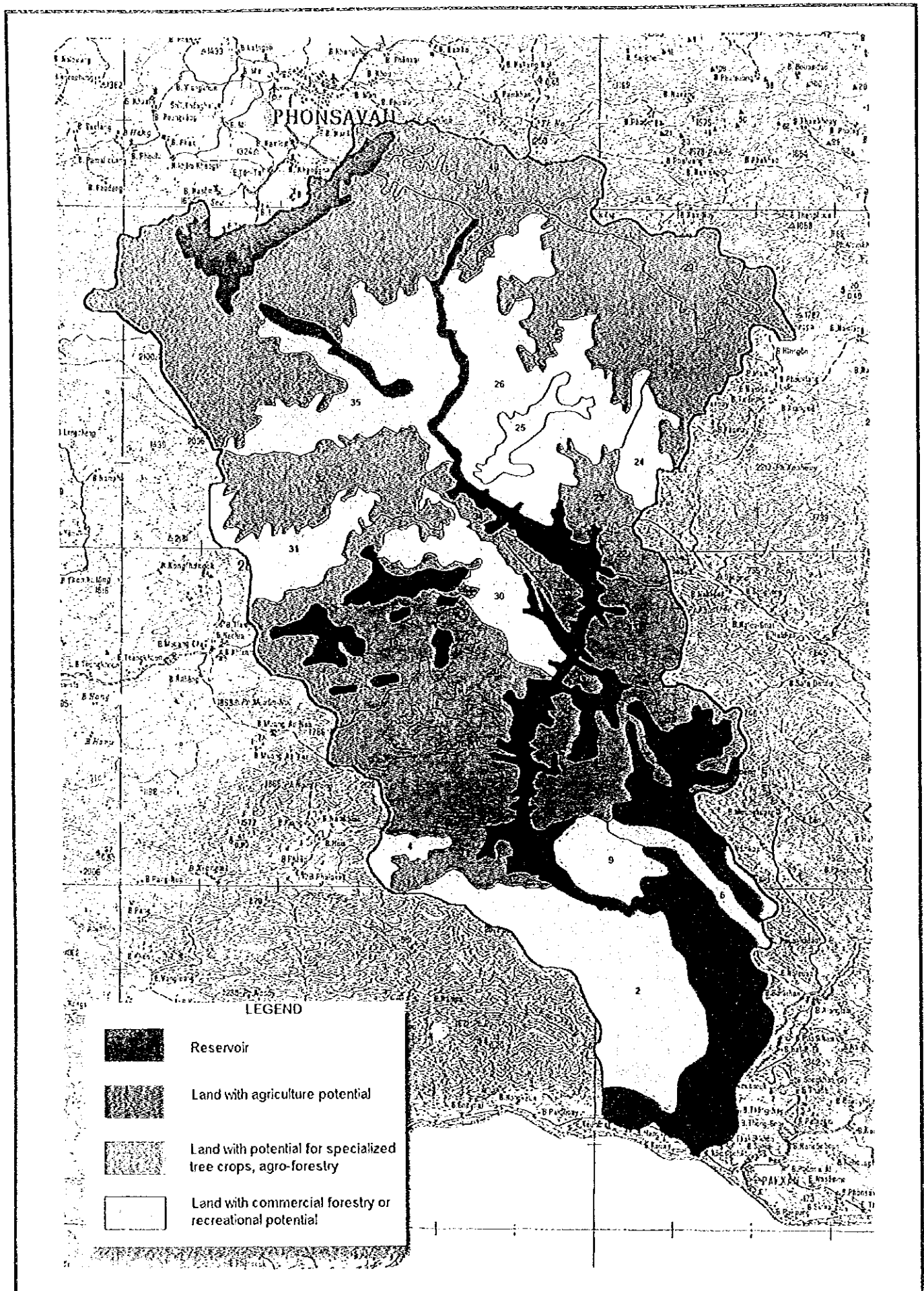
Table 2.2 Summary of Estimated Regional Population and No. Villages

DISTRICT	POPULATION	VILLAGES
UPSTREAM		
Khoune	30,000	21
Xaysomboon	11,600	23
Thathom	7,500	33
Hom	6,600	31
<i>Subtotal Upstream:</i>	<i>55,700</i>	<i>108</i>
DOWNSTREAM		
Bolikhan & Pakxan	54,600	140
<i>Subtotal Downstream:</i>	<i>54,600</i>	<i>140</i>
TOTAL:	110,300	248

While the population upstream and downstream from the dam site is approximately even, the downstream area has transportation advantages that don't exist upstream. Highway 13 S, a paved highway that has been upgraded for some years, links the downstream area to Vientiane along the low-lying Mekong plain, access to Thailand across the Mekong is assured, and there is considerable boat traffic north and south along Nam Ngiep and Nam Xan Rivers. Rural electrification, already existing along Highway 13 S, is currently being put in place along Highway 4 northward to the district capital at Bolikhan. Irrigation has been expanding in the downstream region for some years, mainly through pumping stations placed directly on the Nam Ngiep River to a limited extent but primarily on the Nam Xan River. In general, the area downstream is developing at a rate that is not seen north of the dam site.

North of the dam site, while highways exist on the map, they have to date not for the most part been upgraded. Security issues are prominent in all the districts included in the region, and populations have tended to concentrate along roadsides partly for this reason. In general, subsistence agriculture is the rule, with little scope given the current restrictions in communication for commercialization. UXO contamination is a major factor of life and limits agricultural development, even reclaiming fields that were used prior to the Indo China War. In the neighboring Nam Ngum watershed area, per capita GDP was found to be around US\$56, compared to US\$390 for the Lao PDR overall.⁵¹ This would probably apply to the upstream area of the NNPP as well.

⁵¹ BCEOM. 1999. *Final Nam Ngum Watershed Management and Development Strategic Framework*. April 15. For Ministry of Agriculture and Forestry, Center for Protected Areas and Watershed Management. Asian Development Bank TA 2734-Lao, Nam Ngum Watershed Management. In Association with SEATEC and SEMED.



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