Final Report

Pa Mong Resettlement Research Project

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PREFACE

The Committee for the Coordination of the Investigation of the Lower Mekong Basin has undertaken extensive investigations of all aspects of the proposed mainstream Pa Mong dam. As a part of these investigations, the Committee contracted with the University of Michigan to study the resettlement problems and costs involved in the Pa Mong project. Funds for this research were provided by the Regional Economic Development division of the Agency for International Development.

The University of Michigan resettlement research project extended over two years, collecting a wide range of field data in Northeast Thailand and Laos. A list of surveys may be found in Appendix B of this report. This research project would not have been possible without the generous assistance of Lao and Thai colleagues, officials and advisors, and the rural population among whom we worked for two years. Appendix C of the report lists Thai who assisted in our work; we are grateful to them, and to our Lao colleagues and friends who contributed so much to this project. Our work would not have been possible without the support and assistance of the Mekong Secretariat, particularly Chamlong Tohtong who participated in the original formulation of this project and the vital early stages of field work, as well as I. S. Macaspac and Dr. Prachoom Chomchai, both of whom were of great assistance to our work in their capacity as Director of the Economic and Social Studies Division of the Secretariat. Finally, the hospitality and help of the staff and students of Khon Kaen University were of vital importance, and we are very grateful to Dr. Kavi Chutikul, Dean of the Faculty of Agriculture, for his assistance.

Whatever credit may attach to this work is due to the extensive assistance we have received; however, whatever faults or errors there may be in data analysis and conclusions are the responsibility of the Michigan personnel.

Finally, the Committee for the Coordination of the Investigations of the Lower Mekong Basin is to be congratulated for their role in initiating and supporting this research. Too often there has been inadequate concern with the problems of resettlement of population flooded by reservoir construction, which contributes to the substantial human costs associated with major dam projects. We hope our work will be useful in the design of more complete and sophisticated resettlement research in the future.

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Section 1

INTRODUCTION

The reservoir created by the proposed Pa Mong dam will displace approximately 480,000 persons (at the 260 meter level, and a construction date of 1982). This involves four times the population displaced by any other dam project for which statistics are available (Table 1). Because of the large number of people involved, resettlement is one of the major potential problems and costs associated with the Pa Mong project.

Table 1 Numbers of People Evacuated in Association with some Large Dams in Less Developed Countries

Country	Dam	Year Dam Closed	Number of evacuees (nearest thousand)
India	Damodar Valley (4 projects)	1953-1959	93,000
Zambia/Rhodesia	Kariba	1958	29,000/11,000
Egypt/Sudan	Aswan	1964	70,000/48,000
Ghana	Volta	1964	82,000
Pakistan	Mangla	1967	90,000
Nigeria	Kainji	1968	44,000
Ivory Coast	Kossou	1971	75,000
Philippinnes	Upper Pampanga	1973	14,000
Pakistan	Tarbela	1974	86,000
Laos	Nam Ngum	1971	4,000
Thailand	(11 projects)	1963-1977	130,000

Dams are good examples of development projects where the immediate costs and benefits may be unequally distributed. The principal economic result of poorly planned and under-financed resettlement projects is that the evacuees personnally shoulder disproportionate amounts of the real costs of the dam project; they have less valuable assets, are less productive and have less income than would have been the case had they not been flooded. They are likely to become socially and politically disaffected.

The main purpose of our study, and focus of this report, is the calculation of the costs involved in the resettlement of Pa Mong evacuees. Costs depend on the design of the proposed resettlement program, and this in turn must be based on a careful study of a wide range of evidence, from past resettlement experience to analogs of proposed solutions to the Pa Mong resettlement problem. Because of the paucity of relevant literature, we have conducted a wide range of field studies over a two-year period in Laos and Thailand, to generate the data required for the project analysis and costing.

Resettlement Planning Goals. We have assumed for the purposes of this project that the primary goal of resettlement planning is that the evacuees should not be made to bear disproportionate amounts of the costs of the dam project. Expressed differently, evacuees should not be made economically worse off as a result of being forced to leave their homes, either in terms of their material and financial assets or in terms of their on-going incomes, or in terms of their economic prospects for the future.

In addition to the economic goals of being "no worse off," and of re-establishing the economic position, income flow and expectations enjoyed prior to being flooded, there are important social goals. These are less easily measured, but in some respects are more important; in social and psychological terms evacuees should be satisfied with their situation and condition after resettlement. Economic and social restoration are not unrelated, and it is seldom possible to achieve one without the other. It is a matter of great concern that so few resettlement programs have come close to achieving these goals, and that many programs have created an impoverished and sometimes disgruntled evacuee population, neither solvent or satisfied.

We stress that both economic and social goals must be achieved. We have found cases where the resettled population has been economically disadvantaged but is reasonably safisfied because of the manner in which the resettlement program was conducted; we have found people who are economically better off, but disgruntled because of the way in which their resettlement was handled. It is not just what is done, but also how it is done that is important.

These resettlement planning goals are hardly revolutionary, and in varying forms have been recognized implicity or explicitly in all major resettlement projects with which we are familiar. Problems arise not in

accepting the goals or in recognizing the justice implied, but rather in determining and accepting the cost of these goals. Clearly the goal of replacement incomes can be achieved in many different ways, and each strategy implies a different level of economic and social costs. To take an extreme example, replacement incomes could very easily be guaranteed for reservoir evacuees in the form of outright cash payments, or pensions, made on a regular basis. However, the economic costs of this strategy would almost certainly be unacceptable within the broader context of the dam project. The resettlement planner has a primary responsibility to the evacuees to find replacement incomes for them, but he also has a responsibility to society in general to do so at the lowest possible economic cost.

We have assumed that the costs of resettlement are integral parts of the total costs of any dam project. Thus, an economic feasibility study for a proposed dam must take account of realistic estimates of resettlement costs. If the costs of providing replacement incomes for the evacuees reach the point where the dam itself ceases to be economically feasible then the dam should not be built, just as if the costs of concrete were prohibitively high.

In our work with resettlement in Laos and Thailand, and elsewhere in the world, we have observed the advantages of an open and flexible resettlement program in contrast to a forced and tightly structured resettlement program. We have observed that resettlement programs which permit evacuees to freely select their own preferred destination from among a variety of different resettlement alternatives are more successful in achieving economic and social goals. We have observed that in many resettlement programs the evacuees are quite efficient in managing their own resettlement, and are generally happier with the results than those involved in highly structured and managed resettlement alternatives. Therefore, the resettlement program we have designed and costed includes free choice among several resettlement alternatives, including the freedom for the evacuees to manage their own resettlement. We believe the relatively "open" resettlement program we have designed will facilitate achievement of the economic and social goals of resettlement; that it is also the most cost effective resettlement program is an added benefit.

Data Sources. This report is based on investigation of a wide range of resettlement projects in Southeast Asia and elsewhere in the world, as well as related research on other aspects of population movement and economic development. These studies were designed to find out what elements of resettlement programs are most successful and well received, and where past resettlement programs have failed.

Five principal groups in Laos and Thailand were surveyed to provide the local data base for the study. The groups consist of:

i) Residents of the proposed reservoir region, who will be the population resettled as a consequence of the Pa Mong project.

ii) Lao and Thai urban and rural populations displaced and resettled from past reservoir projects in both nations, with major emphasis on the Nam Ngum evacuees in Laos and the Nam Pong evacuees in Thailand.

iii) Populations currently undergoing or about to undergo resettlement due to reservoir flooding, at the Kwai Yai and Huai Luang projects in Thailand.

iv) War refugees resettled under a wide range of conditions in Laos.

v) Several groups of voluntary urban and rural migrants in both Laos and Thailand.

In addition to these detailed field studies, project members also visited the major resettlement projects of Tarbela and Mangla in Pakistan, Aswan in Egypt, Kariba in Zambia, Kainji in Nigeria, Volta in Ghana and Kossou in the Ivory Coast, in order to observe the resettlement programs associated with these other major projects. Full details on all surveys are contained in appendices, and in the survey data on tape and on file with the Mekong Secretariat in Bangkok, Thailand. Given the complexity of resettlement program design, and its dependence on detailed population, land inventory, income and other statistics, it is not surprising that almost 80 percent of the project effort was directly involved in data generation and verification.

Terminology. Throughout this report we have used the names Laos and Thailand to refer to the two nations directly involved with the Pa Mong project. The term Laos used in the past tense refers to the Kingdom of Laos, which existed prior to mid-1975; the term Laos used in reference to the present and future refers to the People's Democratic Republic of Laos. Throughout this report, the term Thailand refers to the Kingdom of Thailand.

We have elected to use evacuee as the term to refer to the population displaced from the proposed reservoir.

Currency Conversion Rates. All Thai baht have been converted to U.S. dollars at the rate of 20 baht equal to one dollar. Lao kip fluctuated widely during the period of field work for this study. In 1972 the official rate was 600 kip to the dollar, raised to 750 kip to the dollar by April 1975. The Taux official rate, at which almost all imports were valued, ranged from 840 kip to 1,200 kip to the dollar during the same period. The black market rate ranged from 1,100 to 1,800 during the same period. We have used two different kip rates in our analysis. For valuation of material goods with a large import component, we have used the Taux official rate of 840 kip to one dollar. For valuation of agricultural production, some of which is influenced by the black market rate (and by Thai commodity prices via unofficial trade across the riverine border), we have used the black market rate of 1,200 kip to one dollar. Baht and kip values are presented throughout the basic data tables in the report, so that other rates can be used if desirable.

Inflation. The tables of costs in this report are all in terms of 1974 dollars, baht or kip. Thus, any user of these costs will want to adjust them for general inflation to make them comparable to whatever other types of costs he may be dealing with. Unfortunately, this adjustment has been overlooked in some past resettlement projects. For example, at the Volta Dam project in Ghana, a 1952 estimate of compensation and resettlement costs became the amount budgeted in 1960, without any adjustment for inflation during the eight year interval. This was one of the reasons that resettlement project had insufficient funds.

Working Papers and Appendices. There are nine working papers on file in the Mekong Secretariat in which the basic data analysis is presented. Working Paper 2 provides an inventory of the reservoir population, their economic condition and private and public property contained in Thailand and Laos. Working Paper 3 examines resettlements already completed in Thailand and Laos, and elsewhere in the world, to determine which elements contribute to successful resettlement programs, and what problems must be anticipated and solved. Working Paper 4 translates the desirable elements of successful resettlement into program components, and calculates the basic resettlement cost which applies to all populations to be resettled. Working Papers 5, 6 and 7 coincide with the three major resettlement alternatives: resettlement in rural areas, in planned rural resettlement communities or along the reservoir margin; self-managed resettlement in the private land market; and resettlement in urban areas. For each alternative the incremental costs or savings involved are calculated. Working Paper 8 deals with the problems created by flooding of towns, their economic hinterlands and interaction networks, and compiles the costs of replacing flooded communications and urban functions. The final Working Paper, 9, summarizes total resettlement costs and examines the design of optimal resettlement programs. The results of the nine working papers are summarized in this Final Report. The Final Report is supplemented by three appendices which include an atlas and village inventory.

Section 2

THE RESERVOIR AREA INVENTORY

The area of farmland flooded and the numbers of people affected by the reservoir would vary significantly, depending on the height of the dam, the implementation of protective diking schemes, and the period during which the evacuation would take place. There are five possible diking schemes and possible heights of the dam range from 216 meters to 260 meters MSL. The earliest date for starting construction is 1982, at which time the population of various sub-regions of the reservoir basin will be growing at rates ranging from 2.4 percent to 5 percent per year. Consequently, there are numerous possible combinations of heights, diking schemes, and construction periods. Thus, it is not possible to make a simple statement about how many people or how much farmland would be flooded by the Pa Mong dam.

Working Paper 2 provides more detailed information, allowing estimates to be made for any possible reservoir and any possible construction period up to the year 2000. However, in order to present a broad range of these combinations in summary form, we have selected 10 possible reservoirs, defined according to dam height and protection schemes. In each case we have assumed that construction would start in 1982. The discussion and tables which follow summarize our underlying assumptions for our estimates, as well as areas of farmland, property values, and income sources which would be affected by each reservoir.

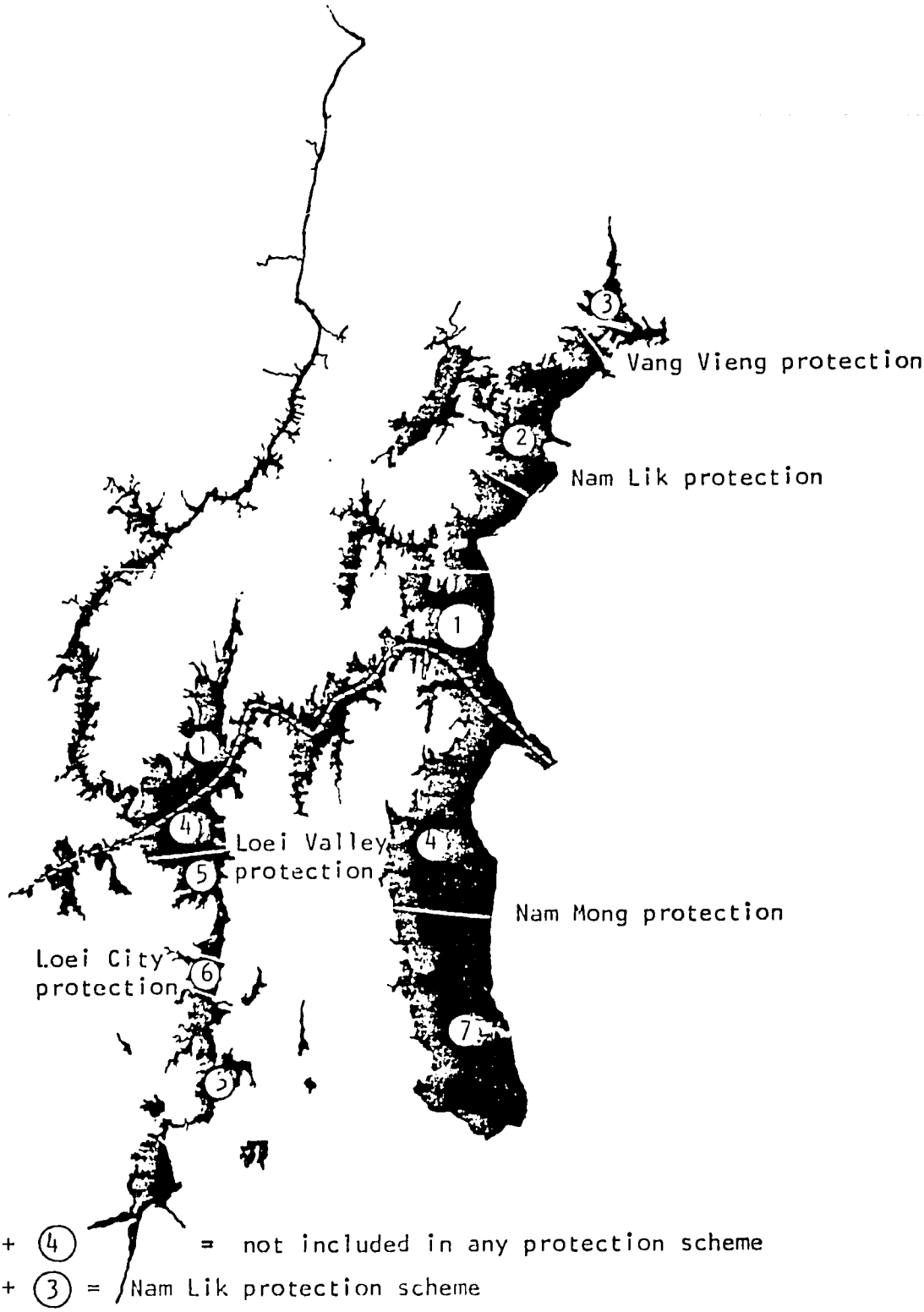
A. BACKGROUND AND ASSUMPTIONS

1. Diking Schemes

Diagram 1 shows the sections of the reservoir basin which could be saved from flooding by protection dikes. There are five possible schemes; some could be implemented in combination and some are mutually exclusive.

i) The Vang Vieng area could be saved either by a dike 20 kilometers downstream from the city, or by a dike on the Nam Lik saddle. The first scheme, Vang Vieng protection, would save only Vang Vieng and its immediate environs (Area 3, Diagram 1). The second scheme, the Nam Lik saddle, would save all of Areas 2 and 3 (Diagram 1), including Hin Heup and the Ban Don Valley,

Diagram 1 RESERVOIR SECTORS AND PROTECTION SCHEMES



Sectors (1) + (4) = not included in any protection scheme
Sectors (2) + (3) = Nam Lik protection scheme
Sector (3) = Vang Vieng protection scheme
Sectors (5) + (6) = Loei Valley protection scheme
Sector (6) = Loei City protection scheme
Sector (7) = Nam Mong protection scheme

as well as Vang Vieng. Both schemes could be implemented at any reservoir level from 230 to 260 meters MSL. Neither scheme would require pumping.

ii) The city of Loei could be saved either by a dike at the northern end of the Loei Valley, or by a system of dikes close to the city boundaries. The first scheme, the Loei Valley protection, would save practically all of the Loei Valley (Areas 5 and 6, Diagram 1). The dike would only be appropriate if the dam were built to 250-260 meters. Whatever the height of the dam, the Loei River would have to be pumped over the dike and into the reservoir. Eight small checkdams would have to be built to control the flow of tributaries into the Loei River, and these checkdams would cause the flooding of areas beyond the edge of the main reservoir which would not be affected if this protection scheme were not implemented. The second scheme, Loei City protection, would save only the city itself (Area 6), with the exception of the parts of the city below 235 meters. The area upstream from Loei but below 247 meters would also be flooded. This scheme would be appropriate if the dam height was 240 meters. A small pumping scheme would be necessary to drain the protection area.

iii) The southern sections of the Udornthani Lobe (Area 7) could be saved by a dike on the Nam Mong saddle. This dike would be appropriate for any reservoir level above 235 meters; the area will not be flooded by any reservoir below that height unless a canal is dug through the saddle. No pumping would be necessary for the area if either the canal or the dike were built.

No diking schemes have been proposed to save any of Areas 1 or 4 (Diagram 1).

2. Selected Reservoirs

We have selected the following ten possible reservoir shapes and sizes for illustrative purposes throughout this report.

Table 2 Selected Pa Mong Reservoirs

Reservoir Number	Level	Protection
1.	260m MSL	No protection (maximum reservoir at this level).
2.	260m MSL	Nam Lik, Nam Mong and Loei Valley protected (minimum reservoir at this level).
3.	250m MSL	No protection; the USBR reservoir (maximum reservoir at this level).
4.	250m MSL	Vang Vieng City and Loei Valley protected.
5.	250m MSL	Nam Lik, Nam Mong and Loei Valleys protected (minimum reservoir at this level).
6.	240m MSL	No protection (maximum reservoir at this level).
7.	240m MSL	Nam Lik and Nam Mong Basins, Loei City enclave protected (minimum reservoir at this level).
8.	230m MSL	No protection, but providing a canal through the Nam Mong saddle to include Nam Mong Basin (maximum reservoir at this level).
9.	230m MSL	With Nam Lik protection and no canal through the Nam Mong saddle; i.e. Nam Mong protected (minimum reservoir at this level).
10.	216m MSL	No protection (reservoir created by the construction of Pa Mong Dam cofferdams).

3. Construction Schedules

The length of time necessary for dam construction varies with the height of the reservoir. The final planning and implementation of a resettlement program would occur during the pre-construction and construction periods. Consequently, variations in these periods have significant implications for the nature of the resettlement program. We have assumed the following construction schedules for several alternative dam heights:

Reservoir Height (m/MSL)	Main Construction Period (Years)	Pre-Construction Work Period (Years)	Total (Years)	Evacuation Begins	Year Reservoir Fills
260	10	5.5	15.5	1982	1993
250	8	5.0	13.0	1982	1991
240	6	4.0	10.0	1982	1989
230	5	3.5	8.5	1982	1988

We have assumed that for each of these dams construction would start in the year 1982. We therefore project population increases after 1982 on the assumption that evacuation would begin in that year.

Some areas would be flooded by the cofferdams in the Mekong and Nam Lik areas. These areas would have to be evacuated at least two years before the closure of the mainstream dam. The reservoir would fill very quickly after the main dam is closed. All parts of the reservoir basin up to 240 meters MSL would be flooded within two months, and up to 250 meters within 4 months, if the dam were closed at the start of the flood season. Filling would take longer in other seasons, but the maximum filling time for a 250 meter reservoir with no protection schemes would be 9 months. A 260 meter reservoir could fill in a minimum of 13 months and a maximum of 19 months. In any event, very little time will be available after the closure of the main dam for the evacuation of the majority of the affected people.

4. Population Projections

Many of the costs of the resettlement program are calculated on a per capita basis while most of the remaining costs depend less directly on population size. Thus, compensation payments for land will vary with the intensity of land use and the size of areas cleared for farming. Consequently, estimates of the costs of resettlement depend heavily on projections of the numbers of people who will have to move.

Our attempts to determine recent growth rates were hampered by the lack of reliable data, particularly in Laos. In that country the population is officially assumed to be growing at the rate of 2.4 percent per year due to natural increase. Although the 'official' rate should not be regarded as a reliable datum, we have no basis for assuming anything other than that rate for the purposes of projecting the population of the Pa Mong Basin. Moreover, since no national goals have yet been set with respect to population growth or family planning programs, we have no basis for projecting changes of the rate of natural increase into the future. Consequently, we have assumed that the population throughout the Lao side of the Pa Mong Basin will increase naturally at the rate of 2.4 percent per year between 1974 and 2000.

Our field survey data indicate wide local variations in net migration rates in Laos. Again, the incompleteness of our data makes general estimates hazardous. However, we have projected a 1.1 percent growth rate due to net migration for areas near the Mekong River (Area 4, Diagram 1), and no net growth from migration for other areas on the Lao side of the Pa Mong Basin.

In Thailand more population data are available, and population policies are more clearly defined. Consequently we have been able to project the population in a slightly more sophisticated manner than for Laos, although again our assumptions are open to question. We estimate that the natural population growth rate in the Pa Mong Basin is 3.0 percent per year in rural areas and 2.7 percent in the towns. Both fertility and mortality rates have been declining in Thailand. We assume the rate of natural increase will decline by about 0.2 percent for each five-year period. This figure is the expected decrease for the current five-year plan (i.e. 3.0 percent to 2.8 percent). A 0.2 percent decrease is also roughly equal to the results of the "medium fertility" assumption of the population projections to the year 2000 done jointly by NESDB and NSO and the Institute of Population Study. We will assume this same decrease in the natural growth rate will exist for both rural and urban areas.

Recently most of the Thai side of the Pa Mong Basin has been growing as a result of net in-migration. The rates of growth vary among the rural areas, and between the rural areas and the towns. We have used

both Malaria Control Unit data and the results of our own surveys to determine local migration rates, and we estimate that rural populations are growing by 1.1 percent each year from net migration. The rate for the towns is 2.3 percent per year. However, we anticipate that migration rates for both urban and rural areas will change over the next twenty years, as vacant arable land becomes more scarce and as the towns expand their functions and areas of influence. Consequently, we anticipate the overall net growth rates from migration in 1985 to be 0.55 percent per year in rural areas and 3.3 percent in the towns. These rates vary among reservoir sectors.

Table 3 summarizes the rates of population growth by period and by reservoir sector, which we have used to project the Pa Mong Basin population to the year 2000.

Table 3 Population Projection Rates by Reservoir Sector, 1974-2000
(Natural increase rate plus net migration rate)

	1974-1985		1986-1990		1991-1995		1996-2000	
Sector	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
LAOS								
1	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
2	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
3	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
THAILAND								
4	4.4	6.4	3.15	5.6	2.95	5.4	2.75	5.2
5	2.2	0	3.15	5.6	2.95	5.4	2.75	5.2
6	2.4	2.0	3.15	5.6	2.95	5.4	2.75	5.2
7	5.8	NA	3.15	5.6	2.95	5.4	2.75	5.2

5. Evacuation Schedule

The projection rates outlined above are not sufficient in themselves to predict the numbers of people who will have to be resettled. Those numbers will depend also on the rate at which the prospective evacuees leave the reservoir basin. We do not anticipate that the evacuation will significantly affect birth or death rates. However, an early evacuation would mean that children who would otherwise have been born within the reservoir basin would instead be born outside of the basin. Since the evacuation could take place over a ten year period, the rate of out-movement would affect the locations of the births of large numbers of children. Therefore, in order to predict as accurately as possible the numbers of people to be included in the resettlement program, we have had to make assumptions about the evacuation schedule.

Management of the resettlement process could be simplified if the evacuation could be phased over a relatively long period, as we will discuss below. Various inducement schemes could be instituted to encourage early or phased movement. The actual rate of movement would depend on these inducement schemes, and on various unknown factors such as the types of destinations favored by the evacuees. Moreover, the rates of movement will vary between geographical areas of the reservoir basin and between rural and urban places. The schedule in Table 4 is a summary of only one of many possible schedules. However, we consider this rate of movement to be a likely compromise between the best rate from the planners viewpoint, and the evacuees' individual preferences.

Table 4 Evacuation Schedule for Pa Mong Reservoirs: Proportion of Remaining Reservoir Population Evacuated During Each Year of Evacuation

Year	Reservoir Level				
	260m	250m	240m	230m	216m
-10	.05	-	-	-	-
-9	.06	-	-	-	-
-8	.08	.05	-	-	-
-7	.10	.07	-	-	-
-6	.14	.10	.06	-	-
-5	.18	.15	.12	.10	-
-4	.22	.20	.20	.20	-
-3	.30	.30	.30	.30	.25
-2	.45	.45	.50	.50	.50
-1	all	all	all	all	all
0	Evacuation complete by beginning of year 0.				

B. INVENTORY OF THE PA MONG BASIN

1. Population

We measured the 1974 population of the Pa Mong Basin using several sources of data. In Laos we used data available from village headmen and District (Muang) offices as far as possible. We were able to check, and in some cases modify, these figures using our own analyses of recent air photographs of the region. In Thailand we tested the accuracy of several data sets and concluded that data from the Malaria Control Office provided the most complete and most accurate coverage.

We have projected the 1974 populations for each sector of the reservoir to the year 2000. Detailed tables are included in Working Paper 2. For present purposes, Table 5 provides a summary of the 1982 population for each of our ten selected reservoirs.

Table 5 Base Resettlement Population for Ten Selected Reservoirs, 1982
(Number of persons to be settled)

Reservoir	Reservoir Height	Protection	Lao			Thai			Total
			Rural	Urban	Sub-Total	Rural	Urban	Sub-Total	
1	260	None	79,406	17,479	96,885	258,028	50,655	308,683	405,568
2	260	LV NM NL	50,380	10,566	60,946	124,293	26,802	151,091	212,041
3	250	None	69,123	17,479	86,602	218,065	40,934	258,999	345,601
4	250	LV VV	59,872	11,652	71,524	204,077	26,337	230,414	301,938
5	250	LV NM NL	43,306	10,566	53,872	116,650	26,337	142,987	196,859
6	240	None	58,088	11,240	69,328	173,915	37,538	211,453	280,781
7	240	LC NM NL	37,596	10,154	47,750	90,388	26,337	116,675	164,425
8	230	None	42,070	6,141	48,211	122,679	26,042	148,721	196,932
9	230	NM NL	26,976	5,055	32,031	60,762	26,042	86,804	118,835
10	216	None	12,033	1,454	13,487	38,803	19,890	58,693	72,180

LV = Loei Valley, LC = Loei City, NM = Nam Mong Basin, NL = Nam Lik Basin, VV = Vang Vieng City and Valley

If construction started in the year 1982, evacuation would take place over the next 5 to 10 years. As noted above, the population to be resettled would continue to grow during that period, although at a reduced rate. Working Paper 2 includes work sheets for the total calculation of the total number of evacuees for any reservoir and any evacuation period. Table 6 summarizes the outcomes for our ten selected reservoirs, assuming 1982 to be the first year of construction in each case.

Table 6 Comparison of Adjusted Resettlement Population Based on Moving Schedule T2/25, with 1982 Population and the Population in the Year -1 before Dam Closure, for Ten Selected Reservoirs

Reservoir No.	Reservoir Height	Protection	Base Resettlement Population (1982)	Adjusted Resettlement Population
1	260	None	405,568	479,867
2	260	LV NM NL	212,041	250,636
3	250	None	345,601	398,646
4	250	LV VV	301,938	348,282
5	250	LV NM NL	196,859	226,656
6	240	None	280,781	313,103
7	240	LC NM NL	164,425	182,617
8	230	None	196,932	214,916
9	230	NM NL	118,835	128,344
10	216	None	72,180	76,347

Note: LV = Loei Valley, LC = Loei City, NM = Nam Mong, VV = Vang Vieng. NL = Nam Lik

Thus, if construction of the Pa Mong dam were to begin in 1982, the maximum number of people who would have to be resettled would be about 480,000. The minimum, if the dam was built to only 216 meters, would be about 76,000. A 250 meter dam with no protection, the scheme most discussed in the Pa Mong Stage One Feasibility Study, would require the resettlement of almost 400,000 people.

2. Land

Very few data concerning land use were available for the Pa Mong Basin. Consequently, we generated our own estimates of the areas currently in use for farming and residential purposes. We depended mainly on analyses of air photographs to measure the areas of land in each use category, though we checked the accuracy of our findings in various ways. Details of our methods are included in Working Paper 2.

Patterns of land use are changing rapidly in the Pa Mong Basin, and it was necessary to project our 1974 estimates into the future. We assumed that the extension of areas in use for agriculture would be related to the growth of population, although the relationship would vary in different sectors of the reservoir area. A good deal of vacant forest land is still available in Laos, and we estimate that there would be no need to reduce the size of holdings per household before the year 2000. Thus, the extension of the area under cultivation will occur at the same rate as the growth of the population: 2.4 percent per year in some areas, and 3.5 percent in others.

Projecting land use on the Thai side is more complex, because less vacant forest land is available. Thus we predict that extensions of the farmed area will occur at ever-decreasing rates, and that no significant extension will occur after 1986. Urban areas and residential land will continue to be extended through the year 2000, though again at decreasing rates.

Working Paper 2 permits estimates of flooded land areas for any reservoir and any year. Table 7 shows these areas for our ten selected dams, assuming that dam construction starts in 1982 and that no extensions of the areas occur after that year.

Table 7 Land Flooded by Ten Selected Reservoirs, 1982 (in rai)*

Reservoir #	Height	Protection	Lao				Thai			
			Residential				Residential			
			Rural	Urban	Paddy	Upland	Rural	Urban	Paddy	Upland
1	260m	None	9,983	822	161,509	137,954	50,125	10,533	425,821	509,541
2	260m	LV NM NL	5,681	532	131,768	86,493	17,405	3,747	182,095	256,883
3	250m	None	9,018	822	139,266	120,217	42,161	7,095	354,728	404,357
4	250m	LV VV	7,973	573	126,720	104,488	37,177	3,676	335,732	388,571
5	250m	LV NM NL	5,250	532	113,267	74,347	16,435	3,676	170,920	235,141
6	240m	None	7,209	547	114,455	97,343	33,371	6,239	280,688	306,843
7	240m	LC NM NL	4,838	506	98,333	64,546	13,341	3,676	145,965	187,675
8	230m	None	5,523	278	83,336	73,110	24,857	3,633	211,816	223,918
9	230m	NM NL	3,989	237	70,556	46,313	9,644	3,633	112,483	131,447
10	216m	None	1,400	174	14,978	4,351	5,171	2,498	41,335	34,836

LV = Loei Valley, LC = Loei City, NM = Nam Mong Basin, NL = Nam Lik Basin, VV = Vang Vieng City and Valley.

*6.25 rai = 1 hectare

Note: This table indicates areas of cleared and developed land only. Other land, such as public forests and water-bodies, are not a charge against resettlement.

Thus, the 260 meter dam with no protection schemes would entail the flooding of about 1.3 million rai (208,000 hectares) of farmland and residential land. The 216 meter dam would flood about 105,000 rai (16,800 hectares) and for the 250 meter dam with no protection the area would be a little over 1 million rai (172,000 hectares).

3. Private Property

Various categories of private property exist in the reservoir area, and we have estimated the total value of each category. We have considered buildings, perennial tree crops, improvements such as wells and fences, and collectively-owned private property. Our estimates of the quantities of each category of property are based on detailed field surveys. We have estimated the replacement cost of property which would be flooded, and our estimates are from property owners' accounts and from appraisals by architects and builders in nearby towns. We have projected the values of each category of private property at the same annual rate as for population growth. Working Paper 2 includes the unit rates, for building materials, trees and other categories, which we used in our estimates; evaluations for each reservoir sector; and projections of those values for each year to 2000. Again, work sheets are included to permit estimates for any permutation of reservoir heights and shapes, and construction dates.

Table 8 presents estimates for our ten selected reservoirs, assuming that no additional investments in private property would be made after 1982.

Table 8 Value of Buildings, Trees, Improvements and Collective Private Property for Ten Selected Reservoirs, 1982 (in US dollars)

Reservoir Number	Reservoir Height	Protection	Laos	Thailand	Total
1	260m	None	30,045,482	125,388,257	155,433,739
2	260m	NL NM LV	22,099,213	61,806,196	83,905,409
3	250m	None	27,007,833	103,609,790	130,617,623
4	250m	VV LV	22,540,548	85,718,535	108,259,083
5	250m	NL NM LV	19,709,211	58,581,195	78,290,406
6	240m	None	21,347,702	82,733,255	104,080,957
7	240m	NL NM LC	17,582,040	47,421,662	65,003,702
8	230m	None	14,242,953	53,587,520	67,830,473
9	230m	NL NM	11,543,444	34,368,484	45,911,928
10	216m	None	4,364,427	23,087,680	27,452,107

LV = Loei Valley, LC = Loei City, NM = Nam Mong, NL = Nam Lik, VV = Vang Vieng

Thus, the replacement cost of private property flooded by the largest possible reservoir would be about $155 million, the cost for the smallest reservoir would be $27 million, and the cost for the 250 meter dam with no protection would be about $131 million.

4. Public Property

Public property includes assets within the reservoir region, owned by the Lao and Thai governments, used largely for provision of services to the population.

We believe that the value of public property flooded by reservoir construction should not be considered a cost of resettlement. Public assets in the region would be lost even if there were no people to be moved. However, at the request of the Mekong Committee we surveyed the value of public property which would be flooded. This study has some utility as a check against compiled compensation payments to cover the social overhead requirements of the evacuees (Working Paper 4) and the costs of reconnecting the transportation network (Working Paper 8), and will be referred to several times in the report. However, we will not include these costs in summaries of resettlement costs because of our decision that they should be charged elsewhere in the project feasibility study.

Most of our data concerning the values of public property were collected in the relevant district or provincial offices. Many of the valuations were given in terms of the original construction costs; in other cases we estimated the values from similar structures elsewhere. We have not projected the values of public property, since we assume that no further investments will be made. Therefore, Table 9 presents the 1974 values for each of our ten selected reservoirs. The table does not include the values of public forest, which are estimated in the USBR reports.

Table 9 Value of Public Property Flooded by Ten Selected Reservoirs, 1974 (US dollars)

Reservoir No.	Height	Protection	Laos	Thailand	Total
1	260m	None	16,755,518	17,648,845	34,404,363
2	260m	LV NM NL	6,572,014	6,718,338	13,290,352
3	250m	None	15,050,873	14,865,113	29,915,986
4	250m	LV VV	10,296,666	7,359,893	17,656,559
5	250m	LV NM NL	5,810,336	6,443,809	12,254,145
6	240m	None	10,358,173	10,962,842	21,321,015
7	240m	LC NM NL	5,150,068	5,228,021	10,378,089
8	230m	None	7,666,735	3,584,739	11,251,474
9	230m	NM NL	3,454,730	2,935,968	6,390,698
10	216m	None	1,454,608	1,920,843	3,375,451

LV = Loei Valley, LC = Loei City, NM = Nam Mong Basin,
NL = Nam Lik Basin, VV = Vang Vieng City and Valley

5. Agricultural Production and Socio-Economic Characteristics

We surveyed a total of 3,778 households within the Pa Mong Basin to determine, among other things, the incomes derived from agriculture. These incomes are significant to the plans for Pa Mong in two ways. First, they provide an estimate of the loss of agricultural productivity which would be caused by the reservoir. Second, they can be used as target incomes in the development of resettlement options for the evacuees. Table 10 shows the gross annual value of agricultural production which would be lost for each of ten reservoirs. These values are for 1974, and have not been projected.

More details concerning incomes are included in Working Paper 2. To summarize our findings briefly, the mean net income for Lao households is 1,074,400 kip. The median value is 720,800 kip. Income levels vary by household size, and the mean net income per capita for the whole sample is 163,090 kip (median is 116,100 kip). Income levels also vary by geographic area, from a mean net income per head of 52,722 kip in Muang Wa, Paklay, to 200,000 kip or more near the Mekong River in Nasaithong and Sanakham. Income levels also vary by farm size.

On the Thai side, the mean net annual household income is 16,821 baht, and the median value is 14,284 baht. The mean net income per capita is 2,750 baht, with a median of 2,230 baht. Income levels vary geographically from a mean income of 2,109 baht in Amphoe Wang Saphung to 3,936 baht in Amphoe Tha Li.

Table 11 summarizes the relative importance of various sources of income for the rural areas of the Pa Mong Basin.

The social characteristics of the Lao and Thai populations are similar. The median age of household heads is 45 years for both countries, and in each case household sizes range from 1 to 17 persons. The mean household size is 6.03 in Laos, and 5.88 in Thailand. Thai household sizes are marginally smaller because a greater proportion of the prospective Thai evacuees live in urban places. Rural household sizes are 6.6 for Laos and 6.7 for Thailand.

The median number of years of schooling for the most educated person in each household was 4 years in both Laos and Thailand. Occupation patterns are similar in the two countries, although off-farm wage labor is relatively more important in Thailand, and fishing, forest gathering and handicrafts are relatively more important in Laos. More than 90 percent of the farmers in each country own their own farms; the proportion is 91 percent in Laos and 97 percent in Thailand. The remainder rent all or part of the land which they use.

Table 10 Value of Annual Agricultural Production Lost by Ten Selected Reservoirs, 1974 (kip in 1,000's; baht in baht; $1 US = 1,200 kip; $1 US = 20 baht)

Res. No.	Height in MSL	Protection	Laos		Thailand	
			Rural	Urban	Rural	Urban
1	260m	none	K7,322,461 $6,102,051	1,052,375 876;979	B381,309,294 19,654,647	25,594,080 1,279,704
2	260m	LV NM NL	K5,647,028 $4,705,857	734,998 $612,498	B183,824,030 $9,191,202	14,623,857 $731,192
3	250m	none	K 6,366,169 $5,305,141	1,052,375 $876,979	B318,788,685 $15,939,434	18,609,985 $930,499
4	250m	LV VV	K 5,980,508 $4,983,757	780,527 $650,439	B300,869,135 $15,043,456	14,368,874 $718,443
5	250m	LV NM NL	K 4,854,121 $4,045,101	734,998 $612,498	B172,060,478 $8,603,023	14,368,874 $718,442
6	240m	none	K 5,481,458 $4,567,882	751,857 $626,547	B254,445,306 $12,722,653	17,571,474 $878,573
7	240m	LC NM NL	K 4,214,128 $3,511,773	706,328 $588,607	B137,202,245 $6,860,112	14,368,874 $718,443
8	230m	none	K 4,006,657 $3,338,881	397,181 $330,984	B184,864,191 $9,243,209	14,284,454 $714,222
9	230m	NL NM	K 3,023,734 $2,519,778	351,652 $293,043	B 93,641,784 $4,682,089	14,284,454 $714,222
10	216m	none	K 1,348,769 $1,123,974	101,126 $84,272	B 59,721,312 $2,986,065	10,910,209 $545,510

LV = Loei Valley, LC = Loei City, NM = Nam Mong Basin, NL = Nam Lik Basin, VV = Vang Vieng City and Valley

Incomes in rural areas are distributed somewhat more equally on the Thai side of the reservoir. In Laos the wealthiest 10 percent of the rural households earned 41 percent of all the income generated by our sample of households. The proportion was 28 percent in Thailand at the time of our survey.

Table 11 Sources of Incomes for Rural Households (percent of total gross household incomes)

	Rice	Other Wet Season Crops	Dry Season Crops	Off-Farm Income	Tree Crops	Animals (net) 4 Legs	Animals (net) Poultry	Home Industry	Business	Transfer	Total Gross
Laos	38	7	6	0.1	3	18	2	22	2	0.2	100
Thailand	40	15	0.4	9	4	14	0.3	13	3	0.6	100

Section 3

RESETTLEMENT EXPERIENCE: POLICIES AND PRINCIPLES

In Section 1 we noted two broadly defined goals for a resettlement program: the evacuees should be neither economically nor socially disadvantaged as a result of their enforced relocation. There is nothing new in these goals, which theoretically have guided practically all the resettlement efforts with which we are familiar. But achieving these goals is quite a different matter. The purpose of this section of the report is to elaborate on some of the obstacles which have prevented achievement of these goals in the past, and to describe a number of principles or elements upon which our particular conception of a fair resettlement program will be based.

The following discussion results from extensive investigations of the policies and government departments related to past resettlement projects, particularly in Thailand and Laos. We interviewed many officials in Bangkok, Vientiane and at several settlement site offices. We reviewed as much documentary evidence as was available. Working Paper 3 provides additional details and discussion for each of the issues raised below.

A. INADEQUATE PLANNING AND FINANCING

A total of eleven dam projects requiring planned resettlement programs had been completed or were under construction in Thailand by 1975, while only one, the Nam Ngum project, had been undertaken in Laos. The agencies involved have not generally kept accurate records of the numbers of households or people flooded by these projects, and the numbers vary depending on the source of one's information. Table 12 shows the best available estimates of the number of households and people affected by each project.

Table 12 Thai and Lao Dam Projects Requiring Resettlement Programs

Project	Year Closed	Building Agency	Main Purpose of Dam	Numbers of Evacuees	
				Households	People* (est.)
Thailand:					
Yanhee (Bhumipol)	1964	RID	Power	4,035	24,210
Nam Pong (Ubonrat)	1965	NEA	Power	5,012	30,072
Lam Pao	1965	RID	Irrig.	5,459	32,754
Lamtakhong	1966	RID	Irrig.	444	2,644
Kiew Lom	1969	RID	Irrig.	496	2,976
Lam Nam Oon	1969	RID	Irrig.	1,639	9,834
Lam Dom Noi	1969	NEA	Power	1,317	7,902
Nan (Sirikit)	1971	RID	Irrig.	2,797	16,782
Huai Luang	1975	RID	Irrig.	612	3,672
Krasiew	(1975)	RID	Irrig.	313	1,878
Kwae Yai (Chao Nen)	(1977)	EGAT	Power	1,200	7,200
				23,324	139,944
Laos:					
Nam Ngum	(1971)	LNMC	Power	579	3,474

*Numbers of people are estimated on the assumption that households consist of a mean of six people.

In general, resettlement has been considered a very minor issue in the overall context of dam projects. The studies made to assess the economic and technical feasibility of dams have usually either ignored the question of resettlement, or they have given it only brief consideration. The case of the Nam Pong project in Northeast Thailand is illustrative. The feasibility study, made over 15 years ago, included only a brief statement of the resettlement problem, and an estimate of the costs of land acquisition. We studied the Nam Pong resettlement closely and conservatively estimated the total costs of several elements of the program. Estimates from the feasibility study are compared with our own research findings in Table 13.

Table 13 Comparison of Feasibility Study Estimates and Actual Dimensions of the Nam Pong Resettlement

	Feasibility Study	Actual Estimate
Area of cropland flooded	11,000 hectares	20,000 hectares
Numbers of people flooded	16,000	30,072
"Market" value of flooded land	$45/hectare	$156/hectare
Total compensation cost	$1,496,700	$3,100,000
Settlement development cost	Not Included	$1,121,000
Other resettlement costs	Not Included	$1,744,000
Total Costs	$1,496,700	$5,965,000

Admittedly our estimates have been made with the benefit of hindsight. Nevertheless, the differences between the two sets of figures are meaningful. The resettlement costs predicted by the feasibility study comprised only 7 percent of the total costs predicted for the Nam Pong project. Our estimates of the actual costs, including some of the personal losses suffered by the evacuees privately, constitute 29 percent of the total anticipated costs of the project as a whole. Moreover, even this amount was not nearly enough to allow the evacuees to maintain their former economic status.

The Nam Ngum project in Laos provides another example of the same problem. No reliable estimate of the numbers of people who would be flooded was available until after the engineering work was underway. No resettlement costs were included in the feasibility study or in later modifications of that study.

With few exceptions, most importantly the Kwae Yai project, resettlement programs have been financed by the domestic governments concerned, and not by the international agencies which have funded most of the dam projects in other respects. Thus, the task of resettlement planning and implementation has been handed over to existing agencies, which have had to compete for funds within their respective government systems. In Thailand the dam building agencies, such as the National Energy Authority, have paid compensation for flooded lands, only the first half of a total resettlement package. The Land Settlement Division of the Public Welfare Department has had most responsibility for planning agricultural settlements for the evacuees, the second half of the package. Many other agencies have been involved with varying degrees of power in processes such as choosing settlement sites, delineating road networks, and determining compensation rates.

The results of these resettlement programs have generally fallen far short of expectations. First, few of the evacuees have moved to the settlements which have been planned for them. Our studies of five reservoir resettlement programs in Thailand revealed that, although planned settlements to accommodate the evacuees were prepared in each case, less than one-third of the evacuees moved into the settlements. Two-thirds of the evacuees managed their own resettlement elsewhere, in some cases because squatters had taken up nearly all the land in the settlements.

A second important shortcoming of past programs has been that evacuees have borne the high costs of resettlement. Evacuees have to make various kinds of monetary outlays in the process of moving and re-establishing themselves. Theoretically, these outlays should be covered by compersation receipts. In fact, compensation payments have not nearly covered all of the costs. A detailed investigation of the cost experience of evacuees from the Nam Pong and Nam Ngum reservoirs is reported in Working Paper 6 and summarized in Section 6 of this report. At Nam Pong, compensation covered only about two-thirds of the monetary costs of resettlement and the evacuees had to acquire the balance by selling their possessions, working as laborers, and from loans and other sources. Moreover, the monetary costs do not reflect the considerable social costs involved in moving. Communities and households broke up at unusually high rates, and many evacuees were forced to move repeatedly after their initial departure from reservoir basins as a result of their failure to locate adequate sources of livelihood.

We do not mean to suggest that the government of Thailand has failed to spend significant sums for evacuees from reservoir projects. For Nam Pong alone, the government's expenditures have been on the order of 75 million baht for compensation and establishment of the planned settlement. The evacuees have spent another 31 million baht attempting to establish themselves in their new locations, and the government continues to spend about 1,000 baht per evacuee household every year at the planned settlement.

In spite of the significant public and private expenditures, the evacuees as a whole are worse off as a result of having had to move. The study of Nam Pong evacuees included a control group who lived in the same general area but had not been displaced by the reservoir. Compared to the control group nine years after the evacuation, the evacuees had lower cash incomes, less good farmland, less livestock, and perceived themselves still suffering from the relocation. Thus, although financing resettlement has been a significant budget item for the Thai government and a severe drain on the capital resources of the evacuees, the funds have still been insufficient to re-establish former income levels or standards of living for the evacuees.

A parallel analysis of the effects of the Nam Ngum project, where both government and private capital available to the evacuees from the Nam Ngum reservoir were much less, showed even greater losses and more severe poverty among the evacuees. In both countries the funds for resettlement have been inadequate, and in Thailand the distribution of resettlement funds has not conformed with the distribution of evacuees. Half of all the funds used for resettlement have been invested in planned settlements, but less than a third, and in some cases as few as 1 percent, of the evacuees have moved to those settlements. Moreover, resettlement in planned settlements has required high expenditures and the settlers have still become worse off than their former neighbors who resettled themselves.

Working Paper 3 provides more details of these problems and of the underlying reasons for the failures of past resettlement efforts. After reviewing the evidence from the past we have concluded that a set of nine basic elements would be essential for any resettlement program if it is to achieve the goals which we have proposed.

B. ESSENTIAL ELEMENTS FOR A SUCCESSFUL RESETTLEMENT PROGRAM

1. The resettlement program must be designed to ensure that the evacuees can make the same incomes after resettlement as they made before reservoir formation.

This element represents the usual goal of resettlement programs: that resettled people should not be economically worse off than they were before the dam was built. There is no way to be sure of meeting

this goal; in practice it is impossible to guarantee that any particular individual or household will be restored to their former economic position. However, it is possible to know the means and frequency distributions of incomes in the reservoir area before the flood, and to design the resettlement program so that these pre-flood income levels and distributions can be replicated to the greatest extent possible. It is also possible to include special remedial programs for evacuees who are not able to regain their former economic status.

The entire resettlement program we have designed is based on the goal of economic restoration; i.e. insuring that the resettled evacuee can reproduce the income he enjoyed before being flooded. To this end we have recommended detailed baseline surveys of assets and income prior to flooding (section 4/4/3 of Working Paper 4) which will be used to calculate the compensation for assets and to set income goals for each evacuee. The resettlement program, particularly the information system and the placement and advisory services, is designed to direct the evacuee to a situation where he will have the best opportunity to replicate his pre-flood income level. For those evacuees who fail to regain their prior income level we have recommended some remedial programs. These, in combination with other elements of the resettlement program, should enable the resettlement project or other governmental assistance programs to assist the evacuees in attaining the goal of economic restoration.

2. <u>The resettlement program should recognize all categories of individuals who will be significantly disadvantaged by the reservoir.</u>

In Section 4 we identify several categories of people who will be disadvantaged by the reservoir. These include: i) the flooded population who will lose land, buildings and other property; ii) the non-flooded people who are cut off from services by flooded roads, or who lose markets, clientele, or other important services in the flooded area; and iii) non-flooded people who receive the flooded evacuees into their communities.

We recommend that <u>all</u> people affected by the reservoir, directly flooded or indirectly damaged by the flooding or the resettlement of evacuees, should receive some form of assistance from the resettlement program. Inclusion of <u>all</u> people damaged by reservoir creation in the obligations of the resettlement program raises many problems in defining categories of loss and assessing degrees of damage. It also raises problems of distributive justice, which lie beyond our frame of reference. We recommend the creation of a Compensation Commission and a Compensation Research Program, which together should be able to identify categories of legitimate loss and determine who should receive resettlement assistance or other benefits.

3. The resettlement program should provide full and fair compensation for all losses suffered by all people significantly affected by the reservoir.

Almost all past major reservoir resettlement projects have included the concept of compensation for flooded property. However, there is wide variation regarding who has been compensated, which losses have been compensated, and in the forms and levels of compensation payments. In general, compensation programs have failed to compensate all damaged persons, have excluded many legitimate losses which merit compensation, and have set compensation rates at inadequate levels.

Working Paper 4 outlines a detailed compensation program for all categories of losses, including land, with rate adjustments for land type and location, for buildings, tree crops, private property improvements and collective community assets. We also make detailed proposals for the design and implementation of a compensation program, to provide not only full and fair compensation payments, but also to provide adequate protection against misappropriations of the compensation funds.

4. The resettlement program should be designed to give the evacuees free choice among several resettlement alternatives, all of which are ecologically and economically viable.

Resettlement alternatives should be capable of producing replacement income for the evacuees. Alternatives should not result in extensive damage to the environment, a condition which simply transfers the costs of resettlement elsewhere. All resettlement alternatives should be designed with these criteria in mind, to ensure that evacuees can achieve economic restoration with least cost to society. From past resettlements we have learned that evacuees' social satisfaction can be enhanced and psychological losses minimized if they are given free choice among several different viable resettlement alternatives and if the resettlement operation is designed with the preferences of the evacuees in mind.

One aspect of Element 4 is the need for mechanisms for communication between planners and evacuees. In the past, resettlement planners have shown little interest in the preferences of evacuees, and have made few attempts to persuade the evacuees to move to their planned settlements. The result has been a marked lack of conformity between the distribution of investments in resettlement, and the distribution of evacuees. We therefore recommend research into the question of how to establish communication channels, and the eventual implementation of information-gathering and communications procedures.

5. The resettlement program must bear the full monetary costs of resettling reservoir evacuees.

Pa Mong resettlement cannot be done cheaply. Resettlement costs will be high regardless of the type of resettlement program implemented. A low-cost program transfers the burden of the resettlement costs to the evacuees themselves, to be borne from savings, sales of property, and reduced income levels, as we noted earlier. The resettlement authority should bear all of the costs of the resettlement and the evacuees should not be expected to bear any of the monetary costs from their own resources.

This element of the program requires the identification of all categories of costs likely to be incurred by the evacuees, estimation of the likely levels of costs, and the payment of those amounts directly to the evacuees. In Section 4 of this report, and in Working Paper 4, we list all of the cost categories which we have identified in our surveys, and estimate the cost levels in each case.

6. The resettlement program should be scheduled to prepare both the evacuees and the resettlement sites adequately before flooding, and to avoid transportation and equipment bottlenecks.

Unlike most development projects, a resettlement program for reservoir evacuees is limited by rigid time constraints. The planning process cannot start before a final decision is made to build the dam, or before money becomes available for hiring planners and staff, and the program must be almost entirely implemented by the time the dam is closed. As a result of these constraints, resettlement plans are usually rushed and their principles and objectives often compromised. If a resettlement program is to have a fair chance of achieving its objectives, adequate time must be made available for the planning and implementation of that program.

We recommend that the evacuation of the Pa Mong evacuees should be phased over an eight-year period. Experience indicates that evacuees tend to delay their moves until the latest possible time, resulting in rescue operations and a sudden influx of relatively large numbers of people into other local economies. Therefore, we propose to make incentive payments available to the Pa Mong population to encourage significant numbers of them to move out will before the closing of the dam.

7. The resettlement program should incorporate measures to insure the protection of the evacuees from fraud, from speculators and from others engaged in illegal activities.

The effects of resettlement on the environment and lifestyles of the evacuees are likely to be drastic. Evacuation and resettlement commonly necessitate activities and ideas with which evacuees are not familiar. Their assets are commonly transferred, at least temporarily, from land to cash, and the evacuees often have little choice but to learn new farming techniques or to change their occupations completely. Under these circumstances the evacuees are vulnerable to the new and unfamiliar hazards associated with imperfectly learned job skills, uncertain markets for new crops, and contacts with sophisticated and often dishonest businessmen, speculators and "confidence men." The resettlement authority should anticipate these hazards, and take steps to protect the evacuees.

Specifically, we recommend an information program designed to warn the evacuees against the most likely hazards, as well as referral, placement, and land-title verification services to assist them in locating legitimate resettlement opportunities, simple procedures for banking compensation money, and the institution of an ombudsman as a check on the integrity of the resettlement personnel.

8. The resettlement program should maintain former standards of government and private services for the population affected by the creation of the reservoir.

Rural populations are always served to some extent by schools, police forces, health clinics, and other government functions. These populations are also served by private individuals and firms, such as merchants who buy crops and provide credit, and transportation operators. The relocation of large numbers of people, due to creation of a reservoir, disrupts these services. Relocated people may find themselves living further away from schools and health clinics, and they may not be served as well or as frequently as before by private operators. Moreover, the removal of large numbers of people may cause continued services to the residual, non-flooded population to become uneconomic and these services might therefore be curtailed. In addition, reservoir flooding may physically separate residual populations from public service networks to which they had access before the creation of the reservoir.

Section 6 of this report, and Working Paper 8, provide detailed analyses of the dislocation of roads and government services which will result from the creation of the Pa Mong reservoir. We also recommend procedures for replacing lost infrastructure, and we estimate the costs of doing so.

9. The resettlement program should be designed and administered by an independent, centralized Resettlement Agency.

The success of the resettlement program requires a coordinated combination of a wide range of varied activities; it is probable that such close coordination can be achieved only if all components of the complex resettlement program are administered by a single organization with strong central control. No single existing government agency combines all the activities or skills required for the resettlement program. Therefore, the resettlement program will require the creation of a new, temporary organization to implement and coordinate the program.

Working Paper 4 includes details of the structure and operating costs of a centralized, autonomous Resettlement Agency.

Section 4

THE BASIC RESETTLEMENT PROGRAMS: COMPENSATION AND RESETTLEMENT

1. Introduction

The most important element in a successful resettlement project is payment of full and fair compensation for losses suffered by the evacuees. This compensation must be paid promptly to enable evacuees to make the best use of funds in re-establishing their former economic situation; compensation delayed can have the effect of compensation denied. The compensation level must be adequate in order to insure that evacuees can indeed replace flooded assets and lost income flows. Furthermore compensation procedures must be clear and equitable in order to avoid litigation and delays which ultimately can increase resettlement costs substantially and decrease evacuee satisfaction.

The most difficult task in formulating a compensation program is developing criteria for separating compensable losses from non-compensable losses. Losses can be classified in a number of ways and different criteria can be used to distinguish between those which are permanent and require full compensation and those which are temporary and require only limited term assistance until the losses are restored. Losses are frequently divided into three categories: technological, pecuniary, and psychological. Technological losses are usually permanent and refer to the loss or reduction of some factor of production, such as land. This invariably involves output losses, because factors of production are lost, and it may not be possible to combine the remaining factors of production in efficient ways. Pecuniary losses may be temporary or permanent, refer to changes in relative income positions of individuals, and have no technological basis. An example would be the loss of business suffered by a merchant whose clientele is flooded by the reservoir. Psychological losses again may be temporary or permanent and refer to a wide range of usually unmeasured and perhaps unmeasurable losses, such as the loss of social networks and feelings of stability and continuity.

In general, technological losses should be fully compensated. Pecuniary losses may involve some re-establishment costs so that the evacuee can restore his income in a new location. Psychological losses are difficult to measure and compensate, and therefore are usually dealt with by designing an overall program in which they are minimized and a compensation program in which other elements offset psychological losses in some way.

We have compiled a list of most of the types of losses which the population affected by the creation of the Pa Mong reservoir might suffer. For each loss category we have suggested an appropriate compensation policy. This list

includes losses undergone both by persons who are flooded by the reservoir and by persons who live outside the reservoir but who are significantly affected by its creation.

2. Losses to the Flooded Population

a) Immovable Property

i) Land. Compensation will be paid for land.

ii) Buildings. Compensation will be paid for buildings. If the evacuee wishes to salvage and move building components to another location, he will bear the costs of such salvage and movement.

iii) Tree Crops. Compensation will be paid for tree crops.

iv) Private Property Improvements. Compensation will be paid for fences, wells, fish traps, charcoal kilns, and other private property improvements.

b) Movable Property

i) Standing Crop. It is assumed that the standing crop will be harvested and either sold or transported by the evacuee to his new location.

ii) Livestock. It is assumed that livestock will either be sold by the evacuee, or will be transported to his new location.

iii) Standing Timber. It is assumed that the value of standing timber is included in the compensation value calculated and paid for land.

iv) Business Inventory. The costs of moving the inventory, machinery and other movable assets of shops, factories, mills and other business will be paid.

v) Debts, Accounts Receivable and other Claims. It is assumed that compensation and other payments will create a period of liquidity in which various debts and obligations will be paid.

c) Claims to Collective or Public Assets

i) Collective Community Assets. Compensation will be paid for collective community assets (wats, roads, wells, ponds, etc.). This payment will be made to the receiving or "host" community, on behalf of the evacuee.

ii) Use of Public Assets for Income Production. A wide range of public land is used in the production of income, including forests from which produce is gathered, public grazing lands, river bank garden lands, and rivers and ponds. Claims for compensation will be considered by the Compensation Commission, who will judge damages involved in special categories of losses.

d) Locational Losses

i) Favorable Economic Location. Additional value is often attached to an economically favorable location on a roadway or river which provides irrigation water, access to transportation and other benefits. In urban areas, favored business locations may command a considerable premium. The compensation program for land will include a premium paid for favored location.

ii) Access to Rental Land. Both the rural and urban tenant lose their access to the property which they rent and their links with former landlords. An information-placement service will assist former tenants in finding new land and buildings which they can rent. A downtime allowance will be paid to support them until new rental properties are found.

iii) Access to Full-Time and Off-Season Employment. Rural and urban laborers will lose their jobs and their links to former employers. An information-placement service will assist them in finding new jobs. A downtime allowance will provide support during the period of searching for new jobs.

iv) Access to Supply of Raw Materials. The population engaged in craft industries, factories, and shops may no longer have access to raw materials from the flooded reservoir region. Information will be provided regarding new locations where raw materials are available. A downtime allowance will provide support during the period necessary to re-establish their activities in new locations.

v) Access to Credit and Marketing Networks. Elaborate credit and marketing networks currently link rural and urban populations in the reservoir region and facilitate agricultural production and exchange. In resettlement situations where no local networks exist or where the networks cannot be re-established promptly, the resettlement program should cover the incremental cost for expanding government credit and marketing services to include the evacuees.

vi) Access to Social Services (educational, medical, police, etc.). A Social Overhead Allowance will be paid on behalf of the evacuee to the administrative unit to which he moves to cover the incremental costs of re-establishing or expanding social services.

vii) Access to Labor Supply. Some farms and many urban business operations depend on access to labor which will be scattered by resettlement. Information will be provided about the labor market in various alternative destinations.

viii) Tenancy or Lease Terminated. Some rural and urban evacuees have signed, and sometimes paid for, long-term agreements for occupancy and use of property which they will have to leave. We assume that evacuees with long-term tenure agreements or evacuees who have prepaid leases on buildings or property will recover their deposits and prepayments from the landlord who receives compensation payment for the property. If the timing of the compensation payment makes it difficult for the tenant or leaseholder to secure refund of his deposit and/or prepayment in time to re-establish himself in a new location, the Resettlement Authority may refund this deposit in advance and deduct it from the compensation payment due to the landlord.

ix) Clientele and Goodwill. In moving from the reservoir region, sellers of goods and services may suffer a substantial loss in the clientele and goodwill they have built up over the years. This category involves the rural as well as urban population and affects a diverse group ranging from restaurant owners to minibus operators. Since it is unlikely that many of their old clientele will resettle in the same area, this group must begin operating in a new competitive situation with the probability of substantially reduced income levels until such time as they can establish a new clientele, if ever. Compensation claims in this category will be submitted to the Compensation Commission for action.

3. Losses to the Non-Flooded Population

Some of the population in the reservoir region who are not directly flooded may nonetheless suffer substantial losses. How these losses are treated depends on the degree of damage.

i) Connections with Neighboring Commmunities or Service Centers. Some households will be isolated when floodwaters cover access roads or otherwise sever connections with neighboring communities and service centers. These people will be reconnected either by construction of a replacement road or by scheduled boat service. If the Resettlement Agency decides that the expense of reconnecting these households is too great, they will be treated as part of the resettled population and will be relocated elsewhere.

ii) Market and other Central Services. The combination of new (replacement) towns and a reconnected transportation network should provide

access to new market and service centers. If isolation precludes the use of these reconstructed facilites, affected households will be relocated together with the resettled population as under i) above.

iii) Source of Raw Materials, Labor, and Clientele. Many of the towns immediately adjacent to the reservoir zone depend on the reservoir region to supply their raw materials, their labor, and a large part of their clientele. Therefore, the displacement of the reservoir population may result in a sharp reduction of their operations. Any shop, factory or service which is judged to be significantly affected by the flooding of the reservoir will be assisted in moving to a new location where business opportunities are better and will be given the same information, searching and moving allowances, placement assistance, and downtime payments which are provided to other evacuees. The Compensation Commission will decide the level of lost business at which this policy will come into effect and will make judgements on all claims in this category of losses.

iv) Social Services. Communities receiving substantial numbers of evacuees may experience some initial overburdening of their educational, medical, police, and administrative services, as well as other problems in adjusting to a large influx of new settlers. Each evacuee will receive a Social Overhead Certificate representing the per capita cost of creating or expanding social services for the host community. With this certificate the host community can obtain funds for expansion of services. In addition, each evacuee will receive a certificate for the value of collective village assets such as temples, village ponds, and wells. This certificate also will be given to the host community in order to cover the costs of these village services.

4. Psychological Losses

The term psychological loss is widely used to refer to a general category of usually unmeasurable losses related to changes in location, occupation, and social networks as well as to the trauma of moving. When a person is flooded out he loses a familiar physical landscape, ancestral lands, a home, relatives, friends and neighbors, employment, those within the community he turned to for advice and help, an accumulated reputation and status within the community, an extensive network of non-monetary debts and obligations, important labor exchanges and other economic relationships, and a wide range of other interactions--in brief, an entire universe. Moving may lead to the breakup of an extended family into smaller nuclear families and to a wide range of other changes of lifestyles. Furthermore, re-establishment in a new location, and perhaps even in a new occupation, involves many adjustment problems.

Our solution to the problems of psychological losses is to minimize them by making sure the project meets its economic and social goals. Put in different terms, we believe the resettlement project should be designed so that evacuees are encouraged to behave, and therefore perceive themselves, less like involuntary migrants and more like voluntary migrants. If the evacuee can see before resettlement that there is some advantage in moving, that he will be as well off or better off in a new situation, then he may well be converted to a voluntary migrant, and the psychological losses will be sharply reduced.

A voluntary migrant deals with most of the psychological losses in advance; he decides that he values a new location and opportunities more than the complex of social and economic networks in which he currently lives. Voluntary urban migrants trade the comfort of home villages for the potential financial returns opportunities, and amenities of towns; migrants to the frontier trade an established village for the returns of larger land areas and potential income from clearing the forest. The major characteristics of the voluntary migrant are that he anticipates a better financial situation in a new location, and he is free to decide where he will go and what he will do. This freedom to select one's own destination is very important; people usually rationalize their own errors of judgement but are not forgiving of errors made by a bureaucracy.

In addition to designing the resettlement project so that it encourages voluntary migration, it is important to handle the entire compensation and moving process with efficiency and fairness. Many psychological costs are caused by the trauma of a badly-managed resettlement rather than by discrepencies between the old and new locations. How the resettlement operation is carried out is as important as what is done for the evacuees.

Therefore, to avoid or minimize psychological losses (and achieve the social goal of resettlement) we have built into the recommended resettlement project a wide range of operational procedures and services to induce or facilitate "voluntary" resettlement and to avoid trauma in the process of moving. These procedures and services include the following: the evacuee will have free choice of his resettlement destination; he will be assured that resettlement will place him in a situation where he will be able to replicate if not exceed his current income level; he will be encouraged to visit potential destinations to select the one which most nearly fits his economic and social needs; full and fair compensation for his fixed assets will insure that he suffers no permanent economic loss; the information system will inform him of a wide range of opportunities; assistance in moving and re-establishment will be provided with all moving and re-establishment costs covered; information and placement services will assist in finding locations to which groups of evacuees can move together to maintain their former networks; and a downtime allowance will provide support during the period of adjustment to new social networks in new locations.

A. THE COMPENSATION PROGRAM

1. Compensation for Land

Compensation for land is the largest single cost in the resettlement budget. In order to achieve the project's goal of economic restoration, each evacuee must receive sufficient compensation for his land to enable him to purchase replacement land which will produce the same income as his lost land; in past resettlements, most compensation payments have fallen far short of this level.

There are many problems in determining the value of land for compensation purposes. Because the payment of full and fair compensation is of over-riding importance, we examined a wide range of different land values derived by several methods from a variety of sources. We found that almost all land value data were highly varied and somewhat suspect, both data collected from available records such as land office records and assessment lists, and data generated in our own surveys of land transactions and land market values.

After careful evaluation of the data, we have selected different methods to compile compensation costs for each of three different categories of land; agricultural land, rural residential land and urban land. We used two different methods and many sources of information to arrive at a compensation value for agricultural land; we selected rates of compensation which are consistent with both the capitalized value of agricultural land and with various estimates of the real market value of agricultural land. We used corrected market data to value rural residential land for compensation purposes, and we used assessed land values to determine compensation rates for urban land.

Two criteria must be considered in determining rates of compensation for farmland. First, the rates should be fair and consistent with respect to conditions within the reservoir basin itself; therefore the rates should reflect both the current market value of land which is to be flooded and the productivity of that land. Second, the evacuees must be able to buy replacement land with their compensation money; therefore the compensation rates must not only be consistent with conditions within the reservoir basin but must also take into account the prices and quality of land in areas to which the evacuees are most likely to move.

Land Values Within the Pa Mong Basin. Due to the uncertain and often conflicting nature of our various sources of data concerning land values, we have used two different methods to calculate the fair value of land within the Pa Mong Basin. We collected information concerning recent land transactions and perceived

values of land from several groups of people, including land officers, kamnann, village headmen and farmers. These sources give us a range of values of land of equal quality within each sector of the reservoir. In order to verify those values we have also calculated the capitalized values of land according to established principles of economics; these calculations give us a range of land values which are correct according to economic theory. These two methods taken together will allow us to make a first approximation of the fair value of farmland for compensation purposes and therefore an estimate of the total cost of the compensation program for the Pa Mong evacuees.

Capitalized Value of Land. The income-capitalization method of valuing land depends upon the principle that the value of a property is determined from the future stream of net income which the property is expected to yield. Thus, if a piece of land normally yields an annual net income of 1,000 baht ($50) per rai, the present value of that land is in effect the sum of the present values of all the future 1,000 baht incomes which the land is expected to yield. The present value of each of these future annual incomes will of course be somewhat less than 1,000 baht, since in general people will prefer to have some given amount of cash immediately rather than the promise of a marginally greater amount of cash in the future.

The chief advantage of measuring the capitalized value of land is that this method does not depend upon land-sales statistics of dubious validity; therefore the capitalized value of land provides an independent check of whatever land market data are available, and it provides a guide for adjusting those data in determining compensation rates. This is an important advantage. The main problems with using this method lie in the mechanics of calculating the appropriate rates; first, the income derived from factors of production which will be destroyed by the reservoir must be distinguished from the income derived from other factors of production which will be unaffected by the reservoir, and second, an appropriate rate of discount must be selected to determine the present value of future incomes. Both practical and theoretical problems are involved in solving these problems. However, the problems are solvable, and precedents exist for using this method to calculate compensation rates for land.

The details of our calculation of the capitalized value of land will be found in Working Paper 4. These results are fully consistent with what one would expect the contribution of land to be to the total value of production. At a rate of capitalization of 10 percent, farmers would be entitled to compensation of 4.2 to 5.6 times the gross value of production in the area. Using the 6 percent capitalization rate that the USBR has used for the Pa Mong project would imply compensation for land at the rate of 7 to 9.3 times the gross value of production. Compensation rates which fit within these ranges of implied land values would be approximately correct from a theoretical point of view. Our inclination towards a 10 percent discount rate suggests that compensation rates should be around five times the gross value of production.

Market Prices, Estimated Prices, and Productivity. In order to provide a check on our calculation of the capitalized value of farmland we investigated the relationship between values of production and stated values of land. We interviewed village headmen and farmers to determine what they thought land in a particular area was worth, and we compared those statements with estimates of the annual values of production derived from that land. By dividing values of production into stated values of land, we can express land values as multiples of the annual values of production and compare those multiples to those derived from our analysis above of the capitalized values of land.

Table 14 shows the values of farmland expressed as multiples of the annual values of production according to each of our sources of data. Each value in the table is the mean from one source of data, and therefore represents a range of values for particular tambons, villages or plots of land. All the multiples for paddy land fall between 4.6 and 7.2 and for upland between 3.9 and 5.5. These ranges are similar to those identified from our measurement of the capitalized value of land. The concordance of these two sets of data is encouraging. For the purposes of determining the total costs of compensation for farmland we will use rates on both sides of the reservoir equal to 6 times the gross value of production for paddy land and equal to 5.5 times the gross value of production for upland.

Table 14 Estimates of Land Values as Multiples of Production

Data Source	Location	Paddy	Upland	All Farmland
Buyers & Sellers	Ban Phai	7.2	3.9	6.5
Buyers & Sellers	So Phi Sai	2.2	2.4	2.3
Buyers & Sellers	Nong Rua	n.a.	n.a.	4.3
Buyers & Sellers	Muang Fueng	4.6	4.3	4.5
Village Headmen	Pa Mong: Laos	n.a.	n.a.	5.2
Village Headmen	Thailand	6.3	5.5	6.0
Tambon Records	Assessed values	3.9	13.1	7.4
Tambon Records	Recorded prices	5.4	4.1	4.9

We have measured the gross value of production from our surveys of households within the Pa Mong Basin. However, we expect yields on the Thai side of the reservoir to change as the population increases and as the area of arable land per head decreases. We have therefore projected the 1974/75 yields approximately in proportion to the increase of population which we expect; we have assigned most of the increase of yields to wet riceland, assuming that most of the increased inputs of labor will be focused on farming rice. In Laos more uncleared land was available in 1975, and we do not expect any increase in the population density per rai of arable land; therefore we have not projected yields for the Lao side of the reservoir.

The resulting compensation rates are shown in Table 15 using constant multiples but different gross values of production for each sector of the reservoir following the results of our household surveys.

Table 15 Compensation for Agricultural Land by Reservoir Sector, 1982

Sector	$ per rai		260m		250m		240m		230m	
	Compensation Rate Paddy	Compensation Rate Upland	Paddy	Upland	Paddy	Upland	Paddy	Upland	Paddy	Upland
1	108.35	102.94	14,277,062	8,903,589	12,272,371	7,653,280	10,654,380	6,644,365	7,644,742	4,767,460
2	129.28	47.73	1,857,236	1,536,237	1,739,204	1,438,630	1,648,578	1,363,646	1,411,608	1,167,619
3	122.80	56.17	1,888,050	1,082,723	1,540,648	883,498	413,836	237,318	228,530	131,044
Lao Subtotal			18,022,348	11,522,559	15,552,223	9,975,408	12,716,794	8,245,329	9,284,880	6,066,123
			29,544,907		25,527,631		20,962,123		15,351,003	
4	174.06	102.13	25,415,554	20,783,455	23,470,424	18,562,638	20,802,954	15,214,306	18,048,281	12,074,114
5	196.93	83.61	14,620,477	9,348,350	7,627,493	4,875,383	3,894,290	2,488,902	1,731,605	1,105,659
6	227.82	71.34	5,047,807	1,676,133	3,725,768	775,394	1,666,047	234,066	1,823	4,280
7	196.04	97.48	35,957,068	16,644,515	32,309,744	14,956,356	26,289,356	12,169,598	19,473,241	9,014,073
Thai Subtotal			81,040,906	48,452,453	67,133,429	39,169,771	52,652,647	30,106,872	39,254,950	22,198,126
			129,493,359		106,303,200		82,759,519		61,453,076	
Total			99,063,254	59,975,012	82,685,652	49,145,179	65,369,441	38,352,201	48,539,830	28,264,249
Total All Land			159,038,266		131,830,831		103,721,642		76,804,079	

Compensation for Rural Residential Land. In compiling the compensation rates for rural residential land, we have had to depend entirely on interview data concerning current market values. Field studies have shown that the assessed value is usually below the market value, and we do not have sufficient information about rentals paid for residential land to impute a value as a multiple of the income it produces.

Table 16 Compensation for Rural Residential Land by Reservoir Sector, 1982 (in dollars)

Sector	Rate ($/rai)	260 m	250 m	240 m	230 m
1	108.35	615,536	568,838	524,197	432,208
2	129.28	374,912	352,029	213,312	159,919
3	122,80	174,376	128,326	88,539	36,472
Lao Subtotal		1,164,824	1,049,193	826,048	628,599
4	200.34	2,384,447	2,190,117	1,875,583	1,742,557
5	263,02	2,933,988	1,410,050	702,263	248,817
6	227.82	1,222,938	1,167,805	449,945	0
7	201.83	4,379,711	4,186,358	3,908,236	3,070,440
Thai Subtotal		10,921,084	8,954,330	6,936,027	5,061,814
Total		12,085,908	10,003,523	7,762,075	5,690,413

Compensation for Urban Land. The compensation rates for urban land are derived from the 1974 assessed value of urban land in Thailand. Field study indicated that in general the assessed rates were reasonably close to market value. Since the Lao urban surveys were terminated before we were able to collect data on urban property values, we have extended Thai urban property values to Lao towns.

Table 17 Compensation for Urban Land by Reservoir Sector, 1982
(in dollars)

Sector	Towns	Compensation Rate ($/rai)	260m	250m	240m	230m
1	Paklay Ken Thao Sanakham	1,050	558,600	558,600	531,300	247,800
2	Hin Heup Fueng	1,000	41,000	41,000	41,000	41,000
3	Vang Vieng	1,500	373,500	373,500	0	0
Lao Subtotal			973,100	973,100	572,300	288,800
4	Chieng Khan Pak Chom Nam Som Sangkhom	1,350	4,988,250	4,887,000	4,887,000	4,887,000
5	Wang Saphung	1,500	6,193,500	1,143,000	0	0
6	Loei	3,750	10,121,250	10,121,250	9,600,000	0
7	None	-	0	0	0	0
Thai Subtotal			21,303,000	16,151,250	14,487,000	4,887,000
Total			22,276,100	17,124,350	15,059,300	5,175,800

Local Variations of Compensation Rates. We have recommended compensation rates which vary by sector of the reservoir and which vary among each of the towns; these rates are adequate for determining the overall costs of the compensation program for the Pa Mong evacuees. However, the values of individual plots of land within each sector of the reservoir and within each town vary according to such factors as local soil conditions and proximity to roads and to permanent sources of water. The compensation payment received by each property owner should reflect as nearly as possible the characteristics and value of his particular plot as well as the gross variations of those characteristics and values among the reservoir sectors.

We recommend that the general rates of compensation for each reservoir sector should be the rates which we have listed in Tables 15, 16 and 17, subject to confirmation by further research into land values within the reservoir basin and elsewhere. Ultimately the local Village Resettlement Councils should have the power to set premiums, within certain limits, for plots with particularly valuable characteristics. These differential rates for land of varying quality will affect the distribution of compensation funds among groups of land owners but will only slightly affect the gross amounts of compensation money available to each group of land owners. For the purposes of this report, we have increased the total cost of compensation for land in each sector of the reservoir by 10 percent to allow for premiums above the general rates of compensation.

Compensation for Ten Selected Reservoirs. Compensation for land for ten selected reservoirs is summarized in Table 18.

We believe that the Land Research Program should start immediately and should continue in modified form during the period when compensation is being paid and evacuees are leaving the reservoir area. The objective of the Land Research Program would be:

i) To develop a detailed set of land-value data, including both perceived values and actual prices of land, within the Pa Mong Basin and in areas to which the evacuees are most likely to move.

ii) To analyze relationships between plot characteristics and values.

iii) To locate areas with high frequency of sales of good quality land.

iv) To monitor changes of prices of land over time.

These last two objectives will be particularly important during the period evacuees are actually moving out of the reservoir area. Findings from analyses at that time would permit adjustments to compensation policies and rates to be made as necessary, in order to insure that evacuees can purchase replacement land.

Table 18 Compensation for Land for Ten Selected Reservoirs, 1982 (in dollars)

Res. #	Reservoir Height	Protection Scheme	LAOS						THAILAND						LAO + THAI TOTAL
			Paddy	Upland	Rural Residential	Urban	Premium	Total	Paddy	Upland	Rural Residential	Urban	Premium	Total	
1	260m	None	18,022,348	11,522,559	1,164,824	973,100	3,168,283	34,851,114	81,040,906	48,452,453	10,921,084	21,203,000	16,171,744	177,889,187	212,740,301
2	260m	NE,NM,LV	14,277,052	8,903,590	615,536	558,600	2,435,477	26,790,255	33,185,358	24,958,523	3,642,893	10,585,500	7,237,227	79,609,501	106,399,756
3	250m	None	15,522,223	9,975,408	1,049,193	973,100	2,754,992	30,304,916	67,133,429	39,169,771	8,954,330	16,151,250	13,140,878	144,549,658	174,854,574
4	250m	VV,LV	14,011,575	9,091,910	920,867	599,600	2,462,395	27,086,347	63,390,380	37,848,984	7,643,439	8,246,250	11,712,905	128,841,958	155,928,305
5	250m	NE,NM,LV	10,731,723	6,769,782	568,838	558,600	1,862,894	20,491,837	27,337,587	21,571,841	3,457,081	8,246,250	6,061,275	66,674,034	87,165,871
6	240m	None	12,716,794	8,245,329	826,048	572,300	2,236,047	24,596,518	52,652,647	30,106,872	6,936,027	14,487,000	10,418,254	114,600,800	139,197,318
7	240m	NE,NM,LC	10,654,380	6,644,365	524,197	531,300	1,835,424	20,189,666	26,217,714	17,937,274	2,876,063	8,355,750	5,538,680	60,925,481	81,115,147
8	230m	None	9,284,880	6,066,123	628,599	288,800	1,626,840	17,895,242	39,254,950	22,198,126	5,061,814	4,887,000	7,140,189	78,542,079	96,437,321
9	230m	NE,NM	7,644,742	4,767,460	432,208	247,800	1,309,221	14,401,431	19,781,709	13,184,053	1,991,374	4,887,000	3,984,413	43,828,549	58,229,980
10	216m	None	1,491,654	411,657	138,579	182,700	222,459	2,447,049	6,958,918	3,440,963	998,294	3,354,750	1,475,292	16,228,217	18,675,266

NE = Nam Ein, NM = Nam Mong Basin, LV = Loei Valley, VV = Vang Vieng, LC = Loei City

2. Compensation for Private Property Buildings. We recommend the use of replacement value as the most equitable and efficient basis for calculating compensation for buildings. It is the best way to insure that the evacuee will be able to reproduce his current buildings in a new location. All of the other methods either penalize the evacuee in some respect or are more difficult to implement.

The use of replacement value for buildings will necessitate an inventory of the components of each building and the calculation of the value of the components, and the labor costs involved in constructing a similar building. We recommend use of local values for construction materials, drawn from the sample of provinces which represent the most likely destinations of the evacuees. The total value of compensation for buildings is detailed on Table 19.

Tree Crops. Crops from perennial trees can contribute substantially to a farmer's income and home consumption. In general, compensation for trees in past resettlement projects has not adequately reflected the stream on income they generate. Because of this we have elected to compile new rates rather than accept rates currently in use. The method and factors used to calculate values for tree crops are detailed in Working Paper 2. The total value of tree crop compensation for selected reservoirs is detailed in Table 19.

Private Property Improvements. The valuation of private property improvements in this report includes only fences and wells. Other private property improvements should be surveyed and valued for compensation purposes. These include fish traps, fish ponds, water storage ponds, irrigation distribution ditches, charcoal kilns, drying yards and other non-movable property.

The compensation value of private property improvements should be based on the replacement cost for these improvements in the evacuees' new location. The value of private property improvements used in Table 19 was based in part on compensation rates paid by the Highway Department in Thailand, updated and adjusted where necessary.

Collective Community Assets. The compensation value for community assets should be based on the replacement cost for these assets. The values in Table 21 were derived from our public property surveys for temples and roads, and from field surveys for the value of wells and ponds. These estimates probably undervalue the collective community assets because, in the case of temples and roads, they represent original construction costs, not replacement costs, and do not reflect all of the contributed community labor and capital invested in these assets.

Each evacuee will receive a certificate for his per capita value of collective community assets. When he arrives in his host community, he will either present the certificate to the abbot of the temple, or to the community

headman, who in turn can collect this amount from the Resettlement Referral Office or Resettlement Agency. We assume that this payment will help enhance the favorable reception of evacuees by the host community. A gift of this size, approximately $20 for the average family, can be translated into considerable merit and status in the new community.

Private Property Compensation Summary. Private property compensation is summarized in Table 19.

3. Operation of the Compensation Program

The operation of the compensation program should begin at the same time as pre-construction engineering and land acquisition, five years before the start of dam construction.

Careful and complete background research is vital to a successful compensation program. This research will consist of two major parts:

i) Land Research. To develop accurate data regarding the real market price of replacement land, and to provide information about where such land is available.

ii) Compensation Research which will record the land holdings and claims of every individual in the reservoir region on air photographs and verify them in person with the land owner. The survey will also provide a complete inventory of other assets, such as buildings, tree crops, property improvements, and collective village property, and will collect detailed income data and such other socio-economic and demographic data as may be useful in planning resettlement alternatives and predicting resettlement preferences.

Land Ownership. It is important that the evacuees feel they receive full and fair compensation for land they "own." This involves confirmation of the ownership of land and requires the direct participation of the evacuee and his agreement on the ownership, size and characteristics of land claimed and/or used.

There are always problems in establishing clear title to rural land. Relatively little land in the reservoir region has a clear title deed, and most is held under some form of usufructory rights or a claim intermediate between clear title and squatters' rights.

Table 19 Compensation for Private Property, by Type of Property, for Ten Selected Reservoirs, 1982
(kip in 1,000's, baht in baht; $1 US = 20 baht, 840 kip)

Reservoir #	Reservoir Height	Protection		LAOS (1,000's Kip) Bldgs.	Trees	Improve.	Col. Prop.	Total	THAILAND (Baht) Bldgs.	Trees	Improve.	Col. Prop.	Total	TOTAL US Dollars
1	260		R	11,420,758	6,832,772	156,083	348,041	K25,238,205	1,499,861,680	370,744,366	17,131,764	99,174,750	B2,507,765,140	155,433,739
			U	4,702,216	1,641,518	43,236	33,576	$30,045,482	425,193,998	71,161,407	7,252,274	17,244,901	$ 125,388,257	
2	260	NL NM LV	R	8,564,600	5,380,584	105,798	246,862	K18,563,339	759,902,470	204,085,808	9,390,433	54,841,526	B1,236,123,930	83,905,409
			U	3,693,725	1,128,449	22,189	21,132	$22,099,213	152,290,090	46,243,895	3,369,425	6,000,280	$ 61,806,196	
3	250	[illegible]	R	9,992,412	5,929,416	133,262	300,944	K22,686,580	1,235,052,350	310,167,918	14,521,690	79,356,339	B2,072,195,941	139,617,623
			U	4,702,216	1,641,518	43,236	33,576	$27,007,833	356,212,016	56,603,006	6,074,173	14,208,449	$ 103,609,790	
4	250	VV LV	R	8,992,114	5,171,759	100,883	260,240	K18,934,061	1,129,324,430	299,193,108	13,157,986	68,353,887	B1,714,370,744	108,259,083
			U	3,158,850	1,164,287	22,841	23,087	$22,540,548	149,692,140	45,439,913	3,311,300	5,897,980	$ 85,718,535	
5	250	NL NM LV	R	7,362,020	4,629,081	90,943	212,199	K16,555,738	715,794,720	190,871,058	8,786,636	51,830,184	B1,171,623,931	78,290,406
			U	3,693,725	1,128,449	22,183	21,132	$19,709,211	149,692,140	45,439,913	3,311,300	5,897,980	$ 58,581,195	
6	240	[illegible]	R	8,407,733	4,925,621	105,136	250,831	K17,932,070	957,101,668	246,810,579	11,424,465	58,712,648	B1,654,665,100	104,080,957
			U	3,078,216	1,120,285	21,975	22,263	$21,347,702	308,992,760	53,878,538	5,439,490	12,304,952	$ 82,733,255	
7	240	NL NM LC	R	6,331,329	4,019,253	78,952	184,220	K14,768,914	549,214,510	148,373,557	6,913,375	39,657,742	B 948,433,257	65,003,702
			U	2,973,031	1,084,447	21,323	20,308	$17,582,049	149,692,140	45,372,653	3,311,300	5,897,980	$ 47,421,662	
8	230	[illegible]	R	6,021,159	3,459,726	70,486	178,426	K11,964,081	647,252,376	181,036,857	7,847,600	36,105,825	B1,071,750,416	67,830,473
			U	1,598,229	575,712	11,268	12,065	$14,242,953	145,496,650	45,026,618	3,255,250	5,729,240	$ 53,587,520	
9	230	NL NM	R	4,[illegible]	2,831,037	46,650	132,182	K 9,696,493	354,384,966	104,321,694	4,751,750	24,403,512	B 687,369,680	45,911,928
			U	1,450,105	534,874	10,616	10,110	$11,543,444	145,496,650	45,026,618	3,255,250	5,729,240	$ 34,368,484	
10	216	[illegible]	R	2,055,610	988,503	25,269	58,962	K 3,666,119	223,932,110	67,090,387	3,065,437	15,288,382	B 461,753,606	27,452,107
			U	425,731	119,083	3,053	2,908	$ 4,364,427	111,125,430	34,389,810	2,486,250	4,375,800	$ 23,087,680	

Individual farmers can identify the fields they cultivate and there would usually be an agreement among farmers in any village about ownership of or rights to various fields. However, because the land is not surveyed, the farmer may sometimes overestimate the size of his fields. This leads to disenchantment when a farmer who believes he has been farming a twenty-rai plot and has been paying taxes on 20 rai, is told by the Resettlement Agency after survey that he owns and will receive compensation for only 15 rai. Therefore, there will have to be a carefully prepared education program regarding the measurement problem accompanying the verification of plot ownership and size on air photographs. We repeat, the evacuee must be satisfied that he has been compensated for all his land.

Compensation Calculation and Payment. The final compensation payments due to each household or evacuee will be discussed with each evacuee household by the village/town resettlement agent, a representative of the Compensation Office, and the local administrative official. Any major disagreement with the calculated compensation payments will be taken up by the Village/Town Resettlement Council. If the disputes cannot be resolved at that level, an appeal can be made to the Compensation Commission. If the disputes are not resolved by the Compensation Commission, they can be referred to the resettlement ombudsman for disposition. His decision will be final. It is vital to have clear complete agreement in advance regarding the amount of compensation to be paid and the details of payment, to avoid continuing litigation, to prevent fraud and to ensure that the evacuees feel they have been treated fairly and equitably.

Immediately upon completion of the final compensation calculations, compensation will be paid to the owner of each asset, and the title to all assets will be assumed by the dam authority. There can be no delay in this action. Compensation paid is compensation terminated; compensation delayed is compensation denied. Delay in payment of compensation prevents prompt resettlement of the population, adds to their anxiety and dissatisfaction, and facilitates the operations of speculators and confidence men. Moreover, given the long period of dam construction, the dam authority must assume title to all reservoir property immediately, to avoid a complex and chaotic series of land transactions, continuing in-migration, and other property exchanges.

However, it is desirable to avoid full cash payment at the time compensation is paid. Theft, fraud, or the improvidence of some evacuees could lead to loss of their compensation funds before they can be re-established in a new location and occupation. The impact of the large amount of compensation money on the national money supply might have several inflationary effects if it is all paid at one time. If all compensation payments are made immediately in the first year of resettlement, those who do not leave the reservoir until later years may suffer a considerable loss in the real value of their compensation money due to inflation.

It is possible that, if people receive all their compensation money before they move, they may simply spend all or part of it on something other than relocation. When finally flooded, they would be destitute and incapable of re-establishing their former economic level. For these and other reasons, we recommend the following compensation payment procedures:

i) In the first year of construction, the dam authority will acquire all evacuee assets and pay full compensation.

ii) Ten percent of the total compensation will be paid in cash at the time of transfer of title. This 10 percent may be banked if the evacuee wishes to do so. Ninety percent of his compensation money will be deposited on behalf of the evacuee in an individual interest-bearing Compensation Account.

iii) The interest paid on the 90 percent in the Compensation Account will be pegged at a rate which will protect the evacuee against the current rate of inflation in Laos and Thailand. This rate should not, however, be less than appropriate bank interest rates.

iv) The evacuee can withdraw any or all of the funds in the Compensation Account only when he leaves the reservoir, and turns over his compensated property to the official owner, the dam authority.

Interim Use of Compensated Assets. It is recommended that the original owner be permitted continued use of his land, if he remains in occupance or if some direct member of household remains in occupance. This privilege of continued use may be terminated if the village or part of the village is required to move according to a pre-determined moving schedule. When the original household has left the land, no other in-migrants or squatters will be permitted to use the land. There will be some legitimate migrants coming into the reservoir region during the resettlement period. These could be family members born in the village and now returning home from residence or employment outside the reservoir region, or destitute relatives who have nowhere else to live. Each case should be reviewed by the village/town resettlement agent and the Village/Town Resettlement Council, and such individuals can be added to the resettlement roster with their approval. Unrelated in-migrants or those judged not to have sufficient right or reason to return may be permitted to reside in the reservoir region only if they sign a disposition renouncing all present and future rights to any part of the resettlement program.

It is anticipated that the largest possible influx might be a migration into reservoir region cities by urban unemployed from towns and villages outside the reservoir. Therefore, the information program should make it very clear that only those persons listed in the resettlement roster are eligible for any resettlement action or payments.

Protection of the Evacuees. There is some concern that the evacuees will be cheated out of their compensation money, or that their own improvidence and/or inexperience in handling large sums of money may result in poor investment decisions, waste or loss. The best way to prevent advance speculation in land would be to freeze all land transactions in the reservoir region as of the date the decision is made to build the dam. After this date, any land transaction would have to be given approval by the District Office, which would check the details of the transaction.

Other measures should be taken to provide some protection to the evacuees:

i) All persons eligible for compensation money and/or resettlement assistance will be entered in the compensation and resettlement roster, and will receive an identity card with photograph and thumb prints, which can be used to check an evacuee's identity at the time payments are to be made.

ii) Within the Resettlement Agency, there must be careful internal security checks, to insure the honesty of officials involved in all aspects of program administration.

iii) The information program in every village and town should give wide publicity to the methods and activities of speculators.

iv) Information about compensation payments due to any individual should be restricted as much as possible; the compensation roster entries should be considered as classified information.

v) All payments should be made directly and only to the owner of the asset for which compensation is being paid.

vi) A cash bonus or bounty should be paid for information leading to the conviction of any person involved in fraud.

We cannot stress strongly enough the fact that only a few instances of dishonesty can discredit the Resettlement Agency and reduce the effectiveness of its program. Given the vast sums of money involved in the resettlement program, and the great number of widely scattered recipients, the probability of many attempts at speculation, corruption and fraud is great.

Protection against the improvidence of the individual evacuee is more difficult to deal with than protection against external acts. We do not believe there will be serious problems of improvidence and waste; most evacuees are well aware of the value of money and already acquainted with a money economy. In some past projects compensation payments have been placed in blocked accounts, and could be withdrawn by the evacuee only with the approval of the Resettlement Agency. We do not think this would be a suitable

arrangement for Pa Mong. It restricts the free use of funds by the vast majority of evacuees in order to protect a few. It also leads to great dissatisfaction among the evacuees who feel they have not really received compensation money and it encourages corruption on the part of the officials in charge of approving the use of compensation funds. In general, we are opposed to any system which restricts free use of compensation funds by the evacuee, and prefer to use an effective information system to guide his investment decisions and prevent improvidence.

The Compensation Commission. A Compensation Commission will be attached to the Legal and Compensation Division of the Resettlement Agency. This commission will consult on the design of the basic compensation program and compensation rates, including payment of premiums reflecting high land quality and favorable location. In addition, the Compensation Commission will have the responsibility for adjudicating compensation disputes and grievances, and for establishing fair compensation for technological, pecuniary and other losses of the sort for which formal compensation procedures will not exist. Because past compensation programs have usually ignored many subjective categories of loss, there is little precedent for such payment in resettlement projects. However, there is substantial precedent in civil law. We recommend the institution of a Compensation Research Project, to start three years prior to the beginning of the compensation program, which will develop policy guidelines and procedures for adjudication of compensation claims. The product of this research will be a detailed guide for all possible types of compensation decisions included in the design and operation of the compensation program.

The Compensation Commission will develop policy guidelines and calculate compensation for all categories of special claims, including compensation for lost income from use of public assets, compensation for lost goodwill and clientele, compensation for economic losses suffered by the non-flooded population dependent on the reservoir region and other similar categories of losses.

4. Compensation Saved by Protection Schemes

Table 20 summarizes the amount of compensation for land and private property that will not have to be paid if any of the five protection schemes are implemented.

5. Total Compensation for Ten Selected Reservoirs

Table 21 summarizes total compensation for land and private property for ten selected reservoirs, for 1982 commencement of dam construction.

Table 20 Total Compensation for Ten Selected Reservoirs, 1982 (in dollars)

Reservoir #/Level	Protection Scheme	LAOS				THAILAND				LAO + THAI
		All Land	Private Property	Compensation Commission	Total	All Land	Private Property	Compensation Commission	Total	Total
1. 260	None	34,851,114	30,045,482	6,489,659	71,386,255	177,889,187	125,388,257	30,327,744	333,605,188	404,991,443
2. 260	NL NM LV	26,790,255	22,099,213	4,888,946	53,778,414	79,609,501	61,806,196	14,141,569	155,557,266	209,335,680
3. 250	None	30,304,916	27,007,833	5,731,274	63,044,023	144,549,658	103,609,790	24,815,944	272,975,392	336,019,415
4. 250	LV VV	27,086,347	22,540,548	4,962,689	54,589,594	128,841,958	85,718,535	21,456,049	236,016,542	290,606,126
5. 250	NL NM LV	20,491,837	19,709,211	4,020,104	44,221,152	66,674,034	58,581,195	12,525,522	137,780,751	182,001,903
6. 240	None	24,596,518	21,347,702	4,594,422	50,538,642	114,600,800	82,733,255	19,733,405	217,067,460	267,606,102
7. 240	NL NM LC	20,189,666	17,582,040	3,777,170	41,548,887	60,925,481	47,421,662	10,834,714	119,181,857	160,730,744
8. 230	None	17,895,242	14,242,953	3,213,819	35,352,014	78,542,079	53,587,520	13,212,959	145,342,558	180,694,572
9. 230	NL NM	14,401,431	11,543,444	2,594,487	28,539,362	43,828,549	34,368,484	7,819,703	86,016,736	114,556,098
10. 216	None	2,447,049	4,364,427	681,147	7,492,623	16,228,217	23,087,680	3,931,589	43,247,486	50,740,109

NL = Nam Lik, NM = Nam Mong, LV = Loei Valley, LC = Loei City,
VV = Vang Vieng

Table 21 Compensation Saved by Protection Schemes, 1982 (in dollars)

Protection Scheme	260m	250m	240m	230m
Nam Lik	17,607,827	15,889,652	8,989,720	6,812,656
Vang Vieng	9,685,429	8,454,439	2,075,289	885,368
Loei Valley	78,377,550	36,958,854	8,994,112	--
Loei City	-	-	18,774,505	-
Nam Mong	99,646,576	92,108,547	78,662,861	59,325,821

B. THE RESETTLEMENT PROGRAM

The resettlement program consists of multiple services and support provided the evacuee to inform him of various resettlement opportunities, facilitate his movement from the reservoir region to the destination of his choice, and to help re-establish him in a situation where he can regain his prior income level and follow his desired way of life. On balance, a well designed and implemented resettlement program may be more important than compensation. Evacuees with adequate compensation may do badly if they select or are directed to an unfavorable economic and social location. In fact, our studies indicate that a favorable resettlement experience has as much or more influence on the subsequent social and economic success of the evacuee than his prior socio-economic status or the size of compensation payment.

The resettlement program is designed to provide several possible resettlement alternatives among which the evacuee is free to choose. An evacuee who is forced into a single fixed resettlement alternative may feel dissatisfied even if his economic situation is not drastically damaged. On the other hand, an evacuee who freely selects his resettlement alternative is inclined to judge it more favorably, perhaps, in order to justify his decision. The resettlement program is also designed to bear all of the costs of resettlement: costs of locating a suitable resettlement opportunity, costs of moving to the selected location, and costs of re-establishing in the new location. The program is also designed to provide protection for evacuees against dishonest practices and insecurity of title.

The resettlement program is administered and payments made on a per capita basis. The payments are generally standard for any and all evacuees. The calculations of resettlement costs are based on the Adjusted Resettlement Population detailed in Section 2. The following components are included in the resettlement program.

1. Information System

Effective exchange of information between the Resettlement Agency and the evacuee is an important part of a successful resettlement program. Evacuees must be informed about and understand the details of complex compensation and resettlement programs; they must be informed of resettlement alternatives, the location of land they can purchase or jobs they can obtain, and the details of new economic opportunities. Furthermore, they must be protected against fraud, speculation and improvidence. In order to improve the resettlement program and to ensure that evacuees feel committed to it, knowledge of evacuee preferences, reactions and problems is essential. In addition, there must be continuing feedback from evacuees who have already been resettled, to evaluate their success, analyze their problems, and improve the design and operation of the resettlement program.

The information program involves a wide range of activities and agencies, from the central Resettlement Agency to the village resettlement office. Operation of the program includes the training of Resettlement Agency personnel, preparation of multi-media materials and pilot projects, and monitoring the program to assess resettlement success and problems. The information program will also i) educate evacuees about all aspects of the proposed resettlement program, including compensation procedures, resettlement alternatives, and special problems such as those posed by land speculators and confidence men; ii) administer the passive program of the information system, including media presentations, radio clubs, special meetings, and other presentations made to evacuees; and iii) supervise active information programs including site visits and individual or group searches for replacement land and employment opportunities by evacuees prior to their resettlement.

2. Moving the Evacuees

The moving program involves payment of moving allowances to enable the evacuees to hire vehicles or boats to move their persons, animals, stored crops, and other movable property from their village or town in the reservoir area to their resettlement destination. The moving component includes three possible allowances:

i) basic moving allowance, paid to all evacuees

ii) adjustment for extra distance moved

iii) adjustment for extra property moved.

The basic moving allowance is paid to each evacuee. This payment is based on a weight allowance of 1/2 ton per person (an estimation from field data of the average amount of personal possessions, rice, livestock and other movable property of the average evacuee), and on a distance allowance of 200 kilometers (an estimate of the mean distance of all reservoir evacuees to their resettlement destination).

Supplements to the basic moving allowance are available to people who choose to settle themselves in new locations at a distance greater than 200 kilometers. In this case, the supplement equals the difference between the basic moving allowance per capita and actual distance times 1/2 ton per person. The supplement will be paid in advance upon the receipt of a statement by the appropriate official in the receiving village/town verifying the intention of the evacuee to move to that specific location.

Many persons in the reservoir area, particularly shopkeepers, brokers and manufacturers, will have amounts of movable personal property in excess of the 1/2 ton per capita covered in the basic allowance. Supplementary allowances will be paid on the basis of the actual weight of inventory and distance to the resettlement destination.

Transit Camps. A contingency for the establishment and operation of transit camps is necessary; despite inducements for early moving and careful planning and staging of development of resettlement areas and new towns, there may be evacuees who must be removed from the reservoir at the last moment or evacuees whose destination is not yet ready for them. It is also possible that resettlement program administration, and perhaps even the available transportation system, will be overloaded from time to time by an unprogramed flow of evacuees at any stage of the resettlement process, again requiring temporary placement in transit camps while moving and resettlement arrangements are completed.

We have estimated transit camp capacity for 2,000 families with a mean in-camp residence of 6 months for a total operation of 72,000 man months for this entire project. This capacity can be increased or decreased by the resettlement authority during the resettlement period, depending on the success of early moving inducements and the general progress of the resettlement program.

Early Moving Program. The evacuees must be induced to move out of the reservoir over the entire period of dam construction. If evacuees delay their resettlement until the last possible moment, when the reservoir waters are actually rising, serious problems will occur. The reservoir can fill within a few months in a single wet season and the logistic problems and the cost of emergancy removal of evacuees would be very great. Moreover, emergency removal is always damaging to the evacuees and may involve not only considerable economic losses resulting from abandoned possessions, but also considerable psychological costs. Furthermore, evacuees can be reintegrated into the economy and society with least economic cost only if they are resettled during the entire period of dam construction.

Despite the obvious benefits of spreading resettlement over as long a period of time as possible, there are all too many examples from reservoir projects throughout the world of rushed, last-minute evacuations, with some cases reported of evacuees being plucked from islands where they have been isolated by floodwaters. The necessity for emergency removal of evacuees arises from a variety of factors. In some cases, the planned resettlement alternatives to which the evacuees were to be moved were not ready for them in advance. In other cases, the evacuees had not been adequately informed of the timing and location of reservoir flooding. Some evacuees delay departure because of the difficulty of breaking their ties with home and land and moving into a strange new existence. Some evacuees along the upper margins of the reservoir do not leave because they wish to wait and see if their lands are actually flooded; reservoir residents know that many reservoirs do not fill to their planned levels. Conversely, some are told they are above the high water level, but due to survey error become flood victims. Finally, a delay in the payment of compensation or unresolved litigation over compensation often results in the evaucee's decision to delay departure.

Our design for the resettlement project takes cognizance of these and other problems experienced in scheduling reservoir population removal. Full, fair and prompt compensation payment, an effective information program, efficient scheduling of the establishment of various planned resettlement alternatives, and other measures all help eliminate factors which delay evacuee removal from the reservoir. However, to insure that evacuees move on schedule, it will be necessary to do more than attempt to solve problems which in the past have contributed to moving delays.

Therefore, we recommend including an early moving inducement component in the resettlement program. If evacuees move out early the Adjusted Resettlement Population is decreased, because natural increase in population takes place outside the reservoir. If this additional population

is born in the reservoir area it is included in the resettlement program, thereby increasing resettlement costs. For the most fertile age groups, this savings alone pays the cost of their early moving inducement. There are other even more important benefits. Early moving makes possible reintegration of evacuees into the economy and society with least cost and trauma since the inflationary effects of compensation funds and competitive bidding for replacement land would be minimized. Early moving also provides an opportunity for "pilot projects," the results of which can be useful in revising the resettlement program. In addition, evacuees who move in the earlier stages of the program can serve as sponsors for later evacuees, assisting them in finding land and adjusting to a new location and life. A gradual out-movement also permits optimal use to be made of trained resettlement staff and avoids the inefficiencies and costs of emergency removal programs which require a large short-term staff and major transit camp operations.

Therefore, in order to induce a phased movement out of the reservoir that will approximate the optimum moving schedule, we recommend the use of a combination of premiums and penalties. The premiums would consist of:

i) An early moving premium payment.

ii) The right to continued use of previously-owned land in the reservoir.

The penalties would consist of:

i) An increase in the amount of the quit rent charged for use of compensated land.

ii) The reduction of inflation-adjusted interest paid on the Compensation Account deposit.

We hope that the use of adjusted premiums alone will be sufficient to achieve adherence to the moving schedule and we would be reluctant to impose the penalties unless absolutely necessary; penalties will certainly cause some friction and dissatisfaction but will probably involve less trauma and trouble than would occur if the moving schedule is not met and the evacuee must be forced out of the reservoir at the last moment.

Premiums for Early Moving. We recommend the following schedule of incentive payments to be paid to evacuees on a per capita basis for moving out of the reservoir area early. Only persons listed in the resettlement roster will be eligible for this premium. The premium will be paid to people who are forced to move by cofferdam and other construction, as well as to those who move voluntarily. The amount of this premium will be reduced annually on the assumption that it will take more to induce an evacuee to abandon his home and land many years prior to flooding than it will after resettlement has commenced and a more effective information and placement program has been developed; the incentive payment is a premium for pioneers. The rates we propose are detailed below.

Table 22 Per Capita Premium for Early Moving

Years Before Dam Closure	Premium (US $)			
	260m	250m	240m	230m
10	120			
9	100			
8	90	100		
7	80	90		
6	70	80	80	
5	60	70	70	80
4	50	50	50	60
3	40	40	40	40
2	20	20	20	20
1	0	0	0	0

Additional incentives for early moving can be provided by permitting evacuees who move out prior to year -2 before dam closure to continue using their previously-owned, but now compensated land in the reservoir region. It is possible that a number of evacuees may wish to continue farming their former land after they have resettled by migrating from nearby resettlement destinations or by leaving some members of an extended household behind.

In order to encourage early moving, it would also be possible to penalize evacuees who do not meet the moving schedule. It would be possible to charge them rent on the land they use, because they will no longer own the land after payment of compensation in the first year of dam construction. It would also be possible to reduce the inflation-adjusted interest paid on the Compensation Account deposits, to induce them to reinvest these funds elsewhere as quickly as possible. We would be reluctant to see the use of such penalties, but it might be preferable to the trauma of late or forced removal from the reservoir region.

3. Title Verification

Introduction. The large amounts of compensation funds which evacuees will have available to purchase new land makes them potential victims of fraudulent land sales practices. We propose that every evacuee who is resettled or purchases land should have legal title to the land verified before the transaction is completed.

In addition to providing direct protection against fraud we also find there are substantial psychological benefits in having clear title. In Thailand, many of the evacuees currently hold only marginal title to their land and in rural Laos there are no legally recognized land titles. We feel that every evacuee will wish to have and should have a clear title to the land and buildings he may purchase as a part of the resettlement program.

In addition, the process of title verification also provides an opportunity for an informed evaluation of the quality of the land and a chance to ascertain if the proposed purchase price is fair. In past resettlements the evacuees have sometimes been cheated by being offered land which was subject to disasterous floods or had some other major flaw. The inclusion of an evaluation of land is an important component of the title verification program.

Title verification will be supervised by the Village/Town Resettlement agents and will be carried out by the appropriate government agencies for a fee.

4. Social Overhead

Every evacuee should be assured access to the same level of education, police protection, health care and other social services enjoyed prior to being resettled. Likewise, communities who receive evacuees (host communities) should not be disadvantaged in having their social services overloaded by the influx of evacuees. The social overhead component is designed to provide the host community with the incremental capital to cover the costs of establishing or expanding schools, for expanding police protection, for expanding or constructing rural clinics, and for other related social services.

The Social overhead payment will be a standard per capita payment, calculated at the same level for all evacuees. This payment will take the form of a certificate which will be given by the village/town resettlement agent to each evacuee when he moves from the reservoir area. Upon arriving in the community in which he intends to resettle, the evacuee will give the Social Overhead Certificate to the headman of the village, who will then send it to the Resettlement Accounting Office for redemption.

In planned rural resettlement communities and in new towns where the Resettlement Authority builds and furnishes new buildings for social services, the Social Overhead Certificate will be collected from any evacuees coming into these planned resettlements and will be used to help defray the capital costs of social service facilities.

5. Dislocation Allowance

The dislocation allowance is designed to meet various costs and minor losses associated with terminating activity and residence in the reservoir region and getting established in a new location. It recognizes the existence of uncompensated tangible costs and of intangible losses not otherwise covered by compensation payments and the searching and moving allowances. It insures that even the poorest evacuee, with no property compensation payments, will have a minimum amount of capital to cover his immediate needs. In other projects, the payment of a dislocation allowance has also been considered as a partial payment for psychological costs, on the assumption that windfall cash in hand can offset some unhappiness.

6. Downtime Allowance

The downtime allowance is designed to meet the maintenance costs of evacuees during the period it takes them to recover their prior level of income in their selected resettlement location. This time will vary greatly from person to person and will also vary in different resettlement locations and alternatives. A truly equitable downtime allowance program would provide the individual evacuee with supplemental income after removal from the reservoir for as long a period as is necessary to recover his former earning capacity and income level. Unfortunately, such an individual program is impossible to design and implement.

Evacuees from the Nam Pong reservoir took an average of three years to establish incomes equal to their expenses, according to our surveys. Howeve many of the Nam Pong evacuees moved to frontier areas and spent relatively long periods clearing and leveling forest land. Since the Pa Mong evaucees should be better off than the Nam Pong evacuees in terms of compensation payments, other allowances and guidance from the Resettlement Agency during their mean downtime period should be less than those of the Nam Pong evacuees. We will therefore assume a mean downtime period of two years between the time of each person's evacuation and the time when his previous income generating capacity is restored.

Based on our income surveys, we have calculated that the per capita downtime allowance for the two-year period will be $140. This will be paid in quarterly installments to every evacuee.

There are two advantages in paying the downtime allowance in installments. It protects the evacuee from either his own improvidence or from being cheated out of his entire maintenance funds at one time. It also provides an opportunity to maintain contact with resettled evacuees. This contact is important in monitoring the progress and problems evacuees experience in re-establishing their lives in new locations and permits follow-up assistance programs when desirable. When the evacuee cashes in his installment coupons, he could be required to complete a brief questionnaire designed to assist in the improvement of the resettlement program; these questionnaires could be used as a sample frame for more detailed evaluation surveys. In addition, after the two year period there would be an official record of those evacuees who had not been able to re-establish their former income levels. These evacuees who fail to meet the economic goals of the resettlement program might be included in a "second chance" program.

7. Resettlement Program Payments: Summary

The basic overall resettlement program entails both fixed and variable administrative costs. Table 23 below summarizes on a per capita basis both that part of the basic resettlement program cost which consists of actual allowances paid to the individual evacuee and the variable administrative cost of paying those allowances. Table 24 summarizes the total cost of resettlement program payments for ten selected reservoirs.

Table 23 Per Capita Resettlement Payments (in US dollars)

	Paid to Evacuee or Paid on Behalf of Evacuee	Administrative costs
Land searching	8.75	11.17
Site visits	2.02	
Moving allowance	10.00	0.50
Moving allowance adjustment for distance and inventory	5.29	
Early moving incentive*	49.00	0.85
Title verification	-	7.81
Social Overhead	43.20**	1.50
Dislocation	50.00	
Downtime	140.00	8.68
Sub-total	308.26	30.51
Total	338.77	

* = Mean payment for 260m reservoir differs for other reservoir levels.

** = Paid on behalf of evacuee

Table 24 Total Resettlement Payments for Ten Selected Reservoirs, 1982
(in 1,000's US dollars)

Reservoir No.	Reservoir Height	Protection Schemes	Early Moving Incentive	Other Resettlement Payments	Total
1.	260m	None	23,483	139,051	162,534
2.	260m	NL NM LV	11,124	72,627	83,751
3.	250m	None	16,213	115,516	131,729
4.	250m	VV LV	14,373	100,922	115,295
5.	250m	NL NM LV	9,434	65,678	75,112
6.	240m	None	10,006	90,728	100,734
7.	240m	NL NM LC	6,230	52,917	59,147
8.	230m	None	7,069	62,276	69,345
9.	230m	NL NM	5,106	37,190	42,296
10.	216m	None	None	22,123	22,123

NL = Nam Lik, NM = Nam Mong, LV = Loei Valley, LC = Loei City,
VV = Vang Vieng

8. Resettlement Agency

The resettlement project is designed and costed on the assumption that it will be administered by an autonomous Resettlement Agency with its own independent budget, pay scales, and resources for all operations. It would work in cooperation with the Lao and Thai government agencies whose activities are related to the resettlement program, but it should not be dependent on the Lao or Thai governments for contributed services and seconded personnel or equipment.

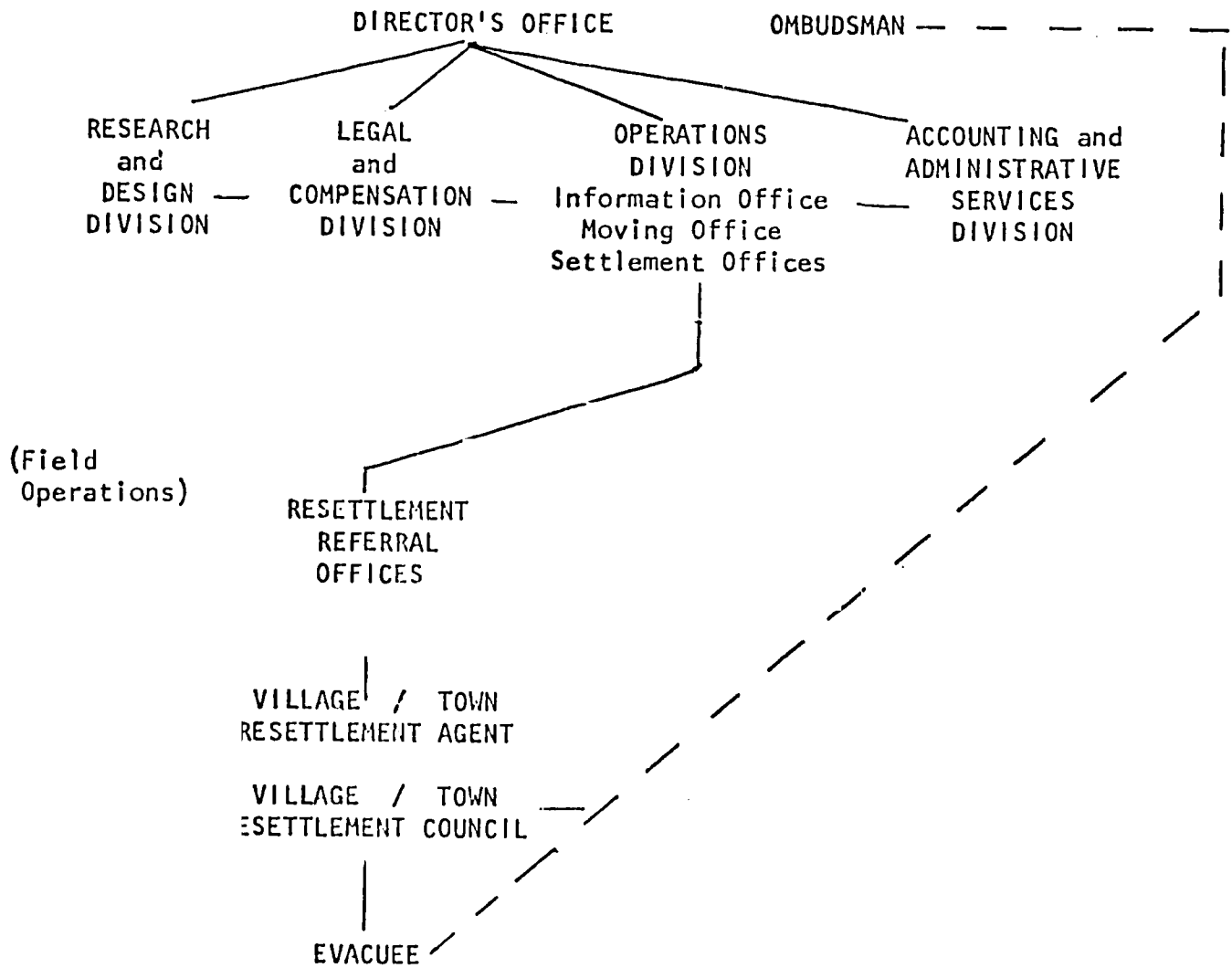
The Resettlement Agency would plan and implement the resettlement project in such a way that all resettlement activities would be terminated five years after dam closure, at which time it would cease to exist. By the end of five years after dam closure, all evacuees should have resumed their former economic and social positions in Lao and Thai societies and therefore should be extended normal government services by the established agencies of these nations.

9. Resettlement Agency Organization

The Resettlement Agency consists of five divisions: the Director's Office, the Research and Design Division, the Legal and Compensation Division, the Accounting and Administrative Services Division, and the Operations Division. The Resettlement Agency headquarters should be located at or close to the damsite. If possible, there should be a single office responsible for supervising both the Lao and the Thai resettlement projects. In addition, we recommend the establishment of a Project Ombudsman, independent of the Resettlement. Diagram 2 illustrates the Resettlement Agency organization.

The Director's Office. The Director's Office has responsibility for overall supervision and coordination of the resettlement project, direct superivsion of the field offices involved in the resettlement program (Village and Town Resettlement Offices and Resettlement Referral Offices), appeals and grievances, liaison with Lao and Thai government agencies, and liaison with the Project Ombudsman.

Diagram 2 Pa Mong Resettlement Agency



Research and Design Division. The Research and Design Division has the following major functions: design and implementation of all baseline research required by the project, including research on the private land market, on information system effectiveness, on the socio-economic characteristics of the reservoir population, and that necessary for the calculation of compensation payments; training of personnel from other divisions in research and analysis techniques and procedures and supervision of research undertaken in other divisions; follow-up and evaluation research to ascertain the progress and problems of evacuees after resettlement and evaluation of Resettlement Agency operations and effectiveness.

Legal and Compensation Division. This division has major responsibilities for design and supervision of the compensation calculations and payment; operation of the Compensation Commission which hears appeals regarding compensation matters; title verification for all land, buildings, and other major assets acquired by evacuees in their resettlement locations; and liaison with Lao and Thai governments and negotiation on legal matters pertaining to the resettlement project.

Accounting and Administrative Services. The duties of the Accounting and Administrative Services Division include personnel recruitment and supervision; acquisition and operation of office space, vehicles, equipment, and other materials required for the project; supervision of all payments, accounting and auditing; and provision of computerized recond keeping for other divisions.

Operations Division. Three offices within the Division manage its program. The Central Information Office manages the information system. The Moving Office oversees the searching program, moving the evacuees out of the reservoir area and payment of early moving premiums. The Settlement Office is involved in the design and management of several planned resettlement alternatives, including settlements on the reservoir margin, establishment of new or replacement towns and settlement of evacuees in these towns, and establishment of planned rural residential communities. In addition, this office is responsible for maintaining liaison with the field referral offices, and formonitoring, adjusting, improving and assisting the operation of the self-managed resettlement alternative.

Office of the Project Ombudsman. The Project Ombudsman should be independent of the Resettlement Agency. His office will be responsible for hearing all appeals and grievances and will provide a continuing external review of the resettlement project.

Field Operations. In addition to the five central divisions, the Resettlement Agency will include two major field operations coordinated by the Director's Office: the Village and Town Resettlement Offices and the Resettlement Referral Offices.

Village and Town Resettlement Offices. Each village and town within the reservoir region and each village and town located immediately along the reservoir margin will have a Resettlement Office. Each Town Resettlement Office will have at least one full-time Town Resettlement Agent. There will be one Village Resettlement Agent for every three villages; this agent will spend at least one day a week in each of his three villages.

These field resettlement agents are vital to the successful operation of the project. They are in face-to-face contact with the evacuees; it is the agent who must transmit to the evacuee all of the information about the resettlement program and who in turn must solicit the participation of the evacuee. He is responsible for administering the compensation program and supervising complex resettlement program operations, including the land searching, moving, early moving incentive and dislocation allowance components. He must keep a variety of records, obtain and process data, make a wide range of important decisions, settle disputes and handle grievances. Furthermore, he must strongly represent the interest of his constituents, the evacuees, and in many cases maintain an adversary position against the Resettlement Agency.

Along with the field resettlement agency, each village and town will have a Resettlement Council composed of the local administrative officials, the village/town resettlement agent and members elected from the evacuee population of the village or town. The Resettlement Council will advise the village/town resettlement agent, settle disputes, establish local premiums to be paid for differences in value of land and other assets, make policy decisions regarding the local operation of the resettlement program, and will be responsible for ensuring local adherence to and participation in the program.

Resettlement Referral Offices. Forty-five offices will be located in the reservoir region district towns and in towns outside the reservoir where evacuees are most likely to relocate. These offices have a wide range of responsibilities. They will provide continuing information on land availability and prices as well as on other employment opportunities; assist the evacuee in his search for land and other resettlement alternatives; manage the title verification program and oversee the social overhead and downtime payments; and provide counselling and placement service

for evacuees seeking rental land and new jobs. In addition, they will collect data on the progress and problems of evacuees who have been resettled in order to ascertain changes which might be beneficial to the resettlement program or to devise follow-up programs for certain problem cases.

Personnel. Recruitment of personnel will be a major problem. The Resettlement Agency will not be part of the normal Lao and Thai government bureaucracies, and therefore service in the resettlement project will not be useful in furthering career goals. Depending on the chosen dam height, the project will only last for a period of ten years at the minimum to twenty years at the maximum. The Resettlement Agency will not continue its existence beyond the end of the fifth year after dam closure and will not have normal retirement pensions. Past experience indicates that, although government officers may be given leave or seconded from their regular assignments for work with the Resettlement Agency, many of the most able officers will be reluctant to accept secondment because they will be forgotten or bypassed during their absence.

The only inducement which can be used in recruiting adequate personnel is provision of substantially higher salary levels than are available in normal government or private employment. In addition, to provide incentive for remaining with the project and remaining honest, we recommend a bonus in lieu of retirement or pension funds of 50 percent of the total salary earned during the entire period of employment. The bonus should serve as some incentive for maintaining high standards of work and honesty.

Quality Control. A major problem in the operation of the resettlement project will be to prevent corruption and to maintain the honesty of employees at all levels. The large amounts of money available in the program and the opportunity to influence and coerce the evacuees will provide many temptations. Elsewhere we have recommended the establishment of an independent Resettlement Ombudsman who would be empowered to investigate all charges of illegal activities and corruption. In addition, we recommend an intelligence network which works from the top down and from the bottom up. The Director would make spot checks of field operations without giving prior notice and in the course of these field checks would review records, interview evacuees, and in general ascertain if records were complete and operations on schedule. The intelligence network from the bottom up would involve the payment of rewards for information leading to the conviction of any Resettlement Agency official or other person for illegal activities. Such measures

are indeed distasteful, and it is difficult for any agency to police itself itself effectively. However, if the problem of corruption is ignored or inadequately handled, the credibility and success of the program will be greatly damaged.

10. Costs of the Resettlement Program

Costing Assumptions. We have used the following assumptions in deriving the resettlement administrative costs detailed in Table 25.

i) Resettlement Agency Costs. There will be a single central Resettlement Agency. If duplicate central facilities in both Laos and Thailand are required, Resettlement Agency personnel and operating costs will rise by an estimated 25 percent. This additional cost will amount to approximately $8,000,000 at the 260m level, $7,000,000 at the 250m level, $5,500,000 at the 240m level, and $5,000,000 at the 230m level.

ii) Inflation. No factor for inflation has been included in the project costs.

iii) Operating Overhead. Various operating costs have been estimated based on what is required in each project operation. The aggregate operating costs are less than 60 percent of personnel costs; this compares with operating overheads of more than 130 percent in the Volta project in Ghana and 90 percent for the land development projects in the Ivory Coast to 25 percent in the Federal Land Development Schemes in Malaysia in which some self-help components are included. We feel the operating costs are approximately accurate but may be a slight underestimate.

iv) Merit increases in salary and wages have not been included in the annual costs but have been entered as a separate item at the rate of 10 percent of total personnel costs.

Table 25 Resettlement Administration Costs by Reservoir Level, 1982
(in thousands of US dollars)

	No. Of Years in Operation	260m		No. of Years in Operation	250m		No. of Years in Operation	240m		No. of Years in Operation	230m	
RESETTLEMENT ADMINISTRATION												
RESETTLEMENT AGENCY												
DIRECTOR'S OFFICE												
Director, Associate Director for Laos and Thailand	20	1,964		18	1,702		15	1,190		13	1,089	
Office Staff	20	600		18	515		15	443		13	403	
Office Operations	20	630		18	615		15	605		13	565	
Vehicles, including light aircraft and helicopter	20	2,035		18	1,875		15	1,705		13	1,625	
SUBTOTAL (Dir. Off.)			5,229			4,707			3,943			3,682
RESEARCH AND DESIGN DIV.												
Director	19	532		17	476		14	442		13	364	
Office Staff	19	348		17	320		14	226		13	182	
Office Operations	19	760		17	680		14	480		13	520	
SUBTOTAL (R&D Div.)			1,640			1,476			1,148			1,066
LEGAL AND COMPENSATION DIVISION												
Director	17	510		15	450		13	390		12	360	
Office Staff	17	510		15	450		13	260		12	240	
Office Operations	17	910		15	790		13	590		12	540	
Compensation Commission Operations and Fees	15	460		13	420		11	300		10	280	
SUBTOTAL (L&C Div.)			2,390			2,110			1,540			1,420
ACCOUNTING AND ADMINISTRATIVE SERVICES DIV.												
Director, Accounting	20	532		18	486		15	364		13	336	
Acct. Office Staff	20	176		18	163		15	149		13	136	
Acct. Office Operations, Audit	20	1,455		18	1,330		15	800		13	750	
Computer Rental	20	160		18	140		15	88		13	77	
Directors, Admin., Personnel, Equip.	20	374		18	348		15	254		13	242	
Admin. Office Staff	20	431		18	403		15	173		13	152	
Admin. Office Operations	20	495		18	425		15	343		13	327	
Equipment Acquisition and Maintenance	18	810		16	675		12	570		10	510	
Computer Service to Project	17	485		15	428			280			270	
SUBTOTAL (A&A DIV.)			4,918			4,398			3,021			2,800
OPERATIONS DIVISION INFORMATION OFFICE												
Director	14	308		12	386		11	264		10	242	
Office Staff	14	300		12	278		11	232		10	220	
Office Operations	14	488		12	428		11	250		10	225	
Information Research	1	50		1	50		1	50		1	50	
Training, Preparation of Information Materials	13	450		12	414		11	405		10	400	
Equipment	13	360		12	256		9	190		7	160	
Information Program, Field Operations	14	1,156		12	908		9	635		7	570	
SUBTOTAL (Info. Off.)			3,112			2,720			2,026			1,867

Table 25 (continued)

	No. of Years in Operation	260m		No. of Years in Operation	250m		No. of Years in Operation	240m		No. of Years in Operation	230m	
MOVING OFFICE												
Director	13	286		11	264		10	230		8	176	
Office Staff	13	242		11	200		10	149		8	88	
Office Operations, Including Early Moving Program	13	790		11	638		10	510		8	311	
Equipment	5	168		5	168		4	168		4	156	
Transit Camps	5	770		5	770		4	770		4	770	
SUBTOTAL (Mov. Off.)			2,256			2,040			1,827			1,501
SETTLEMENT OFFICE												
Director	16	330		14	290		13	260		11	240	
Office Staff	16	308		14	270		13	240		11	220	
Office Operations	16	872		14	756		13	524		11	490	
Social Overhead Program, Title Verification	10	520		8	440		6	360		5	320	
SUBTOTAL (Sett. Off.)			2,030			1,756			1,384			1,270
OFFICE OF THE OMBUDSMAN												
Ombudsman	15	450		13	390		11	330		10	300	
Office Staff	15	225		13	195		11	165		10	150	
Office Operations	15	300		13	260		11	220		10	200	
Vehicles	15	30		13	30		11	30		10	30	
SUBTOTAL (Ombuds.)			1,005			875			745			680
SUBTOTAL, RESETTLEMENT AGENCY OPERATING COSTS			22,580			20,082			15,674			14,286
FIELD OPERATIONS												
RESEARCH PROGRAM												
Land Research Program	4	323		4	323		3	261		3	261	
Compensation Research Program (air photos, cadastral survey, ownership verification)	4	2,970		4	2,970		3	2,180		3	2,180	
SUBTOTAL (Res. Prog.)			3,293			3,293			2,441			2,441
VILLAGE/TOWN RESETTLEMENT AGENTS												
Agent Salaries	13	10,725		11	9,575		9	7,525		8	6,700	
Operations	13	10,800		11	8,750		8	7,200		7	6,300	
Village Councils Stipend and Operations	11	6,120		9	5,150		7	2,940		6	2,700	
Vehicles and Equipment	13	4,725		11	4,275		8	3,825		7	3,600	
SUBTOTAL (Res. Ag.)			32,370			27,750			21,490			19,300
RESETTLEMENT REFERRAL OFFICES												
Resettlement Referral Officers	17	5,472		15	4,798		12	3,630		11	3,393	
Office Staff	15	1,765		13	1,418		11	1,000		10	900	
Operations	15	10,170		13	9,167		11	7,450		10	6,775	
Vehicles and Equipment	15	1,271		13	1,211		11	955		10	925	
SUBTOTAL (Res. Ref.)			18,678			16,594			13,035			11,993
SUBTOTAL, FIELD OPERATIONS COSTS			54,341			47,637			36,966			33,734
SALARY ADJUSTMENT (10% of all salary items)			3,422			2,916			2,115			1,969
TOTAL, RESETTLEMENT ADMINISTRATION COSTS			80,343			70,635			54,755			49,989

Summary of Basic Costs of Compensation and Resettlement for Pa Mong Evacuees. A summary of the basic resettlement costs is contained in Table 26. These basic costs apply to all reservoir evacuees, no matter what resettlement alternative they may select. There are additional costs or savings which relate to different resettlement alternatives or the provision of replacement infrastructure. These additional costs and savings are detailed in other sections of this report.

Basic Resettlement Costs Saved by Protection Schemes. Table 27 details the basic resettlement costs saved by the use of protection schemes proposed for various sectors of the reservoir. Again, it should be noted that there will be additional savings in road and town replacement costs, as detailed in Section 8.

Table 26 Basic Resettlement Costs for Ten Selected Reservoirs, 1982
(in thousands of U.S. dollars)

Res. Height	Protection Schemes	Compensation Costs	Resettlement Payments	Administration Costs	Total
260m	None	404,991	162,534	80,343	647,868
260m	NL NM LV	209,336	83,751	61,936	355,023
250m	None	336,019	131,729	70,635	538,383
250m	VV LV	290,606	115,295	66,439	472,340
240m	NL NM LV	182,002	75,112	56,131	313,245
240m	None	267,606	100,734	54,755	423,095
240m	NL NM LC	160,731	59,147	43,904	263,782
230m	None	180,695	69,345	49,989	300,029
230m	NL NM	114,556	42,296	40,520	197,372
216m	None	50,740	22,123	33,870	106,733

NL = Nam Lik, NM = Nam Mong, LV = Loei Valley, LC = Loei City
VV = Vang Vieng

Table 27 Basic Resettlement Costs Saved by Protection Schemes, 1982
(in US dollars)

Protection Scheme		260m	250m	240m	230m
NAM LIK	Compensation	17,607,827	15,889,652	8,989,720	6,812,656
	Resettlement	14,229,864	12,312,960	7,646,862	5,670,265
	Administration	3,370,253	3,151,371	1,989,855	1,941,934
	Total	35,207,944	31,353,983	18,626,437	14,424,855
VANG VIENG	Compensation	9,685,429	8,454,439	2,075,289	885,368
	Resettlement	6,795,594	5,672,370	1,697,127	577,524
	Administration	1,609,493	1,415,783	411,623	197,789
	Total	18,090,516	15,542,592	4,184,039	1,660,681
LOEI VALLEY	Compensation	78,377,550	36,953,854	8,994,112	
	Resettlement	27,161,358	10,860,300	914,529	
	Administration	6,432,995	2,779,579	237,977	-
	Total	111,971,903	50,598,733	10,146,618	
LOEI CITY	Compensation			18,774,505	
	Resettlement			5,221,707	
	Administration	-	-	1,358,783	-
	Total			25,354,995	
NAM MONG	Compensation	99,646,576	92,108,547	78,622,861	59,325,821
	Resettlement	36,331,986	33,495,990	28,832,862	21,979,181
	Administration	8,605,000	8,572,943	7,502,831	7,527,359
	Total	144,583,562	134,177,480	114,958,554	88,832,361

Section 5

RURAL RESETTLEMENT ALTERNATIVES

Introduction. Of the population that will be flooded by the Pa Mong project 82.7 percent is rural. We have assumed that only about 2 percent of the rural reservoir evacuees will wish to relocate in towns; we believe the balance will seek resettlement in rural areas, where they can maintain their present way of life and continue to derive their income from agriculture.

In the past, reservoir evacuees in Laos and Thailand have selected among several rural resettlement alternatives. Some have moved to the margin of the reservoir, some to government-managed land settlements and some have purchased new farms in the private land market. In this section we will examine two of these alternatives: resettlement in government-managed land settlements and resettlement on the reservoir margin.

The number of reservoir evacuees who can be resettled in either government-managed land settlements or on the reservoir margin depends on (i) the quantity and quality of land available, and (ii) the developmental inputs provided in each alternative to increase productivity and carrying capacity. We inventoried the amount of land available, reviewed the developmental inputs required to prepare this land for resettlement, estimated the number of evacuees who may be resettled in each alternative and finally calculated the incremental resettlement costs of each alternative.

A. GOVERNMENT-MANAGED LAND SETTLEMENT -- LAOS

1. Land Availability, Laos

Our study of the quantity and quality of public land available for resettlement in Laos involved an examination of three categories of land:

i) large areas anywhere in Laos of relatively flat, sparsely settled land of at least moderate soil quality, on which large-scale government-managed land settlements might be established;

ii) available land of any plot size, suitable for either paddy or upland cultivation and located near the reservoir region:

iii) unused land located in the annually innundated flood plain areas of the Mekong and its tributary rivers.

Large Areas of Sparsely Settled Land. The inventory of sparsely settled agricultural land in Laos involved several constraints. Land statistics are incomplete and inaccurate, air photo coverage is not available for much of the nation, and the use of available air photo coverage for land inventory was ruled out because we could not go into the field to establish ground truth for land types identified on the prints. National maps are of inadequate detail and scale to provide necessary information. Therefore, we had to depend on interviews with informants, both Lao and foreign, who were familiar with the land situation in several parts of Laos.

Interviews were conducted in Luang Prabang, Vang Vieng, Long Tieng, Vientiane and Pak Lay. Both additional interviews in other provinces and field checks in accessible areas were scheduled but our program of field checks and interviews was prematurely cancelled with the termination of Lao operations. In addition to the interviews, project personnel collected detailed land availability information from village headmen in study villages within the Lao reservoir area.

Our interviews identified more than 500,000 hectares of sparsely populated, relatively level undeveloped land. We adjusted this reported acreage by factors developed in Northeast Thailand, to correct for portions which are already occupied or are of quality too poor to be used for resettlement purposes. These calculations are detailed in Working Paper 5. Table 28 summarizes the inventory and calculations. For many provinces no data are available. For those provinces which report no large areas of sparsely settled agricultural land it should be noted that substantial amounts of vacant land may indeed exist, but probably not in the large blocks required for efficient government-managed land settlements.

Table 28 Land Available for Evacuee Resettlement in Laos, 1982

Provinces	1974 Land Reported by Informants (hectares)	1974 Vacant Land Reported land reduced by 40% for current occupancy and 20% for poor quality (hectares)	Rate of Land Clearing and Occupancy (hectares per year)	Available Land in 1982 (hectares)
Houa Khong	44,550	16,484	527	12,268
Phong Saly	*	*	*	*
Houa Phan	*	*	*	*
Luang Prabang	0	0	0	0
Sayaboury	*	*	*	*
Paklay	0	0	0	0
Hongsa	*	*	*	*
Xieng Khouang	97,700	36,149	1,157	26,893
Vientiane	0	0	0	0
Vang Vieng	6,325	2,340	75	1,740
Borikhane	*	*	*	*
Khammouane	*	*	*	*
Savannakhet	0	0	0	0
Champhone	*	*	*	*
Sarravanne, Attopeu, Xaithanthong & Sedone (Bolovens Plateau and adjacent area)	340,200	125,874	4,028	93,650
Sedone	15,256	5,645	180	4,205
Chomassak	*	*	*	*
Sithandone	0	0	0	0
TOTAL	504,031	186,492	5,967	138,756

2. Vacant River Flood Plain Land in Laos and Thailand

There is land along the Mekong River and its tributaries currently subject to annual flooding. After construction of the Pa Mong dam and the subsequent control of river flooding, much of this land might become available for continuous use. This land would be particularly valuable for resettlement because it is located close to the reservoir in the Lao provinces of Vientiane and Borikhame, and the Thai provinces of Nongkhai and Udorn. Approximately 209,000 hectares of land would have been available for cultivation in 1969 if there had been flood control. Of this, 176,000 hectares are already under intermittent cultivation, leaving 33,000 hectares which might be capable of development, given flood control. These 33,000 hectares are currently classified as deltas, backswamps and lower deltas, and may require drainage and other investments in order to be usable even after effective flood control.

From the point of view of large-scale government-managed land settlements, we conclude that relatively little, if any, of this vacant flood plain will be available. Its scattered nature would seem to limit its potential to use by individual evacuees; the possibly high costs of drainage and development may in fact preclude any use of a large part of the 33,000 hectares.

3. Government-Managed Land Settlement in Laos

Given the assumption that reserves of land will be available for resettlement, the next step is to determine the best procedures for establishing evacuees on undeveloped public land and for forecasting the ultimate costs. Government-managed resettlement projects can vary widely in the level of services and developmental inputs provided for the population, and in costs to the Resettlement Agency. Laos has several types of government-managed land settlements; we have attempted to discover which of these have been most successful in meeting the economic and social needs of evacuees at the least cost.

Land Settlement Development Costs and Returns, Laos. Table 29 indicates the costs and returns on the Lao land settlement projects we studied at Na Phok, Na Bong and Tha Ngon. While settlers in these settlements have survived, they have not achieved Pa Mong replacement income levels and their standard of living should not be considered comparable with that desired for Pa Mong evacuees. We do not have statistics on the income of refugees at the Na Phok and Na Bong projects, but it is reported to be far below the income at Tha Ngon. Incomes at Na Phok have been sufficiently low to cause a number of settlers, including evacuees from the Nam Ngum dam, to abandon the project and seek better situations elsewhere. The incomes at Tha Ngon are fairly high, and may actually be higher than reported. Nevertheless, even if the reported income levels were increased by 50 percent they would still fall below the replacement income required for Pa Mong evacuees.

Based on analysis of the Vientiane Plain land settlement data from these three projects, it appears that fairly substantial capital investments, reflecting the provision of a relatively complete infrastructure and a large number of services, does not produce the replacement income required by Pa Mong evacuees. These projects are still in the developmental stage, and productivity and income may rise somewhat in the future, but they do not at this time provide effective or encouraging models for Pa Mong evacuee land settlement.

4. Land Settlement Costs and Returns, Thailand Experience

Developmental and operating costs of government-managed land settlements in Northeastern Thailand provide analog data for some aspects of planning and costing land settlements in Laos. There have been sixteen self-help land settlement projects in Northeast Thailand, six of which have been designed for evacuees from reservoir flooding. Many of these projects have involved much lower development or establishment costs than the Vientiane Plain projects, partly due to the exclusion of various types of developmental costs from the accounts. However, projects also fall far short of producing the replacement income levels required for Pa Mong. The mean per household establishment costs for the Nam Pong, Lam Pao and Lam Dom Noi resettlement projects, which contain 77 percent of the reservoir resettlement population in Northeast Thailand, were $1,125 per household, or $225 per capita.

Table 29 Costs and Returns on Land Settlement Projects, Vientiane Plain, Laos, 1973-1975
($ US = 840 kip)

Settlement Name	Area of Farmland (hectares)	Number of Households	Land per Household (hectares)	Capital Investment ($ per Household)	Capital Investment ($ per Capita)	Capital Investment ($ per hect. in use)	Annual Income ($) Household Gross	Household Net	Per Capita Gross	Per Capita Net
Na Phok	600(est.)	180	2.5	3111	519	933				
Na Bong	800(est.)	250	2.5	4000	667	1275				
Tha Ngon	630	244	2.58	8,423	1,403	3262	606	428	101	71
						with pump irrigation				
				4,656	776	1803	308	220	51	37
						without irrigation				

In addition to these costs, there were substantial developmental investments of compensation money and savings by the evacuees themselves. The mean household income from these land settlement projects is no more than $230 per household. This income is insufficient for Pa Mong evacuees. Therefore, like the Vientiane Plain settlements, these projects do not provide an effective model for resettlement planning in Laos.

Raising Productivity on Land Settlements in Thailand. More lessons will be learned from a pilot project instituted as part of the Resettlement Study and Planning Project of the Mekong Committee. With financial assistance from the Government of the Netherlands, a program was begun at the Nam Pong land settlement in Thailand. Its purpose was to develop an input center which would raise farm productivity through the improvement of upland agricultural techniques.

This project operated with foreign advisory assistance for two years. For the fourteen villages in the best-off one third of the land settlement the project provided a more reliable operation of the pumped water supply, and some villages got individual farm planning assistance by resident agriculturalists and by the staff of the Faculty of Agriculture at Khon Kaen University. Suitable crop seeds and improved cultivation techniques were introduced and reliable fertilizers, insecticides and herbicides were made available at cost through a new input center. A baseline socio-economic survey was conducted at the beginning of the project, and another survey a year later measured some of the changes. During the first year of the project net incomes from crops grown on the farmers' allocated land settlement land increased by an average of 2,350 baht per household. However, the project's report states that the effect of the project in the first year was limited to the two rai homelot areas, where the increase in net income averaged only 440 baht per household. Thus, it is too early to determine the extent to which incomes at Nam Pong can be raised by subsidized inputs.

Unfortunately, we do not have cost data which could be used to determine what level of investment has been made by the project to improve incomes at Nam Pong. Therefore, with neither benefit nor cost data, we cannot accurately determine whether or not an input center together with a high level of extension services would constitute a cost-effective method of producing replacement income in relatively poor upland settlements.

We strongly recommend that lands as poor as those found in most Northeast Thai settlement schemes should not be considered appropriate for resettlement sites in Laos. Areas selected for land settlement must be of sufficient quality to ensure that evacuees can attain replacement incomes using their present technology and that they will not become dependent on the operation of development centers requiring large capital and managerial inputs. We are not opposed to developmental inputs, but feel they should be used to supplement a basic situation which already

provides replacement income. When used ir this way, their availability and success can make planned land settlement an even more attractive, competitive and productive alternative.

5. Requirements and Costs of Lao Land Settlements for Pa Mong Evacuees

Our estimates of land availability in Laos indicated that there will be more than enough land in 1982 for Pa Mong evacuee resettlement. However, much of this land is located on or adjacent to the Bolovens Plateau in southern Laos quite far from the reservoir region. In addition, much of it is upland of sufficient elevation to require some changes in the evacuees' accustomed agricultural techniques. The fact that so much of this potential replacement land is alien in nature and far away will not encourage many evacuees to voluntarily seek this resettlement alternative.

If the Lao evacuee is to have a free choice of resettlement alternatives, the government-managed land settlement must be made attractive enough to compete with other options. In order to be competitive, this alternative must have some economic advantage, some additional security and services which other alternatives lack. In the following discussion of components and costs of land settlements, we have included some inducements which should be attractive to evacuees.

6. Components of Proposed Land Settlements for Pa Mong Evacuees

In order to make government-managed land settlements an attractive resettlement alternative for evacuees, the following benefits should be built into the program:

i) Unimproved land should be provided at no charge to the evacuee. The current reservoir region land holdings of evacuees are about 4.7 hectares. Amounts of land provided in the settlements will vary according to land productivity, but for planning purposes we have assumed a resettlement farm size of six hectares, a slight increase over current farm size, compensating for a possible reduction in land quality.

ii) A cadastral survey of the land should be provided and titles issued immediately. A title may be tied or limited in some way to help discourage land speculation.

iii) Houselots should be cleared by the land settlement authority, prior to the movement of evacuees, but agricultural land should be cleared by the evacuees themselves.

iv) All roads should be provided and laid out in advance, and should provide all weather connections with the national transportation network.

v) Schools, a dispensary, administrative and police offices, a market and a temple should be provided. A central area should be reserved for shops. Past experience indicates that television, basketball courts and beauty shops do more to provide a focus for community action than development centers and clubhouses. Electric power should be provided as well.

vi) Timber, fencing and other building materials should be provided in the land settlement at cost.

vii) An experimental farm (or agricultural input center) should be established, together with an adequate number of agricultural extension workers to assist farmers with land development and adjustment to new ecological and economic conditions.

viii) A reliable drinking water supply should be provided.

Land Settlement Costs. The costs for each evacuee who moves to a land settlement are detailed below. Part I consists of the basic compensation and resettlement costs which will be paid to the evacuee. Part II discusses the additional costs involved in government-managed land settlements.

Part I. The following basic resettlement payments will be paid to or on behalf of each evacuee moving to a land settlement:

Compensation:

i) Compensation for land will be paid at established rates. The evacuee will use this capital to clear and develop new land, acquire inputs necessary for new farming systems, and provide for his support during the long period of establishment. Compensation for houses, improvements and tree crops will be paid as scheduled. Compensation for collective community property will be paid to the land settlement authority to cover partial costs of temples, markets and other common property in the land settlement.

ii) Land settlement site visit costs and land searching costs will be paid, to ensure that the evacuee knows the relative advantages and disadvantages of different resettlement alternatives and can decide which land settlement he prefers.

iii) Moving costs will be paid as scheduled. If large groups or entire villages move together to the same site, it may be possible for the resettlement authority to move the whole group at one time, effecting some economy in moving costs.

iv) The early-moving premium might be withheld from families who plan to enter a land settlement when it is ready for occupancy. Land settlement availability could also be scheduled so as to encourage early moves from the reservoir, reducing the need for early-moving incentive payments.

v) Title verification costs will be included in the costs of cadastral survey and title issue for the land settlement.

vi) Social overhead payment will be used to offset some of the costs of providing school, health, police and other central social services.

vii) Dislocation and downtime payments will be paid as scheduled. Our reserach indicates that it takes longer than the two years currently covered by downtime allowances for evacuees to recover their former income levels while clearing and developing new land. However, evacuees will have their land compensation payments to help defray extra expenses and living costs during the period of new land development.

Part II. The land settlement costs presented here were developed from unit requirements and costs, and are derived from analysis of other resettlement projects. The following are the major areas of development included in the costs of government-managed land settlements:

i) Clearing and construction of access roads and settlement road networks.

ii) Clearing of houselots.

iii) Construction of the settlement service center, which would include schools, dispensary, demonstration farm, temple, market, police and administrative offices, electric power and other facilities.

Part of the costs of these facilities will be offset by the collective community property compensation payment, and the social overhead payment.

iv) Water supply.

v) Drainage channels, canals and controls will be provided where required. (Most wet paddy in the reservoir region is raised under conditions of controlled drainage rather than demand irrigation, and we propose replacement of the controlled drainage infrastructure. In some cases additional investment in demand irrigation, by pump or by irrigation dams and controls, might bring substantial increases in productivity, justifying the additional investment. We have not included irrigation development in our costing because it is site specific, and the necessary site data for proposed land settlement areas are not available.

Table 30 details the development costs of land settlements for a base unit of 500 households.

Recurrent Costs. The Resettlement Agency will assume the continuing costs of agricultural extension and land settlement management for a period of three years after the reservoir is filled. This should be sufficient time for evacuees to become familiar with new agricultural techniques, to develop most of their land, and to regain their former level of income. After this time it is assumed that agricultural extension and settlement administration budgets will be assumed by the government agencies which normally supply these services to the population.

For calculating recurrent costs, we have assumed that each unit settlement of 500 households will require one supervisor, two clerical/ administrative assistants, one driver, one mechanic and two agricultural extension workers. Additional funds have been included for the maintenance and replacement of machinery, and for operating costs.

Table 31 details the recurrent costs charged to the resettlement project during the period of 1982-1995, for ten selected reservoirs.

Table 30 Development Costs for Lao Land Settlements (for a 500 household unit, cost in US dollars)

i)	Clearing 154 hectares of land for houselot, at $185 per hectare	$29,000	
	COST		$29,000
ii)	Cadastral survey and boundary staking of 4,000 hectares of land	20,000	
	Offset. Title Verification Budget	(-23,430)	
	NET COST		(-3,430)
iii)	Road clearing and construction:		
	Access road, from main road to settlement	139,500	
	Settlement roads, connecting households with settlement center	78,702	
	Settlement paths connecting farmlots with houselots	117,500	
	COST		336,000
iv)	Settlement administrative and service center:		
	Schools	17,500	
	Dispensary	2,750	
	Administrative office, police	45,000	
	Demonstration farm and associated structure	29,200	
	Temple	2,000	
	Electric power	90,850	
	Market and recreation center	2,000	
	Clearing costs for administrative and service center	19,240	
	Offset. Community Asset Compensation and Sound Overhead Payment	(-134,100)	
	NET COST		74,400
v)	Water supply		133,750
vi)	Drainage ditches		11,510
vii)	Planning and supervision of land settlement development		55,000
	TOTAL FOR 500 HOUSEHOLDS		$636,230
	Per household cost (Total/500)		$1,272
	Per capita costs (Total/3,000)		$212

Table 31 Recurrent Costs of Lao Land Settlements, 1982-1995
(in 1,000's of dollars)

Reservoir No.	Reservoir Height	Number of 500 Household Units	Staff Costs	Operating Costs	TOTAL
1	260m	13	2,340	702	3,042
2	260m	8	1,440	432	1,872
3	250m	10	1,575	473	2,048
4	250m	7	1,403	331	1,734
5	250m	6	945	284	1,229
6	240m	8	1,080	324	1,404
7	240m	5	675	203	878
8	230m	5	619	186	805
9	230m	3	371	111	482
10	216m	2	248	74	322

Net Additional Resettlement Costs for Evacuees in Government-Managed Land Settlements. The per capita land settlement development costs detailed in Table 30 represent the additional costs for each evacuee who elects to go to a land settlement. These per capita costs should be reduced by the early moving premium, which will not ordinarily be paid to evacuees who go to government-managed land settlements. This yields a net additional per capita resettlement cost. The total additional resettlement cost for all evacuees selecting this alternative for ten selected reservoirs is shown in Table 32.

Table 32 Costs for Lao Land Settlements for Ten Selected Reservoirs, 1982
(in 1,000's of dollars)

Res. No.	Reservoir Height	Protection Schemes	A Development Costs	B Recurrent Costs	C Early Moving Allowance Saved	(A + B - C) Additional Costs of Land Settlements*
1	260	None	8,231	3,042	1,698	9,575
2	260	NL NM LV	5,089	1,872	1,054	5,907
3	250	None	6,363	2,048	1,182	7,229
4	250	VV LV	5,578	1,734	1,047	6,265
5	250	NL NM LV	3,817	1,229	742	4,304
6	240	None	5,089	1,404	762	5,731
7	240	NL NM LC	3,182	878	501	3,559
8	230	None	3,182	805	445	3,542
9	230	NL NM	1,909	482	331	2,060
10	216	None	1,273	322	0	1,595

* i.e. costs in addition to the basic costs detailed in Table 27.

Land for Land Resettlement. We anticipate the argument that in "land for land" resettlement, the evacuee should not be paid compensation for his land. The main problem in a land for land exchange is that the evacuee trades familiar, developed, producing land of known risk for unfamiliar, undeveloped, non-producing land of possible high risk. Even if all inputs to develop the new land are provided by the Resettlement Agency or the government, and even if the new land turns out to be as productive as the old, the evacuee initially may be very dissatisfied with the exchange. Consequently, from a social point of view, and from the immediate economic point of view, this cannot be considered a successful resettlement. Moreover, if evacuees from the Pa Mong region are to be induced to move freely to distant land settlements involving new systems of agricultural production, feelings of dissatisfaction are not likely to encourage voluntary migration. These evacuees will see their neighbors receiving generous compensation for land, whereas they will be receiving no compensation, only a parcel of strange, distant, undeveloped land.

A partial solution to this problem would be to pay evacuees full and fair compensation which they could use to purchase the undeveloped land in a land settlement. The evacuee should consider it fair to purchase undeveloped land at the market rate. We feel, however, that the savings resulting from the sale of land to evacuees might not justify the ultimate cost. Such a program would involve a more complex administrative structure, and free land would no longer be a major inducement for bringing evacuees into land settlement projects.

Another approach in a "land for land" resettlement, which would still avoid payment of compensation, would require the Resettlement Agency to bring new land to the same stage of development as the flooded land before the arrival of evacuees. In fact, this would be difficult, if not impossible, to do; it would involve the complete transformation of forest land into a productive wet-rice agricultural landscape. We have attempted to cost out the major additional development inputs which would be required in Table 33.

The mean recommended compensation payment for land is $310 per capita. Therefore, land development costs shown in Table 33 greatly exceed compensation costs, and there would be no savings in a program of "land development for land" exchange.

Table 33 Land Development Costs for Replacement Land (for units of 500 households, in US dollars)

i)	Clearing of paddy land (1,520 hectares)	$562,000
ii)	Surveying and platting of land	3,496
iii)	Leveling paddy land	285,000
iv)	Compacting paddy land	316,667
v)	Clearing upland fields (1,326 hectares)	490,620
vi)	Constructing drainage channels	11,510
vii)	Constructing field dikes and pathways	39,000
viii)	Planning and supervision	256,304
Total Cost		$1,964,997
	Per household cost (for 500 households)	3,930
	Per capita cost (for a six-person household)	655

B. GOVERNMENT-MANAGED LAND SETTLEMENT -- THAILAND

1. Land Availability in Thailand

The land situation in Thailand differs significantly from that found in Laos. Available statistics on areas of potentially arable land and on current forest-clearing rates in Thailand indicate that limited reserves of undeveloped land are being rapidly depleted. We project that no major area of potentially arable, undeveloped land will remain after another decade.

Almost all of Thailand's undeveloped public land is forested, and most public forested land has been or soon will be declared official forest reserve. However, forest reserve land in Thailand has been made available for settlement programs in the past, and so we have assumed that in 1982 any forested land that is potentially arable, and is in blocks large

enough to meet the legal economic criteria for the size of government-managed land settlements, could be used for resettlement of Pa Mong evacuees. It is difficult to predict how much land will still be forested in 1982, however, because current information is inexact regarding the amount of land currently forested, its agricultural capability, and the rate at which it is being cleared.

In Working Paper 5 we projected forest clearing rates and calculated the amount of forest land which will remain at the time of Pa Mong resettlement. We predict that all of the potentially arable forest reserve lands will have been cleared by 1985 in Northeast Thailand, and at earlier dates in other parts of the nation. Our predictions are based on the assumption that all arable forest reserve land will be brought under cultivation; this may be a doubtful assumption because it is probable that the Thai government may have to restrict clearing of such land to a greater extent than is currently the case.

The forest reserves of Thailand may already be far below what is required to maintain a flow of forest products for domestic use, as the population and its demands increase, let alone for export sale. There is some evidence that excessive forest clearing may already have contributed to the occurrence in the Chao Phya Basin of two "100 year" floods in the past ten years, despite the existence of the Bhumipol and Sirikit dams. A detailed analysis of the forest reserve requirements and the potential for agricultural use of current forest lands requires better data on land capability and forest condition than are currently available. When such a study is done, we believe it will confirm our rather gloomy prediction that there will be no unoccupied forest land available for government-managed land settlements in 1982.

It may be argued that the government of Thailand will somehow be able to protect forest before 1982 and slow the rate of forest clearing; therefore, we should determine whether Pa Mong resettlement could utilize forest reserve land if the forest situation as it now stands could be "frozen" until the time of Pa Mong evacuation. With this question in mind, the National Energy Authority commissioned a soil survey and land capability study which was carried out in 1972-1973 in a large area of government land west and south of the Nam Mong lobe of the Pa Mong reservoir basin. The survey indicated that there were arable uplands in the area, although there were no unoccupied soils suitable for paddy cultivation. In 1975 we had an opportunity to join an official of the National Energy Authority in an aerial reconnaissance of the area and we observed that, with the exception of a few small areas at the bases of the limestone hills, the area was already completely cleared and occupied by farmers.

Under Thai law, blocks of land used for government-managed land settlements must meet a size requirement of at least 5,000 rai. In practice, none of the past self-help land settlements in the Northeastern region

have been under 10,000 rai in size. We concur with the Land Settlement Division's wisdom in this practice, since we estimate that cost-efficient land settlements would have to provide for at least 500 households and would have to encompass at least 10,000 rai. The experiences of the Land Settlement Division in the Northeast during the 1960's and 1970's confirms our expectation that all large blocks of arable forest land have already been occupied by squatters for several years. At the resettlement community built for the evacuees of the Lamtakhong reservoir, for example, the previous occupants of the site comprise 90 percent of the settlement members, and reservoir evacuees comprise only 7 percent. At the more recently established settlement for evacuees from the Huai Luang reservoir, the situation is still inconclusive. Eviction of squatters to make room for reservoir evacuees is not a feasible solution; the process of eviction would simply shift the resettlement problem from the evacuees to the evictees.

It is axiomatic that the best land is always cleared first, with the exception of some areas that are too remote or insecure to permit development. In any 10,000 rai block, we can assume that squatters will have already cleared the best land by the time evacuees arrive. We therefore conclude that the remaining land, though it might be arable with intensive inputs, will probably to too poor to produce the levels of replacement income required for successful resettlement of the population currently occupying the fertile soils of the Pa Mong reservoir area.

Land Made Available by the Land Reform Program. Thailand's Agricultural Land Reform Act of 1975 was designed to provide land for tenants or agricultural laborers resident on landlord-owned land. There is no provision in the land reform law or its proposed operation which would make land available directly to reservoir evacuees. Since almost all agricultural land in private ownership is occupied, it is likely that the tenants already in residence on the land will be the new title holders.

In later stages, land reform will be applied in less-developed areas and there may be some areas of sparsely-settled private land which will still have room for new settlers. Even private land is subject to settlement by squatters, however, and it is unlikely that any 10,000 rai blocks of land will be unsettled and available for government-managed land settlements at the time of Pa Mong reservoir evacuation.

Land Available in Existing Land Settlements (Nikhoms). Government-managed land settlements in Thailand were originally designed for the landless poor, but during the past fifteen years they have also been used to accommodate evacuees from several reservoir projects. Varied amounts of land in the settlements, called "nikhoms," have been made available to reservoir

evacuees in addition to their compensation payments. Thus, reservoir evacuee resettlement in Thailand has not been a "land for land" exchange program, but rather a program in which compensated evacuees have been eligible for nikhom land.

In order to determine the present occupancy of Thailand's nikhom land and predict the rate at which unoccupied land will be settled, we analyzed data from 85 percent of the nikhoms. The result of our analysis shows that there may still be some nikhom land available in the southern and northern regions of Thailand in 1982. If the settlement rate in the southern nikhoms increases as the other nikhoms are closed to new settlers, however, all nikhoms would be filled to capacity by 1984, only two years after the earliest target date for the beginning of Pa Mong resettlement.

Moreover, the last land to be occupied in the nikhoms (i.e. the land which might still be available in 1982) will generally be the land of lowest quality, since each successive new development is made in the area where it is most likely to succeed. Currently-used nikhom land does not yield incomes as high as those enjoyed in the Pa Mong reservoir region, and it is thus extremely doubtful that the last land allocated will yield replacement incomes for the evacuees. It might be possible, with optimum physical planning and with heavy inputs of credit and expert advice, including economic reorganization of the members, to achieve nikhom incomes approaching those currently enjoyed by the Pa Mong reservoir basin farmers. It might even be possible to make the relatively poor land on the nikhoms yield incomes high enough to allow evacuees to purchase rice at retail prices and still have living standards as high as those in the Pa Mong Basin. Experiments with such programs have been initiated at the Lamtakhong and Nam Pong nikhoms. However, such income increases have not as yet been demonstrated, and the additional costs necessary for such inputs are unknown. Until there is substantial proof that upland nikhom areas can sustain incomes in the 12,000 to 14,000 baht range even on their poorer sections, we must conclude that they cannot be utilized for Pa Mong resettlement, even in the event that space is still available.

2. Use of Settled Agricultural Areas for Government-Managed Land Settlements

Given the lack of uncleared arable forest land in Thailand for development of new government-managed land settlement projects (nikhoms), and given that almost all space available in the existing nikhoms will be filled before the Pa Mong resettlement, we considered two other possibilities for government-managed settlement projects:

i) purchase of large blocks of land in the private land market for the creation of new land settlements,

ii) reorganization of private land holdings in selected areas to reduce the average size of farms, while making inputs to raise productivity, so that evacuees could be settled in among the established population.

Purchasing Large Blocks of Land. We dismissed this alternative without detailed analysis. Large blocks of land will have been subdivided and allocated by the current land reform program before Pa Mong resettlement starts. Therefore, to acquire blocks of land sufficiently large for government-managed settlements in which all or most of the settlement members would be reservoir evacuees, the Resettlement Agency would have to purchase land from and displace a large number of individual owner-operator farmers. This would result in the creation of a new set of "evacuees," with more people disaffected and dislocated by the loss of their land. Furthermore, there would be no cost advantage with such a program. All the compensation and resettlement costs would probably have to be extended to the land sellers, in addition to the substantial costs for development and management of the land settlement. In brief, as long as the evacuees can effectively settle themselves as individuals in the private land market (see Section 6) there is no reason to start a program that would cost more than privately-managed resettlement and would probably be much less acceptable to the population affected.

Reorganization of Land Holdings. The second alternative involving use of private land for government-managed settlements involves the reorganization of land holdings and concommitant investment to raise productivity so as to fit in evacuees. We made a detailed study of this alternative, developing cost estimates for three types of programs:

i) reorganization of holdings on high quality land without cash payments to prior occupants (the Lamtakhong analogy),

ii) reorganization of holdings in the Stage One irrigation area, which would involve land consolidation and land purchase, and

iii) reorganization utilizing land purchases outside the Stage One area.

In general, all of these programs would involve the reorganization of land holdings throughout large areas of land. The average size of farms within these areas would have to be reduced so that evacuee families could be added without completely displacing any of the former occupants. The Resettlement Agency would then have to effect agricultural development in the entire area, so that both the old and new occupants could produce as much as they did before, in spite of having less land each. Details of these studies are included in Working Paper 5.

We concluded that reorganizing land without purchasing it is not a feasible way to establish government-managed land settlements for Pa Mong evacuees. It is too slow, because convincing prior occupants to cooperate peacefully takes longer than the time necessary to build the dam. It is too massive an undertaking, because where soil is good enough to provide replacement incomes the ratio of prior occupants to evacuees will be at least 15 to 1. It is too expensive because after evacuees receive compensation the cost is still over $20,000 per household.

We also concluded that a government-managed resettlement program in the Stage One area is not feasible, because by the earliest possible date for Pa Mong irrigation to begin, the area's natural population increase will have reduced the mean farm size to less than half the 25 rai considered by the Stage One Feasibility Report to be a fully occupied irrigation landscape with no room for resettled evacuees.

Summary. Any government-managed program of incorporating evacuees into an already settled and developed landscape involves investment in excess of that required for settlement into undeveloped areas (as may be possible in Laos) or for privately-managed resettlement into the already developed areas (as has been done in Thailand in the past). It can be argued that a large proportion of the high investments necessary for government-managed settlements will bring about general rural development; in addition to re-establishment of evacuees there will be benefits to the overall economy and to large numbers of rural farmers due to increases in productivity and income. If the government of Thailand is willing to make this investment, and pro-rate to resettlement only those costs involved with the evacuees themselves, then it may be desirable to consider this alternative in greater detail. However, it should be noted that the number of evacuees thus accommodated is relatively small given the total public costs involved. Furthermore, there is as yet no practical indication that such projects can succeed in providing resettled evacuees with replacement incomes as high as those needed for the Pa Mong reservoir population.

In addition, there are possible political problems involved with this type of resettlement. The resident population may not be interested in giving up land for the resettlement of evacuees, even if they are also scheduled to benefit from the developmental inputs and even if they are offered payment for the land they give up.

C. RESERVOIR-EDGE RESETTLEMENT, THAILAND AND LAOS

One of the most preferred resettlement alternatives is to move to the margin of the reservoir. Over half the evacuees from areas flooded by the Ubolratana (Nam Pong) dam now reside along the margin of that reservoir.

In Ghana, nearly one-third of the Volta reservoir evacuees abandoned their government-sponsored resettlement towns, at least temporarily, and moved back to the reservoir rim. The psychological advantages of this alternative are apparent, as the evacuee who stays near the reservoir can often remain in touch with part of his former social and economic interaction network. The logistic advantage of moving to a location near the former home is also significant. Most importantly, the economic benefits to be obtained from newly created reservoir resources may be great, particularly if the fishery provides a dependable high income to peasant fishermen.

1. Reservoir Resources

Unfortunately, reservoir margin resources are limited, sometimes severely. Nam Pong has been a special case, because of the excellent fishery, but margins of other reservoirs in the Pa Mong area have not typically supported major segments of displaced populations. At Pa Mong, the reservoir fishery and the arable land around the edge of the reservoir could provide the main economic base for some evacuees who may choose to resettle near their former homes. Given the resettlement goal of establishing evaucees where they have opportunities to earn their former incomes, it is important to carefully examine the absorbtive capacity of the land and fishery resources in order to calculate the actual number of people who could maintain former income levels on a sustained basis by use of those resources.

Therefore, we inventoried the resources that would occur at the edges of the alternative Pa Mong configurations, and researched the development and use of resources at existing reservoirs, to develop estimates of the number of evacuees who could successfully resettle around the reservoir and the costs of establishing those evacuees in their reservoir margin locations. Working Paper 5 examines in some detail the opportunities for fish catching and for farming the reservoir's drawdown zone. Other economic opportunities, including fish buying, fish rearing, cattle rearing and farming above the high water contour are considered more briefly.

2. Fisheries

We estimate that the average evacuee household resettled at the reservoir edge will catch about 375 kilograms of fish per year, providing an income of $146. This figure is developed in Working Paper 5 from estimates which are summarized in Table 34.

A regulation to allow only evacuees to catch fish would be undesirable from both a fisheries management and a social/political point of view, and would be impossible to enforce in any case. However, the Resettlement Agency should be able to affect the proportion of the total catch that accrues to resettled evacuees by:

Table 34 Estimated Annual Fish Catch for Nine Configurations of the Pa Mong Reservoir (in metric tons, in US dollars)

Reservoir No.	High Water Level	Valley Protection Scheme	Lao Side		Thai Side		Total Reservoir	
			Tons	Million Dollars	Tons	Million Dollars	Tons	Million Dollars
1	260m	None	3,400	1.3	3,300	1.3	6,700	2.6
2	260m	Nam Lik Loei Valley Nam Mong	2,200	0.9	1,500	0.6	3,700	1.5
3	250m	None	3,700	1.5	3,600	1.4	7,300	2.9
4	250m	Vang Vieng Loei Valley	3,300	1.3	3,500	1.4	6,800	2.7
5	250m	Nam Lik Loei Valley Nam Mong	2,400	0.9	1,800	0.7	4,200	1.7
6	240m	None	3,200	1.3	3,700	1.5	6,900	2.7
7	240m	Nam Lik Loei City Nam Mong	2,100	0.8	3,300	1.3	5,400	2.1
8	230m	None	2,800	1.1	3,300	1.3	6,100	2.4
9	230m	Nam Lik Nam Mong	1,900	0.8	1,600	0.6	2,500	1.0

*Dollar values calculated as $0.395/kilo of fish (8 baht/kilo), the average price received by fishermen at Nam Pong reservoir in 1974. Values are rounded to the nearest one hundred thousand dollars and weights are rounded to the nearest 100 tons because of the great inaccuracy of estimation. These estimates may be off by a factor of two.

i) assuring that they are in position to exploit the fishery as soon as it develops and

ii) by making good equipment available to them promptly.

It might also be possible to provide some instruction in fishing methods through a special extension service program. Assuming these inputs, the resettled evacuees at the reservoir edge might get 70 percent of the total catch on the Thai side and 33 percent on the Lao side.

3. Drawdown Agriculture

Arable land which is exposed by the reservoir's annual drawdown can be another important resource for resettlement. We examine, in Working Paper 5, the reasons why use of such land is usually prohibited, and we discuss the results of our research at the Nam Pong drawdown, where farming is officially sanctioned. We conclude that drawdown land that slopes 6 percent or less and that is regularly exposed for over 140 days could be used at Pa Mong by reservoir-edge resettled evacuees. Table 35 summarizes the estimated areas of drawdown that could be farmed around each of the reservoir configurations.

In order to harvest drawdown crops before they are flooded by the rising reservoir, farmers would have to plant before the spring rains begin. These and other constraints are considered in Working Paper 5. We conclude that the drawdown farmland would produce annual yields worth about $14 per rai, after the farmers learn to make the necessary adjustments to their farming methods and labor schedules.

4. Other Reservoir-Edge Resources and Opportunities

The drawdown will provide more extensive pasture than pre-reservoir conditions, and the reservoir-edge resettlees' incomes from sale and consumption of their bovine livestock are expected to be about $166 per household. This estimate is based on our observations at Nam Pong, on an investigation of the economics of cattle raising in Northeast Thailand, and on the drawdown zone slope maps.

Arable land above the high water level will all be in use on the Thai side by 1982, and most such land on the Lao side will also be in use. We do not recommend government purchase of that land for re-distribution as farmlots, for the reasons cited in this section of the final report and detailed in Working Paper 5. However, the land above high water level will remain an important resource for reservoir-edge resettlees, since some will already own fields above the reservoir and others may purchase such fields with their compensation funds.

Table 35 Farmable Drawdown Area Estimates for Alternate Reservoir Configurations (areas given in rai)

	1	2	3	4	5	6	7	8	9
High Water Level:	260m	260m	250m	250m	250m	240m	240m	230m	230m
Protection Scheme:	None	Nam Lik, Loei Valley & Nam Mong	None	Vang Vieng, Loei Valley	Nam Lik, Loei Valley & Nam Mong	None	Nam Lik, Loei City & Nam Mong	None	Nam Lik, Nam Mong
Upper and lower elevations of zone exposed for over 140 days:	253-260	253-260	242-250	242-250	242-250	232-240	232-240	221-230	221-230
Area of that zone (rai) in Laos:	186,000	132,500	224,600	181,500	156,000	181,900	124,000	189,000	124,900
in Thailand:	174,200	49,400	202,200	139,600	71,800	202,200	114,400	206,100	100,000
Total reservoir:	360,200	181,900	426,300	321,200	227,800	384,100	238,400	395,100	225,500
Percent of that zone with slope of 6% or less in Laos:	22%	22%	26%	26%	25%	25%	27%	28%	29%
in Thailand:	53%	30%	55%	53%	40%	57%	40%	63%	34%
Farmable area of drawdown zone (rai) in Laos:	40,900	29,200	58,400	47,200	39,000	45,500	33,500	52,900	36,200
in Thailand:	92,300	14,800	111,200	74,000	28,700	115,300	45,800	129,800	34,200
Total reservoir:	133,200	44,000	169,600	121,200	67,700	160,800	79,300	182,700	70,400

Note: The upper and lower elevations of zones exposed for over 140 days were determined from the 1971 edition of the reservoir operation study. The rule curves referred to were those for the reservoirs with maximum-minimum elevations of: 260-235, 250-220, 240-216 and 230-210. The total areas within the zones exposed for 140 days or more were determined from the 1971 edition of the Pa Mong Reservoir Area and Capacity Tables. The percent of land with a slope of 6 percent or less was measured for the 250m reservoir on 1:20,000 maps and extrapolated for other reservoir configurations from the relationship between zone size and total reservoir area.

There will also be opportunities for small business activities, such as trading and providing boat transportation, and resettled evacuee households are expected to average about $25 per year from this source. Purchasing fishermen's catches and transporting them to landings for resale to middlemen is likely to become a profitable occupation, but will absorb only about 200 evacuees. Off-farm employment is not expected to provide income for evacuees using the fishery and drawdown land resources, because of the remoteness of their locations and the timing of their fishing and farming activities. Household industries, including some fish processing, are expected to provide an average income of about $120 per household. We investigated the possibility of fish farming at the reservoir's edge, and concluded that only pond fish raising is likely to be reliable, and it is unlikely that remotely located fish ponds could compete economically with the wild-caught reservoir fish in the first years and with the better located and controlled ponds in the areas irrigated by the Pa Mong project in later years.

Most tree crops will not survive the annual flooding of the drawdown, but if the farmers are provided with sufficiently large residential lots above the drawdown, they should be able to produce fruit for their own consumption, plus a small amount for trading, as was done in the area in 1974. If tree crop production can be maintained at the 1974 level, it should provide about $33 per year per household. Poultry and pigs for home consumption can also be expected to produce the same income as that experienced before reservoir formation, about $15 per household per year.

5. Numbers of Evacuees to be Resettled as Fishermen with Drawdown Farms

By the 1982-1990 period when Pa Mong may be constructed, the average farm size on both the Lao and Thai sides of the reservoir basin is expected to be about 23 rai. If the areas that are to become farmable drawdown are already in use by farmers with normal 23 rai farms, and if an average of 80 percent of each farm is located within the zone that remains unflooded for over 140 days and on soils with slope and drainage suitable for drawdown farming, then the average post-reservoir drawdown farm holding will be about 18 rai, without any rearrangement of land holdings.

Assuming the mean drawdown farmlot is to be 18 rai, there will be 6,176 households on the Thai side and 3,246 households on the Lao side farming drawdown land along the edges of the basic 250 meter reservoir. The numbers of farms for other reservoir configurations and the numbers of evacuees supported by those farms are indicated in Table 36.

Table 36 Numbers of Drawdown Farms and Numbers of Evacuees Supported by those Farms (assuming mean farm size of 18 rai)

Reservoir Number	High Water Level	Valley Protection Schemes	Lao Side		Thai Side		Entire Reservoir	
			Farms	Evacuees	Farms	Evacuees	Farms	Evacuees
1	260m	None	2,274	13,712	5,125	30,135	7,399	43,847
2	260m	NL, LV, NM	1,620	9,769	823	4,839	2,443	14,608
3	250m	None	3,247	19,579	6,176	36,315	9,423	55,894
4	250m	VV, LV	2,623	15,817	4,110	24,117	6,733	39,934
5	250m	NL, LV, NM	2,168	13,073	1,595	9,379	3,763	22,452
6	240m	None	2,526	15,237	6,403	37,650	8,929	52,882
7	240m	NL, LC, NM	1,860	11,216	2,542	14,947	4,402	26,163
8	230m	None (Canal through Nam Mong Saddle)	2,940	17,728	7,214	42,418	10,154	60,146
9	230m	NL, NM	2,013	12,138	1,900	11,172	3,913	23,310

NL = Nam Lik, LV = Loei Valley, LC = Loei City, NM = Nam Mong, VV = Vang Vieng

6. Summary Estimation of Drawdown Farmer's Incomes

The average annual net income of an evacuee household exploiting the drawdown farmland and fishery is estimated to comprise the following:

i)	Catch of 375 kilograms of fish	$146
ii)	Production from 18 rai of drawdown farmland	252
iii)	Sale and consumption of cattle and buffalo	166
iv)	Profit from small business activities	25
v)	Household industries including fish processing	120
vi)	Sale and consumption of fruit, poultry, pigs	48
vii)	Income from investment of compensation funds in capital assets	75
	Total net annual income	$832

The average net incomes of rural households in the reservoir basin averaged $830 in 1974, according to our socio-economic survey of 2,054 Thai-side and 1,724 Lao-side households. Thus, the normal resources and opportunities of the reservoir edge, covered by the first six items above, will not replace the average income. The evacuees will need an additional $75 per year from investments in capital assets such as land above high water level, motorboats, pumps to irrigate drawdown, special fishing equipment, or extra livestock.

The drawdown farmers will receive compensation at the full rate for their land which is flooded longer than 140 days or is of a type not suitable for drawdown farming. Such land will be mainly upland, so payments will average about $80 per rai for 5 rai, or $400 per household. They will also receive compensation, at less than the full rate, for the lowered productivity of the farmable drawdown. These compensation payments, discussed in more detail in Working Paper 5, will total about $1,760 per household on the Thai side and $960 per household on the Lao side. That capital should suffice for the investments in paddle boats, simple fishing equipment, increments in livestock herds and other items needed to produce the basic income from reservoir resources, as well as the extra land or other assets needed to produce the remainder of their replacement incomes.

Other evacuees who are not owners of land that will become farmable drawdown will wish to resettle at the reservoir edge. Some could use compensation funds to purchase land above the high water contours, some could become subsistence fishermen, and some might use compensation funds to finance fish-buying or other small businesses. For the purposes of cost estimation, these land buyers will be no different from those evacuees who go further away to make private land purchases. Subsistence fishermen will have to compete with the better-placed drawdown farmers on the

Thai side; on the Lao side the land suitable for drawdown farming comprises less of the reservoir shore, so there will be more opportunities for other evacuees to enter the fishery. However, the incomes of subsistence fishermen without land will be too low on either side to constitute replacement incomes for any but the poorest of the evacuees. Fish buyers and other businessmen will be arranging their own resettlement, and will be relatively few in number.

Summary. From our study of potential reservoir margin resources, we have concluded that 15,000 to 60,000 evacuees could resettle at the reservoir edge on 2,440 to 10,150 drawdown farms, depending on the dam height and the protection schemes used. These evacuees should be able to re-establish their pre-reservoir income levels by using a wide range of reservoir resources, including fisheries, drawdown farmland and pasture, and private investment in land above the high water contour.

However, this conclusion should be considered somewhat optimistic, because it rests on a number of assumptions not as yet capable of testing or proof. These assumptions include:

i) that the fish catch will be as high as 20 to 30 tons per hectare per year.

ii) that the evacuees who become drawdown farmers will be able to get 33 percent of the total catch on the Lao side and 70 percent on the Thai side, in spite of the necessity to work land on the unusual drawdown schedule.

iii) that the drawdown land can be used without excessive siltation damage and without creating unacceptable health hazards.

iv) that agricultural problems such as tight timing of drawdown crop schedules, farming without rain, drawdown drainage, etc., can be solved.

v) that evacuees will be willing to make the drastic changes in activity patterns necessary to adjust to fishing and drawdown farming.

vi) that through extension programs, the evacuees will be able to learn the techniques of fishing and drawdown agriculture and that they will master both those techniques and the socio-economic complexities of operating a variety of different income sources which have very specific scheduling demands and which necessitate the establishment of an entirely new marketing structure for fish and produce.

Obviously these are all difficult changes in function for the evacuees, but our optimism is based on observation of farmers around the Nam Pong reservoir, and other reservoirs, who have adjusted rather well to the reservoir-edge environment, in spite of an almost complete lack of extension services and meager capital assets at the beginning of their adjustment.

7. Alternative Policies and Cost Estimation for Reservoir-Edge Resettlement

The re-establishment of evacuees at the edge of the reservoir will involve somewhat different costs than those outlined in Section 4. There will be some cost items not included in the "basic costs" estimation, including costs of land acquisition above the high water level and programs to support the new occupations of fishing and drawdown farming. These costs will be more than offset, however, by the considerable economies realized by the adjustment of compensation for drawdown farmland and by a reduction in compensation paid for housing. In order to estimate the ways in which costs of reservoir-edge resettlement will differ from the "basic costs" of other kinds of resettlement, certain assumptions must be made about policies to be adopted. The following discussion reviews the policy assumptions and cost estimations developed in Working Paper 5.

Policies. We have assumed that the governments of Laos and Thailand will revoke original titles to the farmable drawdown land, pay the owners compensation at reduced rates, and then issue to the same owners titles of a new type that clearly establish the government's right to flood the land annually. This policy is expected to result in drawdown farmlots averaging 18 rai in size.

The compensation rates for land to become farmable drawdown will be the capitalized value of the productivity lost because of the constraints of drawdown farming. The annual loss is estimated to be from $3 to $19 per rai, depending on the type and location of the land, and the capitalized value will be from $16 to $114 per rai. The savings to the compensation budget from paying these reduced rates will average about $80 per rai for all the farmable drawdown land.

Cost Estimation. The main cost items for the reservoir-edge resettlement program would be:

i) Compensation paid to drawdown farmers for the productivity they will lose because of the annual flooding of their land.

ii) The cost of purchasing residential sites above the high water contour for relocation because of the annual flooding of their land.

iii) Costs of dismantling, moving and reconstructing houses.

iv) Costs of constructing roads to those villages cut off from former access and to the new village sites around the reservoir.

v) Costs of an extension program to develop appropriate farming and fishing techniques and to teach them to the drawdown farmers.

vi) Various resettlement allowances as outlined in Section 4, including establishment of social service facilities at the new residential areas.

If the average drawdown land holding is to be 18 rai, and the compensation paid for that land is the capitalized value of its lost productivity, then payments will average about $545 per household on the Lao side and $1,365 per household on the Thai side.

The estimates of compensation for farmable drawdown land do not include any payments for residential land, because those who have houselots flooded will probably have them replaced by the Resettlement Agency on a land for land basis. An average of 1.25 rai per household will probably suffice for the private houselots. If another 20 percent is added for village communal use (roads, schools, temples, markets, etc.), the residential land needed will be 1.5 rai per household for those households whose former residential land is flooded. We estimate that 85 percent of the reservoir-edge resettled evacuees will need replacement houselots (the other 15 percent having their original homes above high water level). Land for the new village residential sites is expected to cost $94 per rai on the Lao side and $99 per rai on the Thai side. Thus, for the basic 250 meter reservoir on the Lao side, 4,140 rai will have to be purchased at a cost of about $390,000. For the Thai side of that reservoir, 7,870 rai will have to be purchased at a cost of about $780,000.

The compensation rates to be paid for flooded housing will be substantially reduced for the evacuees with farmable drawdown, because they will move relatively short distances and so will be able to dismantle and move their houses. Thus, they will need only a moving allowance, calculated as one-half of the replacement value, rather than the full replacement value to be paid to other evacuees who will be moving much further. The moving allowances would average only $691 per household, compared to $1,381 per household paid for housing replacement to the majority of evacuees who will have to move to distant places to find economic opportunities that will enable them to re-establish their income levels. For the basic

250 meter reservoir this would mean compensation savings of about $1,659,000 on the Lao side and $5,373,000 on the Thai side. The compensation estimates for house moving costs, and the concommitant savings to costs shown in Section 4, are included in Table 38.

Evacuees resettled at the reservoir edge will need access to market networks and to centralized social services. Some reservoir edge areas will have existing or new road access, and other more remote areas will have to depend on water transportation. Cost estimates for the new road system are developed in Working Paper 8 and summarized in Section 8 of this report.

Experience at Nam Ngum, Nam Pong and other existing reservoirs indicates that the evacuees can learn to exploit the fishery within a few years without a special fisheries extension service, though such a service might help them to avoid costly and even dangerous mistaken decisions about types of boats and other equipment. The adjustment to drawdown farming is much more difficult, and probably cannot be made by most of the evacuees without the support of a special research and extension service which determines the crop types and farming schedules that are suitable for drawdown, teaches the farmers to adjust their methods and schedules to the radically changed farming environment, facilitates the distribution of appropriate seeds in the first years, and facilitates the early establishment of market networks. The cost of such a service will be about $25 per drawdown farm per year, which is $200 per drawdown farm capitalized at the same rate as programs cited in the Pa Mong Stage One and Phase Two reports.

Table 37 summarizes the numbers of evacuees and households we believe can be accommodated at the reservoir edge with the greatest probability of successful economic restoration and social satisfaction at a minimal cost. The cost components itemized in Table 37 include compensation for lost productivity of farmable drawdown land, provision of replacement residential land for 85 percent of the households using the drawdown land, compensation for the cost of moving houses to the new locations, and costs of an extension service to provide the information reservoir-edge evacuees will need. It is assumed that almost all of the evacuees who are to become drawdown farmers will be among the last to leave the adjacent flooded areas of the reservoir, and therefore all are assumed in our moving schedule to move during years -2 and -1.

Since the savings to the compensation budget resulting from resettlement of evacuees at the edge of the reservoir margin are substantially more than the extra costs of extension services and residential land replacement, there is a net savings over the cost estimates summarized in Table 38. Those net savings, summarized in Table 38, will be subtracted from the basic costs detailed in Table 26 in the porcess of producing the final resettlement cost tables in Section 9 of this report.

Table 37 Summary Estimation of Compensation Costs for Farmable Drawdown Land (areas in rai, costs in thousands of US dollars)

		Lao Side of Reservoir								
	High Water Level:	260m	260m	250m	250m	250m	240m	240m	230m	230m
	Protection Scheme:	None	Nam Lik, Loei Valley, Nam Mong	None	Vang Vieng, Loei Valley	Nam Lik, Loei Valley, Nam Mong	None	Nam Lik, Loei City, Nam Mong	None	Nam Lik, Nam Mong
a	Number of Drawdown Farms:	2,274	1,620	3,247	2,623	2,168	2,526	1,860	2,940	2,013
b	Number of evacuees accommodated by drawdown farm:	15,712	9,769	19,579	15,817	13,073	15,232	11.216	17,728	12,138
c	Rai of farmable drawdown land:	40,900	29,200	58,400	47,200	39,000	45,500	33,500	52,900	36,200
d	Pre-reservoir paddy land that becomes farmable drawdown:	30,675	21,900	43,800	35,400	29,250	34,125	25,125	39,675	27,150
e	Full rate compensation for that paddy land ($120/rai):	3,681	2,628	5,256	4,248	3,510	4,095	3,015	4,761	3,258
f	Compensation for lost productivity only ($36/rai):	1,104	788	1,568	1,274	1,053	1,228	904	1,428	977
g	Savings from paying reduced compensation for paddy land that becomes farmable dd:	2,577	1,840	3,688	2,974	1,457	2,886	2,110	3,333	2,281
h	Pre-reservoir upland that becomes farmable drawdown (rai):	8,180	5,840	11,680	9,440	7,800	9,100	6,700	10,580	7,240
i	Full rate compensation for that upland ($94/rai):	769	549	1,098	887	733	855	630	995	681
j	Compensation for lost productivity only ($16/rai):	131	93	187	151	125	146	107	169	116
k	Savings from paying reduced compensation for upland that becomes farmable dd:	638	456	911	736	608	710	523	825	565
l	Pre-reservoir residential land that becomes farmable dd (rai):	2,045	1,460	2,920	2,360	1,950	2,275	1,675	2,645	1,810
m	Full rate compensation for that residential land ($120/rai):	245	175	350	283	234	273	201	317	217
n	Cost of replacing residential land for dd farmers, rather than paying compensation ($94/rai):	273	194	385	314	260	303	223	352	241
o	Savings, i.e. difference between compensation and replacement cost for resid. land:	-28	-19	-39	-31	-26	-30	-22	-34	-24
p	Cost of moving houses of reservoir-edge evacuees to sites above high water contour (per hshold):	1,162	828	1,659	1,340	1,108	1,291	950	1,502	1,029
q	Savings compared to paying full replacement cost for houses on drawdown:	1,162	828	1,659	1,340	1,108	1,291	950	1,502	1,029

Table 37 (continued)

		Lao Side of Reservoir								
	High Water Level:	260m	260m	250m	250m	250m	240m	240m	230m	230m
	Protection Scheme:	None	Nam Lik, Loei Valley, Nam Mong	None	Vang Vieng, Loei Valley	Nam Lik, Loei Valley, Nam Mong	None	Nam Lik, Loei City, Nam Mong	None	Nam Lik, Nam Mong
r	Total savings of compensation for land, plus replacement of residential land plus cost of moving houses (g + k + o + q):	4,349	3,105	6,219	5,019	3,147	4,857	3,561	5,626	3,851
s	Cost of agriculture and fisheries extension services ($200/hh):	455	324	649	525	434	505	372	588	403
t	Net savings in resettlement costs due to use of Drawdown Resettlement Alternative (r - s):	3,894	2,781	5,570	4,494	2,713	4,352	3,189	5,038	3,448
		Thai Side of Reservoir								
a	Number of drawdown farms:	5,125	823	6,176	4,110	1,595	6,403	2,542	7,214	1,900
b	Number of evacuees accommodated by drawdown farms:	30,135	4,839	36,315	24,167	9,379	37,650	14,947	42,418	11,172
c	Rai of farmable drawdown land:	92,300	14,800	111,200	74,000	28,700	15,300	45,800	129,800	34,300
d	Pre-reservoir paddy land that becomes farmable drawdown:	55,380	8,880	66,720	44,400	17,220	69,180	27,480	77,880	20,520
e	Full rate compensation for that paddy land ($198/rai):	10,695	1,758	13,211	8,791	3,410	13,698	5,441	15,420	4,063
f	Compensation for lost productivity only ($114/rai):	6,313	1,012	7,606	5,062	1,963	7,887	3,133	8,878	2,339
g	Savings from paying reduced compensation for paddy land that becomes farmable dd:	4,652	746	5,604	3,730	1,446	5,811	2,308	6,542	1,724
h	Pre-reservoir upland that becomes farmable drawdown (rai):	31,382	5,032	37,808	25,160	9,758	39,202	15,572	44,132	11,628
i	Full rate compensation for that upland ($99/rai):	3,107	498	3,743	2,491	966	3,881	1,542	4,369	1,151
j	Compensation for lost productivity only ($22/rai):	690	111	832	554	215	862	343	571	256
k	Savings from paying reduced compensation for upland that becomes farmable drawdown:	2,416	387	2,911	1,937	751	3,019	1,199	3,798	895
l	Pre-reservoir residential land that becomes farmable drawdown (rai):	5,538	888	6,672	4,440	1,722	6,918	2,748	7,788	2,052

Table 37 (continued)

High Water Level:	Thai Side of Reservoir								
	260m	260m	250m	250m	250m	240m	240m	230m	230m
Protection Scheme:		Nam Lik Loei Valley, Nam Mong	None	Vang Vieng, Loei Valley	Nam Lik, Loei Valley, Nam Mong	None	Nam Lik, Loei City, Nam Mong	None	Nam Lik, Nam Mong
Full rate compensation for that residential land ($200/rai):	1,108	178	1,334	888	344	1,384	549	1,558	410
Cost of replacing residential land for drawdown farmers, rather than paying compensation ($99/rai):	647	104	780	519	201	808	321	911	240
Savings, i.e. difference between compensation and replacement cost for residential land:	461	74	555	369	143	575	228	647	171
Cost of moving houses of reservoir edge evacuees to sites above high water contour ($ per hshld.):	4,459	716	5,373	3,576	1,388	5,571	2,212	6,276	1,653
Savings from paying less than full replacement cost of houses on drawdown:	4,459	716	5,373	3,576	1,388	5,571	2,212	6,276	1,653
Total savings of compensation for land plus replacement of residential land plus cost of moving houses (g + k + o + q):	11,988	1,923	14,443	9.612	3,728	14,976	5,947	17,263	4,443
Cost of agriculture and fisheries extension services ($200/household):	1,025	164	1,235	822	319	1,281	508	1,443	380
Net savings in Resettlement Costs due to use of Drawdown Resettlement Alternative (r - s):	10,963	1,795	13,208	8,790	3,409	13,695	5,439	15,820	4,063

Table 38 Savings in Resettlement Costs Due to Use of the Drawdown Resettlement Alternative, 1982 (in 1,000's US dollars)

Reservoir Number	Reservoir Height	Protection Schemes	Laos	Thailand	Total
1	260	None	3,894	10,963	14,857
2	260	NL,LV,NM	2,781	1,759	4,540
3	250	None	5,570	13,208	18,778
4	250	VV,LV	4,494	8,709	13,203
5	250	NL,LV,NM	2,713	3,409	6,122
6	240	None	4,352	13,695	14,047
7	240	NL,LC,NM	3,189	5,439	8,628
8	230	None	5,038	15,820	20,858
9	230	NL,NM	3,448	4,063	7,511
10	216	None	1,491	2,543	4,034

Section 6

SELF-MANAGED RESETTLEMENT IN THE PRIVATE LAND MARKET

A. EXPERIENCE FROM PAST PROJECTS

Self-managed resettlement is a term applied to one type of resettlement alternative. In this alternative, evacuee households buy into economic positions within the economy and manage their own resettlement. Evacuees who choose to resettle themselves in this way are not supervised by the Resettlement Agency after their moves. The chief benefit they receive from the Resettlement Agency is compensation money for their flooded assets, information, moving costs and re-establishment expenses.

There are five important reasons for considering self-managed resettlement as an alternative for some Pa Mong evacuees:

i) This alternative does not depend upon the alienation of large consolidated blocks of land. This point is important, especially for the Thai part of the Pa Mong resettlement project, because large vacant blocks of land will not exist in Thailand by the time when the resettlement will occur.

ii) Continued inputs from government agencies over an extended period of time after resettlement occurs are not necessary for self-managed evacuees.

iii) Self-managed resettlement in the past has required less initial investment per household compared to the investments necessary for planned settlements.

iv) Self-managed resettlement has been popular among evacuees from past resettlement projects in Thailand. Approximately two-thirds of all households forced to move by reservoir construction in Northeast Thailand have chosen to resettle themselves rather than enter planned settlements. When compared with evacuees in planned settlements, the self-managed evacuees are more content with their situation; this alternative seems to promise a greater possibility of achieving the social goals of resettlement if planned and handled well. Although Laos has had no experience with reservoir-related resettlement which would allow a comparison between evacuees within planned settlements and evacuees who managed their own resettlement elsewhere, we believe that many of our conclusions from research among reservoir evacuees in

Northeast Thailand can be extended into the parts of Laos which would be affected by the Pa Mong reservoir; there is no reason to believe that Lao farmers are any less capable than Northeast Thai farmers of managing their own affairs.

v) In general, the self-managed evacuees from Thai reservoirs have come closer to achieving restoration of their prior economic position than those in planned settlements.

It should be noted, at least in the case of Thailand, that self-managed resettlement is not an option, but probably an inevitably important resettlement alternative because vacant land is not available for planned resettlement communities. Therefore, the basic question is not if this alternative should be part of the resettlement program in Thailand, but how to develop a self-managed resettlement program which will achieve the economic and social goals of resettlement at least cost. The fact that in the past it has been the most cost-effective, most successful and most popular method, compared with other alternatives, does not insure that self-managed resettlement on the scale required by Pa Mong will work well if it is handled in the laissez-faire fashion which has characterized past programs.

Table 39 Flooded Households by Project and Type of Resettlement

Project	Year	Distribution of Flooded Households		
		Total	Currently in Settlement	Currently Elsewhere
Nam Pong	1964	4,841	638 (13%)	4,203 (87%)
Lam Pao	1965	6,857	1,742 (25%)	5,115 (75%)
Lam Ta Kong	1966	444	35 (8%)	409 (92%)
Lam Nam Oon	1969	1,639	906 (55%)	733 (45%)
Lam Dom Noi	1969	1,317	1,281 (97%)	36 (3%)
		15,098	4,602 (30%)	10,496 (70%)

1. Preference for Self-Managed Resettlement

Table 39 shows the numbers of evacuees from past reservoir projects in Northeast Thailand who have entered the planned settlement communities and the numbers who have moved elsewhere and managed their own resettlement. About one-third of the evacuees from these projects are currently living in their respective planned settlements, and two-thirds of the evacuees are living elsewhere. Clearly, the self-managed resettlement option has been attractive to the majority of evacuees.

2. Monetary Costs

In order to compare the costs of self-managed resettlement with the costs of planned land settlements, we conducted detailed surveys of the Nam Pong project evacuees. The results are summarized in Table 40.

Table 40 Costs Incurred by Nam Pong Evacuees (Mean costs per household in baht)

Cost Category	Evacuees in the Planned Settlement (n = 75)	Self-Managed Evacuees Elsewhere (n = 177)
Searching	218	157
Moving	305	793
Establishment:		
Land Purchase	2,930	7,238
Land Clearing	5,710	4,495
House Construction	2,385	3,078
Foregone Income	5,873	2,370
TOTAL COSTS (evacuees)	17,430	18,131
Compensation	10,903	11,758
NET TOTAL PRIVATE COSTS	6,527	6,373

The costs incurred by the two groups are significantly different in only three categories: moving costs, land purchase, and foregone income. The evacuees who moved to the settlement incurred lower moving costs because they moved shorter distances than many of the evacuees who moved elsewhere. The evacuees in the settlement also spend significantly less on land purchases, but what is most surprising here is that the settlement evacuees spent anything at all in this category since they were given 2.5 hectare plots free of charge. In fact 40 percent of the evacuees in the settlement have purchased plots outside of the settlement to supplement their allocated plots. The third interesting difference between the costs incurred by the two groups lies in the foregone income costs. The evacuees in the settlement took, on average, longer to re-establish their sources of income than the evacuees elsewhere took. The reason for this difference is that all of the evacuees in the settlement had to clear their new plots before they could plant and harvest crops, while many of the evacuees elsewhere bought farms which were already operational.

The total costs incurred directly by the evacuees who managed their own resettlement were marginally higher than the equivalent costs for the evacuees in the planned settlement. The difference is not statistically significant. However, in order to compare the total costs of resettling these two groups of evacuees we need to consider the costs incurred on behalf of each group from public funds, as well as the costs incurred directly by the evacuees.

Table 41 Total Costs Including Public Costs, for Nam Pong Evacuees, in Baht (mean costs per household)

	Evacuees in the Planned Settlement	Evacuees Elsewhere
i) Settlement Development	28,795	0
ii) Compensation	10,903	11,758
Total Public Costs	39,698	11,758
Private Costs	6,527	6,373
Total Costs	46,225	18,131

Table 41 summarizes our calculation of the total costs of resettling Nam Pong evacuees within their planned settlement. These costs were the sum of the private costs (6,527 baht) and the public costs (39,698 baht), or 46,225 baht. That figure should be compared to a total resettlement cost of 18,131 baht for evacuee households who managed their own resettlement.

To summarize this survey of the costs of resettlement in the past, evacuees have clearly incurred considerable costs beyond their receipts from public funds. But most significantly, the creation of a relatively expensive planned settlement had practically no effect on either the monetary costs or the psychological costs incurred privately by the evacuees from the Nam Pong settlement. The Land Settlement Division spent over 28,000 well-intended baht for each evacuee household from the Nam Pong reservoir, but even with that expenditure the private costs of those evacuees were almost exactly the same as the private costs of evacuees who managed their own resettlement. Moreover, although the evacuees as a whole perceived of substantial "psychological" costs according to our surveys, the expensive planned settlement again had had no effect on ameliorating those "psychological" costs.

3. Current Economic Status of Evacuees

Table 42 shows a preliminary comparison of the current economic status of the two groups of evacuees from the Nam Pong reservoir and a control group. The table shows the mean values of selected assets and the incomes of each of these three groups. The groups are ordered consistently on three of the four variables. The control group appears economically best-off, followed in turn by the individual self-managed resettlement evacuees and the evacuees in the planned settlement. The ordering is reversed with respect to the amount of upland used.

Table 42 Current Assets and Income Levels for Evacuees and Control Households

Assets/Income Levels	Evacuees		Control Group
	Planned Settlement	Self-Managed	
Paddy Land	5.3	17.2	26.0 rai
Upland	13.1	5.1	2.9 rai
Buffalo and Cattle Owned	2.0	3.7	4.9 animals
Annual Cash Incomes	2,994 baht	4,038 baht	4,261 baht

Moreover, the variations of incomes within each group are as important as the mean income levels. Diagram 3 shows the distribution of adjusted incomes graphically for the three groups of people. Table 43 shows the results of tests for significant differences between variances of incomes. The variance of incomes in the planned settlement is the lowest and that of the self-managed evacuees is the highest.

This ordering is to be expected. Evacuees in the planned settlement were given fairly standard plots of land, and most of the income variance for that group results from differential earnings outside of the settlement. While moving to the settlement tended to reduce income variations compared to the variations within the control group, moving elsewhere tended to increase income variations. Some of the self-managed evacuees were able to capitalize on their enforced relocation much more than others. The wide variation of incomes represents a wide variation in the abilities of individual evacuees to seize the opportunities and cope with the risks of moving to unsupervised situations.

Diagram 3 Income Distributions

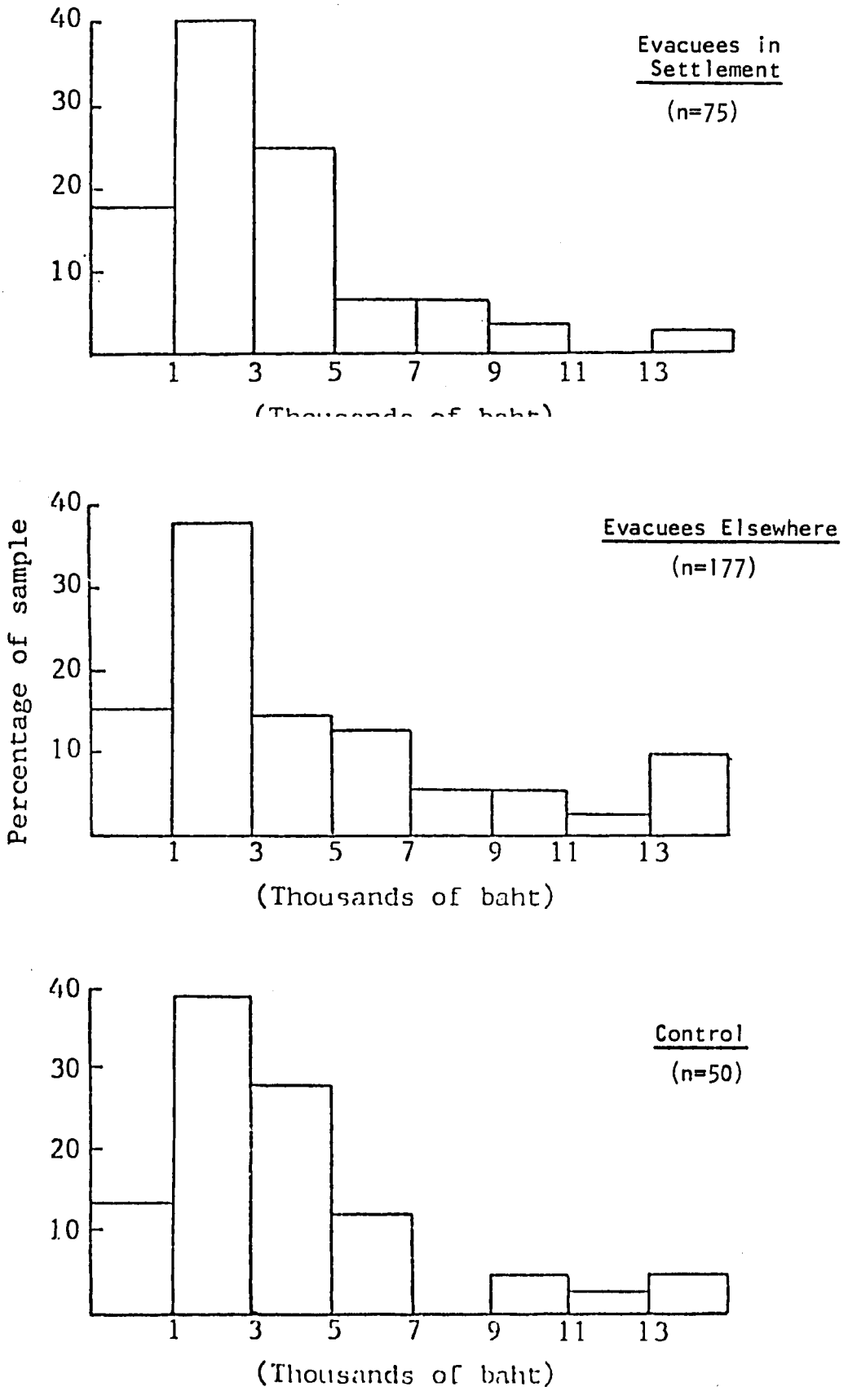


Table 43 Comparisons of Adjusted Cash Incomes

Group	(n)	Minimum	Maximum	Mean	Standard Deviation	Confidence Level for Significance of Differences Between Variances
Control	50	560	22,400	4,261	5,151	----
Self-Managed Evacuees	177	242	32,300	4,038	5,273	.95
Evacuees in Settlement	75	556	27,930	2,994	4,072	.99

However, the high variance of incomes for the self-managed evacuees results from a small number of relatively high incomes. Diagram 4 shows cumulative frequency distributions for all three groups. The curve for the self-managed evacuees lies above the curve for the evacuees in the planned settlement at all points. Even at the tenth percentile the evacuees elsewhere are economically better off than those in the planned settlement.

4. Social Satisfaction of Self-Managed Evacuees

Central to the acceptability of the self-managed alternative is the degree to which the evacuees who have managed their own resettlement feel satisfied with their current situation.

Table 44 reports on their own assessments of current well-being. Respondents in all three groups were asked to subjectively compare their situations now with their situations before the time of the resettlement. Comparisons were based upon five factors: Standards of housing, friends and neighbors, water supplies, communciations and accessibility, and "Happiness" or "fun." The ordering of the responses from the three groups was essentially the same for all five factors. The responses for the five factors are aggregated with equal weight. The figures are the percentages of responses for all factors in each response category.

Diagram 4 Income Levels by Percentiles for Three Samples

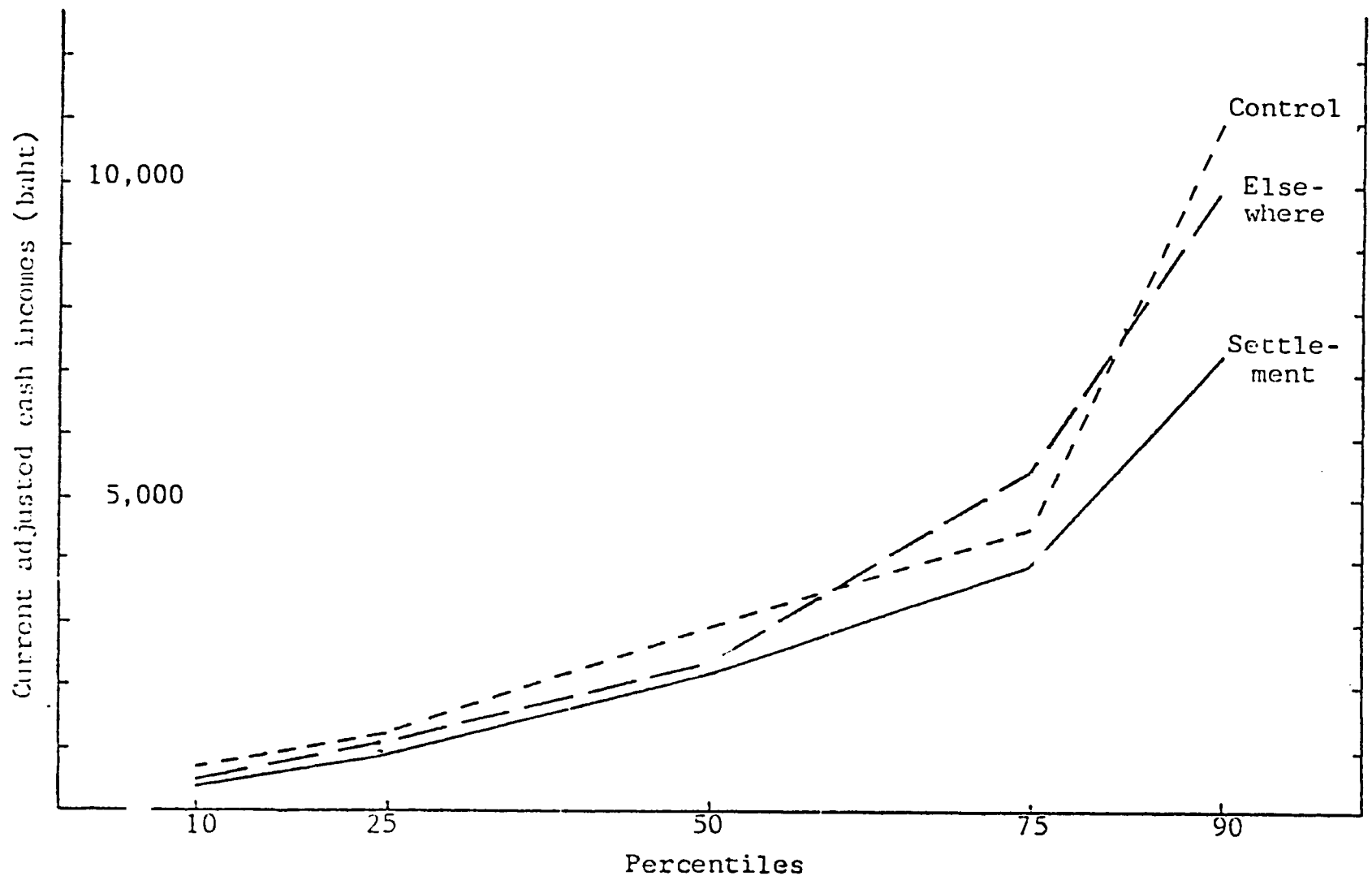


Table 44 Subjective Measures of Well-Being (indicated as percent of responses)

Response Category	Evacuees		Control
	Planned Settlement	Self-Managed	
Better Now	26	44	54
No Difference	23	28	25
Better Before Resettlement	51	28	21
Percent	100	100	100

5. Conclusion: Self-Managed Resettlement in the Past

The main conclusions from the above analysis are clear. The Nam Pong evacuees as a group are worse off as a result of being forced to abandon their homes. The evacuees have less land, fewer livestock, and lower incomes than comparable people who were flooded by the reservoir. Fewer of the evacuees have title to their land compared to the period before they were flooded, and fewer evacuees had titles when compared to non-flooded households. There have been more changes of the relative economic status of individuals among the evacuees than among the non-flooded households. The distribution of incomes has changed more for the evacuees than for the control group. And evacuees as a whole perceive more changes for the worse and fewer improvements during the last twelve years than the non-flooded households perceive. Our surveys among Nam Ngum evacuees indicate that, in general, they have lost even more than the Nam Pong evacuees. That difference is not surprising since the Nam Pong evacuees received far more assistance than the Nam Ngum evacuees received.

But almost all of the changes among the Nam Pong evacuees are more marked among the evacuees in the planned settlements than among the self-managed evacuees elsewhere. In most cases, the differences between self-managed evacuees elsewhere and the control group were small enough to be statistically not significant. However, where evacuees in the planned settlement were compared with either of the other two groups, the differences were significant. The chief exception to these general statements was the comparison of the variances of incomes among the three groups. The income

variance for the self-managed evacuees was greater than that of either of the other two groups, indicating varying abilities among the individual evacuees to cope with the risks of moving to unsupervised situations. However, closer investigation showed greater differences between the three distributions of income at the upper end. At the lower end of the distributions the self-managed evacuees were marginally better off than the evacuees in the planned settlement.

The purpose of this analysis was to find out whether or not Lao and Northeastern Thai farmers in general are capable of managing their own resettlements without government supervision. We have discovered nothing which indicates a general failure by the Nam Pong evacuees to manage their own resettlement, within the constraints of their inadequate compensation payments. On the contrary, not only were the costs of self-managed resettlement less than half of the costs of developing a planned settlement, but also the self-managed evacuees are economically better off than the evacuees living in the planned settlement and more content with their present situation. Therefore, based on this study, as well as general reports on resettlement in North America and Western Europe, we conclude that self-managed resettlement is not only feasible, but probably the most cost effective, and certainly a widely preferred, resettlement alternative.

B. SELF-MANAGED RESETTLEMENT FOR PA MONG EVACUEES

Given that the Nam Pong evacuees managed their own individual resettlement effectively, a critical question remains before individual self-managed resettlement can be considered as a legitimate resettlement strategy for Pa Mong: Could evacuees find enough viable new opportunities within the economy? Expressed differently, what would be the cost of ensuring that enough opportunities could be found?

1. Information Program and Land Searching

Increasing the Supply of Land through the Information Program. Literally, to increase the supply of land in Thailand is impossible. However, increasing the amount of land known to be for sale in the private land market is not impossible and could be effected through various kinds of planning policies.

In general, farmers in Northeast Thailand have little specific knowledge about alternative sources of livelihood. Farmers know in general terms that land is frequently available in both frontier areas and long-settled areas, but few know about specific plots of land which are for sale. The reason for this general lack of knowledge lies in poorly-developed communications networks rather than in a lack of available land or employment opportunities.

According to our investigations of land transactions in rural areas of North and Northeastern Thailand, significant amounts of land change hands every year. Furthermore, there appear to be more potential sellers of land than buyers with cash in many areas. However, land is "advertised" only by word of mouth, with the result that such knowledge that does exist about land for sale tends to be confined to particular kin and friendship networks and/or to neighboring villages.

The ability to find and secure land for a replacement farm will depend greatly upon the types and amounts of information available to each evacuee, as well as upon his capital assets. Increased knowledge about land markets will increase any evaucee's chances of locating a favorable deal. Individuals who have become familiar with distant as well as nearby land markets will on the average get more or better land for a given amount of money than will people who do not know much about any land market. One very effective type of information source is trips made by evacuees specifically to search for land. This particular source of information was important among the Nam Pong evacuees. Thirty-nine percent of those evacuees who settled outside of the planned settlement found their present land primarily as a result of their own searching efforts. A further 10 percent first learned of their present land directly from neighbors who had visited the area where they now live. Migrants generally rely most heavily on inter-personal sources of information about moving destinations, and land searching trips are the type of inter-personal information source most easily used by resettlement planners. Trips depend upon two factors which resettlement planners can effect: general ideas about where to search and travel money.

Effects of Information and Land Searching. In order to determine the effect of information on land searching, we conducted a survey of Nam Pong evacuees. In Table 45 we have divided the evacuees into three compensation categories, to determine if the amount of compensation funds available influences the success of those evacuees who choose self-managed resettlement. Each compensation category is divided by those who searched for land and those who did not search, and for each the amount of riceland, upland, livestock and annual income is also provided. Generally, the searchers have more land and livestock and higher annual incomes than the non-searchers within the same compensation group. For six out of twelve comparisons between searchers and non-searchers the differences between the two groups are statistically significant.

Table 46 casts more light on the differences between searchers and non-searchers. Evacuees who actively searched found land which was on average only half as expensive as the land purchased by evacuees who did not actively search for land. The searchers' land is marginally less productive than the non-searchers' land, but the difference is not significant.

Table 45 Compensation, Searching and Current Assets Among Nam Pong Evacuees Who Did Not Go to the Planned Settlement (figures are mean values)

Compensation Group	Number who Searched and Who did not Search	Compensation (baht)	Land Owned		Livestock Owned (head)	Annual Income (baht)
			Paddy (rai)	Upland (rai)		
1 Searched	(21)	158	12.0	1.9	3.2*	2,705
Not Searched	(41)	107	9.5	4.1	2.1	3,461
2 Searched	(27)	3,095	18.6*	4.1*	4.9*	5,361*
Not Searched	(24)	4,029	13.2	2.8	2.6	3,263
3 Searched	(21)	13,159	17.7	4.5*	5.2	6,289*
Not Searched	(43)	14,403	16.5	9.7	4.8	3,549

* Difference significant at the .95 level of confidence.

Table 46 Searching, Land Price, Land Productivity and Time of Move (Figures are mean values.)

	(n)	Price of Land (baht/rai)	Agricultural Income (baht/rai)	Time of Move[1]
Searched	(61)	215*	101	14.9*
Did Not Search	(90)	430	110	30.4

[1]Months after first hearing about the flood.
*Difference significant at the .99 level of confidence.

The costs of traveling in search of land were small. The Nam Pong evacuees who travelled in search of land spent a mean of 529 baht. The returns from the investment in searching for new land seem to have been considerable. On the other hand, large increments in compensation for evacuees who did not actively search for land seem to have produced very small returns in terms of land ownership and incomes. The implications for resettlement planners are clear. Increases in compensation rates by themselves will not necessarily have much effect on the purchasing power and subsequent incomes of evacuees. But if planners can increase levels of information among the evacuees about land for sale, the evacuees will benefit materially.

Affecting Information through Sponsored Land Searching: The Huai Luang Project. We tested the hypothesis that the Resettlement Agency can at reasonable costs affect:

i) the general levels of knowledge about resettlement opportunities,

ii) the timing and destinations of moves made by reservoir evacuees.

These hypotheses were tested in the context of a small-scale pilot program in an area soon to be flooded by the Huai Luang reservoir, Udornthani Province. Selected volunteers from one village agreed to search for land in neighboring districts and to share their findings with other villagers. Discussions between our investigating team, the land searchers and other interested villagers led to decisions about the approximate areas within which the searchers should search. The searchers were paid travel and subsistence costs for the expected duration of their travels. After the searchers returned, our investigating team organized village meetings to publicize the findings of the searchers. The team also verbally encouraged the searchers to tell their neighbors about the land discovered during these sponsored trips.

In five follow-up surveys, we asked respondents whether they knew about a specific piece of land or any other kind of opportunity to which they could move after they left the reservoir area. The results are summarized in Table 47.

In addition to increasing knowledge of land availability, the land searching program also affected the timing and destination of moves. Between January and October, 35 percent of the potential evacuees from our test village had resettled themselves, more than half moving to places discovered by our sponsored land searchers. By comparison, only 16 percent of the potential evacuees in the control villages had resettled themselves. In addition, searching permitted location of cheaper land than that available close to the reservoir. Evacuees who purchased riceland at the prices found away from the reservoir area in 1974 would have been able to acquire 73

percent more land for any given amount of compensation money than those who bought land at the prices found near the reservoir. This difference would presumably have considerable impact on the evacuee's subsequent standard of living.

Table 47 Effect of Experimental Information Program for Evacuees from Huai Luang Reservoir

	Study Village (Nong Bua Ban)			Control Villages		
Survey Date *	(n)	% of People Who Knew at Least One Place to Buy Land	Mean No. of Places Known by Respondents	(n)	% of People	Mean No. of Places
January	(54)	28	.46	(46)	43	.67
April	(46)	26	.44	(60)	37	.57
June	(32)	53	.67	(40)	43	.52
October 7	(45)	57	.86	(80)	42	.55
October 26	(36)	69	.94	(68)	39	.48

* The information program began in April, when the first sponsored search took place.

To summarize very briefly, the sponsored land-searching program was effective to the extent that by October 1974 it had caused more evacuees to know about more resettlement opportunities and at generally lower prices than would have been the case without the existence of the program. The value of a sponsored, semi-organized search for land, as opposed to random searching by individual evacuees, can be demonstrated by the fact that the eighteen searchers whom we were able to debrief found enough good quality riceland to accommodate eighty-three evacuee households, assuming 25 rai per household. The total cost of the experimental program, including labor and vehicle costs for the research team as well as travel and subsistence costs for a total of sixty-one searchers, was 16,200 baht or $810. That cost represented a mean of 284 baht for each of the fifty-seven households who had moved to the searcher's plots by October. That mean cost, which would fall as more evacuees responded to the findings of the last group of searchers, equalled less than 1 percent of the mean compensation received by the evacuees. Furthermore, the lower land prices discovered by the sponsored searchers increased the purchasing power of each evacuee by about 73 percent if we assume that the evacuee would otherwise have settled near the Huai Luang reservoir.

2. Self-Managed Resettlement Program Design

The main problem likely to be associated with the self-managed resettlement of large numbers of Pa Mong evacuees will be a temporary inflation of rural land prices, against which the evacuees will need protection. Accordingly we have searched for planning strategies which could protect the evacuees. We discovered that planning inputs in the form of increased information and increased compensation, and especially where these two factors are combined, will be effective.

The levels of these inputs depends upon the amount of land available in the rural land market. If sales of farm land of an appropriate quality are rare, very high levels of inputs will be necessary to ensure that even small numbers of evacuees can secure replacement farms. On the other hand, if many farmers are selling off land for some reason, evacuees should have less difficulty in finding new farms and inputs at a lower level will be sufficient. To determine the level and costs of inputs which will be necessary, we will investigate four characteristics of the rural land market:

i) the types of land which are traded

ii) the size of the market

iii) the elasticity of demand for land

iv) the elasticity of supply of land

Our land market studies included surveys of 75 district land offices in North and Northeast Thailand, data on land transactions from village headmen, and interviews with farmers who had recently sold land in several sample locations. Our analysis indicated that the types of land being sold (i.e. paddy, upland) and the quality of land being sold do not differ significantly from the types and quality of land currently owned in the reservoir region. A study of plot size indicated that plots of land currently for sale are slightly smaller than those owned by the Pa Mong region population, but the discrepancy is not significant. According to our data, evacuees should be able to locate either riceland or upland plots for sale that are at least as large as those currently owned.

Size of the Land Market. Our surveys of land office transactions and of land sales not registered in land offices indicate that 1.48 percent of the land in Northeast Thailand and 3.13 percent of the land in North Thailand is sold each year. However, not all rural land sales should be included in our estimate of the size of the rural land market. Many of the sales are between relatives, rather than on the open market. Transactions between relatives normally will exclude outsiders such as the Pa Mong evaucees.

Also many transactions involve exchanges of land between existing land-owners and would not make land available to new entrants in the land market. These exchanges occur when farmers try to get better land, or when for some reason they move to a new area. Like the land sales between relatives, these exchanges of land should be excluded from the following analysis. We will consider only those transactions where land is sold and not replaced by the seller.

According to our surveys, 25 percent of the land sold in Nongkhai and Khon Kaen involved exchanges of land between pre-existing land owners. Conversely, 75 percent of the transcations would have permitted people who did not formerly own land to become land owners. Our data indicate that about 10 percent of this latter category of transactions involved buyers and sellers who were members of the same families. Consequently, we will assume that 67 percent of all the land sold in rural areas of Thailand would allow people, who did not formerly own land (or whose former land was inundated) and who were not related to land sellers, to become land owners.

Table 48 shows estimates of the mean number of rai sold each year in each region of Thailand. The final column shows estimates of the total numbers of rai currently sold each year in each region of Thailand, and available for buyers who do not already own land. These figures represent the levels of demand and supply for land by region at current price levels.

Table 48 Estimated Areas of Farmland Sold Each Year, by Region
(Thousands of rai)

Region	Certified Holdings	Estimated Total Holdings	% Sold Each Year	Total Sold per Year	67% of Annual Sales
Udon, Loei, Nongkhai	(4,914)	(10,239)	1.48	(152)	(102)
Northeast	32,829	68,395	1.48	1,012	678
North	16,096	36,581	3.13	1,145	767
East	8,249	16,498	1.00	165	111
Central	15,681	31,361	1.00	314	210
South	14,014	28,028	1.00	280	188
TOTAL	86,869	180,864	1.61	2,916	1,954

If land continues to be traded at the same rates in the future, the quantities of land shown in the final column of Table 48 are the quantities of land for which Pa Mong evacuees would be competing in the private land market. In fact the pressure of new demand caused by the Pa Mong evacuees would itself cause the amount of land on sale to change. However, other processes may occur between 1975 and the time of the evacuation to affect the general propensity to trade land. Therefore, the assumptions underlying the estimates shown in Table 48 may no longer be valid at the time when the evacuation would occur.

Three important processes will affect the rate at which non-land owners will be able to buy into the land market in the future. i) The consolidation of settlement in "frontier" areas, accompanied by a continued reduction in the sizes of holdings in those areas, will slowly reduce the capacity of the frontier areas to absorb new settlers. ii) Rural-to-urban migration, and the tendency by people who are now farmers to transfer their assets out of land and into commercial activities, will increase the amount of land being sold. iii) The general intensification of land use associated with technological improvements will reduce the need for large holdings and increase the possibility of sales of "surplus" land. Both the extent to which each of these processes will occur and the extent to which the processes will affect the characteristics of the land market are unknown. Political decisions concerning issues like land reform and the so-called "rice premium" in Thailand could affect each of the processes very significantly, and political action in these areas cannot be safely predicted at the present time.

However, we have noted elsewhere that the land reform program currently being developed in Thailand will probably not make additional land available for Pa Mong resettlement use. Most land obtained under land reform will go to tenants already using the land; moreover, any surplus land will, in all likelihood, be claimed some years before Pa Mong resettlement takes place, unless full implementation of land reform program is long delayed.

We will assume therefore, that the final column of Table 48 is a measure of the size of the land market which the Pa Mong evacuees would enter.

Elasticity of Demand for Land. At the time of the Pa Mong evacuation there would be two distinct types of potential buyers of land; the evacuees themselves and whatever categories of people bid for land in the normal course of events. We will assume two different kinds of behavior for these two groups. The evacuees will want to buy replacement farms, and for the purposes of this analysis we will not permit them to settle for less, regardless of the cost to the resettlement authority. Thus, their demand will be completely inelastic.

We make a different assumption for the other categories of potential buyers. They are under less immediate pressure to buy land, and can delay their purchases or invest their capital elsewhere until the temporary effect of the evacuation on land prices disappears. For those people we will assume that demand will decrease by one percent in reponse to any one percent increase of price.

Therefore, the assumed elasticity of demand for land during the period of the evacuation will be a composite of complete inelasticity for some potential buyers, and unit elasticity for others. The higher the proportion of evacuees to the total number of potential buyers, the nearer will the demand for land approach complete inelasticity.

Elasticity of Supply of Land. The elasticity of supply is more critical than the elasticity of demand in predicting the price changes which will follow a temporary change in the demand for land.

From our interviews with village headmen and other respondents, we found that in many areas there are more farmers willing to sell surplus land than there are buyers with cash, that significant quantities of land would be sold if buyers with cash offered prices in line with the current market rates, and that more land would be sold if higher offers were made. We also observed that households who recently left the Huai Luang area had located large quantities of land for sale, that forty percent of the Nam Pong evacuees living on the planned settlement managed with their compensation money to buy plots of various sizes within a few kilometers of their homes, and that indivdiuals who have had sudden cash "windfalls" have bought fully-developed plots adjoining their farms, even in long-settled areas. This accumulation of evidence strongly suggests that the supply of land is to some extent elastic.

We conducted limited surveys to attempt to measure the elasticity of the supply of land. From a survey of 60 farmers drawn from Khon Kaen and So Phi Sai, we derived estimates of the amounts of land which would be for sale at various prices above the current market-clearing price. Farmers were asked whether or not they would consider selling their land. They were asked what they themselves would pay for the land, what they thought the land was worth, and what price they would sell the land for. Generally, these three prices were different and represented higher price quotations respectively. We used these data to define a "supply curve." The elasticity of supply of land is defined as the percentage change in quantity of land for sale divided by the percentage change in the price of the land. We calculated the percentage increase in land offered for sale at each 10 percent increase in price. The results are summarized in Table 49.

The elasticity of supply of land is relatively high for the first five iterations. Each ten percent increase in the price of land brings forth a mean increase in the quantity of land offered for sale of 16.6 percent, if farmers respond in the way they claim they would. However, after the first five iterations the supply curve becomes quite inelastic. The last four ten percent increases of price bring a mean increase of only 0.2 percent each in the quantity of land offered for sale. Some farmers in the sample said they would not sell any land even if they were offered a price of more than 140 percent of their own estimates of the value of the land.

Table 49 Increases of Amounts of Land For Sale Associated with Increases in Price Offered (Figures are numbers of rai "for sale" among the respondents.)

	Percentage Price Increases														
	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140
Khon Kaen	133	170	176	176	293	363	413	425	724	764	764	768	781	781	781
So Phi Sai	532	532	665	795	879	1071	1077	1077	1127	1127	1127	1127	1127	1127	1127
Total	665	702	841	971	1182	1434	1490	1502	1851	1891	1891	1895	1908	1908	1908
Supply Elasticity	-	.556	1.98	1.55	2.17	2.13	.40	.08	2.32	.22	.00	.02	.07	.00	.00
Summary	-	1.67					0.60					0.02			

We recognize the conjectural nature of this analysis. However, evidence from elsewhere suggests that many farmers are indeed willing to sell their land if they receive attractive offers. On the other hand, there is a point beyond which virtually no increase of price will bring additional land into the market.

We predicted the land price increases which would be associated with increases in demand. The results of this prediction appear in Table 50 The table shows, for example, that if 30,000 evacuees each bought a mean of 25 rai of land in the Northeast, over a period of eight years, the price of land in the Northeast would be 6 percent higher.

Table 50 Predicted Increases in Land Prices Following the Pa Mong Evacuation (Figures are percentage increases of the prices prevailing before the evacuation.)

	Regions	Duration of Evacuation Period (Years)							
		8	7	6	5	4	3	2	1
Assuming a total of 30,000 evacuee households	Udon, Nongkhai, Loei	36	43	52	78	?	?	?	?
	NE	6	6	7	9	11	14	21	45
	NE, N	2	3	3	4	5	7	10	20
	NE, N, E	2	3	3	4	4	6	9	18
	NE, N, E, C	2	2	3	3	4	6	8	16
	NE, N, E, C, S	2	2	2	3	4	5	8	14
Assuming a total of 40,000 evacuee households	Udon, Nongkhai, Loei	52	71	95	?	?	?	?	?
	NE	7	8	10	12	14	19	29	78
	NE, N	3	4	4	6	7	9	14	27
	NE, N, E	3	3	4	5	6	8	13	25
	NE, N, E, C	3	3	3	4	6	8	11	22
	NE, N, E, C, S	2	3	3	4	5	7	10	19
Assuming a total of 50,000 evacuee households	Udon, Nongkhai, Loei	85	137	?	?	?	?	?	?
	NE	9	10	12	14	17	23	36	?
	NE, N	4	4	6	7	9	12	16	34
	NE, N, E	4	4	5	6	8	11	15	31
	NE, N, E, C	3	4	4	6	7	9	14	27
	NE, N, E, C, S	3	3	4	5	6	8	13	25

Many of the assumptions included in Table 50 are unlikely to be realized. Evacuees are not likely to spread their purchases evenly over an eight-year period, or overall of the regions of Thailand, or even over the whole of the Northeastern region. If no action were to be taken by the planners of the resettlement, most of the evacuees would almost certainly move within the last one or two years before the flooding of the reservoir basin, and they would tend to move relatively short distances.

The main purpose of Table 50 is to indicate the necessity of spreading out the Pa Mong self-managed evaucees in both time and space, inducing them to leave the reservoir over the entire period of resettlement (5 to 10 years depending on the level of the dam) and inducing them to seek their land over a much wider area of Thailand than the three provinces adjacent to the reservoir. This is the critical role for the Resettlement Agency to play in the self-managed resettlement alternative.

3. Land Price Inflation: Another View

Throughout the study, we have to assume the worst possible conditions and plan a program which will meet those conditions. Therefore, we have investigated the probable dimension of inflation in land price, in case the competition for replacement land results in substantial land price increases. However, as we mentioned earlier, this problem may be substantially reduced, or may not occur at all, if we assume the evacuees to be economically rational in their decisions regarding land purchase.

The basic argument against inflation in land value is as follows. Farmland is a factor of production and will only increase in value if the final product, agricultural produce, also increases in value. The farmer knows what land is worth as a factor of final production and will not be willing to invest more than its productive value. Rather, he will invest his compensation funds in other factors of production or shift his investment out of agriculture and into some other productive enterprise. Therefore, it is unlikely that he will bid up the price of land to drastically high levels. Even if some combination of imperfect market information and individual myopia result in some uneconomic decisions regarding land price, they will be temporary, and the market will act to bring land prices back to a lower level. If a premium is paid to allow for possible inflation in land prices, it may well contribute to such inflation by simply inflating the evacuee's purchasing power.

We accept this general argument, but point out that even a temporary inflation in land price can cause problems in the tightly-scheduled resettlement program. Both the economic and social goal of resettlement is to get the evacuee back to prior positions as quickly as possible. This will be much more difficult if even modestly inflated land values decrease the amount of replacement land he can purchase. We believe the farmer to be astute and economically rational, but inadequately informed about specific resettlement opportunities, and also subject to a stress situation in the process of resettlement when the need to quickly settle his family and re-establish an income flow may override a more rational or sensible economic decision which might call for him to delay land purchase or change the nature of his production system to avoid overpaying for land. Evacuees are not simply making an economic investment; they are purchasing a life-style, attempting to re-establish a broken life pattern as quickly as possible.

They need stability, a place to be, and something to do which will support them, and they may indeed be willing to pay a considerable premium to recover this stability. In addition to a degree of non-rationality among land buyers, we can also anticipate from our studies some non-rationality among land sellers, who also may attach other values to land besides its value as a factor of production. Because of these factors, we cannot assume the response to inflation in land prices will be rational, and we have to assume that some inflation will take place.

The probability of more "rational" economic behavior can be increased by a good information system; the more the evacuee knows of land prices, farm product prices, and alternative economic opportunities, the better investment he will make.

We do acknowledge that evacuees are sufficiently rational and that they will not pay vastly increased prices for land, far beyond its value as a factor of production. For that reason we have accepted a very low probable inflation rate of 3-4 percent, plus a contingency of about 5 percent for a total potential inflation rate of less than 10 percent. This, of course, assumes that we can spread the impact of evacuees on the private land market over 5 to 10 years and beyond the provinces immediately adjacent to the reservoir.

Finally, we also acknowledge the problem of actually contributing to land inflation if the inflation factor is automatically added to compensation payments. Therefore, we have proposed that the contingency for land inflation be kept in a central fund, to be distributed to later movers if and when land price inflation begins to disadvantage the self-managed resettlement evacuees.

4. Program Requirements for the Self-Managed Resettlement Alternative

The basic resettlement program outlined in Section 4 covers all aspects of the self-managed resettlement program, and there are no incremental costs which accrue directly to this alternative. The specific services required for the smooth operation of this alternative, which occur for the most part in the information component of the resettlement program, are services given to all evacuees regardless of their destination. Self-managed evacuees may consume slightly more of these services than evacuees going to other destinations, but it is not possible to calculate in advance the increments of these costs which could be attributed to self-managed resettlement; in any event, it would be only a very modest share of total resettlement costs.

5. Predicted Numbers of Self-Managed Evacuees

Thailand. Two factors indicate that self-managed resettlement will be an important alternative among Thai evacuees. First, more than two-thirds of all the evacuees from existing reservoirs in Thailand have resettled themselves privately, and there is no reason to believe that at least that proportion of Pa Mong evacuees would not prefer to manage their own resettlement. The more realistic compensation rates which would be paid to the Pa Mong evacuees might induce a higher proportion of those evacuees to purchase land privately. Secondly, as we have pointed out repeatedly elsewhere in this report, there will be very little vacant land available for the development of planned settlements for Pa Mong evacuees in Thailand. Consequently, unless settlements are to be created in areas which are already developed, a very expensive proposition, planners will have to encourage a large proportion of Thai evacuees to resettle themselves outside of planned settlements

We will assume then that all of the Thai evacuees, except for those who move to towns and those who can be accommodated on the reservoir margin, will manage their own resettlement privately in rural areas.

Laos. Although experience from the many dams already built in Thailand provides some basis for estimating the proportion of the Thai evacuees who will prefer not to move to a planned settlement, there has been no such experience in Laos. The Nam Ngum resettlement is an inadequate analog for Pa Mong, since effective resettlement planning had not been done at the time the evacuees left the Nam Ngum Basin. However, recent rates of mobility among rural Lao, aside from the abnormal experiences of war refugees, have been lower than among rural people in Northeastern Thailand. These facts obliquely suggest a lesser inclination among the Lao to move and manage their own resettlement privately and independently.

Given that the planned settlements for the Lao evacuees from the Pa Mong reservoir may have to be developed in the southern part of Laos (see Section 5), it is likely that significant numbers of Lao evacuees will prefer to manage their own resettlement near the reservoir rather than move long distances to the planned settlements. We predict that of all the Lao evacuees who do not move to towns and who cannot be accommodated on the reservoir margin, 50 percent will move to the planned settlements and 50 percent will manage their own resettlement in rural areas of Laos.

On the basis of the above discussion we predict that the numbers of evacuees shown in Table 51 will manage their own resettlement in rural areas, depending on the size and shape of the Pa Mong reservoir.

Table 51 Predicted Numbers of Self-Managed Evacuees for Ten Selected Reservoirs (numbers of persons)

Reservoir Height	Protection	Thailand		Laos		Total	
		Total Evacuees	Self-Managed	Total Evacuees	Self-Managed	Total Evacuees	Self-Managed
260m	None	366,693	259,525	113,174	38,669	479,867	298,194
260m	Nam Lik Nam Mong Loei Valley	179,444	131,787	71,192	23,807	250,636	155,594
250m	None	299,916	204,250	98,730	28,827	398,646	233,077
250m	Loei Valley Vang Vieng	266,742	200,913	81,540	25,537	348,282	226,450
250m	Loei Valley Nam Mong Nam Lik	165,239	119,273	61,417	17,655	226,656	136,928
240m	None	236,544	147,534	76,559	23,656	313,103	171,190
240m	Loei City Nam Lik Nam Mong	129,886	81,204	52,731	14,812	182,617	96,016
230m	None	162,625	85,434	52,291	13,634	214,916	99,068
230m	Nam Lik Nam Mong	93,603	51,327	34,741	8,295	128,344	59,622
216m	None	62,154	39,121	14,193	6,205	76,347	45,326

Section 7

URBAN RESETTLEMENT

A. PAST URBAN RESETTLEMENTS AND OTHER ANALOGOUS EXPERIENCE

More than 80 percent of the potential Pa Mong evacuee population live in rural areas and will probably choose to resettle in one of the agricultural alternatives discussed in Sections 5 and 6. However, the Pa Mong project must also provide for evacuees who wish to resettle in towns.

One group consists of the population from reservoir region towns which will be flooded at all contemplated levels and configurations of the Pa Mong reservoir. At the 260m level, with no protection schemes, the flooded urban population will total at least 70,000.

The second group potentially interested in an urban resettlement alternative comes from the rural area. The migration stream from rural areas to towns throughout Thailand suggests that some Pa Mong rural evacuees will relocate in towns. National rural-to-urban migration rates are not available for Laos, but in Thailand the growth rate of towns due to in-migration is about 2.4 percent. This rate may actually increase due to Pa Mong reservoir evacuation, as villagers liquidate their agricultural holdings and are presented with a clear choice of whether to re-establish agricultural pursuits elsewhere or to become town dwellers.

1. Resettlement Experience in Replacement Towns.

No towns have been flooded by reservoirs in Laos. However, in the extensive Thai experience with reservoir-related resettlement there have been three district towns flooded: Hod in Chieng Mai Province, Tha Pla in Uttaradit, and Sahat Sakhan in Kalasin. In each case, a replacement town was established beyond the edge of the flooded area and public funds were used to construct buildings designed to re-house the administrative function. At Tha Pla and Sahat Sakhan, but not at Hod, shop houses and market places were also provided. There were important differences among the sites of these three planned replacement towns; new Hod was located within and around an existing village with a major road junction while new Tha Pla and new Sahat Sakhan were located far from any existing settlement, without reference to the probable viability of their respective sites as urban centers.

A comparison of the three Thai replacement towns, as shown in Table 52 indicates that both Tha Pla and Sahat Sakhan have decreased in size.

Table 52 Basic Characteristics of Replacement Towns

Town	Province	Reservoir and Dam Project	Year of Dam Closure	Pre and Post Flood Populations		Percent Change in Population
				Pre-Flood	Post-Flood	
				Sanitary Area*	Sanitary Area	
Hod	Chieng Mai	Bhumipol	1964	3,100	3,900	+25.8
Tha Pla	Uttaradit	Sirikit	1971	2,700	1,755	-35.0
Sahat Sakhan	Kalasin	Lam Pao	1967	4,951	3,256	-34.2

* Includes town population.

This differential change in town size reflects different changes in economic functions among the three towns. Hod was relocated at the junction of the main road between Chieng Mai and Mae Seriang, an economic location which prospered with development of the region and its transportation network. The new town of Tha Pla was located within the boundary of the resettlement area planned for evacuees from the Sirikit reservoir. Therefore, a major factor in selection of this location was the availability of resettlement land. However, the location of the replacement town of Tha Pla does not seem to be economically advantageous. Many evacuees initially resettled in the new town but later moved to new market centers which developed spontaneously without the benefit of government investment and assistance.

The replacement town of Sahat Sakhan was also located close to the land resettlement area, on land donated by the Public Welfare Department. While the new town appears to have better social infrastructure (schools, roads, medical facilities, electricity), its future as a viable district center and central place is now in doubt; after an initial period of economic prosperity due to the cash flows associated with the construction of the Lam Pao dam, the town of new Sahat Sakhan has declined in size and economic power and its market function appears to have been taken over by the district town of Somdet on the main Kalasin-Sakon Nakhom road.

Reservoir flooding seriously disrupted the market function served by all three towns. Only the town of Hod has expanded its market function (by 41 percent), while the number of businesses in both Tha Pla and Sahat Sakhan has decreased by 49 percent and 21 percent respectively. For Tha Pla and Sahat Sakhan the economic hinterland areas decreased in size, and the number of functions provided by each town for its rural hinterland has also decreased. Thus, the replacement towns provide fewer services for the adjacent rural areas than was the case in the pre-flood towns.

Occupational continuity and change patterns of occupational continuity among relocated populations give another perspective on the degree of displacement involved in moving to replacement towns. Occupational continuity and change is summarized in Table 53.

Table 53 Occupational Continuity and Change Among Household Heads Resettled in the Replacement Towns

Occupational Category	Percent of Household Heads by Occupation								
	Hod (n=119)			Tha Pla (n=64)			Sahat Sakhan (n=380)		
	Pre-Flood Town	% Who Changed Occup'n	Post-Flood Town	Pre-Flood Town	% Who Changed Occup'n	Post-Flood Town	Pre-Flood Town	% Who Changed Occup'n	Post-Flood Town
Farming	25.8	74.2	10.0	23.6	5.9	32.8	67.5	27.2	53.0
Merchant	20.0	18.2	24.2	26.4	36.8	18.8	12.7	39.6	12.4
Government Employee	7.5	11.1	7.5	30.6	18.2	29.7	10.6	18.4	11.1
General Employee-Laborer	28.3	20.6	36.7	13.9	100.0*	3.1	1.1	50.0*	5.5
Other	15.0	61.1	12.5	5.6	25.0*	7.8	7.7	21.4	12.2
Unemployed	3.3	75.0*	9.2	0.0	-	7.8	0.5	50.0*	6.1
All Categories	199.9	42.0	100.1	100.1	23.4	100.0	100.1	28.4	100.3

* percent based on samples of 5 or less

Significant proportions of these evacuees have changed their occupations since moving to the new towns, particularly in Hod where 42 percent of our sample moved out of the occupations which they had pursued in the pre-flood towns.

Another important change has been the increased tendency for the evacuees to be unemployed. In all three towns higher proportions of evacuees are unemployed now than were unemployed in the pre-flood towns.

Table 54 shows that the unemployment problem is greater among evacuees than among those people who moved to the replacement towns from places outside of the reservoir basin. The difference is most striking in Tha Pla, where 7.8 percent of the evacuees from old Tha Pla are now unemployed, while the proportion is only 1.8 percent for the total work force of new Tha Pla. Possibly the enforced nature of the moves of the evacuees caused some of them to compete less successfully in the job market than people who moved as voluntary migrants from elsewhere.

Table 54 Unemployment Rates for Populations in Replacement Towns, 1975

Town	Resettled Population	Total Population
Hod	9.2%	8.8%
Tha Pla	7.8%	1.8%
Sahat Sakhan	6.1%	5.5%
MEAN	6.8%	5.8%

Significant numbers of evacuees gave precedence to non-economic goals, such as the maintenance of their old social networks, in choosing to move to the planned replacement towns. Consequently, they have been unable to find regular employment.

The Economic Situation in Replacement Towns. Table 55 summarizes the economic situation in Thai replacement towns for those who moved from the flooded towns. The general economic situation is most favorable in Hod and least favorable in Sahat Sakhan. The percentage of persons who have never recovered ranges from 23.5 percent to 79.6 precent, indicating that even in the most successful replacement town (Hod) many evacuees cannot recover their prior economic condition. In general, fewer farmers and general laborers have recovered their prior economic status than evacuees in other categories.

We also examined the economic condition of the rural population who moved into the replacement towns. Even fewer rural villagers who moved to the replacement towns consider their position to be improved; 45 percent in Hod, 77 percent in Sahat Sakhan and 87 percent in Tha Pla consider their current economic situation to be substantially poorer than it was before they moved to the replacement towns.

Table 55 Post-Flood Economic Situation of Townspeople in Replacement Towns, by Occupation Group

Town	Item	Total	Former Occupation					
			Farmer	Merchant	Government	General Laborer	Other	Not Working
Hod	n	119	31	22	9	34	18	5
	% Better Now	44.5	32.3	52.2	77.8	41.2	44.4	50.0
	% No Difference	26.1	29.0	13.0	11.1	35.3	33.3	0.0
	% Worse Now	29.4	38.7	34.8	11 1	23.5	22.2	50.0
	TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	% Never Recovered	23.5	38.5	21.7	16.7*	21.4	0.0	50.0
	% Household Heads in Same Occupation Group	58.0	25.8	81.8	88.9	79.4	38.9	25.0
Sahat Sakhan	n	380	254	47	38	4	28	2
	% Better Now	3.7	1.6	10.4	10.3	0.0	3.4	0.0
	% No Difference	12.4	5.8	8.4	38.4	0.0	44.9	0.0
	% Worse Now	83.9	92.6	81.2	51.3	100.0	51.7	100.0
	TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	% Never Recovered	79.6	91.3	61.7	47.4	100.0	42.9	100.0
	% Remaining in Occupation Group	71.6	72.8	60.4	81.6	50.0	78.6	50.0
Tha Pla	n	64	17	19	22	2	4	none
	% Better Now	10.9	5.9	21.1	9.1	0.0	0.0	-
	% No Difference	25.0	23.5	21.0	26.4	0.0	0.0	-
	% Worse Now	64.1	70.6	57.9	54.5	100.0	100.0	-
	TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	-
	% Never Recovered	50.0	62.5	29.4	50.0	100.0	75.0	-
	% Remaining in Occupation Group	76.6	94.1	63.2	81.8	0.0	75.0	-

* Based on only 6 cases

Rate of Economic Recovery. The processes of relocation and resettlement entail an interuption in the flow of incomes, and the return to some new stable level of economic welfare takes time. The length of time necessary to return to "normal" conditions is a further indicator of the kinds of problems involved in resettling townspeople, and an index of the economic viability of the sites.

Our research on economic recovery rates indicates slower recovery than that required for the Pa Mong resettlement project. Within the first three years only one quarter of the Hod population had recovered their former economic status, and only 16 percent in Sahat Sakhan. After ten years, Hod shows only 76 percent recovered, while in Sahat Sakhan only 33 percent of the evacuees have attained their former economic position. This indicates that, not only is there a substantial portion of the population who cannot ever regain their pre-flood economic position in the replacement towns, but that the time required for successful recovery is far longer than would be acceptable in the Pa Mong program.

Satisfaction with Replacement Towns. Personal satisfaction with life in replacement towns provides another index of the success of the resettlement effort and of the quality of life in the replacement town. Informants were asked to respond to questions about satisfaction by indicating on a scale of 1 (very unhappy) to 5 (very happy) their feelings about life in the replacement town. These responses are summarized in Table 56.

Table 56 Satisfaction with Life in the Replacement Towns

Satisfaction Scale	Percentage of Household Heads Responding					
	Hod		Tha Pla		Sahat Sakhan	
1- Very Unhappy	1.6	25.1	11.8	64.6	4.4	59.7
2- Moderately Unhappy	23.5		52.8		55.3	
3- Neutral	41.0		26.2		33.0	
4- Moderately Happy	29.5	33.9	8.3	9.1	7.1	7.3
5- Very Happy	4.4		0.8		0.2	

Replacer ent Towns: Review, Summary and Recommendations. On balance, urban resettlement in replacement towns in Thailand is not successful. The economic situations of households living in planned replacement towns are often inferior to conditions prior to resettlement. Even households that have regained or surpassed their former condition have commonly had a very lengthy delay before doing so. Neither economic or social goals of resettlement have been universally achieved.

The range of the economic hinterland of the towns has declined, primarily because the replacement towns have been placed in disadvantageous locations. This was especially true in the case of Sahat Sakhan and Tha Pla. Even in the case of Hod, which enjoyed a relatively advantageous location, many merchants suffered a lengthy period during which their economic situation was worse than in the old town.

The major problem with planned replacement towns has been that more people moved to them than could be supported by the altered economic base of the towns. The problem of "over-population" of Pa Mong replacement towns with evacuees will be intensified, not only by the reduction in economic function for each town, but also by a reduction in the number of towns. The reduction of the physical area served by the flooded towns due to the massive Pa Mong reservoir, with resultant decrease in rural population served by the towns and reduced agricultural production of the smaller hinterland, will not be offset by reservoir fishing or other new income sources. Given current and projected economic conditions, the replacement towns will be fewer in number and smaller in size. At the same time evacuees from both the flooded reservoir towns and rural areas will attempt to move to replacement towns in order to remain within the familiar socio-economic network of their former homes.

Therefore, because replacement towns for the Pa Mong area may not be able to absorb all of the evacuees who wish initially to move to them, there must be a number of measures taken to slow movement to this alternative.

i) The phased evacuation of the rural population means that many rural households can be induced to leave the reservoir region before the replacement towns are constructed· this may contribute to restricting the number of flooded villagers who might go to replacement towns. In addition the resettlement program (information system, village and town agents, etc.) should encourage many evacuees to resettle in urban areas other than the replacement towns.

ii) Replacement towns should not be completed for occupancy until the dry season before the closing of the dam. The relatively late completion of the towns will encourage both rural and town households who are moving earlier to select a destination other than a replacement town.

An alternative to restricting the size of replacement towns would be to make the replacement towns major growth centers where the development of industry would provide a base for large towns which would absorb urban evacuees and possibly large numbers of rural evacuees as well. We have studied this alternative and have rejected it because it would involve rather high replacement costs and risks. Any industry which might do well in a replacement town adjacent to the reservoir will do better located in the Vientiane Plain in Laos, or along the Nongkhai-Udorn-Khon Kaen axis in Thailand. These latter areas are central to the established transport network and both current and projected power grid and have a great competitive advantage over locations closer to the reservoir.

2. Resettlement in Other Towns.

The trend of rural-to-urban migration in Thailand and Laos will possibly be accelerated for the rural Pa Mong evacuees. The process of being uprooted from their flooded homes, combined with the possession of large amounts of compensation money may cause a large number of evacuees to decide to move to towns. We have noted that Pa Mong replacement towns will be smaller in size than the towns which are flooded; they will be unable even to accommodate all evacuees from flooded Pa Mong towns, let along evacuees from flooded rural areas. Therefore, it is likely that evacuees from flooded rural areas will have to resettle in urban places outside the reservoir region.

3. Evaluation of the Economic Success of Migrants from Rural Areas.

We have estimated the proportion of evacuees who will shift from rural to urban locations as 2 percent of the total rural population in Laos, and 5 percent of the total rural population in Thailand. We consider this a very conservative estimate; it does not take into account the fact that many rural people have indicated an interest in shifting to town if they could be assured of ample capital and some assistance (both of which will be included in the resettlement program). In addition, it does not take into account the growing trend toward urbanization throughout the region. These factors may raise the proportion of rural evacuees who will choose to relocate in urban areas.

As an analog for Pa Mong rural evacuees who will move to urban areas, we used data on rural-to-urban migrants in Northeast Thailand during the past five years. In general these households experienced good economic success after their move to town. Table 57 presents a variety of data about job seeking and the economic situation of these migrants.

Table 57 Economic Situation of Migrants to Northeast Thai Towns, by Selected Characteristics

	Total	Previous Occupation (Household Head)			Number of Moves Ever		Previous Temporary Urban Experience			Number of Visits to Town Before Moving		
		Farmer	Unskilled Worker	Other Non-farm	One	More than 1	None	Up to 6 Months	More than 6 Months	None	One to six	More than Six
N	495-556	391 71.1	65 11.8	94 17.1	403	153	359-381	35-66	89-93	193-204	131-155	171-193
Time required to find first job												
(a) Day after arrival (%)	77.1	75.2	80.6	85.4	75.9	80.3	78.8	65.1	76.4	82.1	71.8	76.3
(b) Within one week (%)	88.1	87.0	90.3	93.9	88.6	86.9	88.7	79.1	89.9	92.1	82.3	88.3
Satisfaction with income												
(a) "Town is better." (%)	81.8	79.9	91.9	82.7	82.2	80.8	82.2	82.9	79.8	81.3	84.0	80.7
(b) "Village was better." (%)	11.7	13.5	1.6	11.1	12.1	10.8	12.0	14.3	10.1	12.4 (69%)	8.4 (76%)	13.5 (67%)
Time Until Income Equalled Expenses												
(a) Within first year (%)	53.6	51.6	55.4	62.0	53.5	53.6	52.4	53.0	58.2	60.1	47.7	50.3
(b) Never (%)	31.7	34.1	30.8	22.8	31.9	31.1	34.3	34.8	19.8	34.0	31.1	30.4
Annual Household Income												
(a) Head's Main Occupation	10,001	8,989	10,161	14,340	9560	11163	9647	7628	12700	9864	9945	10137
(b) Other Sources	2,936	2,712	(2,625)	(4,126)	2628	3749	2747	3938	2296	2558	2806	3440
(c) Total Income	12,937	11,701	12,786	18,466	12188	14912	12394	11566	14996	12422	12751	13577

	Money Bought		Vocational Training		Present Occupation (Household Head)						Year in Town				
	Less than 1,000 Baht	1,000 Baht or more	None	Some	Unskilled	Semi-Skilled	Skilled	Samlor	Bus Driver	Other[a]	First	Second	Third	Fourth	Fifth or sixth
N	399-437	108-119	370-407	136-141	244 49.9	52 10.6	34 7.0	63 12.9	45 9.2	51 10.4	123-137	101-118	74-80	66-79	129-140
Time required to find first job															
(a) Day after arrival (%)	77.2	76.9	76.8	78.7	74.7	87.3	77.8	72.7	76.5	85.7	76.2	77.1	77.0	69.9	82.2
(b) Within one week (%)	88.2	83.0	89.0	86.8	88.4	94.6	88.9	89.4	82.4	85.7	88.1	86.6	89.2	87.7	89.2
Satisfaction with income															
(a) "Town is better." (%)	81.8	85.8	82.3	80.5	81.3	84.6	88.2	85.7	87.0	72.5	75.6	82.2	80.3	86.4	86.6
(b) "Village was better." (%)	11.7	12.3	11.1	13.5	11.8	11.5	2.9	12.7	4.3	19.6	15.4	10.9	13.2	6.1	10.9
Time Until Income Equalled Expenses															
(a) Within first year (%)	50.9	63.1	52.5	57.9	45.6	57.6	62.5	53.1	63.5	74.5	54.5	59.8	57.5	51.3	47.1
(b) Never (%)	35.0	19.7	33.1	27.1	39.8	28.8	20.0	27.2	21.2	18.2	43.9	25.6	26.3	28.2	29.3
Annual Household Income															
(a) Head's Main Occupation	9,162	13,082	8,974	12,934	8,048	12,345	16,034	8,750	14,745	10,407	8,739	10,678	10,748	10,162	10,149
(b) Other Sources	2,540	4,392	3,107	1,370	(2,882)	2,898	2,135	3,231	704	5,106	2,331	2,603	2,702	4,482	2,970
(c) Total Income	11,702	17,474	12,081	15,304	10,930	15,243	18,169	11,981	15,449	15,513	11,070	13,281	13,450	14,644	13,119

Our survey results summarized in Table 57 encourage optimism about the situation for rural Pa Mong evacuees who may migrate to town. Our survey indicated that about three quarters of the migrants find employment the day after they come to town, and that 90 percent find a job within their first week in town. Most migrants have incomes high enough to meet their expenses within the first year. The vast majority feel that their incomes are better in town. Like these migrants, Pa Mong evacuees who move to towns should be able to attain economic situations at least as good as those they leave behind in their villages.

It appears that the degree of experience in areas outside the migrants home village had no clear relation to the time required to find the first job in town. In particular, migrants with no previous experience outside their villages find jobs at least as quickly as other groups. This implies that rural Pa Mong evacuees would probably not be disadvantaged relative to other migrants merely because they had lived in only one village or had no work or other experience in towns. Migrants who brought more than 1,000 baht to town have been more successful, in most respects, than migrants who brought less than this and households which brought more cash to town have higher incomes. This would indicate that Pa Mong evacuees, with no prior experience outside their village, but with compensation and resettlement funds, can achieve economic success in town.

The most important result of this study was our finding that, regardless of how we subdivided the migrants, each group was successful in town. Most migrants in each group were able to find a job quickly and considered their town income to be better than their former village income. In each comparison the difference between the most successful and least successful groups was generally not great. Thus, while there are definately individual migrants who have not been economically successful in town, we have discovered no large group that is clearly unsuited to becoming rural-to-urban migrants.

It could be argued that our sample of villagers who voluntarily migrate to town are not comparable to Pa Mong evacuees, who will be forced to leave their homes and fields because of man-made permanent flood. While the argument has some initial plausibility, we feel this is a superficial objection. While the decision to move is in fact involuntary, the urban destination of the move will be freely decided by the evacuees themselves. We anticipate that the selectivities in rural-to-urban migration of Pa Mong evacuees will be similar to selectivities previously guiding rural-to-urban migration.

Evacuees will not be disadvantaged with respect to the timing of the move. They will be aware of the necessity of moving and of many program specifics five to ten years before the flood. This time, together with the searching funds provided to all evacuees, should enable them to identify suitable opportunities and move at an advantageous time. In addition, the evacuees can be expected to move with greater cash assets than most urban

migrants had available. This will protect them from deprivation during the initial period and in some cases will provide capital for occupational tools, and inventory. Finally, available information programs will assist rural-to-urban evacuees in identifying desirable urban destinations.

There is also good reason to believe that Pa Mong evacuees will be capable of achieving replacement income in urban destinations. The mean per capita income of recent rural-to-urban migrants (2,752 baht) compares favorably with the mean per capita rural income of 2,735 baht found in the reservoir area. Our research also indicates that urban incomes are increasing at a more rapid rate than rural incomes, suggesting that by the time Pa Mong resettlement takes place the differential between per capita urban and rural incomes may be increased.

We are optimistic about urban migration for rural Pa Mong evacuees. The prior experience of rural-to-urban migrants suggests that Pa Mong evacuees who select the urban alternative will not be economically disadvantaged but may in fact improve their economic situation.

4. Evaluation of the Economic Success of Migrants from Urban Areas

We have noted that replacement towns will not be able to accommodate all the evacuees from reservoir region towns, and that some urban evacuees will be forced to resettle in established towns elsewhere. We also noted that in the replacement towns at least, urban evacuees often take many years to recover their prior economic condition, and in some cases never achieve the same income levels they enjoyed in their pre-flood urban locations.

We were unable to trace the urban evacuees from Hod, Tha Pla and Sahat Sakhan who had moved to towns other than replacement towns. Therefore, we had to use another analog group of voluntary urban-to-urban migrants in Northeast Thailand to represent the possible condition of urban evacuees who will choose to locate in towns other than the replacement towns. In Table 59 the following sub-groups are studied: first, households which have always lived in the study town ("local townspeople"); second, households which moved from another town ("migrants from town"); and third, households which moved from a village and had never before lived in a town for more than six months ("migrants from villages"). Various "mixed" groups are excluded from the table. Households are divided into occupational categories based on the occupation of the head of household.

Table 58 Mean Total Household Income by Household Head's Occupation (in baht)

Occupation Group	Households Originally From This Town			Migrant Households in Town					
				From Other Towns			From Villages		
	Income	Percent*	(n)	Income	Percent*	(n)	Income	Percent*	(n)
1. Professional Technical Administrative Executive Managerial Clerical (Excluding government)	32,406	4	(38)	33,830	17	(17)	19,555	6	(8)
2. Government Officials and Employees (Excluding teachers)	24,103	5	(44)	29,954	24	(109)	23,264	6	(9)
3. Transport (Excl pedicab drivers)	20,234	4	(37)	27,987	7	(30)	115,240	4	(5)
4. Pedicab Drivers	17,156	3	(26)	7,207	2	(7)	8,643	8	(11)
5. Craftsmen Mechanics Repairmen	17,058	4	(32)	24,031	11	(48)	16,842	13	(19)
6. Laborers	13,255	5	(46)	19,656	5	(21)	8,087	17	(24)
7. Service	18,369	3	(26)	16,325	3	(14)	14,290	6	(9)
8. Sales	36,819	6	(53)	31,528	25	(111)	31,466	18	(25)
9. Farmers Loggers etc.	13,638	56	(484)	18,338	2	(11)	18,990	11	(16)
10. Other (including combination)	35,167	2	(18)	44,580	1	(5)	13,550	5	(8)
11. Not employed	15,361	7	(49)	14,510	4	(13)	13,620	6	(5)
TOTAL	17,871	99	(862)	28,947	101	(456)	22,379	100	(144)

* The percent is based on the total number of household heads in each group. The reported n is the base from which mean income is calculated.

Source: Urban Employment Profile data from Loei town, Wang Saphung, and Chieng Khan.

Table 58 indicates that for most occupational groups the total household income is greater for migrants from other towns than for those who have always lived in the town (local townspeople). The exceptions to this rule are generally occupations rarely held by urban-to-urban migrants, e.g. pedicab drivers. Migrants from villages generally had lower incomes than local townspeople in the same occupations.

Although rural-to-urban voluntary migrants are a reasonable analog for the rural Pa Mong evacuees who freely select urban over rural resettlement, voluntary urban-to-urban migrants are not an analog for urban people who will have to evacuate to other towns when the Pa Mong reservoir forms. The voluntary urban-to-urban migrant selects a new location because it has some advantage, probably economic, over his prior location; he also has time to liquidate his investment in his prior location under the most favorable circumstances. The flooded urban evacuee may not have the same opportunity to realize the full value of his investment. None of the value attached to cumulative reputation, goodwill and a clientele developed over many years can be realized in the sale of a business in a community which is to be flooded. The advantage of having a prime business location in the flooded town does not guarantee a prime location elsewhere. We have recommended in the compensation program that the Compensation Commission hear claims for goodwill, and that the compilation of compensation payments for property include additions for valuable business locations. Even these payments, however, will probably not comprise effective recompense for the loss. Similarly, loss of a long-established good job can be a disadvantage to an employee. It may be possible to assist him in locating a new job, but seniority, familiarity and the social contracts which are often part of a long-established employer-employee relationship will not be replaceable or compensable.

Therefore, even though voluntary urban-to-urban migrants appear to be relatively successful this is no guarantee that flooded Pa Mong urban evacuees will be equally successful in other towns. As noted in the case of the flooded urban population from Hod, Sahat Sakhan and Tha Pla, many of the urban evacuees have not been able to regain their former income level in the replacement towns; we must assume that this might be true for some of those who moved to other towns as well.

Summary. We have identified uncompensable losses and lack of selectivity among the urban evacuee population as important factors that may prevent a fully successful resettlement of flooded town populations. We conclude that

i) some townspeople will sustain losses they are not fully compensated for and

ii) some townspeople may not be as successful if required to move as they would have been in a more stable situation (i.e. no flood and no move).

The concern is not that the Pa Mong townspeople will be destitute. Program components, including compensation, allowances, and information, will prevent that from occurring. Instead, the concern is that townspeople, as a group, may be economically worse off than before the resettlement. Such a result would be unfortunate but it is a very real possibility. Overall the loss would probably be fairly small, but in specific instances individual losses could be substantial.

It is something of a paradox that the Pa Mong townspeople (who may be the most eocnomically successful group now) will probably be the group most disadvantaged by resettlement; furthermore, their losses will be hardest to measure and compensate.

B. URBAN RESETTLEMENT FOR PA MONG

1. Number, Origin and Destination of Pa Mong Evacuees Moving to Urban Places

Table 59 indicates the estimated number of migrants who will be entering Thai towns in the mid-1980's. Table 60 indicates the probable distribution of Pa Mong evacuees among the various resettlement alternatives, including resettlement in urban areas. The projected rate of migration to urban places seems adequate to accommodate within the normal pattern of urban growth the numbers of Pa Mong evacuees who will wish to move to towns. It will be necessary for the Resettlement Agency to provide information and operate the moving-incentive program to

i) spread evacuee movement to urban areas over the entire period of resettlement,

ii) to avoid a sudden influx of evacuees, which might overtax urban facilities, and

iii) to encourage accommodation of evacuees within the normal growth rates of the towns.

Summary. Given the assumption that all urban evacuees will move either to replacement towns or other towns, and that 5 percent of Thai rural evacuees and 2 percent of Lao rural evacuees will also move to town, the total urban evacuee population will amount to over 96,000 persons at the 260 meter reservoir level. However, given the current growth rates of Lao and Thai towns (which will probably rise in the future), and given the fact that urban resettlement can be phased over the entire period of the project, we judge that urban evacuees will be absorbed without major dislocation. If urban evacuees focus solely on a few selected towns in Northeast Thailand, of if they do not move out gradually over the entire period of resettlement, serious overburdening of the selected towns could develop. However, we assume this problem will not occur, because the entire resettlement information, advisory and placement system will be used to direct urban evacuees to a variety of new urban locations and because we assume that most urban migrants will themselves be anxious to move to locations where both employment opportunities and urban services are not overloaded.

Table 59 Estimated Annual Net-Migration to Thai Urban Areas in the Mid-1980's

Area	Urban Population (1985)*			Annual Net Urban Migration**		
	Municipal	Sanitary District	Total	Municipal	Sanitary District	Total
1. Khon Kaen, Udorn, Nongkhai Provinces	240,197	418,436	658,633	6,485	11,298	17,783
2. Northeast (All Provinces)	925,690	1,531,743	2,457,433	24,994	41,357	66,351
3. Bangkok-Thonburi	-	-	6,306,824	-	-	182,899
4. Whole Kingdom	9,465,567	6,808,720	16,274,287	265,036	190,644	455,680

* Estimates for 1985 population are obtained by projecting the 1970 Census population figures by the growth rates (found in Goldstein, 1972, Table 2) for the years 1960-67. Central region rates were used for Bangkok-Thonburi. Note that Goldstein's figures refer to both types of area.

** Net-migration rates were calculated from Goldstein, 1972, by subtracting natural urban increase from total growth rate. See Working Paper 2 for estimation of natural urban growth rates. Note that Goldstein's rate of total increase includes increase due to annexation.

Table 60 Distribution of Evacuees in Resettlement Alternatives, 1982 (Number of persons)

Reservoir	Adjusted Resettlement Population		Urban (New Towns, Other Towns)	Reservoir Margin Fishing Drawdown	Planned Agricultural Resettlement Areas	Self-Managed Rural Resettlement
1 260m No Protection	Lao Rural	92,755	1,855	3,712	38,594	38,594
	Urban	20,419	20,419	0	0	0
	Thai Rural	307,498	15,375	10,135	0	261,988
	Urban	59,195	59,195	0	0	0
2 260m (Nam Lik, Nam Mong, Loei Valley Protection)	Lao Rural	58,849	1,177	9,769	23,951	23,952
	Urban	12,343	12,343	0	0	0
	Thai Rural	148,123	7,406	4,839	0	135,878
	Urban	31,321	31,321	0	0	0
3 250m No Protection	Lao Rural	78,803	1,576	19,579	28,824	28,824
	Urban	19,927	19,927	0	0	0
	Thai Rural	253,169	12,658	36,315	0	204,196
	Urban	46,747	46,747	0	0	0
4 250m (Vang Vieng, Loei Valley Protected)	Lao Rural	68,256	1,365	15,817	25,538	25,537
	Urban	13,284	13,284	0	0	0
	Thai Rural	236,925	11,846	24,166	0	200,913
	Urban	29,817	29,817	0	0	0
5 250m (Nam Lik, Nam Mong Loei Valley Protected)	Lao Rural	49,371	987	13,073	17,656	17,655
	Urban	12,046	12,046	0	0	0
	Thai Rural	135,422	6,771	9,379	0	119,272
	Urban	29,817	29,817	0	0	0
6 240m No Protection	Lao Rural	64,147	1,283	15,232	23,816	23,816
	Urban	12,412	12,412	0	0	0
	Thai Rural	134,979	9,749	37,650	0	147,580
	Urban	41,565	41,565	0	0	0
7 240m (Nam Lik, Nam Mong, Loei City Protected)	Lao Rural	41,518	830	11,216	14,736	14,736
	Urban	11,213	11,213	0	0	0
	Thai Rural	101,279	5,064	14,947	0	81,268
	Urban	28,607	28,607	0	0	0
8 230m No Protection (Nam Mong Canal)	Lao Rural	45,631	913	17,728	13,495	13,495
	Urban	6,660	6,660	0	0	0
	Thai Rural	134,804	6,740	42,418	0	85,646
	Urban	27,821	27,821	0	0	0
9 230m (Nam Lik, Nam Mong Protected)	Lao Rural	29,259	585	12,138	8,268	8,268
	Urban	5,482	5,482	0	0	0
	Thai Rural	65,782	3,289	11,172	0	51,321
	Urban	27,821	27,821	0	0	0
10 216m	Lao Rural	12,663	253	0	6,205	6,205
	Urban	1,530	1,530	0	0	0
	Thai Rural	41,180	2,059	0	0	0
	Urban	20,974	20,974	0	0	0

2. Design and Cost of the Urban Resettlement Program

All evacuees moving to town will be subject to the basic compensation and resettlement programs detailed in Section 4. They will receive extra allowances for movement of inventory, and will receive compensation adjustments for loss of prime business locations. They will also be able to make claims to the Compensation Commission for any special losses suffered, including loss of goodwill and clientele.

In addition to the above components, we researched, designed and costed a variety of other urban resettlement components. We believe it is not necessary to provide these components for an urban resettlement program of the limited size we project, which can accommodate evacuees within the limits of normal urban growth. However, should large numbers of additional evacuees decide to move to urban areas, it might be necessary to implement several of these program components to insure that evacuees will be able to achieve the economic and social goals of resettlement in their new urban locations. For that reason we have included detailed discussions of rejected components in Working Paper 7 and its appendices.

These additional components are:

i) Job placement

ii) Job training

iii) Job creation

iv) Housing

Job Placement for Reservoir Evacuees. As reported earlier, current rural-to-urban migrants seem to find employment promptly, with no difficulty. From other studies we ascertained that the Thai Department of Labor offices often have accurate listings of a relatively large number of job openings, although these listings are apparently not well-known in the community and are therefore underutilized. As a pilot project in the investigation of job searching time and problems, we engaged project staff at appropriate levels to look for employment, without benefit of information from labor offices. We discovered that the local job markets in Northeast Thailand were not saturated and contained the potential for immediate employment. In addition our "searchers" were hired into jobs with no delay or problems.

These listed and searched job opportunities probably could not accommodate thousands of new job-seekers in a short period of time. Furthermore, it is difficult to forecast the nature of labor market conditions at some specific but unknown time in the future when the Pa Mong evacuees will need to be resettled. However, the availability of both listed and unlisted jobs indicate that there is untapped labor demand, and that special measures to collate information about this demand and make it available to prospective urban evacuees could have the useful result of helping evacuees secure better jobs more rapidly.

The Resettlement Referral Offices provide job placement service. This service includes a running inventory of available jobs and their skill requirements, to be circulated in reservoir region villages and towns; for every evacuee coming to town, the office will arrange for job interviews. In addition to direct action in the town where their agents are located, the Resettlement Referral Office will also maintain liaisons regarding job opportunities in other urban centers, and will work with the public employment offices in those other centers in obtaining jobs for reservoir evacuees.

Job Training Program. We investigated the benefits and costs of a job training program for evacuees moving to town, on the assumption that evacuees would be able to find jobs more easily, and earn more income, if they were to acquire additional skills.

The results of our research indicate that there is insufficient return from job training to justify the approximate additional cost of 2 to 4 million dollars for a job training program. Migrants find employment easily without vocational training. Those evacuees who do not achieve replacement income are mainly businessmen, for whom vocational education would produce little benefit, because their loss is not based on non-applicability of skills or lack of skill, but on loss of clientele and market. Moreover, at the present time, there does not seem to be an impressive return on vocational education in Thailand. The Report on the Development of Skilled Manpower in Thailand, Department of Labor, p.16, notes that only 30 percent of vocational education graduates found employment in their specialized fields.

We recommend that the Resettlement Referral Offices provide full information regarding

i) vocational education opportunities and

ii) all employment opportunities, through the information system in the evacuee villages and to each urban evacuee directly. The local Resettlement Referral Office can indicate what level of vocational skill is required for each type of job listed. However, the decision to seek vocational training will rest with the individual evacuee, as will the payment of all fees and tuition involved in training courses.

Job Creation. Resettlement in urban areas could be facilitated by government policies aimed at increasing the number of jobs in towns which are likely destinations for urban evacuees. Such a policy could reduce or eliminate possible problems of unemployment which would result from a large influx of evacuees. A job creation program could be combined with job placement and job training to direct evacuees into those selected towns in which industries are induced to establish new jobs reserved for reservoir evacuees, and where special training programs could provide the evacuees with the skills required for the created job.

We have examined the possibility of using economic incentives to create jobs in Northeast Thailand: affecting location decisions of new firms and affecting the expansion decisions of existing firms. Analysis of our job creation research is reported in Appendix 7B, Working Paper 7. However, we recommend that there not be a job creation program as part of Pa Mong urban resettlement for the following reasons:

i) We believe our proposed incentives to create jobs probably would not increase total new employment but would primarily shift employment from elsewhere to designated firms, and would surely lead to the employment of other workers.

ii) The incentive approach to job creation in the Pa Mong area may support expansion of firms that can only be profitable with the subsidy. When the subsidy ends, the firm may be forced to close or to curtail operations, employing fewer workers.

iii) A host of administrative and regulatory problems would arise. It would be necessary to ascertain that subsidized firms were indeed hiring workers in proper quantity from the reservoir area. There would also be questions of eligibility of evacuees (e.g Would all evacuees be guaranteed a job, even several members of a single family?). This implies a large administrative burden to oversee the program in many firms.

iv) From our information about job availability in Northeast Thai towns and the success of rural-to-urban migrants looking for jobs, it appears unnecessary to create additional jobs for moderate annual numbers of urban evacuees.

Housing for Urban Evacuees in Replacement Towns and Satellite Towns. Before evacuation begins, sites must be selected for replacement towns near the reservoir. These towns will be established in order to fulfill post-flood requirements for marketing services, government services, and other functions which will be needed in the area. The resettlement communities will be established with appropriate infrastructure. Details on the location and cost of these towns can be found in Working Paper 8.

Households from the flooded towns will be able to move to these towns if they so desire. A houselot will be provided at cost to each family, and a shop lot in the market area of the town would be provided at cost to each household which had operated a shop or business in the old town. One of the major problems will be the fact that the replacement towns will be smaller than the flooded towns, and will be unable to support the entire urban reservoir population. Therefore, the Resettlement Agency will attempt to direct some urban evacuees to other towns with better economic prospects.

Assuming that replacement towns will not be able to absorb all the urban evacuees, we investigated the possibility of creating satellite towns which would be attached to existing towns in Northeast Thailand and could serve as the major destinations of urban evacuees. Hypothetical satellite towns were desigred and costed; the details are provided in Appendix 7D of Working Paper 7. The cost projected for adequate satellite town development, in units of 1,000 households, ranged from 37,122 baht for small units (0.5 rai per household) to 70,140 baht for the more preferable large units (2 rai per household).

Based on the above research, we recommend that no provision of housing or satellite communities be made for evacuees for the following reasons:

i) If impact on existing towns is as low as we currently project, evacuees can be absorbed into existing towns without major intervention in either housing or employment.

ii) Satellite towns require a major investment (between $1,800 and $3,500 per family) not justified by the additional security provided for evacuees.

iii) The use of satellite towns might be unsuccessful, as evidenced by similar operations in association with other reservoir projects. Unless the location of the satellite town remains economically feasible, the evacuees may eventually undertake another resettlement out of the satellite communities. We are not sufficiently sure of optimal economic locations to recommend a program of satellite communities.

iv) Limited field checks among the reservoir population did not indicate much interest in moving to satellite towns. Most evacuees desire a free choice of destination and housing, and do not wish to be directed to a predetermined location.

Summary. The magnitude of Pa Mong urban resettlement will be unprecedented in Thailand and Laos. In this section we have reviewed past urban resettlement in Thailand, we have discussed potential destinations for urban migrants, with special attention to the differences between rural and urban evacuees, and we have investigated a variety of programs which could be used to assist evacuees moving to towns.

Replacement towns will have to be built near the reservoir. The function of these towns will be to provide convenient government and commercial services for the population remaining in this area, including both evacuees and nearby villagers whose land and homes are not flooded. These towns will be fewer in number and smaller in size than the towns to be flooded.

A number of evacuees, both rural and urban, will move to towns. We are optimistic about the ability of village evacuees to successfully adjust to urban living. From our study of voluntary rural-to-urban migrants we observed that migrants from very diverse backgrounds were successful in town. It is encouraging to note that, of these successful rural-to-urban migrants, a large percentage had little preparation before moving to town.

We are more cautious in drawing conclusions about Pa Mong townspeople who are forced to move to another town. For a variety of reasons, these townspeople may experience difficulty in fully recovering their former position. Townspeople may currently derive their income from a complex social system, involving the goodwill of an employer, or an established clientele that trusts the reputation of a given tradesman or craftsman. This situation, developed over the years, may be quite difficult for the employee or tradesman to rebuild. It is therefore possible that townspeople will suffer the greatest losses as a result of resettlement.

We discussed research on a variety of assistance programs for urban migrants. We concluded that job training, job creation, and construction of satellite communities and subsidized housing were either not useful or not necessary. We do recommend that a job placement program be instituted as a part of the resettlement referral service.

We concluded that for both Thailand and Laos the evacuees moving to urban areas could be accommodated with no great burden on the towns involved. As part of the basic social overhead payment, the towns will be reimbursed to cover costs of health facilities, police, education and temples on a per capita basis, the amount depending on the number of evacuees going to each town. No further expenditure in this area is recommended. If the number of evacuees moving to towns increased dramatically due to a shift in economic conditions in the area, it might become necessary to contemplate measures to increase the capacity of towns to absorb evacuees. For example, creation of jobs, vocational training, or special housing, all discussed in Working Paper 7, might be required. With our present projection, however, these special measures will not be needed.

Urban resettlement will be facilitated by

i) the basic compensation and resettlement program provided to all evacuees and

ii) the construction of replacement towns and transportation networks. No assistance in addition to this is planned or recommended.

3. Pa Mong Project Employment.

The following table presents estimates of construction and permanent OM & R manpower requirements for both the dam-dike-reservoir complex and both Stage One and Phase Two irrigation systems. Forty to fifty percent of the jobs require only common laborers. We investigated the possible use of these jobs to provide Pa Mong evacuees with both income and some additional marketable skills.

Table 61. Estimated Pa Mong Manpower Requirements

	Construction	OM & R
Dam-dike-reservoir	5,000	225
Stage One irrigation	500-1,000	188
Phase Two irrigation	1,000-15,000	3,050

We found that few of these jobs are suitable for reservoir evacuee employment with the possible exception of some of the OM & R jobs. Most of the laborers required by dam, dike and irrigation system construction will not receive adequate wages to make this an important source of capital accumulation for reservoir evacuees; most jobs will not produce the income available from farming in the reservoir region. Moreover, most jobs will not provide training in skills which will be of value after dam-related employment is terminated. Finally, many of the jobs, particularly in the irrigation areas, will be more efficiently filled by the population resident in those areas. Therefore, we judge that project employment will not play a major role in permanent or temporary employment of reservoir evacuees, nor will it provide them with technical training.

We do recommend the following:

i) All project employment opportunities should be widely publicized in the reservoir area through the resettlement information program.

ii) All project employment should be reserved to the reservoir population for an initial period of two months. After two months, any project jobs not filled by the reservoir population will be filled by outsiders.

The above stipulations involve no additional resettlement project costs because they can be handled by the information program as currently planned.

If it is deemed desirable to use project employment as a method of providing technical training for reservoir evacuees, the following additional costs will be involved:

i) An increase in project wage levels of at least 30 percent in order to attract reservoir evacuees into these positions.

ii) A program of vocational training for unskilled reservoir evacuees to enable them to hold higher positions in the project labor force.

In a trial study of this possiblity we calculated the additional costs of the above program (without any administrative costs) to be more than $9,000,000 for the Pa Mong dam and associated dikes. We believe the possible returns from such a program do not justify such an investment.

Section 8

INTERACTION AND REPLACEMENT OF INFRASTRUCTURE

The Pa Mong reservoir will disrupt social, economic, and administrative interaction networks over large areas in both Laos and Thailand. Unless parts of those interaction networks are replaced, large numbers of non-flooded people will be cut off from essential services and sources of income. The flooding of roads, markets, offices, and sources of raw materials will mean the loss of outlets for cash crops, the loss of business for merchants and, ultimately, the loss of jobs among urban employees. The disruptions of interaction networks could therefore cause significant losses to some non-flooded communities. Moreover, the same kinds of losses will occur if the replacement infrastructure is badly planned; in Section 7 we saw how the planned replacement town of Sahat Sakhan had been established without proper analysis of the probable economic viability of the new site. The result was a town which slowly declined in size and economic power, while residents at all social levels steadily became worse off.

We have adopted the principle that no person or group should be disadvantaged by the creation of the Pa Mong reservoir, and that principle applies to people whose property is not actually flooded as well as to the evacuees. Consequently, we investigated the probable impact of the Pa Mong reservoir on interaction networks with three main objectives in mind:

i) to identify and measure potential losses among various categories of non-flooded people, including an analysis of the variations of effects which can be expected due to the differing heights and shapes of several reservoir configurations.

ii) to plan for the replacement of flooded infrastructure, including roads and towns in which government offices, schools, health clinics, and businesses are located.

iii) to evaluate the proposals for saving Loei and Vang Vieng from flooding by using various protection schemes. Excessive flooding of their hinterlands might reduce the economic base of these towns, making their protection less important.

Our general approach was to delineate the boundaries of the interaction networks impinging on, or centered within, the proposed reservoir basin, and to estimate the total effects of possible reservoir shapes and sizes on those systems. This includes the direct and indirect effects on employment and business in the non-flooded towns. A series of surveys was undertaken in each of the affected towns, except Sanakham, and in several of the affected villages, in order to determine:

i) the sources of raw materials and customers for many types of service and manufacturing businesses;

ii) the areas served by schools, health clinics, and hospitals;

iii) the places of origin of passengers arriving in the towns during our survey period;

iv) the interaction patterns of villagers for both social and economic purposes.

In predicting the economic hinterlands and interaction patterns which will exist after the creation of the reservoir, we took into account the probable levels and locations of new economic activities which would result from reservoir creation, primarily the fishing industry and the planned settlements exploiting the reservoir margin and the drawdown zone.

A. CURRENT PATTERNS AND IMPACT OF PA MONG

1. Interaction Patterns

Interaction within the Pa Mong region occurs at several different levels. At the lowest level, many households and village communities within the Pa Mong Basin are almost self-sufficient, and depend very little on interaction with other communities or with broader regional economies. About 54 percent of all the household incomes on the Thai side of the reservoir, and 58 percent on the Lao side, are derived from goods which are both produced and consumed within the home. Between 5 and 10 percent of the households on the Thai and Lao sides, respectively, sold no agricultural produce at all during the 12 months prior to our surveys in the area. Some "central" services are provided strictly within individual villages, with no dependence upon regular contact with other areas for either customers or supplies.

Nevertheless, the rural parts of the Pa Mong Basin are being increasingly drawn into the broader cash economy, particularly in Thailand, and urban centers depend heavily on interaction with both their rural hinterlands and with other urban centers and regions for their supplies of goods and services.

At an intermediate level of interaction, goods (mainly agricultural produce) and services (mainly labor) are exchanged between villages within the region. Exchanges at this level occur either in the large villages or in the local towns. At the highest level of interaction, goods are both "imported" from outside the region, and "exported" for sale elsewhere. Exchanges of this type normally involve only the highest order central places of the reservoir region.

Table 62 shows, for the towns within or near the reservoir basin, some of the commercial functions not usually found in villages, i.e. the so-called higher-order functions. Loei dominates the interaction networks on the Thai side of the Pa Mong Basin. Of the remaining towns within the basin, Chiengkhan and Wang Saphung are clearly important, while Tha Li and Pak Chom have very few higher-order central place functions. Nam Som, Sangkhom, and Suwankuha are not included in the table because they have none of the higher-order functions. The commercial functions of those three towns are indistinguishable from the functions of villages even though the towns happend to have acquired a higher status in the administrative hierarchy.

None of the Lao towns have a set of functions comparable with the functions of Loei, or even with Chiengkhan or Wang Saphung. Vang Vieng has more high-order functions than any of the other Lao towns, but it would fit into the overall hierarchy at about the level of Nong Bua Lamphu or Ban Phu on the Thai side.

Diagram 5 shows the main patterns of interaction between the towns of the Pa Mong region and major centers elsewhere. Each line in the diagram represents movements of people, goods, cost, and information to and from each place. To describe these main patterns very briefly, Bangkok is the highest point in the central place hierarchy for Thailand, and the Northeastern towns of Nongkhai, Udon and Khon Kaen were the chief centers for redistribution into and out of the Pa Mong Basin. Loei dominates patterns of interaction in the western lobe of the reservoir, while Tha Bo, Ban Phu, Nong Bua Lamphu and Na Klang shared the "import" and "export" trade for the eastern lobe.

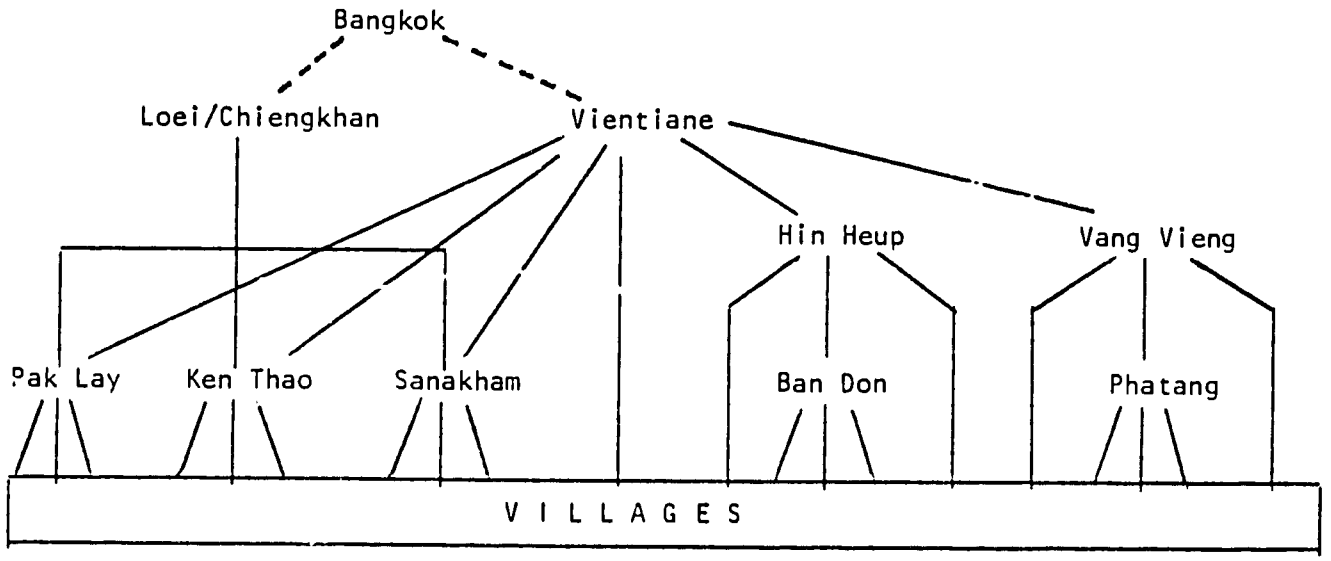
At the time of our surveys, Bangkok was also the highest point of the central place hierarchy for the Lao side of the reservoir basin. Vientiane was the dominant Lao center for most of the Lao reservoir area, although Sanakham, Ken Thao and Pak Lay were functionally part of the Chiengkhan-Loei system of economic interaction. Vang Vieng was the major center in the northern part of the Pa Mong Basin administratively and economically, although the Ban Don Valley (Muang Feuang) interacted economically with Hin Heup and Vientiane rather than with Vang Vieng.

The patterns of interaction which are summarized in Diagram 5 consist of several different categories of interaction including wholesale and retail business, manufacturing and transportation flows. An analysis of interaction studies of each of these functions is provided in detail in Working Paper 8. This analysis permitted us to delineate the economic hinterlands of the various towns in the urban hierarchy, to determine hinterland populations, and to estimate the effects of the creation of reservoirs of various shapes and sizes on each urban center.

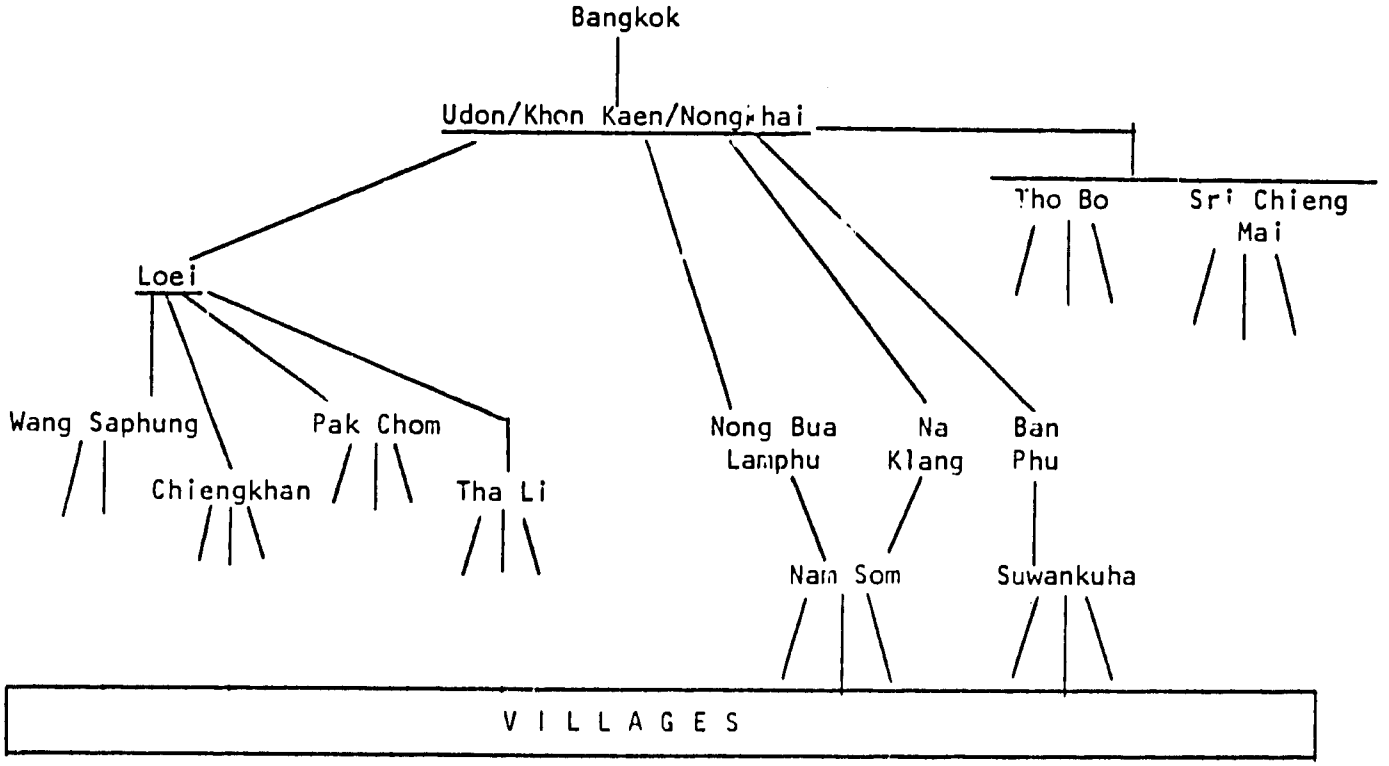
Table 62 Selected Functions in Reservoir-Area Towns (Figures are numbers of business establishments.)

Town	Sign Board	Mufler Repair	Tire Retread	Cookies	Goldsmith	Movie Theatre	Crop Broker	Hotel	Doctor/Dentist	Sewing Machine	Car/Motorcycle Sales and Repair	Cloth	Photography	Dressmaker	Men's Tailor	Total
Thailand:																
Loei	1	2	1	4	2	2	16	6	12	2	19	4	5	12	21	109
Tha Bo			2		1	1	2	1		1	14	1	5	10	24	62
Chiengkhan				4	1	1	8	2	6		2	6	1	6	10	47
Wang Saphung				3		1	5		3	1	5	3	2	5	14	42
Sri Chieng Mai					1		2	4	3			2	3	15	9	39
Nong Bua Lamphu						2		1	1	2	7	1	3	4	12	33
Ban Phu								2	1		8		3	6	16	36
Na Klang										1	6	1	2	7	7	24
Tha Li										1		1	1	3	4	10
Pak Chom															6	6
Laos:																
Vang Vieng							1	1	13		4		1		16	36
Ken Thao							4		1				1		1	7
Pak Lay									3						3	6
Hin Heup									1						6	7
Phatong							1									1

Diagram 5 Economic Interaction, Laos



Economic Interaction, Thailand



2. Impact of the Pa Mong Reservoir on the Regional Interaction System

One effect of the reservoir will be redistribution of the populations currently living within the reservoir basin. Another will be changes or breaks in the commercial, social, and administrative linkages currently in existence between those populations and people or institutions outside the basin. In this section, we will analyze the impact of various shapes and sizes of the reservoir on existing patterns of interaction. We will roughly translate these effects on the interaction system into losses among non-flooded urban communities, and thereby into the costs of programs which would be necessary to make good those losses. Decisions about whether to save towns like Loei and Vang Vieng will be based on comparisons between the costs of paying full compensation for the property which will be flooded within each town, the combined costs of constructing and maintaining the protective dikes, and the costs of making good the losses suffered by non-flooded communities.

Measurement Problems. Based on our analysis of interaction patterns, we conclude that a certain percentage of the rural population served by any one town will move to destinations outside of the service area of that town. In the absence of some other change, this reduction of the service area population will lead to a reduction of the numbers of transactions among those businesses which traded with the rural hinterland and, therefore, to losses of income and profit for the owners of those businesses as well as of fewer wage laborers in those businesses. These contractions will, in turn, lead to losses for the enterprises which the unemployed wage laborers and the profitless merchants formerly patronized. Thus, the contraction of any single business or any group of businesses in a town, if it is not counterbalanced by expansions of other businesses, will have multiplicative effects on practically all aspects of the local urban economy. Theoretically, the reverse process will occur in the areas to which evacuees from the reservoir move; increased population in rural service areas will lead to more transactions, more income and profits, and more employment opportunities. The dispersal of the population will mean that while the adverse effects of a declining population base are concentrated into a few localities, the beneficial effects of increased population in the destination areas are spread thinly over a large number of urban centers.

Predicting the total extent of losses, and identifying the individuals who will suffer losses, is difficult. For example, a reduction by 20% of the population of the rural service area may mean that two particular retail stores close, sixteen identifiable wage laborers ultimately lose their jobs, and four pedicab drivers no longer make enough each day to live. Alternatively, a 20% reduction of the service area may mean that all the stores in the town lose their profit margins, and that wage levels decline for every category of worker. Factories which depend on the flooded area may or may not be able to find alternative sources of raw materials and stay in business. The new kinds of economic activity generated by the reservoir and the dam may or may not affect these particular towns and offset the effects of the truncated

rural hinterlands. Thus, while it is not hard to predict that certain towns will be adversely affected by the creation of the Pa Mong reservoir, it is very difficult to predict exactly how badly the towns will be affected and how the effects will be distributed throughout the various sectors of the towns' economies. For present purposes, we will measure the impact of the Pa Mong reservoir on the non-flooded towns in a relatively simple way: we will measure the proportion of the service area of each town which would be flooded by various configurations of the reservoir. These measurements will at least indicate which towns are most likely to be affected adversely, and will give a rough estimate of the seriousness of these effects.

3. Towns Outside the Reservoir Basin

A few individuals in many towns throughout all of Laos and Thailand depend in some way on business derived from the Pa Mong reservoir basin. We propose that any individual should have the right to make a formal claim for compensation, and that claims should be adjudicated by the Compensation Commission of the Resettlement Agency. However, the majority of non-flooded people who will be affected live near the reservoir, in the Thai towns of Sri Chieng Mai, Tha Bo, Ban Phu, and Nong Bua Lamphu. Our analysis indicates that two other towns close to the reservoir, Na Klang in Thailand and Phon Hong in Laos, will not be significantly affected by the creation of the Pa Mong reservoir.

Our research indicates that each of these four non-flooded towns will suffer significant losses as a result of the creation of the reservoir. Sri Chieng Mai and Tha Bo will lose about 20 percent of the population of their respective service areas if the dam is built at 250 meters or 260 meters, regardless of the construction of protective dikes on the Nam Mong saddle. We expect very few people to settle on the drawdown zone within the service areas of these two towns, because the margin of the reservoir is very steep in those areas. Gross losses for Ban Phu could be as high as 40 percent, and those losses are unlikely to be offset by reservoir-edge resettlement because very little usable drawdown land will exist on the eastern edge of the Udon lobe of the reservoir. Some drawdown settlers on the western edge of that lobe might cross by boat to conduct business in Ban Phu, but those settlers would be more likely to frequent the town of Na Klang or a planned replacement town to the west of the Udon lobe. Losses to Ban Phu will also depend greatly on the construction of the Nam Mong dike; losses would drop to 20 percent for a 250 meter reservoir with the Nam Mong area protected.

Nong Bua Lamphu serves the area at the southern end of the Udon lobe and, again, losses would depend greatly on decisions about the Nam Mong dike. If the dike is constructed, or if a 230 meter dam is built, losses to Nong Bua Lamphu would be negligable. As noted earlier, the town would probably benefit

from the resettlement of displaced people within its service area. If the Nam Mong area was not protected, Nong Bua Lamphu would lose 18 to 24 percent of the population of its service area depending on the height of the dam.

4. Protectable Towns Within the Reservoir Basin

Suwankuha. If the Nam Mong saddle dike were constructed, the town of Suwankuha would not be flooded. As we noted earlier, the commercial functions and service areas of Suwankuha are hardly different from the commercial functions and service areas of any large village within the Pa Mong Basin. According to our surveys, the service area of Suwankuha does not extend into the area beyond the line of the proposed Nam Mong dike. Consequently, we do not expect that the town would be adversely affected by flooding up to the dike. In fact, Suwankuha would probably benefit from the resettlement of many of the flooded households in the area which would be protected by the Nam Mong dike.

Hin Heup. If the Nam Lik saddle dike were built, the town of Hin Heup would be saved from flooding, together with all of the Vang Vieng area and the Muang Feuang (Ban Don) area. Hin Heup serves a large population spread over an extensive area, and is an important focus of the transportation network between Ban Don, Vang Vieng, Vientiane, and rural areas to the east and northeast. However, there is no road from Hin Heup over the Nam Lik saddle into the area which would be flooded south of the proposed dike, and there is very little interaction in that direction. According to our surveys, Hin Heup derives no business from that area, and we do not anticipate any adverse effects on the economic viability of Hin Heup if the area south of the Nam Lik saddle is flooded.

Vang Vieng. Although Vang Vieng is an important regional center, the effects of alternative forms of the Pa Mong reservoir on the viability of the town can be very easily assessed. Vang Vieng can be served by two alternative diking schemes: the Nam Lik saddle dike, and a dike about 20 kilometers to the south of the town. According to our surveys, Vang Vieng derives practically no business from the areas which would be flooded by either of those reservoir configurations. We found no evidence of interaction with the Nam Lik Valley or with the Ban Don Valley. Consequently, if Vang Vieng was protected by either of the two possible schemes, it would continue as a viable regional center and might actually grow as the result of the redistribution of the population from the Mekong Valley, and as a result of the new kinds of economic activity which would be generated by the Pa Mong project.

Loei and Wang Saphung. Two different protection schemes have been proposed for the city of Loei, and both schemes have implications for Wang Saphung, which is located about 20 kilometers upstream on the same river. If a 240 meter dam was built, the city of Loei could be saved by a system of bypass canals and checkdams; if a 250 meter or a 260 meter dam was built, Loei could be saved by diking off most of the Loei Valley. If a 230 meter dam was built, neither Loei nor Wang Saphung would be flooded; however, since parts of their rural hinterlands would be flooded, we have included the 230 meter dam in this analysis of losses to non-flooded communities.

Table 63 shows the gross and net losses of various categories which would be associated with the 230 meter dam and with the possible protection schemes at 240, 250 and 260 meters. Clearly, the impact of the reservoir would vary depending on the height of the dam and the implementation of various protection schemes. But the impact also varies from one urban function to another. For example, the 230 meter dam would cause a 7 percent reduction in the area currently served by crop brokers in Loei, and a 15 percent loss of business for retail stores which sell agricultural imports such as fertilizer and insecticide. Consequently, while the town of Loei will suffer as a whole from the effects of the flooding, some economic sectors within the town will suffer more than others.

In general, the net losses of business to the city of Loei resulting directly from the 230 meter dam would be under 10 percent. Net losses for the 240 meter dam, with Loei city protected would be 20 to 25 percent. Losses for the 250 meter dam with the Loei Valley protected would be more variable, reaching 50 percent for the categories of business which depend most heavily upon the Mekong River Valley rather than the Loei Valley. At 260 meters, losses would be higher in all categories, reaching 65 percent in the case of inputs for factories. These losses reflect the dependence of Loei sawmills on the forests bordering the Mekong River.

Losses of inputs for factories would also be significant in Wang Saphung, which similarly depends on lumber from the Mekong Valley. However, losses in other categories would be insignificant for Wang Saphung if any of these reservoir configurations were implemented. A maximum of 3 percent of the area now served by crop brokers in Wang Saphung would be flooded; no other category of loss is as high as 3 percent.

Summary. As we noted earlier, the translation of reductions of rural service areas into estimates of economic losses for each town is hazardous. Nevertheless, our findings indicate which towns are likely to be adversely affected by which configurations of the reservoir. Sri Chieng Mai, Tha Bo and Ban Phu would lose large proportions of their service areas regardless of the configuration of the reservoir. Nong Bua Lamphu will suffer losses only if the Nam Mong area is flooded. Wang Saphung would lose very little of its service area, but a protected Loei would lose at least 20 percent of its service area for any dam height of 240 meters or higher.

Table 63 Losses of Hinterlands and Business for Loei and Wang Saphung if those Towns are Not Flooded (figures are percentage losses)

	LOEI								WANG SAPHUNG							
Function / Res. Level:	230m		240m		250m		260m		230m		240m		250m		260m	
Protection*:	-		II**		I*		I		-		II		I		I	
	G	N	G	N	G	N	G	N	G	N	G	N	G	N	G	N
Service Area Population																
Loss	0	0	23	20	15	14	18	17	0	0	5	0	0	0	1	0
Broker Service Area Loss	7	6	21	18	23	22	30	29	2	0	3	0	1	0	1	0
Retail: Consumer Staple	10	8	26	23	26	25	34	33	0	0	2		0	0	2	
Luxury Goods	4	3	21	18	26	25	37	36	0	0	0	0	0	0	0	0
Food/Agri. Produce	0	0	59	57	51	50	54	53	0	0	2		0		2	
Agri. Inputs	15	13	31	28	38	36	46	45	0	0	0	0	0	0	0	0
Factory Inputs	12	12	25	25	47	47	65	65	9	9	19	19	42	42	65	65
Factory Labor	0	0	21	18	20	19	21	20	0	0	0	0	0	0	0	0
Bank Accounts	0	0	17	14	12	11	12	11	0	0	0.7		0	0	0	0

* I Loei Valley protection
**II Loei City protection
G = Gross losses
N = Net losses

B. PROGRAMS AND COSTS

1. People from Non-Flooded Urban Places

We have stressed the uncertainties of predicting the extent of losses to the non-flooded towns which depend on interaction with the Pa Mong Basin. We also pointed out that planners could not identify the individuals who would actually incur losses. Consequently, a compensation and resettlement program oriented towards a particular group of individuals would be impractical. Therefore, we propose a different approach, based on our observations in the towns which have already been flooded and relocated by the creation of the Lam Pao, Bhumipol and Sirikit reservoirs. Each of those towns has adjusted its size and range of functions slowly to the new economic environment. The adjustment process in Sahat Sakhan has required the voluntary out-movement of some of the businessmen and laborers over a long period, and the out-movement will continue until the remaining population of the town is appropriate to the size of the area now served by the town. The adjustment process is traumatic because the people who want to move out no longer have enough compensation money or other capital resources to re-establish themselves in alternative locations.

In the case of Pa Mong, we propose that the resettlement authority recognize the fact that some people in non-flooded communities will want to move when the effects of the creation of the reservoir are felt. We propose that the people in designated towns should be eligible for inclusion in the resettlement program at any time up to 5 years after the reservoir is created. During that time, any person in a designated town should be able to apply to be resettled, and he would receive compensation and all of the resettlement allowances on the same basis as the flooded population. His land and non-movable assets would become the property of the resettlement authority, which could sell assets thus acquired at the market price current at the time.

Table 64 shows the possible numbers of people from each town likely to opt for inclusion in the resettlement program. We have used our analysis detailed in Working Paper 8 to predict these numbers of people. We have assumed that if a town would suffer a net loss of 20 percent of the population of its service area, 20 percent of the residents of that town will want to be resettled at some time before the end of the fifth year after the flood occurs.

Table 65 shows the costs of resettling people from non-flooded towns. Costs in all categories are based on the per capita rates discussed in Section 4.

2. Replacement of Infrastructure

The major components of infrastructure which must be replaced after the creation of the reservoir are roads and towns. The reservoir will flood

Table 64 Estimated Numbers of People to be Resettled from Non-Flooded Urban Areas - Ten Selected Reservoirs

	Reservoir Level	Protection Scheme	Loei-Wang Saphung	Ban Phu	Nong Bua Lamphu	Sri Chieng Mai	Tha Bo	Total
1	260	None	16,200	2,677	3,590	937	540	23,944
2	260	NL,LV,NM	1,011	0	0	849	631	2,491
3	250	None	9,491	2,664	3,466	849	631	17,101
4	250	LV,VV	1,011	2,664	3,466	849	631	8,621
5	250	NL,LV,NM	1,011	0	0	849	631	2,491
6	240	None	5,387	2,623	3,095	727	541	12,373
7	240	NL,LC,NM	4,722	0	0	727	541	5,990
8	230	None	1,011	2,028	3,095	727	541	7,402
9	230	NL,NM	1,011	0	0	727	541	2,279
10	216	None	380	0	0	436	162	978

NL = Nam Lik, NM = Nam Mong, LV = Loei Valley, LC = Loei City, VV = Vang Vieng

Table 65 Estimated Costs of Resettling People from Non-Flooded Urban Areas (in US dollars)

Number	Reservoir Level	Protection Scheme	Total Non-Flooded Urban Population To Be Resettled	Cost of Compensation and Resettlement
1	260m	None	23,944	32,324,400
2	260m	NL,LV,NM	2,491	3,527,256
3	250m	None	17,101	23,086,350
4	250m	VV,LV	8,621	11,690,076
5	250m	NL,LV,NM	2,491	3,442,562
6	240m	None	12,373	16,715,923
7	240m	NL,LV,NM	5,990	8,649,560
8	230m	None	7,402	10,333,192
9	230m	NL,NM	2,279	3,502,823
10	216m	None	978	1,367,244

NL = Nam Lik, NM = Nam Mong, LV = Loei Valley, LC = Loei City, VV = Vang Vieng

roadways and isolate communities; towns will also be flooded, depriving their hinterlands of a wide range of urban services. Both flooded roads and towns must be replaced to make sure that both reservoir evacuees and the residual non-flooded reservoir region population are not permanently disadvantaged.

2a. Replacement Towns.

There are two major reasons for replacement of towns flooded by the reservoir. The first is economic; accessible urban services must be provided to a hinterland population consisting of i) the residual population (those who live in the region and are not flooded by the reservoir) and ii) the resettled population (those who have either settled in the reservoir margin resettlement outlined in Section 5, or have elected to purchase or clear new land within the reservoir region). The second reason for establishment of replacement towns is administrative or political. It is difficult to destroy an administrative town which already exists, even though its economic function may be vastly decreased. Moreover, it is desirable, for administrative and political reasons, to have towns scattered along the vast, sparsely populated margin of the reservoir. Such towns play an important economic role for a small scattered population, and may also serve water transportation on the reservoir. However, the small population served may not justify the existence of a town. Therefore, we designate these as administrative towns, because their existence is justified by and subsidized for basic political reasons.

It is difficult to accurately predict the size of replacement towns because their size is influenced by the characteristics of their economic hinterland population. We have estimated the current economic hinterland populations of reservoir-region towns, using an analysis of their commercial interactions, and we can project these hinterland populations, factoring for evacuees who will be flooded, for population increases among the residual population located above the reservoir high water mark, and for evacuees who will settle on the reservoir margin. However, we are not able to predict the number of additional evacuees who will settle among the residual communities, or the number of evacuees who make basically uneconomic decisions and decide to settle in replacement towns despite diminished economic opportunities. Therefore, we consider our estimates of replacement town size to be conservative, and it is possible that the ultimate replacement town population, and hence development costs, will be higher than we now calculate.

Table 66 indicates the towns currently located in the reservoir region, their 1974 population, and the degree to which they will be flooded at various reservoir levels. Town populations included many full time farmers; the geographic boundaries of the municipality, or sanitary district often include one or more agricultural villages, and town population statistics may not accurately reflect the strictly urban functions of a particular town. Table 66 does not include rural "villages" which do not have official "town" status, but in some cases, these "villages" exceed the listed towns in terms of both size and urban

Table 66 Current Population and Percent to be Flooded in Reservoir-Area Towns (1974)

Name	1974 Population	Percent Flooded by Reservoir at this Level				
		260m	250m	245m	240m	230m
Laos:						
Pak Lay	3,939	100	100	100	100	97
Ken Thao	2,905	100	100	100	85	0
Sanakham	1,555	100	100	100	100	100
Hin Heup	898	100	100	100	100	100
Ban Don & Feuang	477	100	100	100	100	100
Vang Vieng	4,820	100	100	40	0	0
Thailand:						
Tha Li	1,098	5	0	0	0	0
Chiengkhan	7,030	100	100	100	100	100
Pak Chom	1,515	100	100	100	100	100
Loei	12,445	100	100	100	78	0
Wang Saphung	9,616	90	5	0	0	0
Sangkhom	2,329	100	100	100	100	100
Nam Soe	6,720	100	100	100	100	100
Suwankuha	1,210	100	100	100	100	100

functions. In Thailand Kut Dinji, Ah Hi and other towns are important urban centers, even though they have only village status. In Laos we have included Hin Heup, which is actually a collection of two villages on either side of the Nam Lik River, although it does not have official recognition as a town.

Table 67 is based on our surveys in reservoir towns, and gives some indication of the functions they serve in their immediate trade area or economic hinterland. It also includes towns outside the reservoir region, such as Sri Chieng Mai, Tha Bo, Ban Phu, Nong Bua Lamphu and Na Klang, which serve the Udorn section of the reservoir region.

Table 68 summarizes the population of replacement towns projected for the reservoir region for selected reservoir levels. This population calculation is based on the projected size of the economic hinterland of each town, plus an adjustment of 300 people as a unit population associated with an administrative center

Replacement Town Population Compared with Urban Population Displaced from Flooded Towns. Replacement towns are logical destinations for the urban population flooded out of totally or partially inundated reservoir region towns, as discussed in Section 7. However, because of the reduction in the population of the reservoir region, the total population and number of functions in the replacement towns will be reduced. This will force some urban evacuees to seek resettlement outside the replacement towns of the reservoir region.

Tables 69 and 70 compare the projected flooded population of the reservoir towns with the projected population of the replacement towns, and indicates the number of urban evacuees who will be forced to seek new urban locations outside reservoir replacement towns.

Location of Replacement Towns. We have based the proposed location of replacement towns on a theoretical distribution pattern developed from central place theory, modified to insure that the towns are located where they will make optimum use of the residual road network, as close as possible to clusters of residual and reservoir-margin resettlement communities, and as close as possible to the reservoir shore, in order to provide water transportation connections and landing places for fishermen. Other locations are feasible, however. Additional research should be carried out on the subject of new town location during the early years of resettlement, when surveys of resettlement intentions and the behavior of the evacuees will permit a more accurate determination of their destinations, and will consequently fluence replacement town location.

Table 67 Number of Businesses and Services Provided by Reservoir Area Towns, 1974

	Number of Different Categories of Business and Service Functions	Total Number of Businesses and Service Outlets
Laos:		
Pak Lay	10	35
Ken Thao	0	23
Sanakham	7	15
Hin Heup	10	26
Ban Don	4	9
Vang Vieng	18	80
Phatong	4	11
Thailand:		
Tha Li	13	34
Chiengkhan	24	109
Pak Chom	12	20
Loei	40	280
Wang Saphung	26	148
Sangkhom	5	11
Nam Som	11	20
Suwankuha	6	9
Sri Chieng Mai	33	181
Tha Bo	39	230
Ban Phu	22	152
Nong Bua Lamphu	25	128
Na Klang	21	75

Table 68 Replacement Town Population

Town Name	Current Town: 1974 Population	Current Town: 1982 Population (Pre-Flood)	Replacement Town: Population by Reservoir Level for Year of Closure of Dam: 260m (1992)	250m (1990)	240m (1988)	230m (1987)
Laos:						
Pak Lay	3,939	5,577	2,522	2,910	3,077	3,575
Ken Thao	2,905	4,147	1,881	2,177	2,290	3,313
Sanakham	1,555	2,223	1,001	1,162	1,189	1,216
Hin Heup	898	1,152	518	522	631	1,001
Ban Don/ Feuang	477	640	136	259	314	628
Vang Vieng	4,820	5,827	2,856	3,735	5,787	6,086
Thailand:						
Tha Li	1,098	1,562	1,370	1,441	1,423	1,481
Chiengkhan	7,030	9,940	1,127	1,447	1,436	1,439
Pak Chom	1,515	2,130	927	1,090	1,171	1,289
Loei	12,445	14,739	14,710	20,586	12,735	15,387
Wang Saphung	9,616	11,280	14,710	20,586	10,967	12,040
Sangkhom	2,329	3,266	466	504	563	607
Nam Som*	6,720	9,514	830	918	1,124	1,214

* We have recommended that Nam Som not be replaced, but have included this projection for comparative purposes.

Table 69 Comparison of Replacement Town Population and Urban Evacuee Population, Laos

Town Name	Reservoir Levels			
	260m	250m	240m	230m
Pak Lay	6,513	6,357	6,157	6,254
New Pak Lay	2,522	2,910	3,077	3,575
Net Loss	3,991	3,447	3,080	2,679
Ken Thao	4,843	4,727	4,578	3,313
New Ken Thao	1,881	2,177	2,290	n.a.
Net Loss	2,962	2,550	2,288	
Sanakham	2,596	2,534	2,454	2,409
New Sanakham	1,001	1,162	1,189	1,216
Net Loss	1,595	1,372	1,265	1,193
Hin Heup	1,345	1,313	1,271	1,248
New Hin Heup	518	522	631	1,001
Net Loss	827	791	640	247
Ban Don-Feuang	747	729	706	693
New Ban Don-Feuang	136	259	314	628
Net Loss	611	470	392	65
Vang Vieng	6,805	6,642	5,787	6,086
New Vang Vieng	2,856	3,735	n.a.	n.a.
Net Loss	3,949	2,907	0	0
Total Net Loss of Urban Population *	13,935	11,537	7,665	4,184

* i.e. urban population that will have to seek resettlement away from the replacement towns.

Table 70 Comparison of Replacement Town Population and Urban Evacuee Population, Thailand

Town Name	Reservoir Levels			
	260m	250m	240m	230m
Tha Li	1,855	1,805	1,746	1,707
New Tha Li	1,370	1,441	1,423	1,481
Net Loss	485	364	323	226
Chiengkhan	11,808	11,490	11,112	10,864
New Chiengkhan	1,127	1,447	1,436	1,439
Net Loss	10,681	10,043	9,676	9,425
Pak Chom	2,530	2,462	2,381	2,328
New Pak Chom	927	1,090	1,171	1,289
Net Loss	1,603	1,372	1,210	1,039
Loei/Wang Saphung	30,910	30,077	29,089	28,438
New Loei	14,710	20,586	23,702	27,427
Net Loss	16,200	9,491	5,387	1,011
Sangkhom	3,880	3,775	3,651	3,569
New Sangkhom	466	504	563	607
Net Loss	3,414	3,271	3,088	2,962
Nam Som	11,302	10,998	10,636	10,398
New Nam Som	0	0	0	0
Net Loss	11,302	10,998	10,636	10,398
Total Net Loss of Urban Population*	43,685	35,539	30,320	25,061

*i.e. Urban population that will have to seek resettlement away from the replacement towns.

We have not conducted detailed studies of replacement town sites, nor have we provided design data for the new towns. We have reviewed 1:50,000 and 1:20,000 maps to determine potential locations for new towns, and we note that there are a number of available sites at all projected reservoir levels. When the final decision on reservoir level is made, we assume there will be an extensive study of potential new town sites, and a detailed physical plan developed for the new towns.

Recommendations. In Laos we recommend that the following towns be replaced: Pak Lay, Ken Thao, Sanakham, Hin Heup, Ban Don/Feuang and Vang Vieng. In Thailand we recommend that the following towns be replaced: Tha Li, Chiengkhan, Pak Chom, Loei and Wang Saphung and Sangkhom. We recommend that the towns of Nam Som and Suwankhua not be replaced, because there will be insufficient residual or resettlement population to justify their continued existence.

Vang Vieng. The town of Vang Vieng does not flood until the reservoir rises above 240 meters. At 245 meters, 40 percent of Vang Vieng is flooded, and the entire city is inundated at 250 meters and above.

As noted elsewhere, Vang Vieng's economic hinterland is limited almost exclusively to the Vang Vieng Basin. When this basin is flooded at reservoir levels above 240 meters, there will be residual communities above the high water level, including the town of Patang in the upper reaches of the basin. Together with the evacuees who can resettle on the reservoir margin, this residual population will require the services of a replacement Vang Vieng. We assume also that it will be desirable to maintain Vang Vieng as an administrative center, serving part of the eastern shore of this reservoir section.

We have located New Vang Vieng on the eastern shore of the reservoir near the flooded city, on the replacement highway for Route 13. The largest number of reservoir-margin resettlement villages and the largest residual population will be found in this region. Water transportation will connect Vang Vieng with residual and resettlement villages on the opposite shore of the reservoir.

An alternative site for New Vang Vieng exists at the present site of Patang, near the northern end of the Vang Vieng Basin. Patang will not be flooded and this site will be superior if a road southward to Ban Don and the western shore of the reservoir is planned.

Loei and Wang Saphung. The provincial capital of Loei is the major center of the Loei Valley, whose economic hinterland extends far beyond the limits of

the reservoir region. The district town of Wang Saphung has been growing rapidly, particularly since the completion of the road to Udorn and improvement of the road network in the upper Loei Valley. It shares this economic hinterland with Loei, which is only 20 kilometers to the north.

Neither Loei nor Wang Saphung are flooded at 230 meters, and the overlapping economic hinterland of both is left intact. At 240 meters, 28 percent of Loei is flooded, but Wang Saphung remains unaffected. At 250 meters, all of Loei is flooded and only 5 percent of Wang Saphung. At 260 meters, 90 percent of Wang Saphung is also flooded.

We have treated Loei and Wang Saphung as a single urban unit for purposes of planning replacement towns, because of their proximity and their overlapping economic hinterlands. In addition, when a replacement town for Loei is established, it will be located close to the end of the reservoir, which at the 250 meter reservoir level coincides with the location of Wang Saphung.

There are substantial reductions in Loei functions based on curtailed hinterland interactions at the higher reservoir levels. The loss of hinterland production and population is not offset by the addition of reservoir-margin resettlement or the addition of residual Chiengkhan hinterland population located on the western shore of the Loei section of the reservoir. Therefore, there is a substantial drop in the combined Loei-Wang Saphung urban population from over 27,000 at the 230 meter reservoir level, when both centers feel little impact from the reservoir flooding, to less than 15,000 at 260 meters, when both settlements are flooded.

At 240 meters, the replacement town of Loei will be located close to the 22 percent of Loei town which remains unflooded at this level, extending upstream and upward into the low hills at the sides of the valley. At 250 meters, the replacement town of Loei will be located in and upstream from the current town of Wang Saphung, incorporating the town of Wang Saphung. At 260 meters, the combined replacement town of Loei-Wang Saphung will be located at the head of the Loei section of the reservoir, approximately 12 kilometers upstream from the present town of Wang Saphung.

New Towns. New towns, as opposed to the replacement of existing towns, may develop at the damsites of the Pa Mong, Nam Mong and Nam Lik dams. At all of these locations there will be large settlements of dam project workers, with the usual accompanying urban functions. Similar minor urban functions will also develop at the dike construction sites. The long-term survival of these urban areas will depend on the permanent population associated with the maintenance and operation of the dams, as well as the transfer and trade functions which may develop from fish landings and water transportation on the reservoir.

We predict that a new town will survive at the Pa Mong damsite, with an approximate population of 1,500. A new town will survive at the Nam Mong damsite, perhaps playing an important service role for reservoir fishermen and traders from the western shore of the Udorn section of the reservoir. The new town at Nam Lik will survive for similar reasons, although it may be smaller if the replacement town of Hin Heup is established in a competing location. We estimate the size of Nam Mong town to be 900, and the size of Nam Lik to be 350. We have not included costs for these towns, on the assumption that they will exist prior to resettlement. They are not a formal part of the resettlement program and their establishment costs will be met by the contractor who constructs the dam, or by other agencies.

Replacement Town Facilities. The resettlement authority will be responsible for planning replacement towns and preparing the town site for the population who may move there. Only houselots and business lots will be available, and no buildings will be constructed for homes or business purposes; the urban evacuees and others who come to the replacement towns will be expected to arrange for the construction of their own homes and business buildings. The resettlement authority will be responsible for providing the various public buildings and facilities required: administrative office, police facilities, government officer housing, schools and medical facilities. In addition, the resettlement authority will provide each platted houselot or business lot access to a road, electric power, drinking water and sewer services.

It has been recommended elsewhere that the Resettlement Agency should continue research into the probable size, function and optimum location of proposed replacement towns during the early period of resettlement. If a replacement town fails to attract or maintain settlers, the Resettlement Agency should be prepared to shift attention and funds to replacement towns which have higher growth rates. Ultimately, the replacement towns will reflect local economic conditions and potential, and the population will shift to those locations which are most prosperous. Sahat Sakhan and Tha Pla in Thailand are examples of replacement towns in the wrong location; this situation should be avoided in the implementation of the Pa Mong replacement towns.

The Resettlement Agency will continue to provide the development funds for replacement towns for a period of five years after the reservoir is filled. It will take at least this much time before the local economies are sufficiently stable for planners to define their desired level of urban services. After this period, the replacement towns will be turned over to the appropriate government agencies, and subsequent urban development will be funded by the usual revenue measures used to finance development in the other towns of Laos and Thailand.

Access to Replacement Towns. Initially, access to replacement towns will be limited to evacuees from towns flooded by the reservoir, or those urban dwellers

who may not have been flooded but have been judged by the Compensation Commission to be sufficiently damaged by the creation of the reservoir to be included in resettlement compensation or moving program. Replacement towns will also be open to rural evacuees who wish to settle in town. The allocation of houselots and business lots within the replacement towns will be made by lottery, adjusted to permit groups of evacuees who lived near one another in flooded villages and towns to settle together in the same residential or business sections of the replacement town. Evacuee applicants who seek settlement in a replacement town will also be given preference according to their town of origin. Therefore, an evacuee from the town of Pak Lay would have preferential claim on resettlement in New Pak Lay, in comparison with an evacuee from Vang Vieng. In this way, the local economic networks will be more easily re-established.

There will be a Resettlement Referral Office in each replacement town to assist evacuees and evaluate the problems and needs of the community. These offices may permit non-evacuees from non-flooded residual villages or from outside the reservoir region to settle in the replacement town, providing that evacuees to not claim all the resettlement lots, and that there are desirable services or economic functions which the evacuees are not able to provide. After five years, when the towns are released from Resettlement Agency supervision, there will be no restriction on movement into the replacement town.

All evacuees and non-evacuees will purchase their home and building lots in the new towns. The funds received from the purchase of such property should offset the cost of replacement town land acquisition by the Resettlement Agency, and will perhaps cover some part of the development costs for the towns. In calculating replacement town costs, we have not included land acquisition costs, on the assumption that they will be covered by lot purchase by evacuees. We have included the full development costs.

The local town Resettlement Council will price the lots in the replacement towns based on the amount of compensation paid for similar land in the nearest flooded towns. These prices also will reflect a premium charge for choice business locations.

Schedule for Replacement Town Development. We noted in Section 7 that the replacement towns will not be able to absorb the entire urban evacuee population from the reservoir region. In order to discourage both rural and urban reservoir evacuees from overburdening the replacement towns, we suggest that the replacement towns should not be open for settlement until relatively late in the resettlement period. This may encourage some part of the evacuees to settle in towns outside the reservoir region. Survey of evacuee intentions will be important for determining the best time to make replacement towns available, and will also assist in design and location of such towns.

Replacement Town Costs. We have reviewed a variety of urban development cost statistics in Thailand, to develop per capita costs for use in calculating the development costs of replacement towns. Per capita replacement town development costs are summarized in Table 71.

Table 71 Per Capita Costs for Replacement Town Development (in dollars)

1.	Survey and layout of 0.5 rai plots	0.22
2.	Street layout and construction within town	25.81
3.	Schools, including teacher housing	48.35
4.	Health facilities	11.77
5.	Potable drinking water distribution system.	44.21
6.	Drinking water purification plant	31.20
7.	Police building and staff housing	48.52
8.	Sewer system.	94.89
9.	Electric power distribution system, including street lighting	16.48
10.	Electric power generating or transmission.	42.80
Subtotal:	Per capita urban development costs.	324.25
	Return of social overhead payment	13.20
	Return of Collective Public Asset payment	20.00
Net per capita costs of replacement towns.		$261.05

In addition to the per capita development costs presented in Table there are also fixed costs for the construction of administrative buildings and government staff housing which is a function of the administrative level of the replacement town. These additional costs are:

Provincial Capital or Major Center (Loei, Pak Lay, Vang Vieng)	$240,000
Large District Town (Ken Thao)	$ 38,000
Small District Town (Sanakham, Hin Heup, Ban Don/Feuang, Chiengkhan, Pak Chom, Sangkhom)	$ 24,000

In addition, we have used a module of 50 rai of land for public purposes in the smaller replacement towns, and 100 rai of public land in the larger replacement towns. The cost of this public land will be $5,000 for small towns and $10,000 for larger centers.

Acquisition costs for the replacement town land to be distributed to private owners will be covered by sale of houselots and business lots to the evacuees. The Resettlement Agency's administrative costs for replacement towns are included in the budget item for the operation of Resettlement Referral Offices.

Table 72 summarizes the costs for replacement towns for each town.

3. Replacement Roads and New Roads

Persons who are cut off from their previous connection with the transportation network by the flooding of roads, should either receive replacement roads or be treated as evacuees, and resettled in a more convenient and economically advantageous situation. Evacuees who resettle on the margins of the reservoir, in resettlement communities based on a combination of fishing, grazing and drawdown agriculture, should also be connected by road to the transportation network. It is the obligation of the resettlement program to provide these new road connections for both the affected and resettled populations.

In some cases, it will be more economic to provide water transportation than to construct new roads. However, where both forms of transportation are feasible, road transport is the form preferred by the reservoir region population for reasons of speed and convenience. Therefore, where the population currently has access to roads, we have recommended replacement roads wherever economically acceptable. In some instances, it is obvious that road replacement is not economic, due to the remoteness and/or small size of the residual or resettlement community; in these cases, we have recommended that water transportation be used. However, in some of these latter cases, it is

Table 72 Replacement Town Costs (in 1,000's dollars)

Name	260m				250m				240m				230m			
	Admin Bldg	Public Land	Dev Costs	Total	Admin Bldg	Public Land	Dev Costs	Total	Admin Bldg	Public Land	Dev Costs	Total	Admin Bldg	Public Land	Dev Costs	Total
LAOS																
New Pak Lay	240	10	658	908	240	10	760	1,010	240	10	803	1,053	240	10	933	1,183
New Ken Thao	38	5	491	534	38	5	503	546	38	5	508	551	Not Flooded			---
New Sanakham	24	5	261	290	24	5	303	332	24	5	310	339	24	5	317	346
New Hin Heup	24	5	135	164	24	5	136	165	24	5	165	194	24	5	261	290
New Ban Don/ Feuang	24	5	35	64	24	5	68	97	24	5	82	111	24	5	164	193
New Vang Vieng	240	10	745	995	240	10	975	1,225	Not Flooded				Not Flooded			
SUBTOTAL				2,955				3,375				2,248				2,012
THAILAND																
New Chiengkhan	24	5	294	323	24	5	378	407	24	5	375	404	24	5	376	405
New Pak Chom	24	5	242	271	24	5	284	313	24	5	306	335	24	5	336	365
New Loei	240	15	3,544	3,799	240	15	2,576	2,831	240	15	2,593	2,848	Not Flooded			
New Sangkhom	24	5	122	151	24	5	132	161	24	5	147	176	24	5	158	187
SUBTOTAL				4,544				3,712				3,763				957
TOTAL				7,499				7,087				6,011				2,969

possible that the population may not be as well served by water transportation as they were served by road transportation before reservoir flooding. Therefore, these settlements should be monitored, and if they are unable to achieve their prior economic condition due to transportation problems, they should be provided with remedial inputs, or considered for subsequent resettlement in a more profitable location.

Standards and Costs for Road Construction. There are a wide range of possible standards and cost data for roads. We assume that replacement roads will be all weather laterite surface roads, which approximates the standard of roads currently available to much of the reservoir region population. We have assumed that the small proportion of paved road which will be flooded in the upper Loei Valley will be replaced with paved roads.

We have compiled our road construction costs from a combination of Highway Department and Accelerated Rural Development figures for roads in Thailand. These are:

Paved road, asphalt/concrete	$75,000/kilometer
Laterite surfaced road, 8 meter width	$13,750/kilometer
Additional cost, laterite road, through steep terrain (variable)	$10,000/kilometer

We have predicted the estimated kilometers of road required in each part of the reservoir region. These estimates are based on surveys of 1:50,000 maps, but without reference to detailed soil data and engineering specifications which may drastically alter road locations and costs. There are many variables in road construction which could greatly alter our estimates, and therefore our costs can be considered only as a rough estimate of possible replacement road costs.

Road Costs Charged to Resettlement. In the United States Bureau of Reclamation feasibility study for the Pa Mong dam, road relocation and access costs were compiled for the major roads to be displaced by reservoir flooding at the 250 meter level, together with the cost of access roads to the various dam and dike construction sites. We have included these roads within our resettlement replacement road network, although we have assumed they will be charged to Pa Mong project construction costs, and not to resettlement costs. Therefore, we have excluded the costs of these roads from the costs of replacement roads for resettlement purposes.

Transportation Replacement by Reservoir Sector. Tables 73 through 77 summarize road replacement costs. For purposes of calculating replacement costs for roads, we have divided the reservoir into four sections: Laos West, Laos East, Loei Section and Udorn Section. We have divided each section into the geographic subsections in which the replacement roads will be located, identified by the names of the subregion or the centers served by the replacement or access road. The road distance in kilometers is summarized for each individual part of the replacement road network, for 230, 240, 250 and 260 meter reservoir levels. In cases where several alternative replacement road systems are possible, we present costs for the major alternatives, and designate what we consider to be the best alternative.

Road Costs by Reservoir Level. Table 78 summarizes the replacement road costs by reservoir level. The table does not include costs for the relocation and access roads included in the USBR feasibility study.

4. Water Transportation

There is no question that expanded and improved water transportation service can be of great assistance to the reservoir region population. A program to develop water transportation could include subsidy for the construction and operation of boats, or the provision of regular government boat services; it might also include navigation locks to enhance the profitability of land-haul water transportation. We have not included such programs as a part of the resettlement project and assume they will be covered elsewhere in programs for improvement of Mekong River (and reservoir) water transportation.

Boat Landings. The location of boat landings usually depends on the location of those points where the road system meets the shore of the reservoir. However, boat landings may change location seasonally, over long distances and in many parts of the reservoir, because of the land uncovered as the reservoir level is drawn down during the dry season. We assume the government will annually maintain the seasonally-flooded roads which lead to landings during low drawdown periods. This usually requires only grading and minor repairs.

There are a number of places where the reservoir will cut into the current road system, and many more places where replacement roads will provide access to the reservoir edge. We believe these will produce sufficient road-reservoir intersections, and no new landings will need to be established.

Most landing and transhipment points on current reservoirs require no major capital investment. Transhipment from relatively small boats into trucks, in both small villages and large towns such as Vientiane, Nongkhai and others on the Mekong River, is always done by hand labor. Therefore, we do not recommend any capital investment in facilities for cargo-handling as a part of the resettlement program.

Table 73 Road Replacement, Laos, Western Sector

Sector and Construction Rate		Reservoir Level 260m	250m	240m	230m
*Pak Lay to Ken Thao (@13,750/Km)	Km	120	103	88	9
	$	1,650,000	1,416,250	1,210,000	123,750
Mi Valley (Sanakham) (@18,750/Km)	Km	51	45	45	39
	$	956,250	843,750	843,750	731,250
Subtotal		956,250	843,750	843,750	731,250

Table 74 Road Replacement, Laos, Eastern Sector

Area		260m	250m	240m	230m
*Vang Vieng (@13,750/Km)	Km	56	56	40	0
	$	(770,000)	(770,000)	(550,000)	0
*Nam Lik (@13,750/Km)	Km	48	48	48	48
	$	(660,000)	(660,000)	(660,000)	(660,000)
Ban Don and Alternatives					
(@13,750/Km) (i)	Km	22	24	24	10
	$	302,500	330,000	330,000	137,500
(@20,000/Km (ii)	Km	182	179	179	44
	$	3,640,000	3,580,000	3,580,000	880,000
(@28,750/Km) (iii)	Km	40	44	45	n.a.
	$	750,000	825,000	843,000	----
Reservoir Access (@13,750/Km)	Km	20	20	20	20
	$	275,000	275,000	275,750	275,000
*Pa Mong Dam Access (@13,750/Km)	Km	29	29	29	29
	$	(261,250)	(261,250)	(261,250)	(261,250)
Subtotal		1,025,000	1,100,000	1,118,750	275,000

* Road included in the USBR Relocation and Access Roads and therefore, not Included in Resettlement Replacement Road Cost totals.

Table 75 Road Replacement Thailand, Loei Reservoir Section

		260m	250m	240m	230m
Chiengkhan East and Pak Chom	Km	36	38	39	50
(@13,750/Km)	$	495,000	522,500	536,250	687,500
Loei and Wang Saphung -Western Shore	Km	166	128	85	4
-USBR Replacement Road	Km	-60 est / 106	-40 / 88	-25 est / 60	0 / 4
(@13,750/Km and @75,000/Km)	$	1,763,750	1,210,000	825,000	55,000
Tha Li	Km	48	70	65	0
-USBR Replacement Road					
(@13,750/Km)	Km	-6 / 42	-6 / 64	-6 / 59	0 / 0
	$	577,500	880,000	811,250	0
Subtotal	$	2,836,250	2,612,500	2,172,500	742,500

Table 76 Road Replacement, Thailand, Udorn Reservoir Section

		260m	250m	240m	230m
Sri Chieng Mai	Km	29	29	29	29
* Pa Mong Dam					
(@75,000/Km)	$	(2,175,000)	(2,175,000)	(2,175,000)	(2,175,000)
*Ban Phu-Huai Sai Dike	Km	21	21	21	21
(@13,750/Km)	$	(288,750)	(288,750)	(288,750)	(288,750)
*Ban Phu-Nam Mong Dam	Km	22	22	22	22
(@13,750/Km)	$	(302,500)	(302,500)	(302,500)	(302,500)
*Ban Phu-Chong Khao Dike	Km	9	9	9	9
(@13,750/Km)	$	(123,750)	(123,750)	(123,750)	(123,750)
Nong Bua Lamphu-SE Margin Settlements	Km	12	12	12	12
(@13,750/Km)	$	165,000	385,000	398,750	302,500
Na Klang-SW Margin Settlement	Km	44	42	36	19
(@13,750/Km)	$	605,000	577,500	495,000	261,250
Western Edge of Reservoir					
Alternative (i)	Km	--	--	--	48
(@13,750)	$				660,000
Alternative(ii)	Km	--	--	--	104
(@15,000)	$				1,560,000
Alternative(iii)	Km	--	96	112	--
(@23,750)	$		2,280,000	2,660,000	
Alternative(iv)	Km	--	102	138	--
(@18,750)	$		1,912,500	2,587,500	
Alternative (v)	Km	10	--	--	--
(@13,750)	$	137,500			
Subtotal	$	907,500	2,875,000	3,481,250	2,123,750

Table 77 Replacement Road Costs (in 1,000's dollars)

	260m	250m	240m	230m
Laos				
Pak Lay-Ken Thao	*	*	*	*
Sanakham	956	844	844	731
Vang Vieng	*	*	*	*
Nam Lik	*	*	*	*
Ban Don/Feuang - Nam Sang	750	825	844	----
Reservoir Access	275	275	275	275
Pa Mong Dam Access	*	*	*	*
Subtotal	1,981	1,944	1,963	1,006
Thailand				
Chiengkhan-Pak Chom	495	523	536	688
Loei-Western Shore	1,764	1,210	825	55
Tha Li	578	880	811	0
Pa Mong Dam Access	*	*	*	*
Ban Phu-Huai Sai	*	*	*	*
Ban Phu-Nam Mong Dam	*	*	*	*
Ban Phu-Chong Khai	*	*	*	*
Nong Bua Lamphu to Reservoir	165	385	399	303
Na Klang to Reservoir	605	578	495	261
Western Edge of Udorn Reservoir	138	1,913	2,588	1,560
Subtotal	3,745	5,489	5,654	2,867
TOTAL	5,726	7,433	7,617	3,873

* Relocation and Access Road included in USBR feasibility study, and excluded from Resettlement Replacement Road costs.

Table 78 Replacement Town and Replacement Road Costs for Ten Selected Reservoirs (in 1,000's dollars)

Res. No.	Reser-voir Height	Protection Schemes *	Replacement Towns			Replacement Towns			TOTAL
			Laos	Thailand	Total	Laos	Thailand	Total	
1	260m	None	2,955	7,499	10,454	1,981	3,745	5,726	16,180
2	260m	NL,LV,NM	1,732	3,700	5,432	1,231	940	1,325	6,757
3	250m	None	3,375	7,087	10,462	1,944	5,489	7,433	17,895
4	250m	VV,LV	2,150	4,256	6,144	1,944	4,279	6,223	12,367
5	250m	NL,LV,NM	1,888	4,256	6,144	1,119	3,027	4,146	10,290
6	240m	None	2,248	6,011	8,259	1,963	5,654	7,617	15,876
7	240m	NL,LC,NM	1,943	3,163	5,106	1,119	4,171	5,290	10,396
8	230m	None	2,012	2,969	4,981	1,003	2,873	3,876	8,857
9	230m	NL,NM	1,529	2,969	4,498	1,003	2,120	3,123	7,621
10	216m	None	399	1,858	2,257	41	83	124	381

NL=Nam Lik, NM=Nam Mong, LV=Loei Valley, LC=Loei City, VV=Vang Vieng

C. INFRASTRUCTURE REPLACEMENT COSTS SAVED BY PROTECTION SCHEMES

The implementation of the various protection schemes changes the number of towns and roads which will be flooded. It also changes the size of replacement towns required due to changes in the economic hinterland population.

Table 79 lists the towns saved by the various protection schemes, and details the replacement town costs eliminated in each situation.

Table 80 details the savings in replacement road costs due to the use of the various protection schemes.

Table 79 Towns and Replacement Town Costs Saved by Protection Schemes

Protection Scheme	Towns Saved				Replacement Town Costs Saved (in 1,000's dollars)			
	260m	250m	240m	230m	260m	250m	240m	230m
Nam Lik	Vang Vieng Hin Heup Ban Don	Vang Vieng Hin Heup Ban Don	Hin Heup Ban Don	Hin Heup Ban Don	1,223	1,487	305	483
Vang Vieng	Vang Vieng	Vang Vieng	n.f.*	n.f.*	995	1,225	n.f.*	n.f.*
Loei Valley	Loei Wang Saphung	Loei Wang Saphung	Loei n.a.*	n.f.* n.f.*	3,799	2,831	2,848	
Loei City	n.a.**	n.a.**	Loei	n.a.**	0	0	2,848	0
Nam Mong	none	none	none	none	0	0	0	0

n.f. = not flooded at this level
n.a. = not applicable

Table 80 Replacement Road Costs Saved by Protection Schemes (in 1,000's dollars)

Protection Scheme	Reservoir Level			
	260m	250m	240m	230m
Nam Lik	750 (1,430)*	825 (1,430)*	844 (1,210)*	0 (660)*
Vang Vieng	(770)*	(770)*	(550)*	n.f.**
Loei Valley	1,764 (825)*	1,210 (550)*	825 (344)*	55
Loei City	--	--	--	--
Nam Mong	1,059	1,252	1,183	753

* Road included in the USBR Relocated Roads, and not included in Resettlement Replacement Road costs.

** n.f. = not flooded at this level.

Section 9

RESETTLEMENT PROJECT DESIGN AND COSTS

A. RESETTLEMENT PROJECT DESIGN

The overall design of a resettlement project can vary widely depending on policy decisions, political and economic philosophies, and the personal opinions of decision-makers involved. The design of the resettlement project costed in this report is based on our research, collective experience in other resettlement operations, and our evaluation of what is fair, feasible and cost-effective. We believe that the project we have outlined in this report is the best means available for meeting the economic and social goals of just resettlement at the lowest possible cost.

With regard to the Pa Mong resettlement project, two points must be emphasized. First, we have included some elements in the project design which have not been included in past resettlement projects. This does not mean that we are providing extra or superfluous elements which were unnecessary in other projects; it does mean that other resettlement programs have not met the goal of "no worse off," rendered into terms of economic and social replacement. We have presented the least cost program to meet the goals of replacement of economic and social conditions; that is, the goal of social justice.

Second, we must emphasize that although we have attempted to meet these economic and social replacement goals, it is probable that they cannot be met. While we have put together the various components of the project, there is no real assurance, based on past experience, that the components will function cumulatively to generate replacement income. We can handle the actual movement and re-establishment of the evacuee with a minimum of trauma, but there is no way to prevent the kinds of psychological losses which cannot be avoided or compensated. While it is possible to provide opportunities for the establishment of replacement income flows and social networks, there is no way to assure that they will be created. It is our frank opinion that successful resettlement, defined in terms of restoration of prior economic conditions and social and psychological satisfaction of the entire damaged population, may not be possible. We do believe, however, that a project similar to that which we have designed will reduce greatly the number of evacuees damaged by resettlement.

At one point in our planning for this project, we assumed that resettlement might actually be a beneficial experience. It would provide opportunities for people to shift locations and function, to enhance their income flow and access to beneficial public services, and bring themselves out of the backwater and into the mainstream of the economic life of their nations. Thus, not only would the welfare of the people be improved, but their role in the national economy would be enhanced as well.

We do not entirely reject this view, but the realities of the field research have resulted in considerable modification of it. Income levels in the reservoir region are higher than in adjacent areas and are growing more rapidly; hence the shift will not be from backwater to mainstream but probably in some cases from mainstream to backwater. Furthermore, many urban incomes have not kept pace with the rural income levels of the reservoir region population. The vast acreages once thought to be available for resettlement are either very poor or have been occupied and even with extensive government inputs in land settlements, marginal land does not produce replacement income. Reality is more harsh than dreams, and the opportunities for evacuees are more limited in reality than on paper.

On the other hand, while we have had to revise our rather optimistic assumptions about economic opportunities, we have similarly revised our evaluations of the problems of social and psychological dislocation. The reservoir evacuees are mobile, resourceful and extremely able people, and they seem capable of adjusting to new situations with a minimum of social and psychological dislocation. We have studied the possible problems which could derive from dislocation of the population from their traditional homes, ancestral lands and village interaction networks, and in general we find that these seem less important to the evacuee than they are to the research scholar. If the economic situation is improved in the process of resettlement, and if an honest, fair and efficient resettlement operation avoids creating trauma and stress, major social and psychological problems will be avoided.

Therefore, we return to the importance of suitable economic opportunities for the evacuees. In the design of our program we have examined the land market and the rate of urban growth; we have assumed that without major changes in occupation during the period of resettlement, most evacuees will be able to relocate successfully and will restore their prior economic level without major problems. This is based on the assumption of continued or expanded economic growth in Laos and Thailand. We assume that the immediate and long-range effects of the Pa Mong project, acting on already growing economies, will create more economic opportunities than it destroys, and that the evacuees, with effective guidance from the Resettlement Agency and with capital, will be able to take advantage of these opportunities. We also assume that if project planners determine that the dam will destroy more economic opportunities that it creates, the dam will not be built.

Contingency Planning. The resettlement program must allow flexibility in planning and program design and maintain close contact with the evacuees in order to respond to two major problems which may develop: (i) there may be major changes in evacuee preferences regarding resettlement destinations and the timing of their moves to those destinations; and (ii) some evacuees will suffer economic failure in the resettlement alternative they select.

Changes in Evacuee Resettlement Preferences. The design and costing of the resettlement program is based on the assumption that evacuees will be free to select their own resettlement alternative. However, the conditions on which we have based our assumptions are subject to change. Government policies regarding acceptable resettlement alternatives can be changed. The rate of urban migration may rise sharply, increasing the flow of evacuees to towns. The rate at which evacuees leave the reservoir to seek new opportunities may differ from our original estimates, and evacuee resettlement preferences are also subject to change. Therefore, it is necessary to have contingency resettlement plans and to engage in a continuing program of resettlement research both prior to and during the early stages of resettlement.

In the program we have outlined and costed, we have assumed that resettlement on the margin of the reservoir will be the preferred alternative and will be filled to capacity. In addition, we have assumed that a large proportion of the remaining evacuees will manage their own resettlement in the private land market or in towns with a minimum of developmental, administrative and maintanance costs to the resettlement program. We have indicated that there will be no available blocks of good quality land for the creation of government-managed land settlement communities in Thailand, but that there probably will be such land available in Laos. Therefore, in Laos, the expansion of government-managed land settlements represents one possible contingency alternative capable of expanding to include more evacuees. In Thailand, and to a lesser extent in Laos, the urban resettlement alternative is elastic, providing the general rate of economic growth expands the demand for employment. The provision of housing in satellite towns, job training or employment in jobs subsidized for reservoir evacuees, and effective support services would make the urban resettlement alternative attractive to a larger number of evacuees. Therefore, urban resettlement also represents an elastic contingency alternative.

However, both these alternatives require increased investment. In Table 81 we have shown the per capita costs of each of the major resettlement alternatives to provide some idea of the extra costs involved in government-managed land settlements or urban resettlement programs if they are to be expanded beyond the base level we have predicted.

Table 81 Per Capita Costs for Expanding Resettlement to Include More Evacuees than the Number Projected in Table 60.

Alternative	Capacity of the Alternative	Per Capita Cost Range of Alternative (dollars)
Reservoir Margin Resettlement	Limited to 23,000-44,000 Persons	1,006-1,214
Self-Managed Resettlement, Rural and Urban	Unlimited	1,344-1,541
Government-Managed Land Settlement Communities	Limited by Availability of Arable Land	1,590-1,791
Satellite Towns, with Urban Employment	Unlimited	1,859-2,476

Economic Failure of Evacuees. The Pa Mong resettlement project has been designed to enable all evacuees to regain their prior economic and social condition; however, experience indicates that this goal cannot actually be achieved. Resettlement is a damaging experience and there will probably be evacuees who remain seriously dislocated and disadvantaged after they are resettled.

There are two ways to view this disadvantaged population. The first is to assume that in the normal course of events, there are always disadvantaged persons who must be supported by the social services of the nation. One could assume that evacuees who remain disdavantaged after the end of the resettlement program fall in this category and should be cared for by the currently inadequate but expanding public assistance services provided by the government.

The second view is that the probable disadvantaged condition of some evacuees is the result of their being resettled, and that the physical act of relocation automatically makes the resettlement program responsible for their subsequent welfare.

Therefore, the resettlement program should include measures to solve the problems of those who are disadvantaged by resettlement. We recommend a three-stage program to deal with these disadvantaged evacuees:

i) The resettlement Agency must identify the disadvantaged evacuees as quickly as possible. This will be done by the Resettlement Referral Offices which will monitor the payment of downtime allowances. When allowances are dispensed, the Resettlement Referral Office will collect data regarding current economic conditions and problems, which will be used to identify specific disadvantaged families.

ii) Additional funds will be made available from the contingency budget for remedial action to be taken in the case of evacuees who are not making normal recovery. It may be possible to move them to new locations where there is more land or employment. Alternatively, they might be provided with direct technical assistance or education. If there are large numbers of disadvantaged evacuees, a larger remedial program will have to be implemented. In the rural areas, this would involve the creation or expansion of government-sponsored land settlements where land could be made available together with supervised central inputs. While in Laos there may be suitable public land available, in Thailand these land settlements would require purchase of suitable land, which would add greatly to the expense of the program. In urban areas the remedial program might consist of some combination of vocational training, creation of new jobs and subsidized urban housing.

iii) If the above directly-sponsored programs of rural land settlements or urban employment do not solve the problems of disadvantaged evacuees, it might become necessary to continue some portion of the downtime allowance for the balance of the period it takes them to recover their prior economic condition. If they are never able to recover from resettlement, this would amount to a lifetime subsidy or pension.

The costs of the above "second chance" program are covered within the 15 percent contingency item in the project budget.

It is sadly inevitable that even with the above measures to provide supplementary support, to sponsor second moves to new locations and opportunities, and to provide structured rural and urban resettlement opportunities for disadvantaged cases, there may still be some evacuees who are either missed, or not substantially helped, by the above programs. These evacuees

ultimately will become charges on the normal social services of the Lao and Thai nations and will remain a sobering reminder that no matter how carefully designed and fully funded the resettlement program may be, there are those who will not or cannot be helped. Even the most well-designed resettlement program can only serve to decrease the size of this disadvantaged group; it cannot eliminate it.

Resettlement and Development. The resettlement program we have designed and costed includes only those elements necessary to achieve replacement income and re-establish a satisfactory social situation. There are also some arguments in favor of adding developmental components to the resettlement program. The inclusion of beneficial development components would offset some unmeasured and uncompensated losses. The extensive information system and the advisory and referral services built into the resettlement program provide excellent opportunities for the dissemination of information on nutrition, health measures, family planning and other beneficial programs.

Development components would not be included in the costs of the resettlement program, but would represent additional costs to be supplied by the Lao and Thai governments or by international development funding. Therefore, we have not identified the best developmental measures to incorporate within the resettlement program, nor have we considered their costs. We suggest that there may be considerable economy in the joining of development and resettlement because of the availability of the information system and the advisory and monitoring services which are integral parts of the resettlement program. We recommend that a study be made of the prospects, problems and costs of a development program to be attached to and implemented as a part of the resettlement program.

Funding Resettlement. In most major dam projects the costs of the resettlement have not been included in international project funding (borrowing) but rather have been met by the nation in which the project is located. This means that resettlement is often funded at a level which is not adequate to meet the goals of economic and social restoration which have been assumed for Pa Mong. It is probable that the Lao and Thai governments will not be able to absorb the high cost of the resettlement program detailed in this report. However, there is a precedent for the inclusion of resettlement costs in the international funding for the project. In the Kwai Yai (Chao Nen dam) project in Thailand, the International Bank for Reconstruction and Development loan included funding for resettlement at the level of almost $8,000 per family, which approximates the costs we have compiled for Pa Mong. Therefore, we assume that resettlement cost can be considered an integral part of dam project costs.

Resettlement and Planning Philosophies. We have calculated costs for a resettlement project designed to operate within the framework of development practices in use in the Mekong region during the period of our research. However, recent changes in government in three of the four Mekong Basin nations may change future planning philosophies, policies and procedures. Central to our resettlement planning is the concept of full and fair compensation for private property and the freedom of choice in the selection of a resettlement alternative. It is probable that the legal definition of private property may change in several of the Mekong nations. In addition, some central planning concepts may require that people be shifted into specific planned locations in order to meet national planning goals. Individual preferences for resettlement alternatives may not be capable of accommodation within a highly-structured central plan.

Our review of the costing procedures involved in highly-centralized planning in the U.S.S.R. and The Peoples Republic of China did not provide details or clear guidelines. In general, costs have been limited solely to the technical costs of a project, and there is no indication of allocations for compensation, moving allowances, maintenance allowances or other payments central to the Pa Mong program we have designed. In order to approximate the technical resettlement costs of a centralized Pa Mong resettlement project, we have made the following assumptions:

i) In the rural areas, this program will have the goal of utilizing undeveloped or underdeveloped land. Therefore, Lao land development costs can be used as a surrogate for technical resettlement costs. In Thailand, where there is little or no undeveloped frontier land, or where the quality of this is marginal, we assume that a land resettlement would involve the reorganization of rural land holdings to enable the addition of evacuee farm families. We have examined the costs of such a program in Section 5 and derive technical costs from these data.

ii) Assessment of resettlement in urban areas would be based on the addition of evacuees to the urban labor force, and would require the use of additional inputs in technical training, urban housing and facilities to implement this part of the resettlement program. The technical costs of various measures designed for evacuees relocated in cities is detailed in Section 7.

To obtain a general idea of the difference in cost between the Pa Mong resettlement project we have designed and a hypothetical highly-centralized project, we compared total costs for a 260 meter reservoir. Total costs for our project are $757,581,000; total costs for a centralized resettlement program would be about $951,446,000. This larger figure is due to the high technical costs of developing replacement land for evacuees, and the relatively high technical costs of providing jobs and housing in urban areas.

B. RESETTLEMENT PROJECT COSTS

The summary of resettlement project costs contained in the following tables are derived from the data tables in all the preceding sections. Table 82 provides total resettlement costs for the ten selected reservoir configurations. Table 83 details the annual expenditure of resettlement funds for each of the ten selected reservoirs over the entire resettlement period. The peak expenditure or allocation of funds in 1982 reflects the fact that all compensation must be paid to evacuees, or deposited on their behalf, during the first year of the resettlement period. Table 84 summarizes the total funds saved by use of the five protection schemes projected for various sections of the reservoir.

Per Capita Resettlement Costs. Table 82 provides the per capita costs of Pa Mong resettlement for ten selected reservoirs. These per capita costs compare favorably with the resettlement costs budgeted as a part of the Kwai Yai project which had funds provided by the International Bank for Reconstruction and Development. Assuming a standard household size of six persons, our Pa Mong resettlement cost estimates range from $9,000 to $10,170 per household compared with the Kwai Yai costs of over $8,000 per household.

Foreign Exchange Component. The direct foreign exchange component of resettlement costs is small because the largest part of resettlement costs consists of compensation and resettlement allowances. We have not compiled a detailed record of foreign exchange expenditures but assume they will approximate the expenditures for vehicles and equipment. This is probably an overestimate and, as such, it should offset foreign exchange expenditures in other project budget categories.

Table 82 Total Resettlement Costs for Ten Selected Reservoirs, 1982 (In 1,000's dollars)

(Cost Category and Table Reference)

Dam Number	Reservoir Height	Protection Schemes*	Population Resettled	Compensation	Resettlement Payments	Resettlement Agency and Field Operations	Lao Land Settlements	Reservoir Margin Resettlements	Replacement Infrastructure	Contingency 15%	Total Resettlement Costs	Per Capita Resettlement Costs
1	260m	None	479,867	404,991	162,534	80,343	9,575	-14,857	16,180	98,815	757,581	1.578
2	260m	NL,NM,LV	250,636	209,336	82,571	61,936	5,907	-4,540	6,757	54,472	417,619	1.666
3	250m	None	398,646	336,019	131,729	70,635	7,229	-18,778	17,895	81,709	626,438	1.571
4	250m	VV,LV	348,282	290,606	115,295	66,439	6,265	-13,284	12,367	71,677	549,526	1.578
5	250m	NL,NM,LV	226,656	182,002	75,112	56,131	4,304	-6,122	10,290	48,258	369,975	1.632
6	240m	None	313,103	267,606	100,734	54,755	5,731	-18,047	15,879	63,999	490,657	1.567
7	240m	NL,NM,LC	182,617	160,731	59,147	43,904	3,559	-8,628	10,396	40,366	309,475	1.695
8	230m	None	214,916	180,695	69,345	49,989	3,542	-20,858	8,857	43,736	335,306	1.560
9	230m	NL,NM	128,344	114,556	42,296	40,529	2,060	-7,511	7,621	29,931	229,473	1.788
10	216m	None	76,347	50,740	22,123	28,750	1,595	-4,034	381	14,933	114,488	1.500

*NL = Nam Lik, NM = Nam Mong, LV = Loei Valley, VV = Vang Vient, LC = Loei City

Table 83 Expenditure Schedule for Ten Selected Reservoirs, 1982 (in 1,000's dollars)

Reservoir Number:	1		2		3		4		5		6		7		8		9		10	
Reservoir Level:	260M		260M		250M		250M		250M		240M		240M		230M		230M		215M	
Protection Scheme:	None		Nam Lik, Loei Valley, Nam Phung		None		Vang Vieng, Loei Valley		Nam Lik, Loei Valley, Nam Phung		None		Nam Lik, Loei City, Nam Phung		None		Nam Lik, Nam Phung		None	
Year	Population Resettled	Resettlement Expenditure	Population Resettled	Resettlement Expenditures	Population Resettled	Resettlement Expenditures	Population Resettled	Resettlement Expenditures	Population Resettled	Resettlement Expenditures	Population Resettled	Resettlement Expenditures	Population Resettled	Resettlement Expenditures	Population Resettled	Resettlement Expenditures	Population Resettled	Resettlement Expenditures	Population Resettled	Resettlement Expenditures
1978		688		379		688		604		906										
1979		1,910		1,052		1,910		1,675		1,177		1,738		1,094		1,238		1,189		593
1980		4,014		2,212		4,014		3,520		2,369		3,473		2,188		3,473		2,376		1,186
1981		11,382		6,274		11,326		9,977		6,715		10,149		6,394		10,149		9,942		4,961
1982	29,228	486,403	10,601	248,008	17,280	404,833	15,096	344,337	9,842	238,469	16,846	342,520	10,919	193,188	22,297	324,832	20,563	143,785	18,046	76,739
1983	23,766	16,818	12,423	29,766	23,628	16,524	20,645	24,497	13,457	9,253	32,569	19,161	20,885	22,071	39,199	21,487	28,532	24,657	28,071	7,334
1984	30,633	19,359	16,010	10,557	32,289	19,525	28,218	17,123	18,387	11,524	49,212	26,166	32,242	16,485	47,993	25,586	37,499	17,501	30,280	8,733
1985	36,249	21,192	18,933	11,680	44,881	24,403	39,230	21,401	25,554	14,403	61,021	31,817	37,547	20,045	50,682	26,501	22,496	15,178		7,574
1986	47,027	25,351	24,566	13,968	52,461	27,737	47,847	24,325	31,848	16,371	73,898	35,611	39,013	23,065	54,745	8,856	24,254	6,058		4,746
1987	53,519	27,567	27,954	15,189	64,933	33,493	160,483	29,373	40,670	19,768	79,557	38,905	42,007	11,910		1,359		3,453		1,777
1988	55,285	28,863	28,824	15,904	70,629	35,294	59,484	30,953	37,917	20,831		7,018		6,757		5,049		2,248		677
1989	60,693	31,625	31,697	17,425	92,545	24,830	77,279	21,726	48,981	14,655		4,296		3,966		3,787		1,379		368
1990	66,026	33,540	34,474	19,481		6,310		5,905		4,120		1,682		2,320		2,013		930		
1991	86,385	28,314	45,098	15,691		6,469		5,673		3,818		1,004		1,263		1,878		737		
1992		5,107		2,814		5,055		4,433		2,983		117		699						
1993		6,397		3,525		2,543		2,230		1,501										
1994		4,842		2,668		1,091		957		644										
1995		2,520		1,637		827		769		518										
1996		1,052		580																
1997		815		449																
Total	429,867	757,581	250,636	417,619	358,646	626,438	348,282	549,526	226,656	369,975	313,103	490,657	182,617	309,475	214,916	335,106	128,344	229,473	76,397	114,488

Table 84 Total Saved by Protection Schemes, 1982 (in 1,000's dollar

Protection Scheme	Reservoir Height	Net Population Saved	Compensation	Resettlement Payments	Resettlement Agency and Field Operations
Nam Lik	260M	41,976	17,608	14,230	3,370
	250M	37,312	15,890	12,313	3,151
	240M	23,822	8,990	7,647	1,990
	230M	17,555	6,813	5,670	1,942
Vang Vieng	260M	20,046	9,685	6,796	1,609
	250M	17,189	8,454	5,672	1,416
	240M	5,287	2,075	1,657	412
	230M	1,788	885	[illegible]	198
Loei Valley	260M	80,122	78,378	27,161	6,433
	250M	32,910	36,595	10,860	2,780
	240M	2,849	8,994	915	238
	230M	-	-	-	-
Loei City	260M	-	-	-	-
	250M	-	-	-	-
	240M	16,267	18,775	5,222	1,359
	230M	-	-	-	-
Nam Mong	260M	107,174	99,647	36,33[illegible]	8,605
	250M	101,503	92,189	33,496	8,573
	240M	89,822	78,623	28,833	7,503
	230M	68,047	59,326	21,979	7,527

Table 85 Foreign Exchange Component of Resettlement Expenditures, 1982

Reservoir Number	Reservoir Height	Protection Scheme *	Foreign Exchange Component (in dollars)
1	260M	None	10,456,000
2	260M	NL, LV, NM	5,763,000
3	250M	None	9,690,000
4	250M	VV, LV	8,500,000
5	250M	NL, LV, NM	5,723,000
6	240M	None	8,172,000
7	240M	NL, LC, NM	5,154,000
8	230M	None	8,041,000
9	230M	NL, NM	5,003,000
10	216M	None	2,496,000

Projection of Resettlement Costs. Table 86 provides a very rough approximation of the manner in which Pa Mong resettlement costs will increase annually after the assumed construction commencement date of 1982. It is compiled by projecting resettlement costs at the rate of population increase during this period. Based on our work with population increase rates we have assumed that the aggregate rate of population increase will drop from approximately 3.8 percent per year to 2.9 percent per year by the end of the century, and we have used an adjusted rate of increase for the calculations summarized in Table 86.

We believe these projections to be underestimates of the cost increases involved in the resettlement program. During this period, land available for resettlement alternatives will become occupied, and evacuees will have to move to more expensive government-managed urban or rural resettlement communities. It is probable that future resettlement costs could be between 20 and 50 percent higher than those indicated in Table 86 if the project is delayed until the end of the century.

Table 86 Projection of Resettlement Costs 1982-2000
(in millions of dollars)

	Reservoir Height			
Year	260M	250M	240M	230M
1982	758	626	491	335
1983	786	649	509	347
1984	816	674	528	360
1985	847	700	549	374
1986	876	723	569	388
1987	906	748	589	402
1988	937	773	609	415
1989	968	800	629	429
1990	1,001	827	651	444
1991	1,032	852	671	458
1992	1,064	879	692	472
1993	1,097	906	713	487
1994	1,131	934	735	502
1995	1,166	963	758	517
1996	1,200	991	780	532
1997	1,235	1,020	803	553
1998	1,271	1,049	826	569
1999	1,308	1,080	850	585
2000	1,345	1,111	875	602

Appendix A

ATLAS AND VILLAGE INVENTORY OF PA MONG RESERVOIR AREA

This appendix is designed to provide both index maps and inventory tables giving data on all settlements within the reservoir region. The maps and tables can be used to identify all villages and their populations affected by various levels of flooding and possible protection schemes. The appendix is divided into two sections:

Section 1: Location maps for villages in the reservoir region, indicating flooding levels for four reservoir levels (230m, 240m, 250m, 260m).

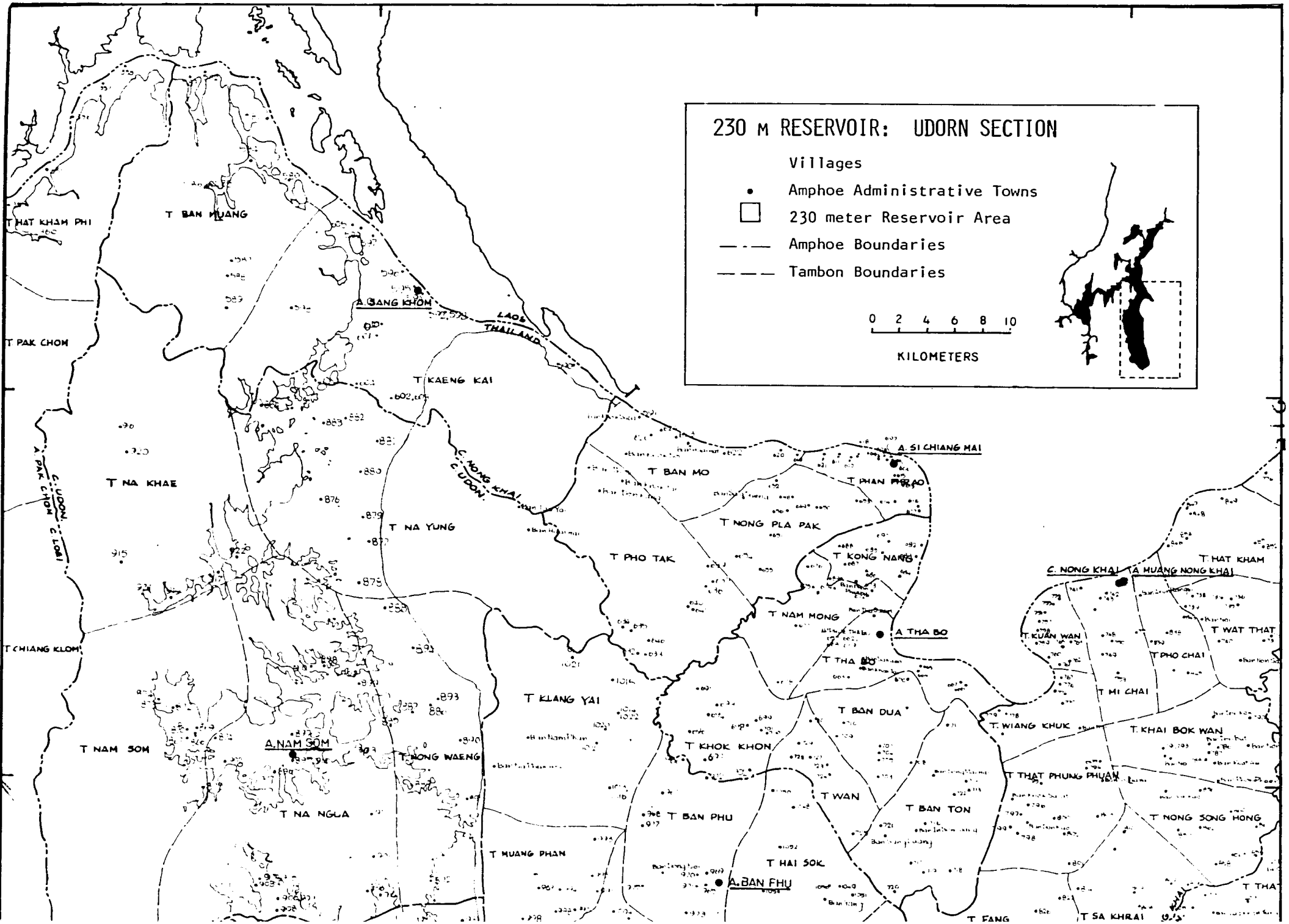
Section 2: Table of all Thai and Lao villages flooded up to 260m, indicating population and portion of village flooded at various reservoir levels and protection schemes.

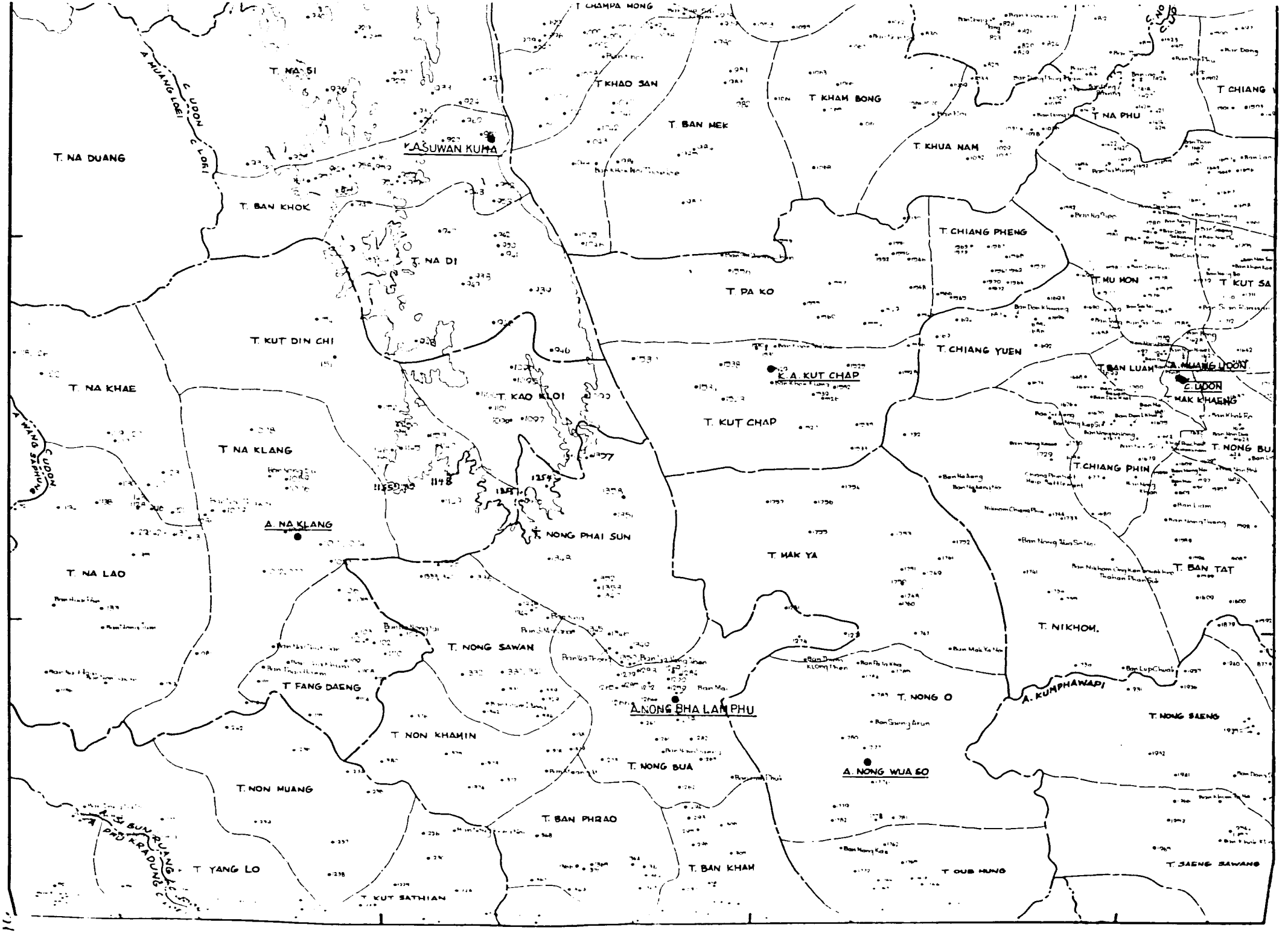
APPENDIX A

Section 1: Location Maps for Villages in the Reservoir Region

On each of the above maps the area flooded by the reservoir is indicated by shading.

All villages below the 260m counter can be identified by their index number in Section 2 of Appendix A, which indicates population and portion flooded at different reservoir levels and protection schemes.


230 M RESERVOIR: UDORN SECTION
Villages
Amphoe Administrative Towns
230 meter Reservoir Area
Amphoe Boundaries
Tambon Boundaries
0 2 4 6 8 10
KILOMETERS
T HAT KHAM PHI
T BAN MUANG
A. GANG KHON
LAOS
THAILAND
T PAK CHOM
T KAENG KAI
C. NONG KHAI
C. UDON
A. PAK CHOM
C. LOEI
T NA KHAE
T NA YUNG
T PHO TAK
A. SI CHIANG MAI
T BAN MO
T PHAN PHRAO
T NONG PLA PAK
T KONG NANG
T NAM MONG
A. THA BO
T THA BO
T CHIANG KLOM
T KLANG YAI
T BAN DUA
T KHOK KHON
T NAM SOM
A. NAM SOM
T NONG WAENG
T NA NGUA
T BAN PHU
T WAN
T BAN TON
T HUANG PHAN
T HAI SOK
A. BAN PHU
T FANG
T SA KHRAI
C. NONG KHAI
A. HUANG NONG KHAI
T HAT KHAM
T KUAN WAN
T WAT THAT
T PHO CHAI
T MI CHAI
T. WIANG KHUK
T. KHAI BOK WAN
T THAT PHUNG PHUAN
T NONG SONG HONG
T THA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T. KHAO SAN
T. KHAM BONG
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T. BAN MEK
T. KHUA NAM
T. BAN KHOK
T. NA DI
T. CHIANG PHENG
T. PA KO
T. MU MON
T. KUT SA
T. KUT DIN CHI
T. CHIANG YUEN
K. A. KUT CHAP
T. BAN LUAM
A. MUANG UDON
C. UDON
T. NA KHAE
T. KAO KLOI
T. KUT CHAP
MAK KHAENG
T. NA KLANG
T. NONG BU
T. CHIANG PHIN
A. NA KLANG
T. NONG PHAI SUN
T. MAK YA
T. NA LAO
T. BAN TAT
T. NIKHOM.
T. NONG SAWAN
T. FANG DAENG
A. NONG BHA LAM PHU
T. NON KHAMIN
T. NONG O
A. KUMPHAWAPI
T. NONG BUA
T. NONG SAENG
A. NONG WUA SO
T. NON MUANG
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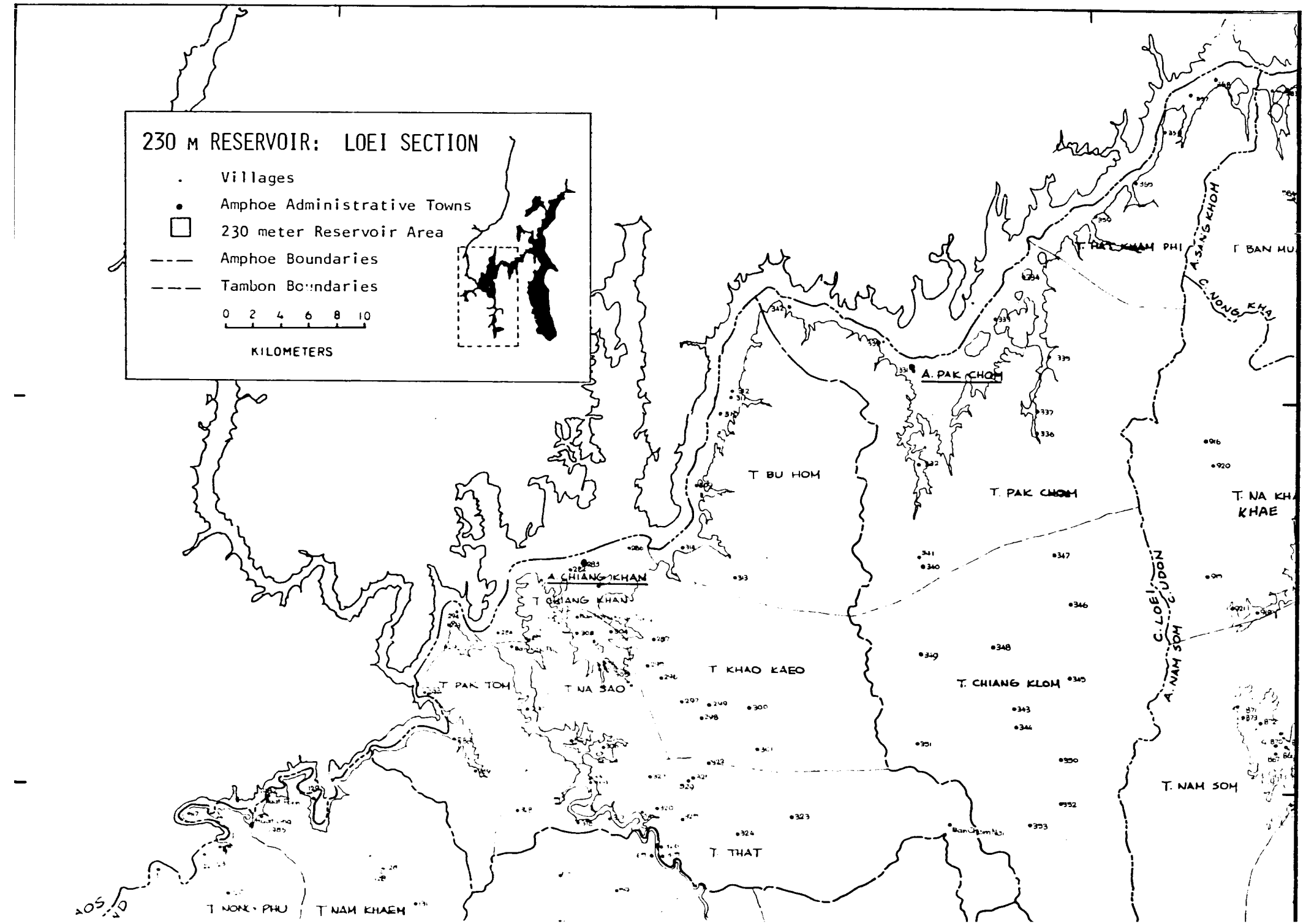
T. YANG LO
T. BAN KHAH
T. DUB MUNG
T. SAENG SAWANG
T. KUT SATHIAN


230 M RESERVOIR: LOEI SECTION
Villages
Amphoe Administrative Towns
230 meter Reservoir Area
Amphoe Boundaries
Tambon Boundaries
0 2 4 6 8 10
KILOMETERS
A. PAK CHOM
T. BU HOM
T. PAK CHOM
T. NA KHAE
A. CHIANG KHAN
T. CHIANG KHAN
T. KHAO KAEO
T. PAK TOM
T. NA SAO
T. CHIANG KLOM
T. NAH SOH
T. THAT
T. NONG PHU
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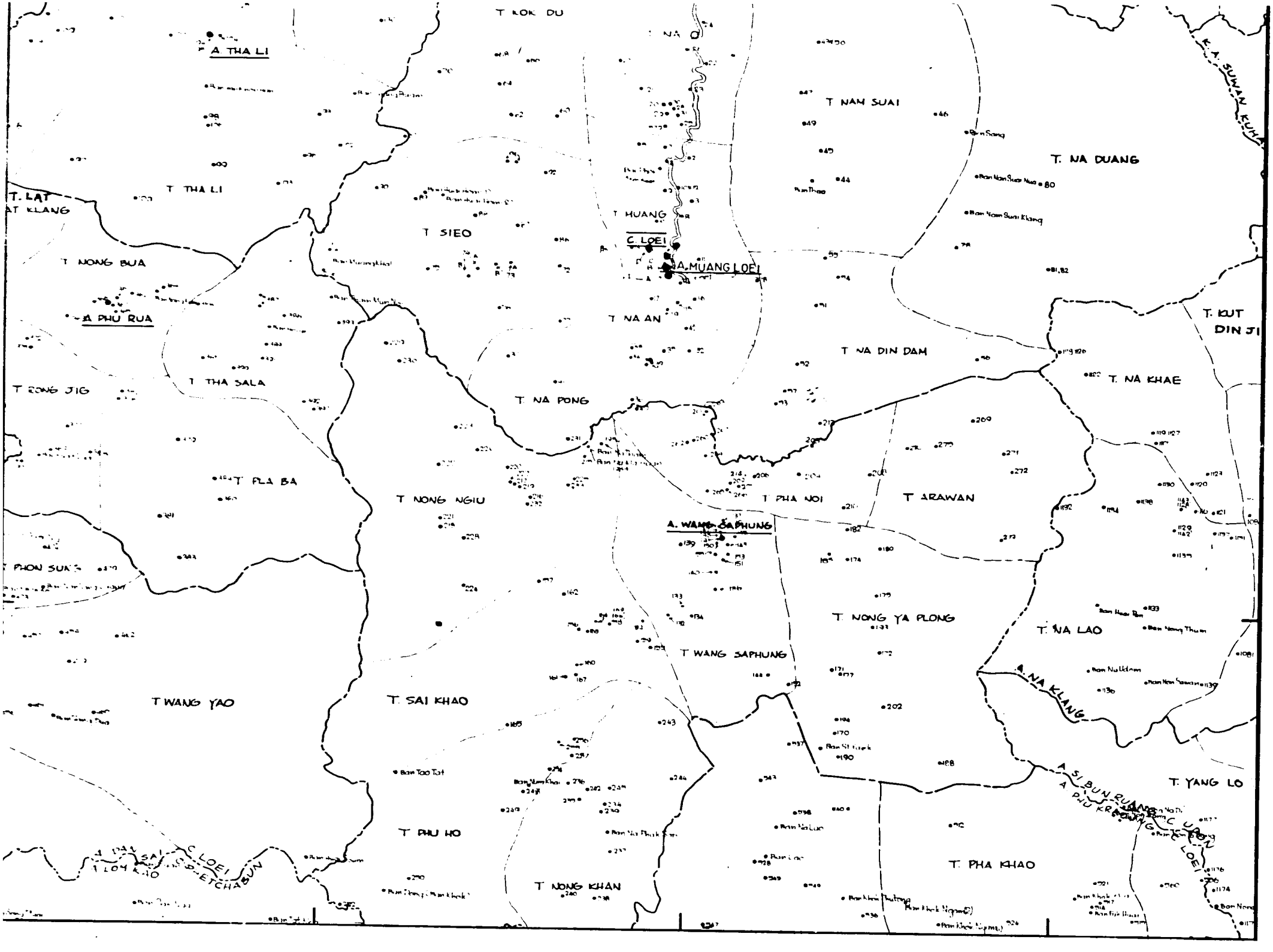
C. LOEI
C. UDON
A. NAM SOH
A. SANG KHOM
C. NONG KHAI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AT KLANG
T. HUANG
T. SIEO
C. LOEI
A. MUANG LOEI
T. NONG BUA
A. PHU RUA
T. NA AN
T. KUT
DIN JI
T. NA DIN DAM
T. NA KHAE
T. THA SALA
T. RONG JIG
T. NA PONG
T. PLA BA
T. NONG NGIU
T. PHA NOI
T. ARAWAN
A. WANG SAPHUNG
T. PHON SUNG
T. NONG YA PLONG
T. NA LAO
T. WANG SAPHUNG
A. NA KLANG
T. WANG YAO
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T. YANG LO
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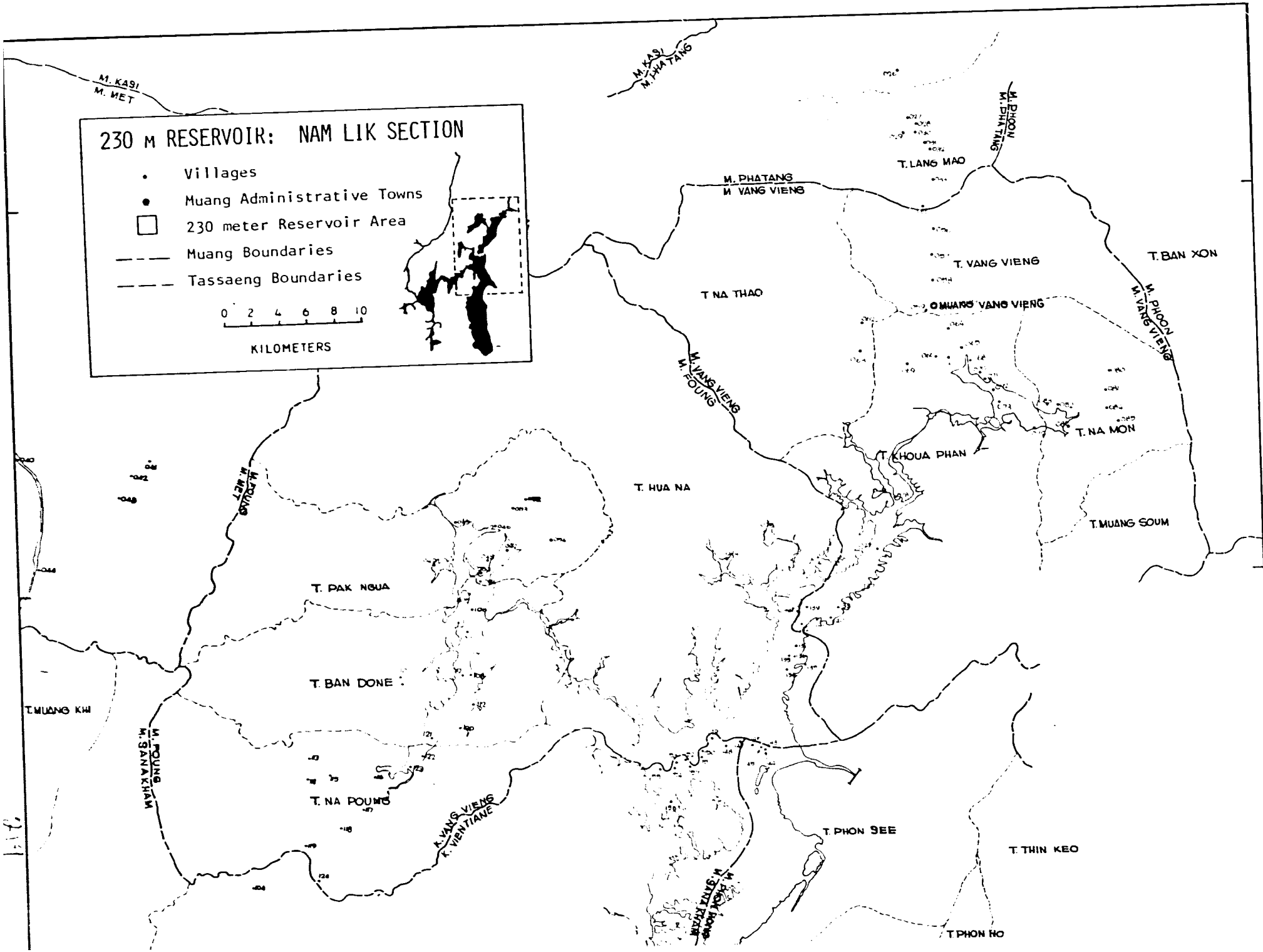
T. PHA KHAO
T. NONG KHAN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Villages
Muang Administrative Towns
230 meter Reservoir Area
Muang Boundaries
Tassaeng Boundaries
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M. MET
M. KASI
M. PHATANG
M. PHATANG
M. VANG VIENG
M. PHOON
M. PHATANG
T. LANG MAO
T. VANG VIENG
T. BAN XON
T NA THAO
MUANG VANG VIENG
M. PHOON
M. VANG VIENG
M. VANG VIENG
M. FOUNG
T. NA MON
T. KHOUA PHAN
T. HUA NA
T. MUANG SOUM
M. MET
M. FOUNG
T. PAK NGUA
T. BAN DONE
T. MUANG KHI
M. FOUNG
M. SANAKHAM
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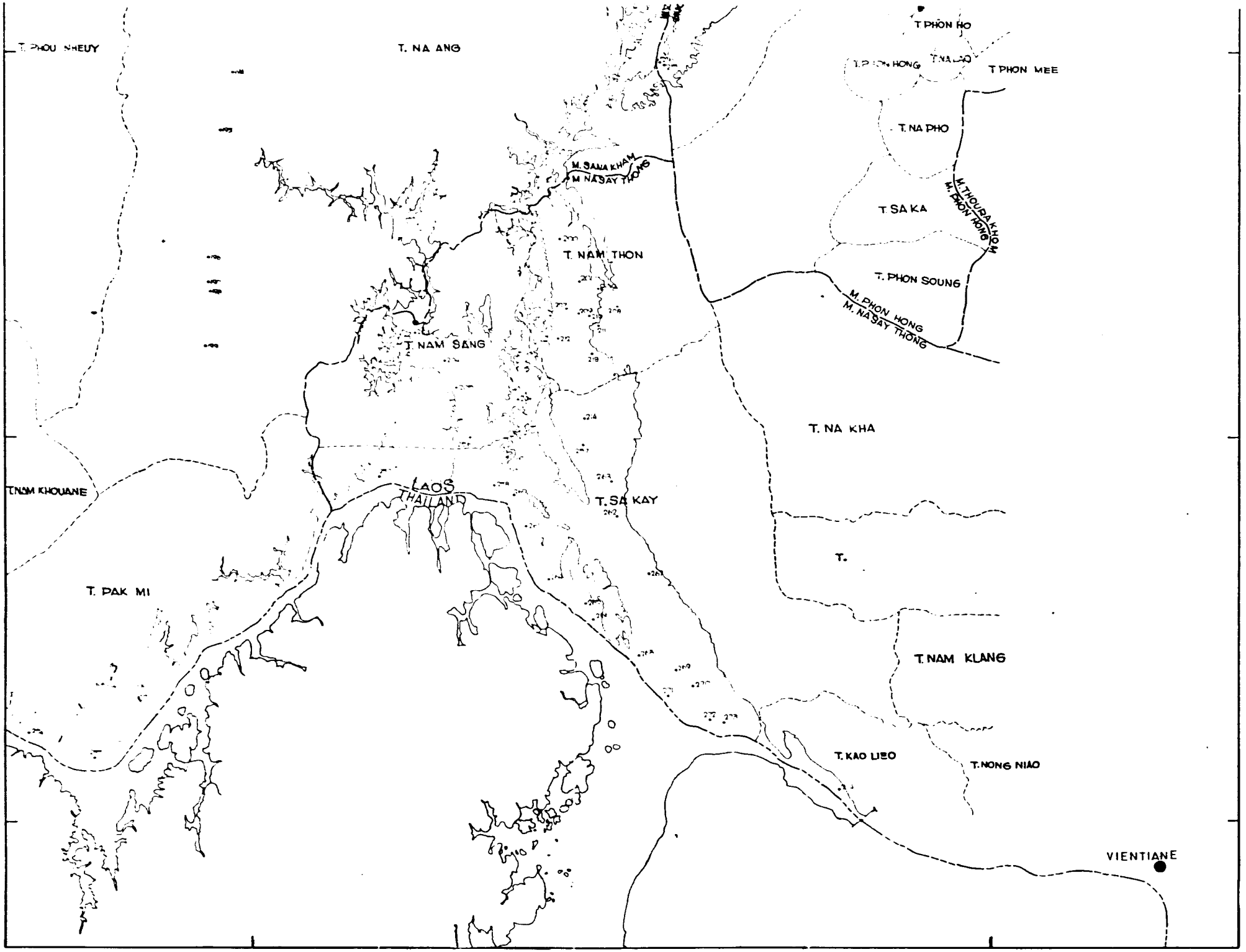
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M. THOUBA KHOM
M. PHON HONG
T. NAM THON
T. PHON SOUNG
M. PHON HONG
M. NASAY THONG
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T.NAM KHOUANE
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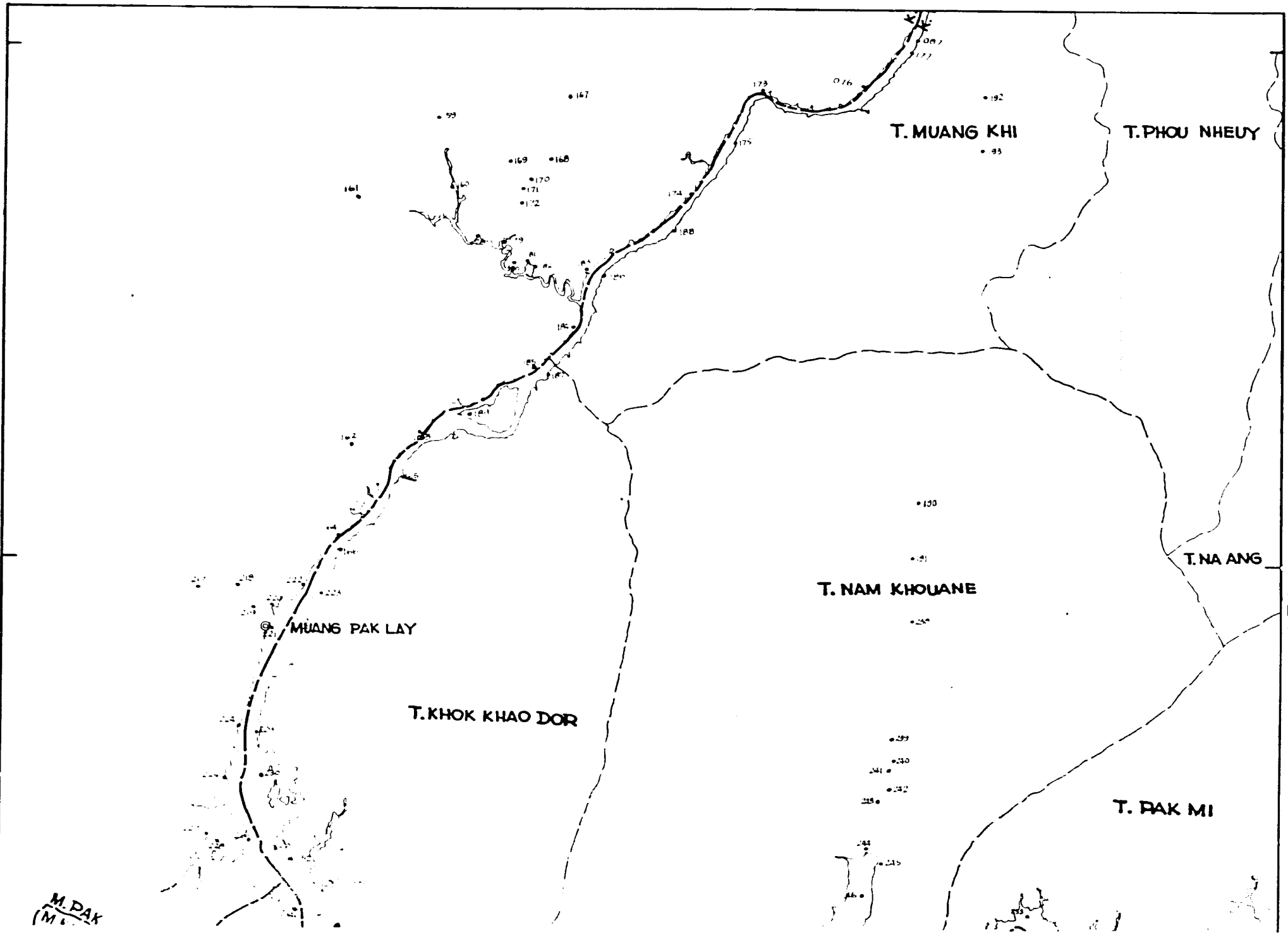
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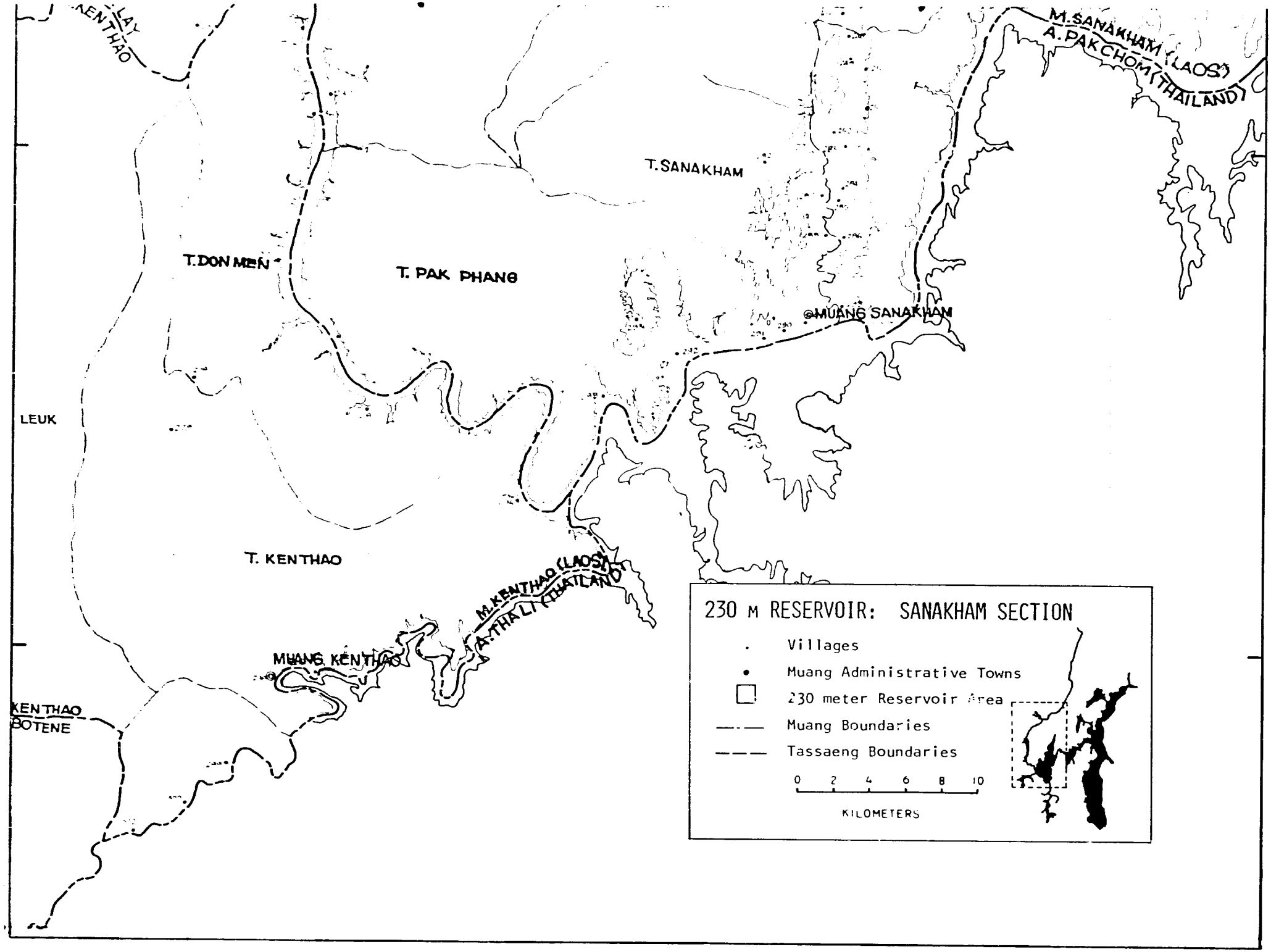
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LEUK
T. KENTHAO
M.KENTHAO (LAOS)
A.THALI (THAILAND)
MUANG KENTHAO
KENTHAO
BOTENE
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Villages
Muang Administrative Towns
230 meter Reservoir Area
Muang Boundaries
Tassaeng Boundaries
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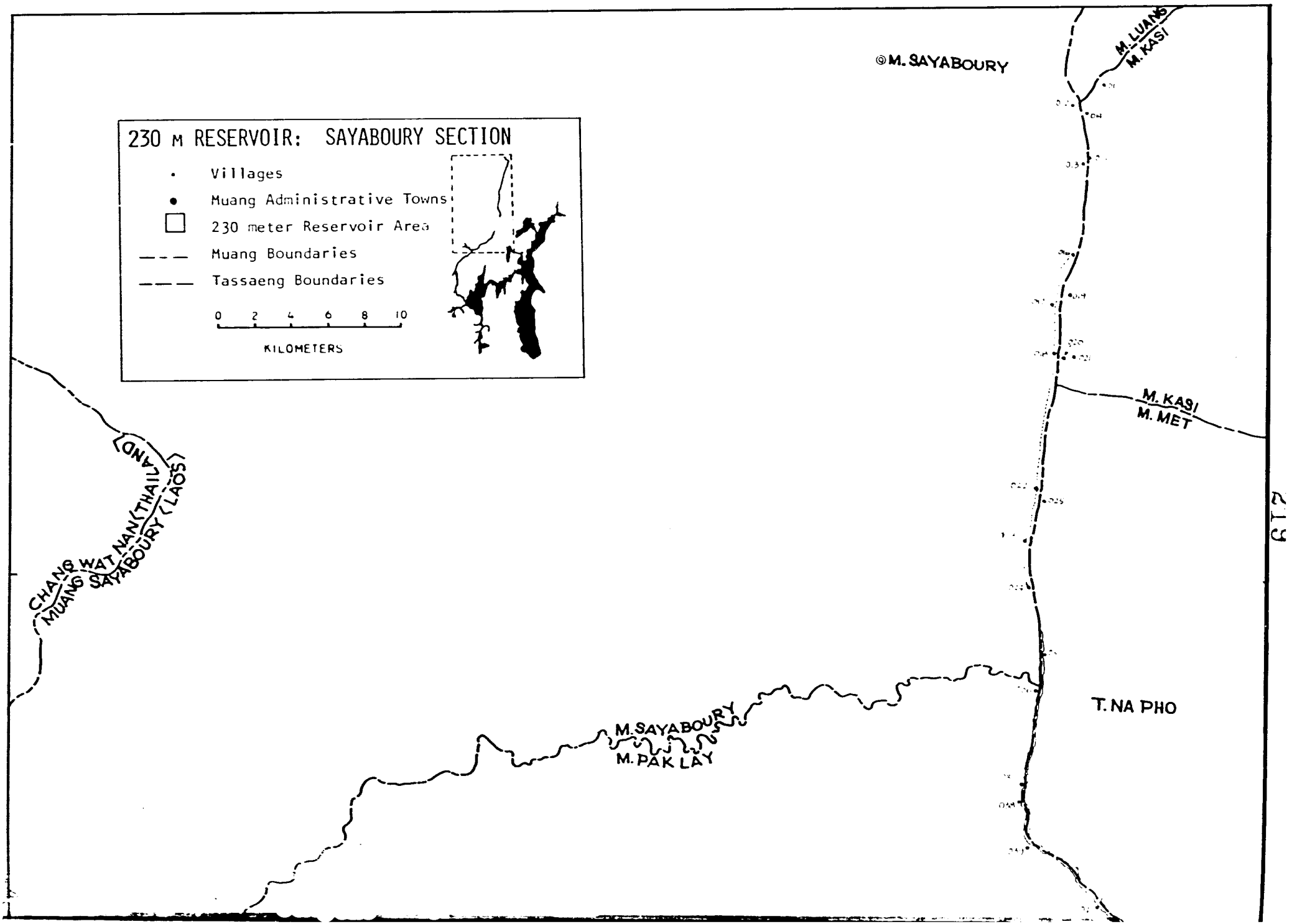
KILOMETERS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Villages
Muang Administrative Towns
230 meter Reservoir Area
Muang Boundaries
Tassaeng Boundaries
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KILOMETERS
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M. LUANG
M. KASI
M. KASI
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MUANG SAYABOURY (LAOS)
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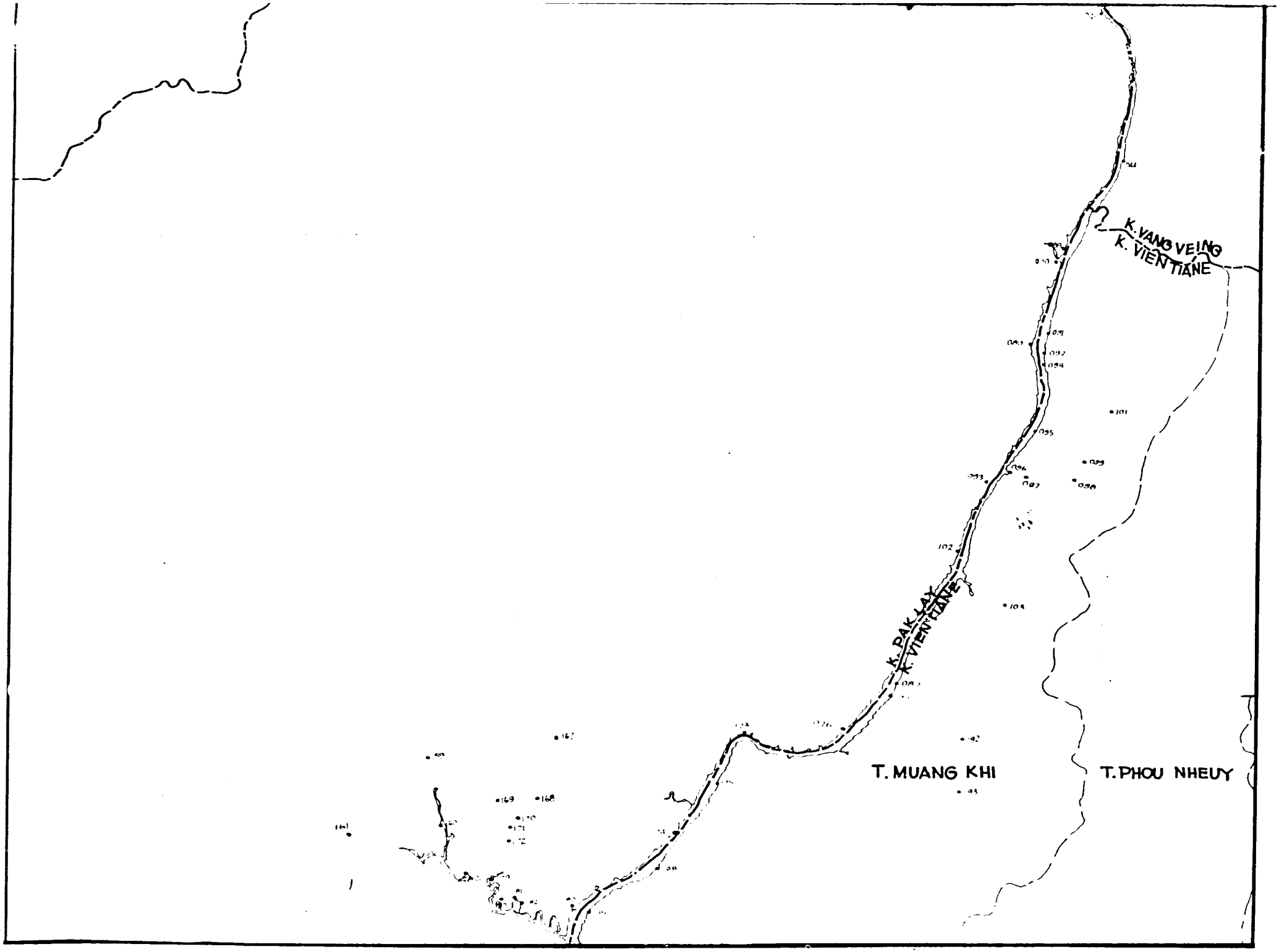
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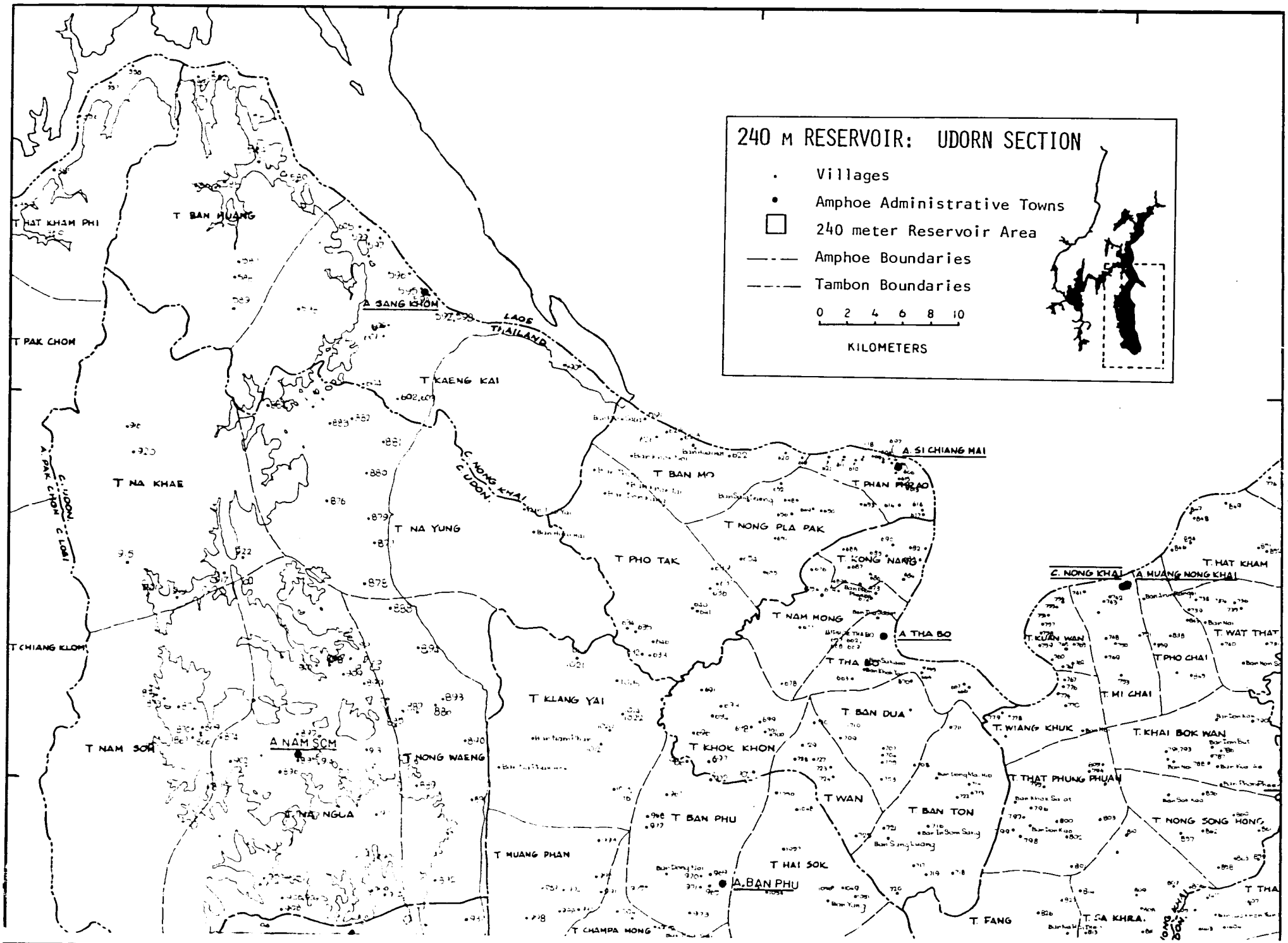
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Villages
Amphoe Administrative Towns
240 meter Reservoir Area
Amphoe Boundaries
Tambon Boundaries
0 2 4 6 8 10
KILOMETERS
T HAT KHAM PHI
T BAN MUANG
A SANG KHOM
LAOS
THAILAND
T PAK CHOM
T KAENG KAI
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T BAN MO
T PHAN PHRAO
T NONG PLA PAK
T NA KHAE
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T KONG NARA
C. NONG KHAI
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A THA BO
T KUAN WAN
T WAT THAT
T PHO CHAI
T MI CHAI
T CHIANG KLOM
T KLANG YAI
T BAN DUA
T WIANG KHUK
T KHAI BOK WAN
T NAM SOK
A NAM SOM
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T KHOK KHON
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T NA NGUA
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T NONG SONG HONG
T MUANG PHAN
T HAI SOK
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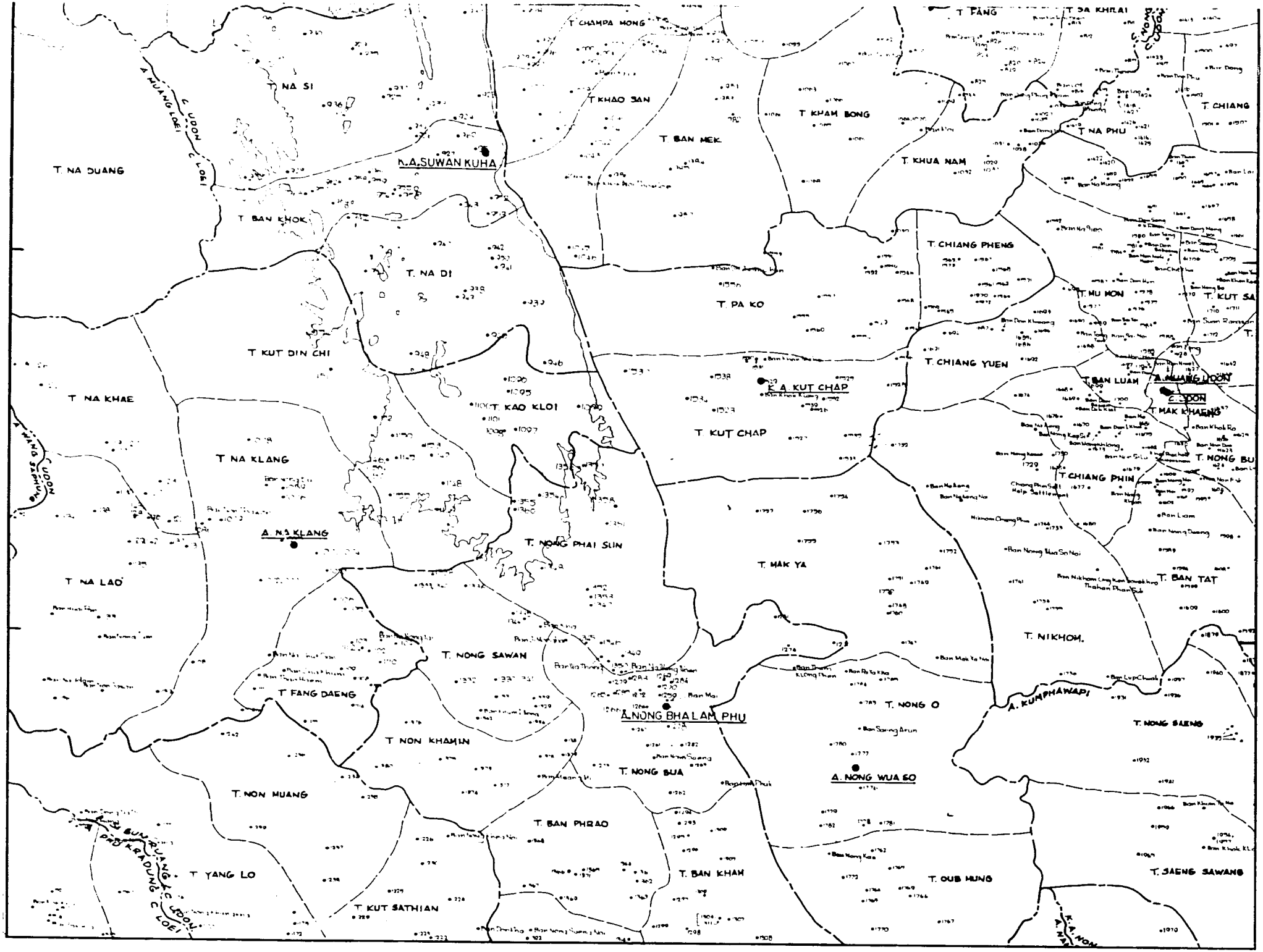
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C. UDON
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A. NONG BHALAM PHU
T. NONG O
A. KUMPHAWAPI
T. NON KHAMIN
T. NONG BUA
T. NONG SAENG
A. NONG WUA SO
T. NON MUANG
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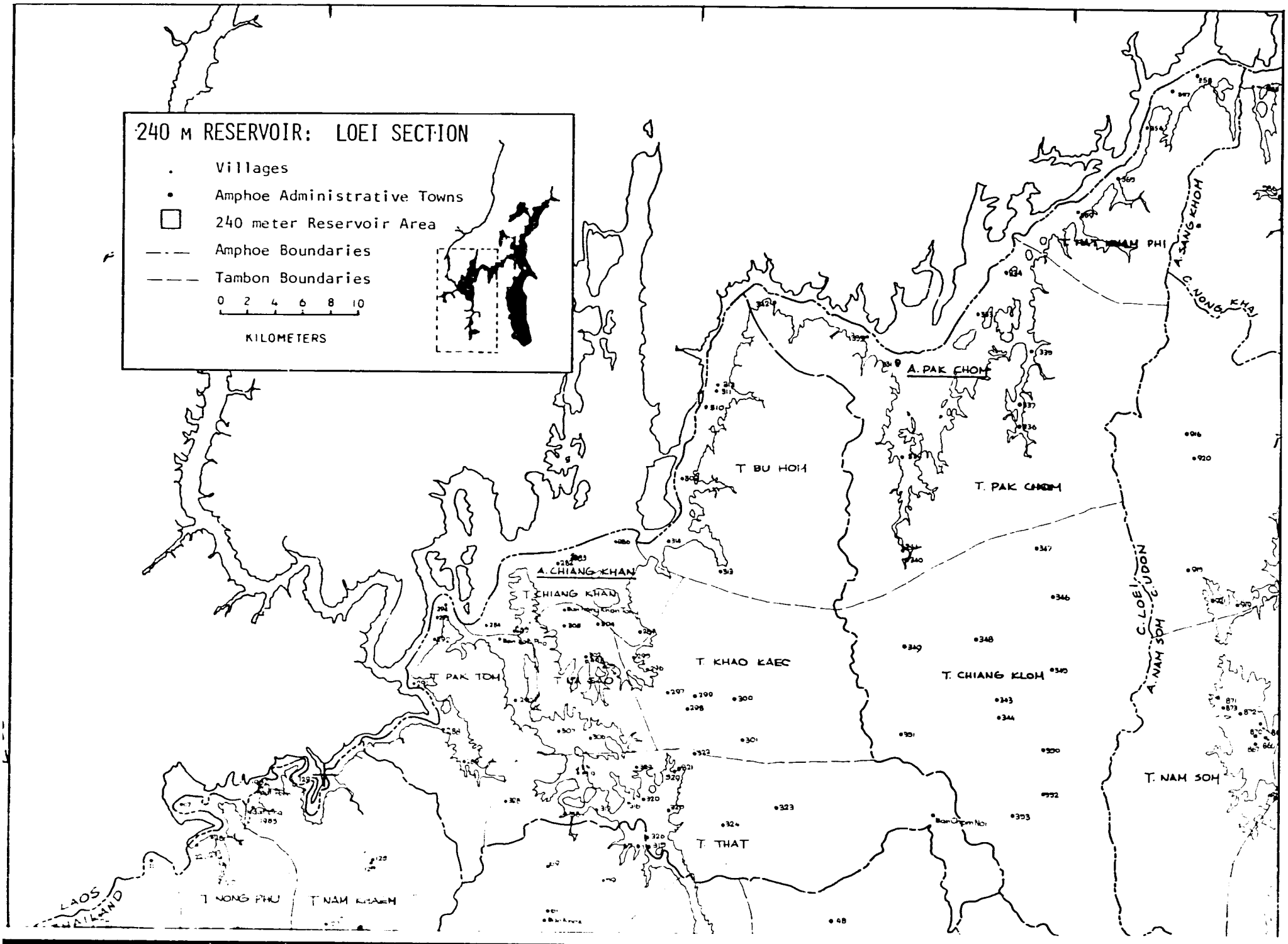
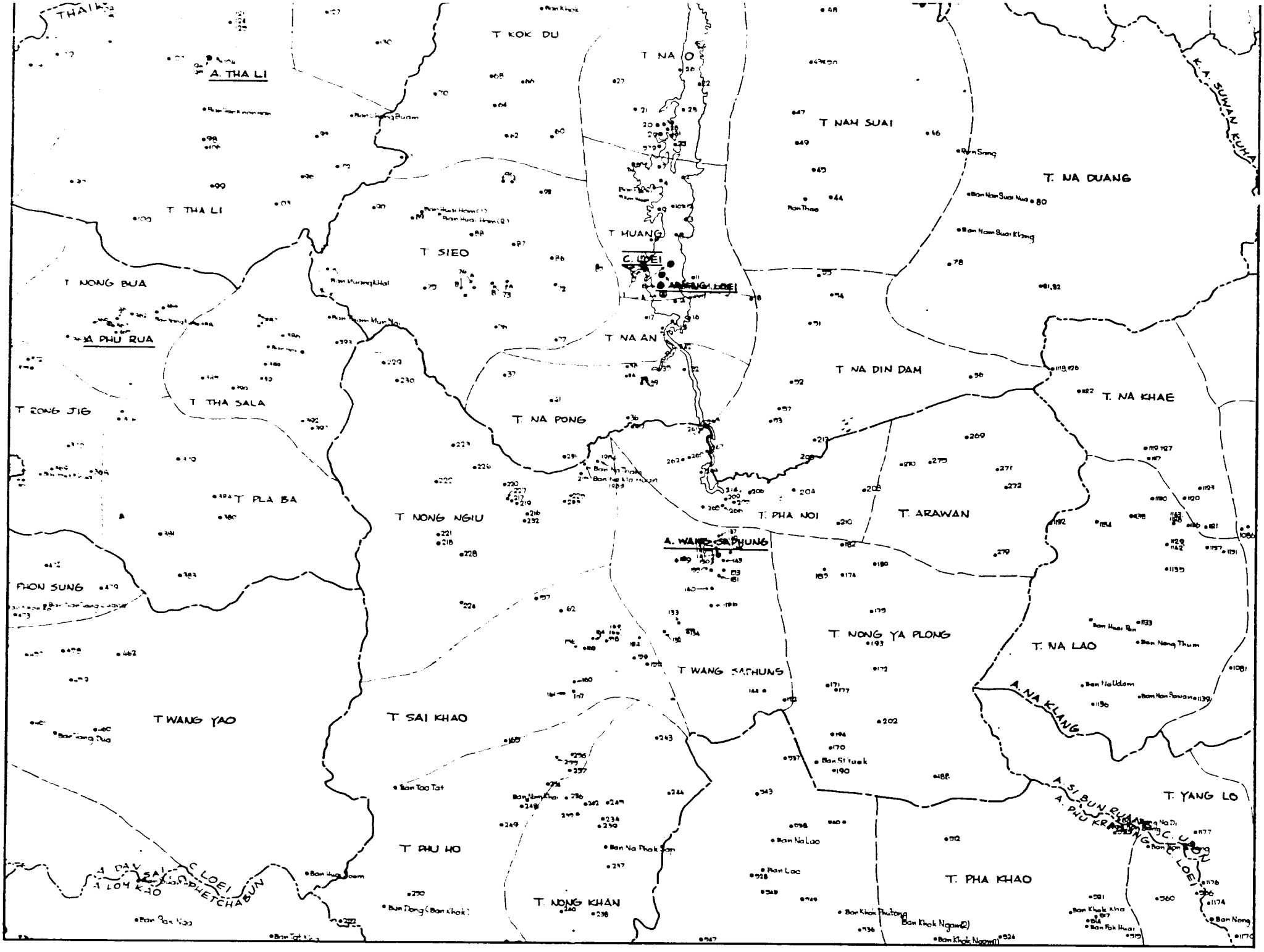

240 M RESERVOIR: LOEI SECTION
Villages
Amphoe Administrative Towns
240 meter Reservoir Area
Amphoe Boundaries
Tambon Boundaries
0 2 4 6 8 10
KILOMETERS
A. PAK CHOM
T BU HOM
T. PAK CHOM
A. CHIANG KHAN
T CHIANG KHAN
T PAK TOM
T KHAO KAEC
T. CHIANG KLOM
T. NAM SOH
T. THAT
T NONG PHU
T NAM KHAEM
LAOS
THAILAND
A. SANG KHOM
C. NONG KHAI
C. LOEI
C. UDON
A. NAM SOH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T PLA BA
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PHON SUNG
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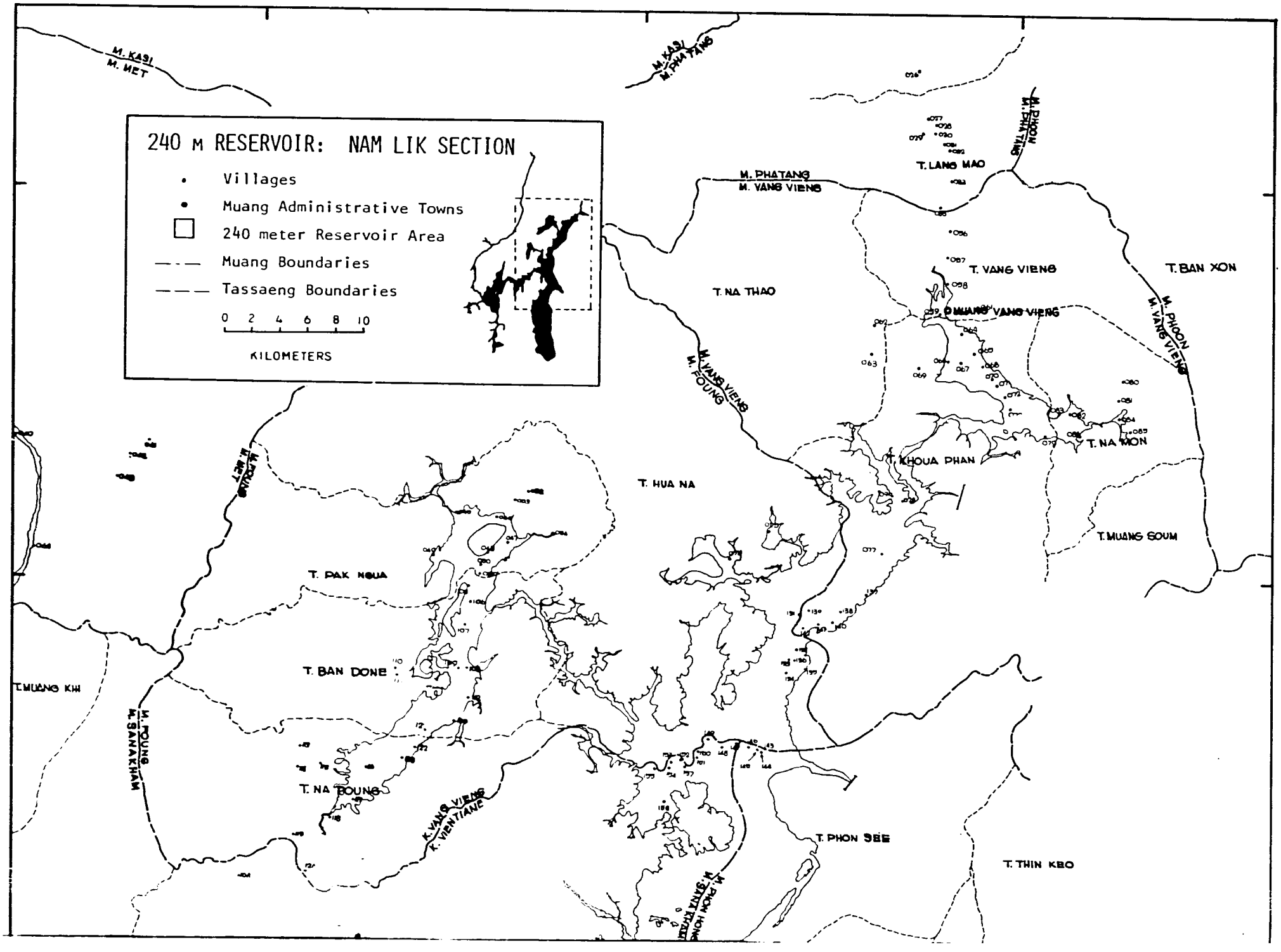
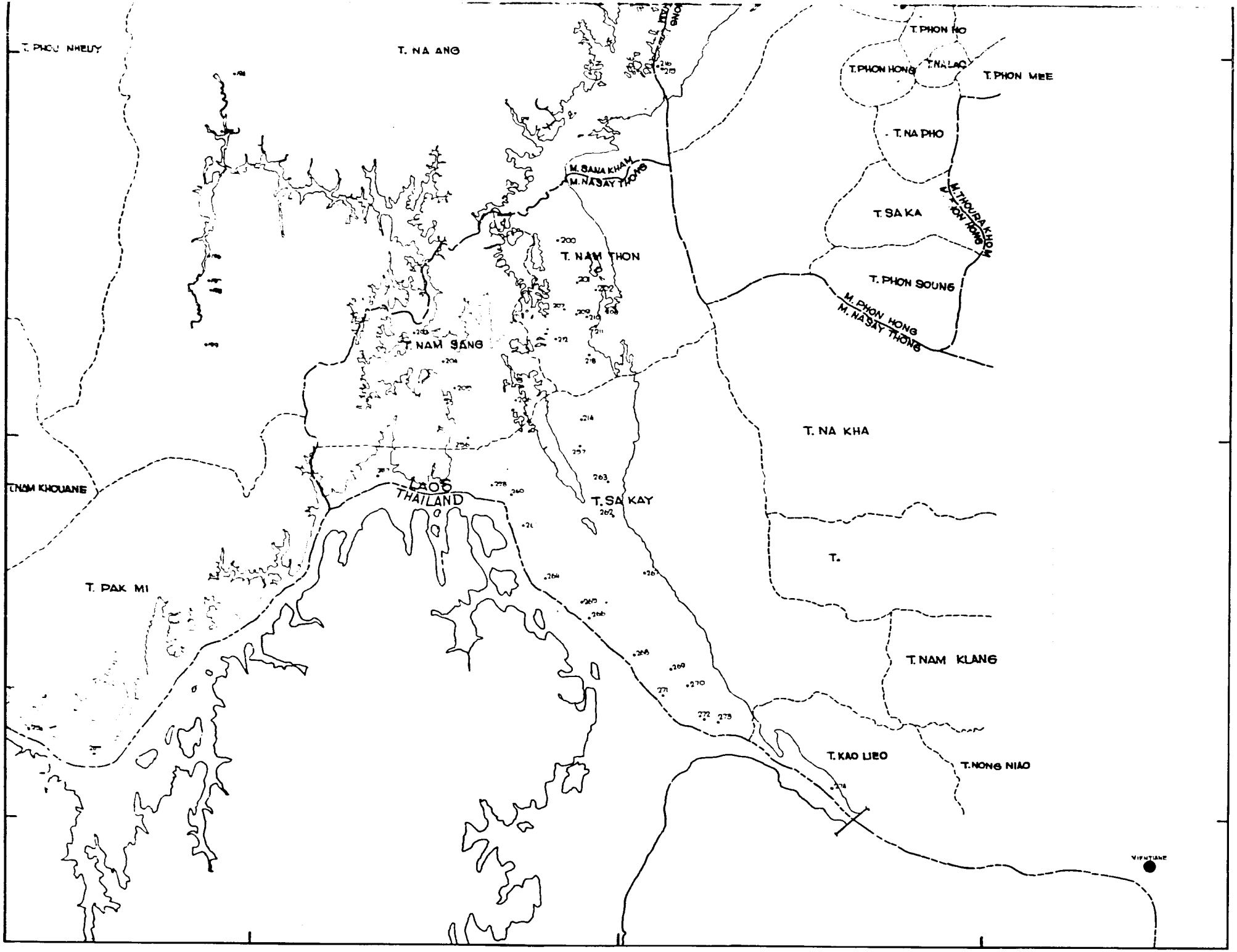
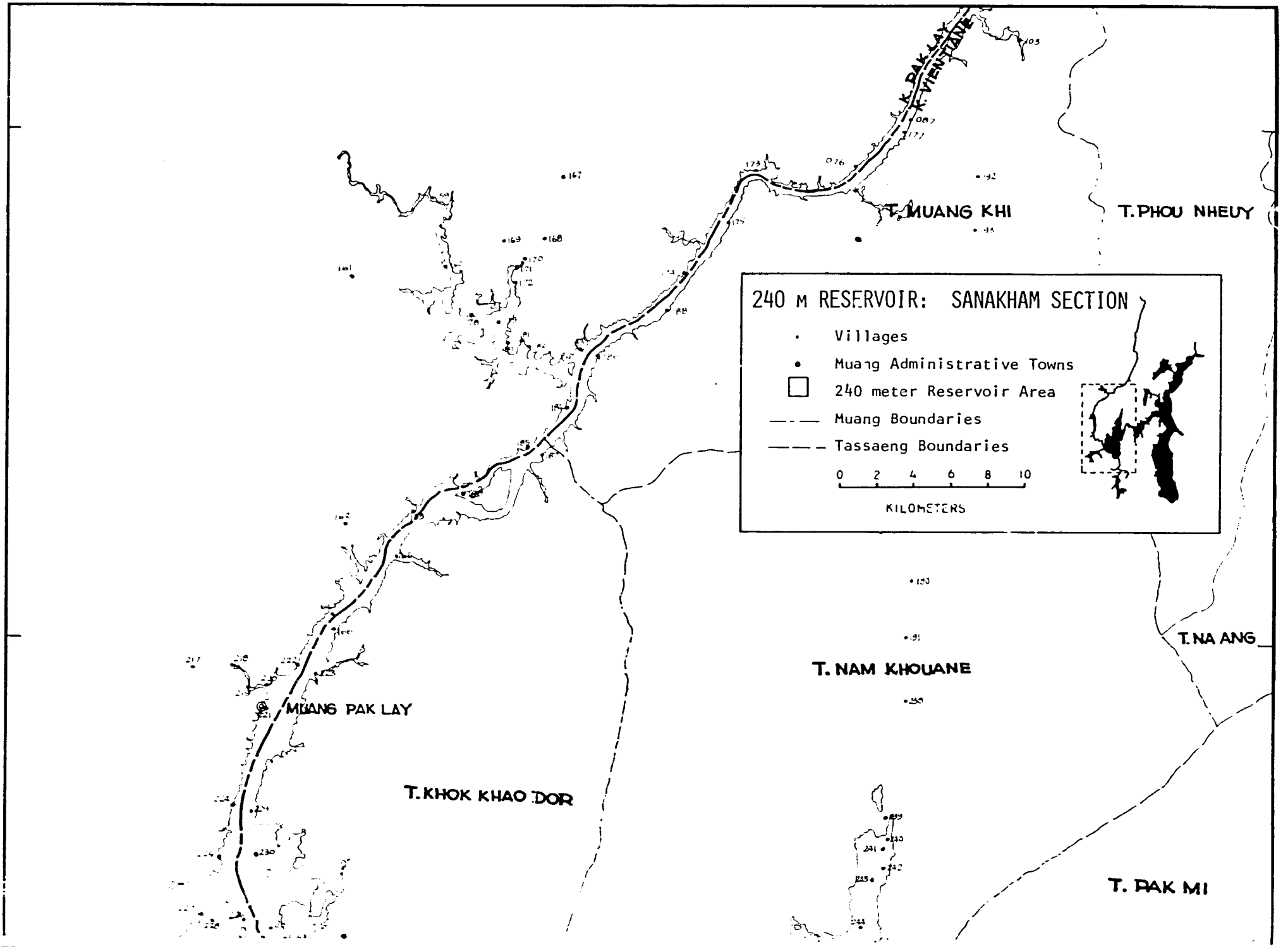
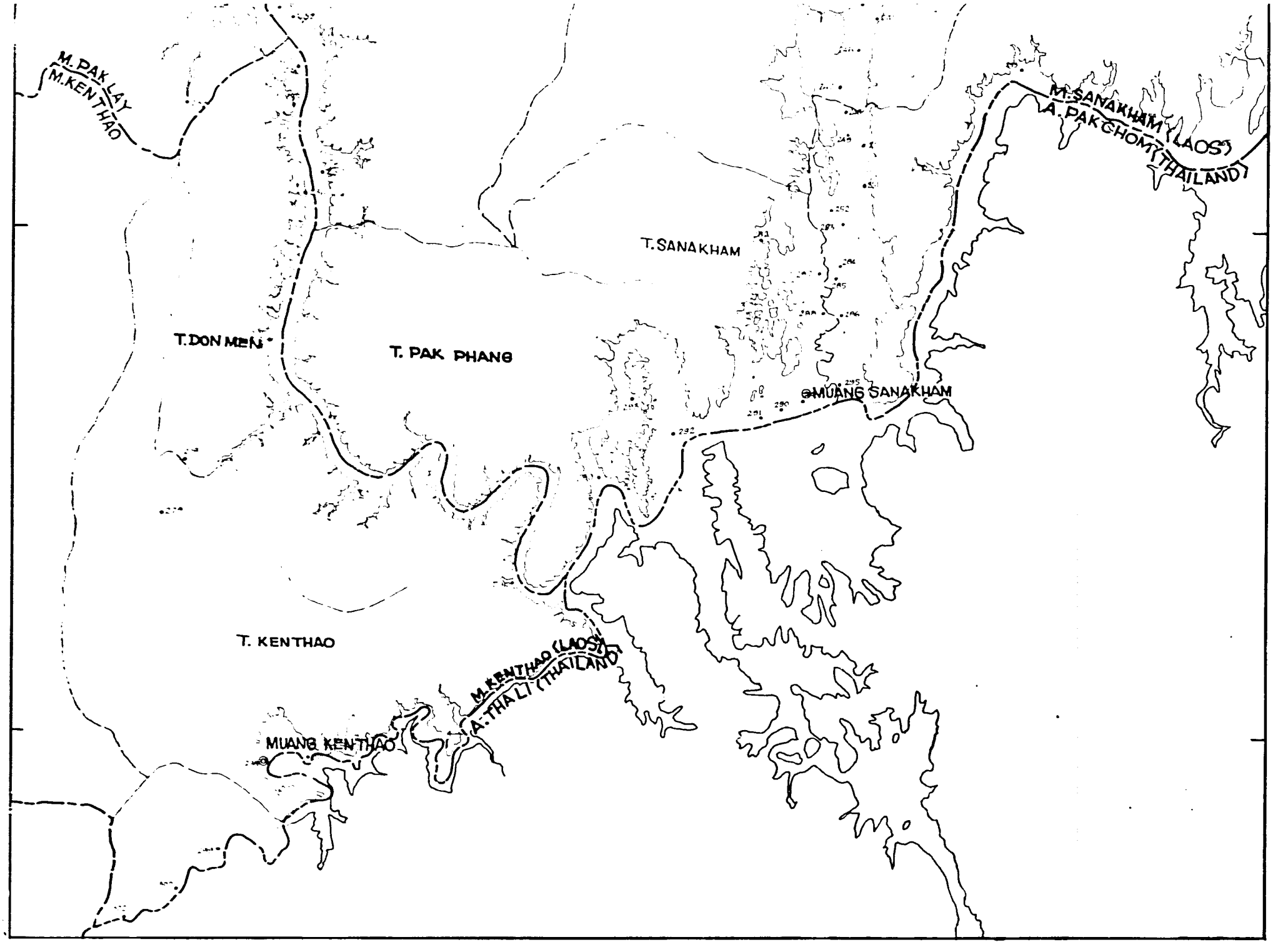
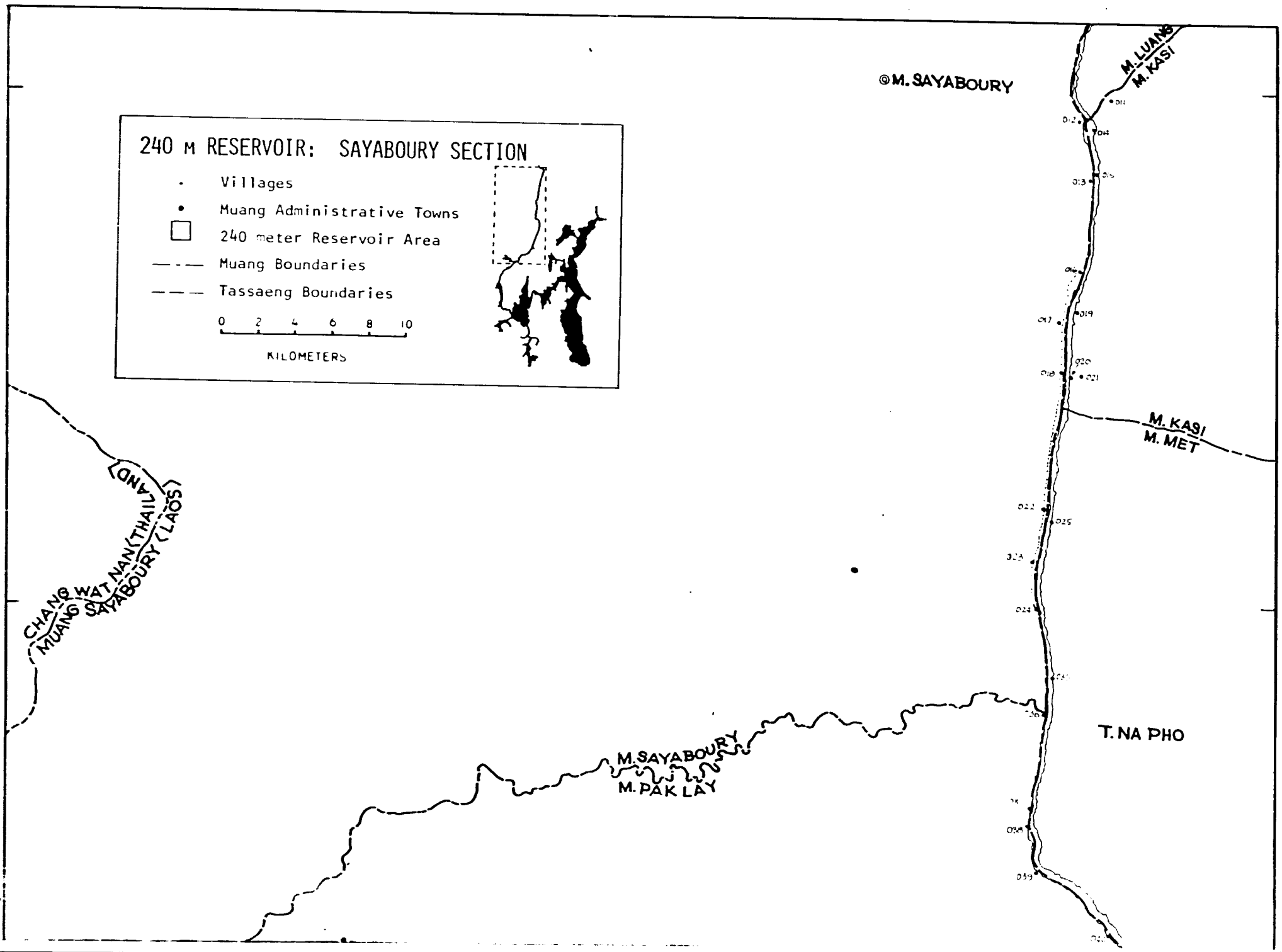
T. NA LAO
T WANG SAPHUNG
T WANG YAO
T SAI KHAO
A. NA KLANG
T. YANG LO
T PHU HO
T NONG KHAN
T. PHA KHAO
K. A. SUWAN KUHA

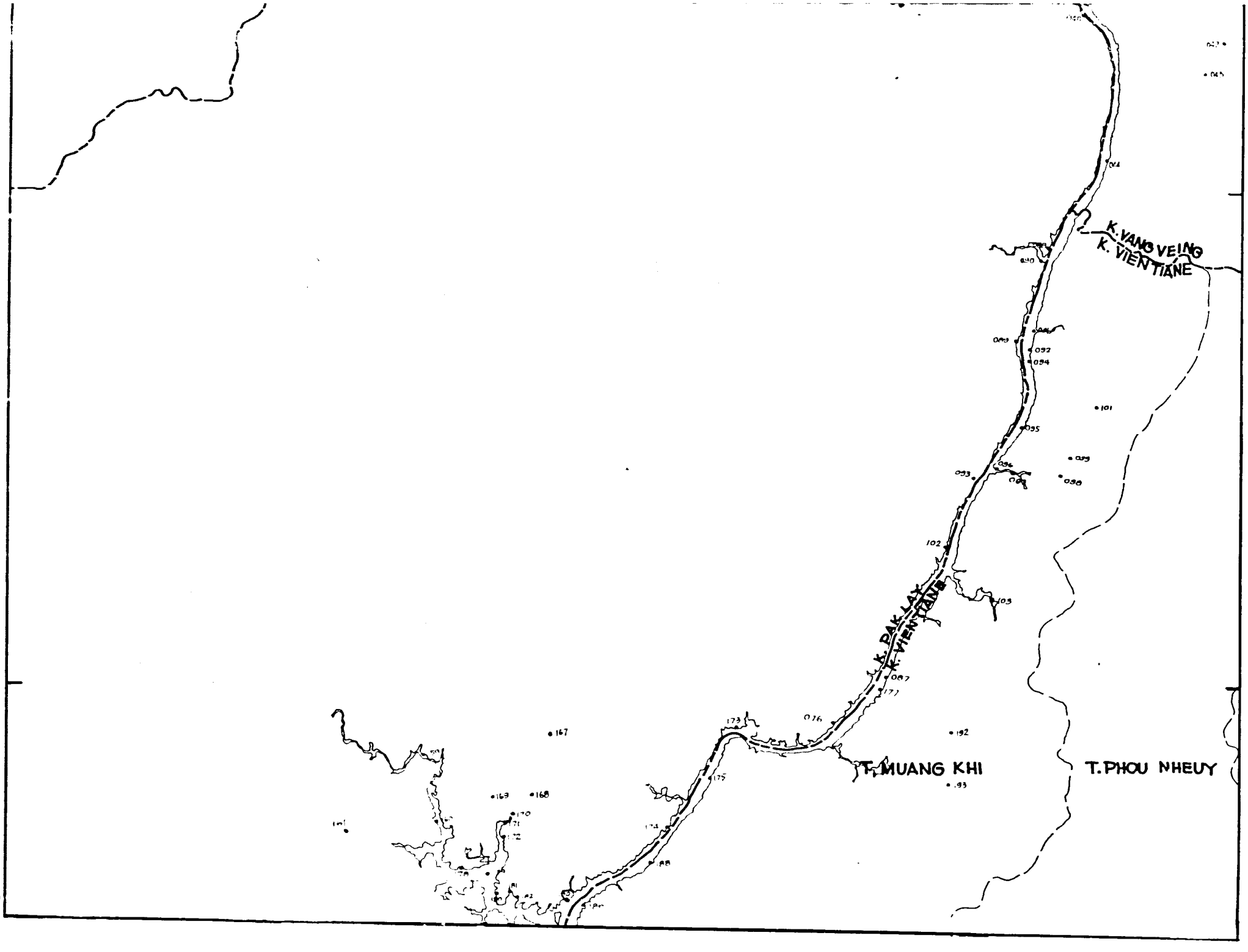

240 M RESERVOIR: NAM LIK SECTION
Villages
Muang Administrative Towns
240 meter Reservoir Area
Muang Boundaries
Tassaeng Boundaries
0 2 4 6 8 10
KILOMETERS
M. KASI
M. MET
M. KASI
M. PHATANG
M. PHATANG
M. VANG VIENG
T. LANG MAO
M. PHOON
M. PAK TANG
T. VANG VIENG
T. BAN XON
T. NA THAO
M. VANG VIENG
M. FOUNG
M. PHOON
M. VANG VIENG
T. NA MON
T. KHOUA PHAN
T. HUA NA
M. MET
M. FOUNG
T. MUANG SOUM
T. PAK NGUA
T. BAN DONE
T. MUANG KHI
M. FOUNG
M. SANAKHAM
T. NA FOUNG
K. VANG VIENG
K. VIENTIANE
T. PHON SEE
T. THIN KEO
M. PHON HONG

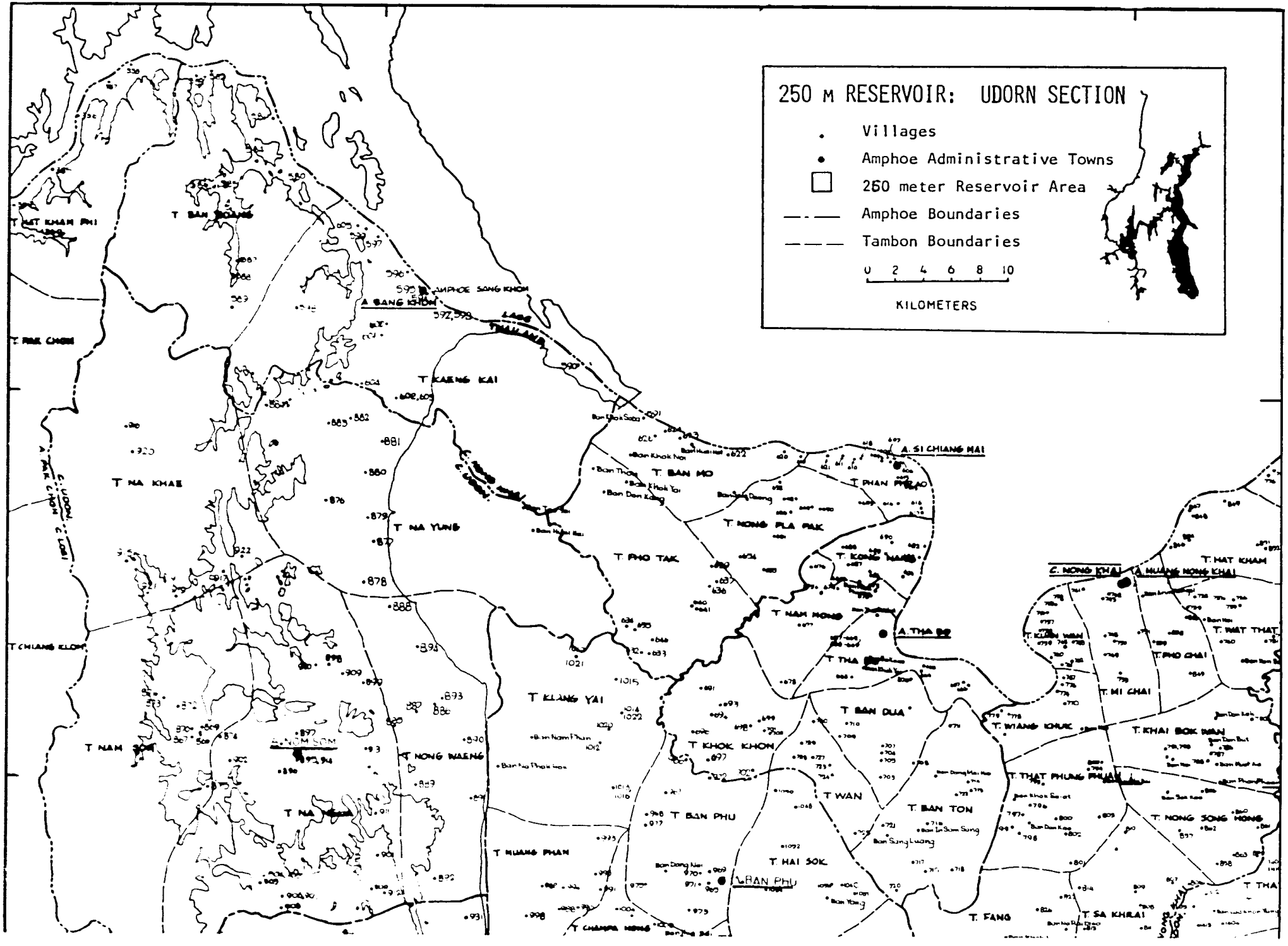

T. PHOU NHEUY
T. NA ANG
T. PHON HO
T. PHON HONG
T. NA LAO
T. PHON MEE
T. NA PHO
M. SANA KHAM
M. NA SAY THONG
T. SA KA
M. THOUA KHOM
T. PHON HONG
T. NAM THON
T. PHON SOUNG
M. PHON HONG
M. NA SAY THONG
T. NAM SANG
T. NA KHA
T. NAM KHOUANE
LAOS
THAILAND
T. SA KAY
T.
T. PAK MI
T. NAM KLANG
T. KAO LIEO
T. NONG NIAO
VIENTIANE

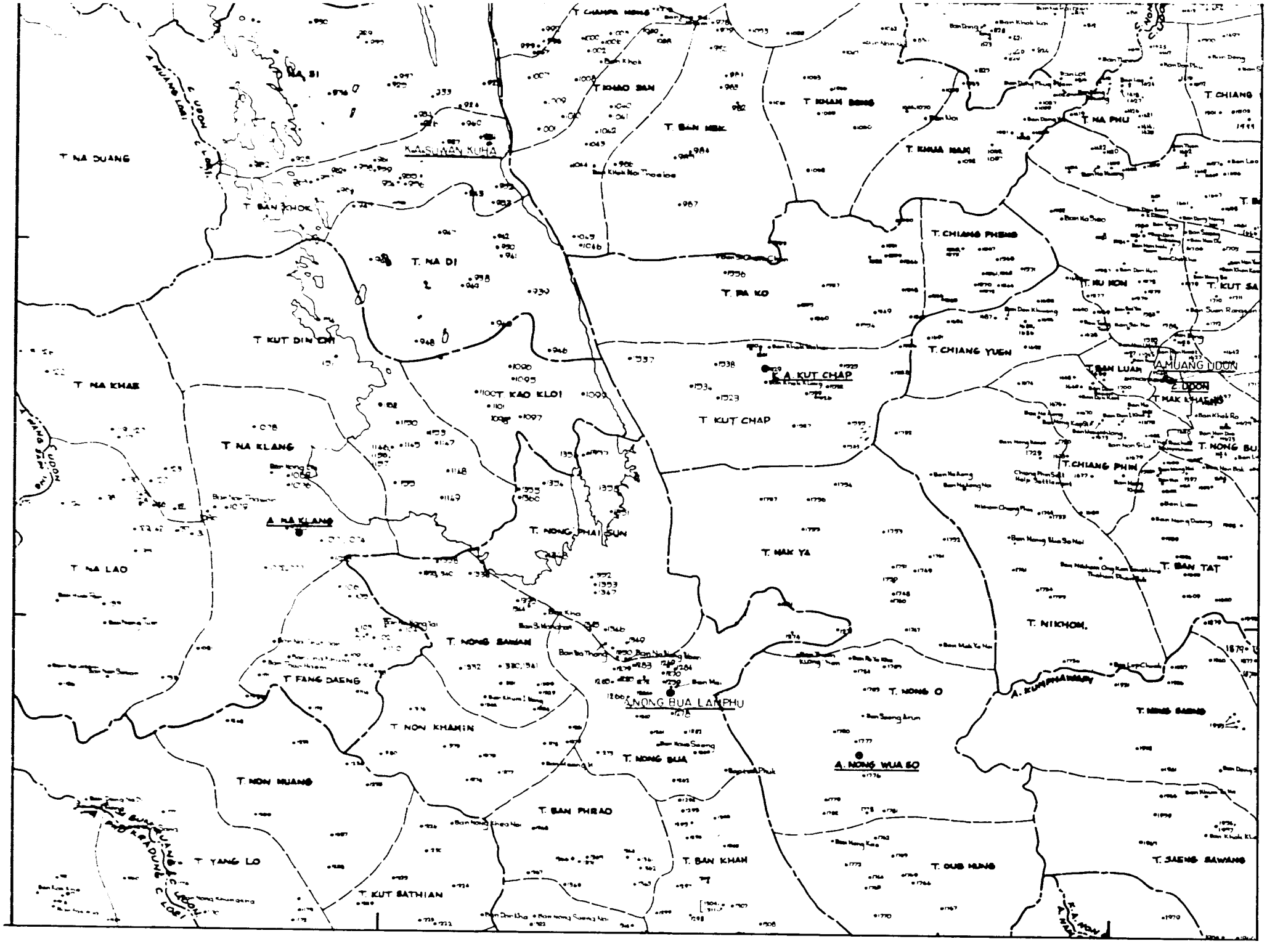

240 M RESERVOIR: SANAKHAM SECTION
Villages
Muang Administrative Towns
240 meter Reservoir Area
Muang Boundaries
Tassaeng Boundaries
0 2 4 6 8 10
KILOMETERS
T. MUANG KHI
T. PHOU NHEUY
T. NA ANG
T. NAM KHOUANE
T. PAK MI
T. KHOK KHAO DOR
MUANG PAK LAY
K. PAK LAY
K. VIENTIANE

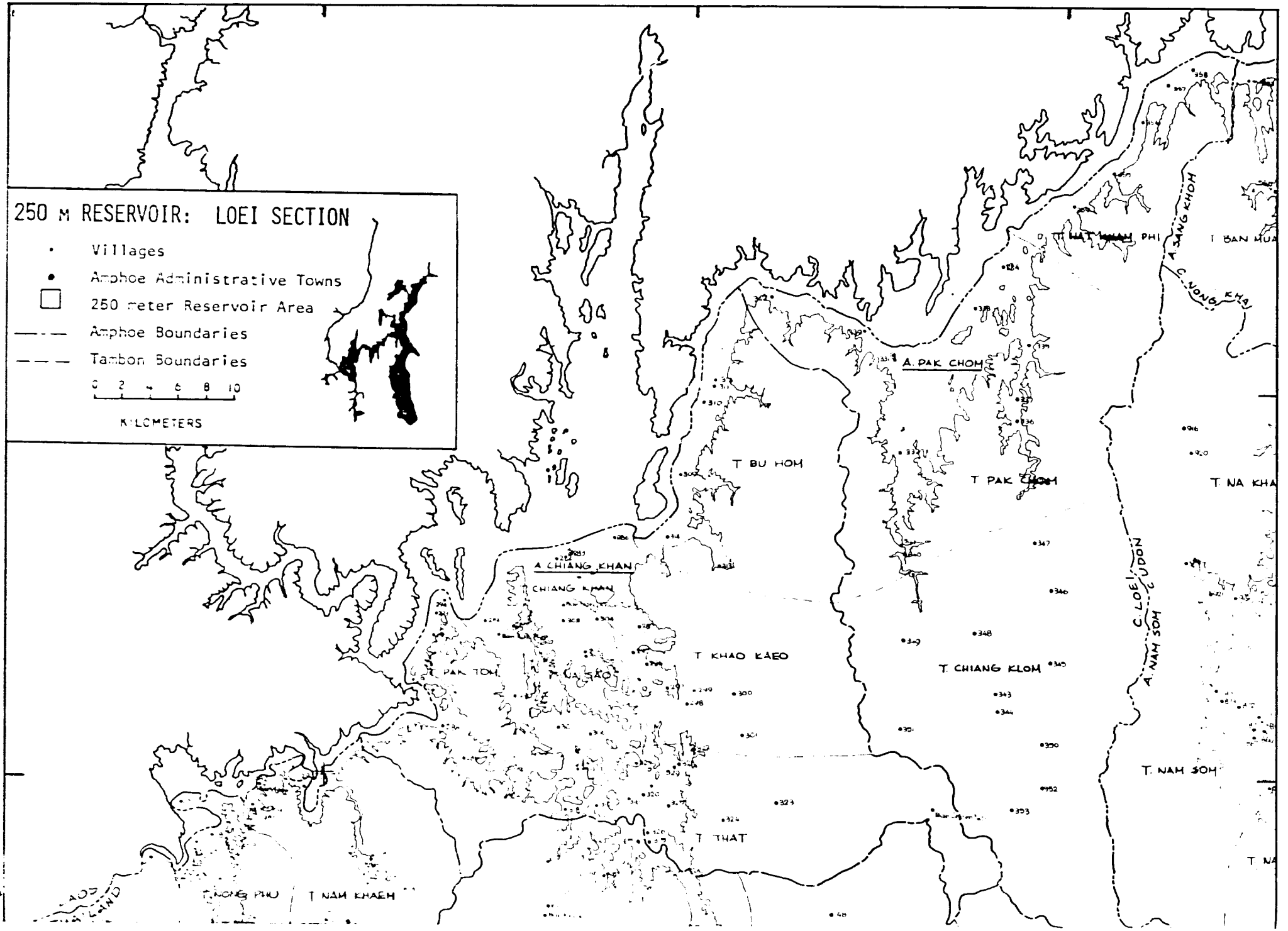

M. PAK LAY
M. KENTHAO
T. SANAKHAM
M. SANAKHAM (LAOS)
A. PAK CHOM (THAILAND)
T. DON MEN
T. PAK PHANG
MUANG SANAKHAM
T. KENTHAO
M. KENTHAO (LAOS)
A. THALI (THAILAND)
MUANG KENTHAO

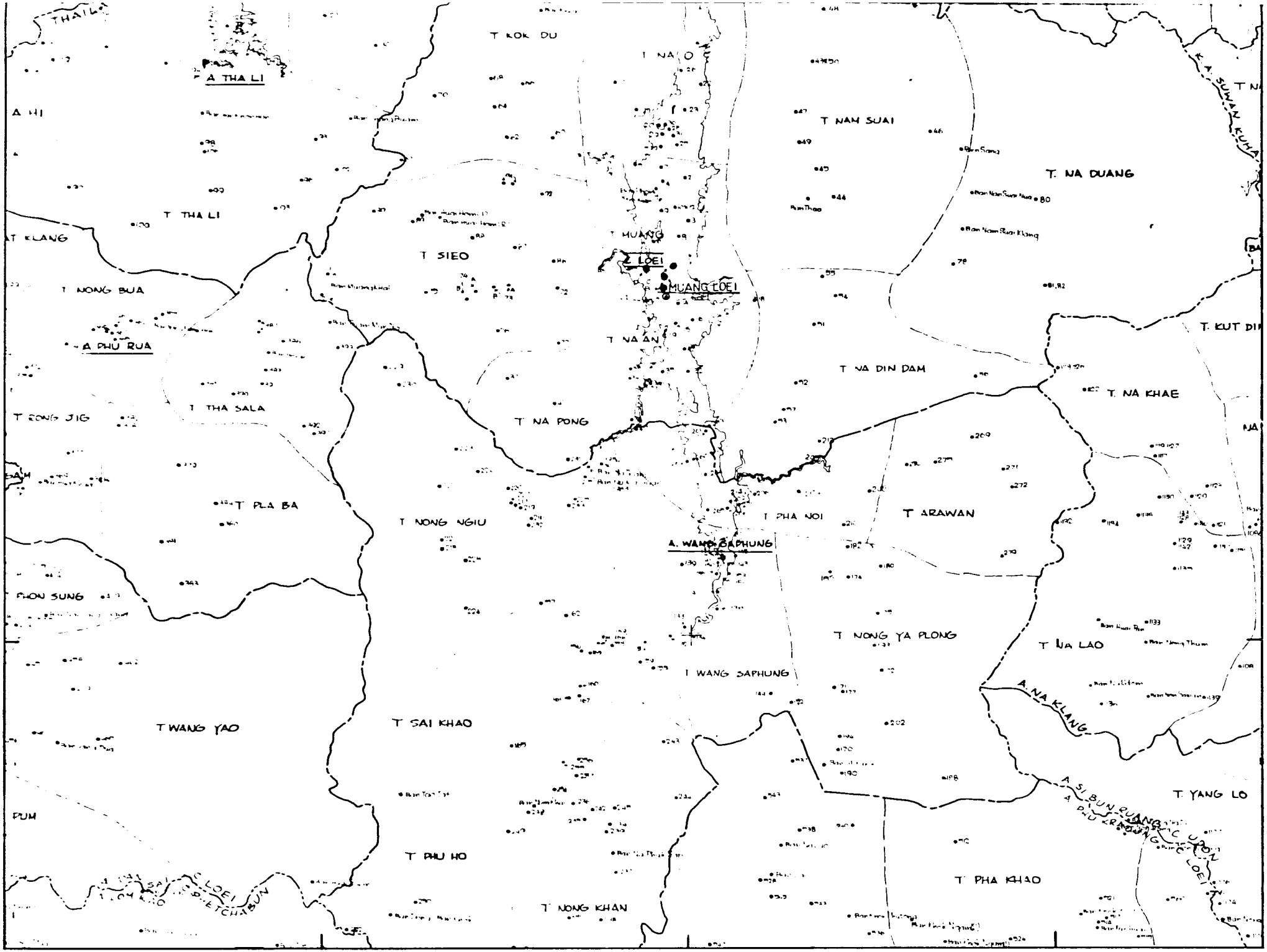

240 M RESERVOIR: SAYABOURY SECTION
Villages
Muang Administrative Towns
240 meter Reservoir Area
Muang Boundaries
Tassaeng Boundaries
0 2 4 6 8 10
KILOMETERS
©M. SAYABOURY
M. LUANG
M. KASI
M. KASI
M. MET
CHANG WAT NAN (THAILAND)
MUANG SAYABOURY (LAOS)
M. SAYABOURY
M. PAK LAY
T. NA PHO

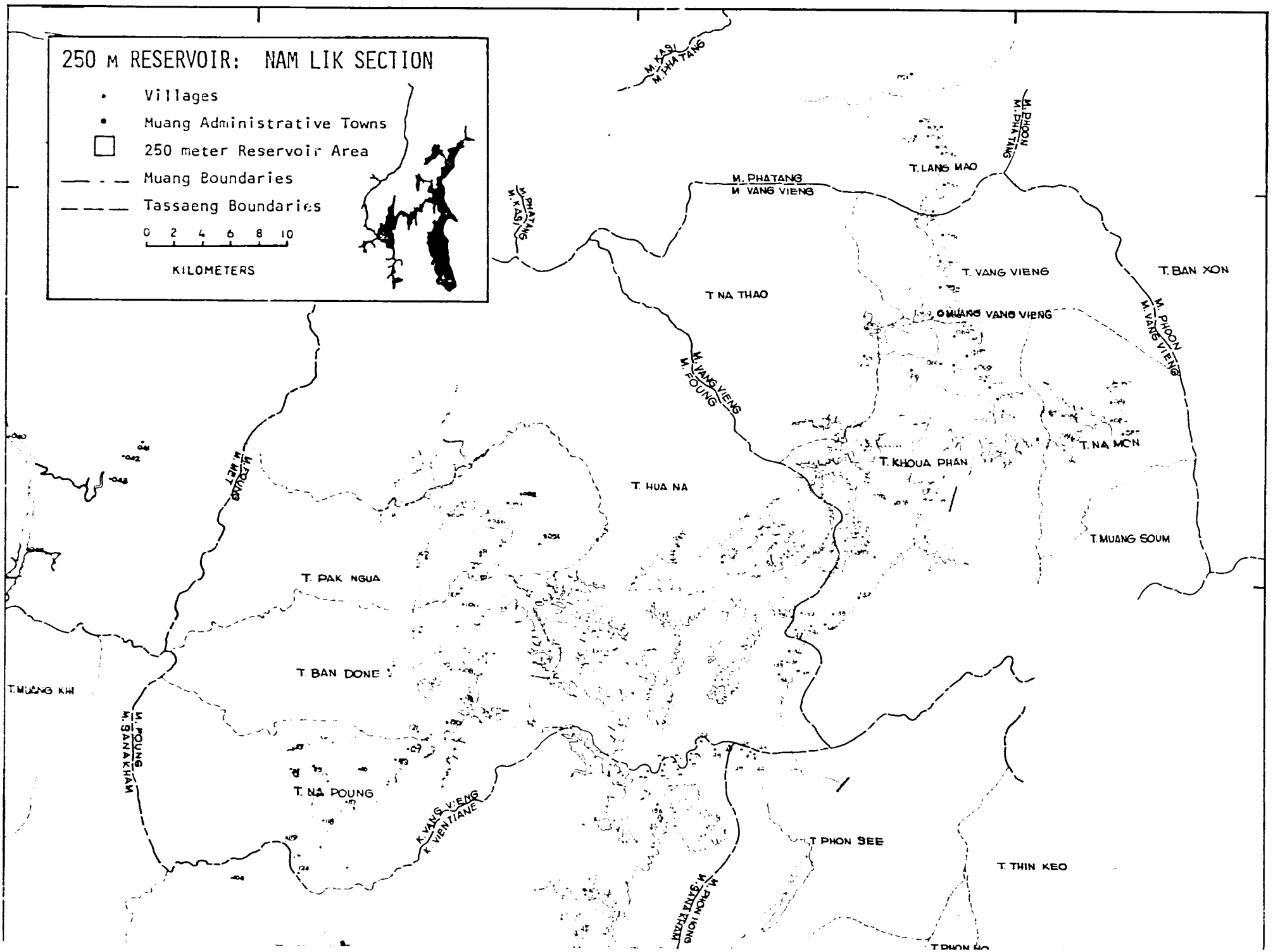

K. VANG VEING
K. VIENTIANE
K. PAK LAY
K. VIENTIANE
T. MUANG KHI
T. PHOU NHEUY

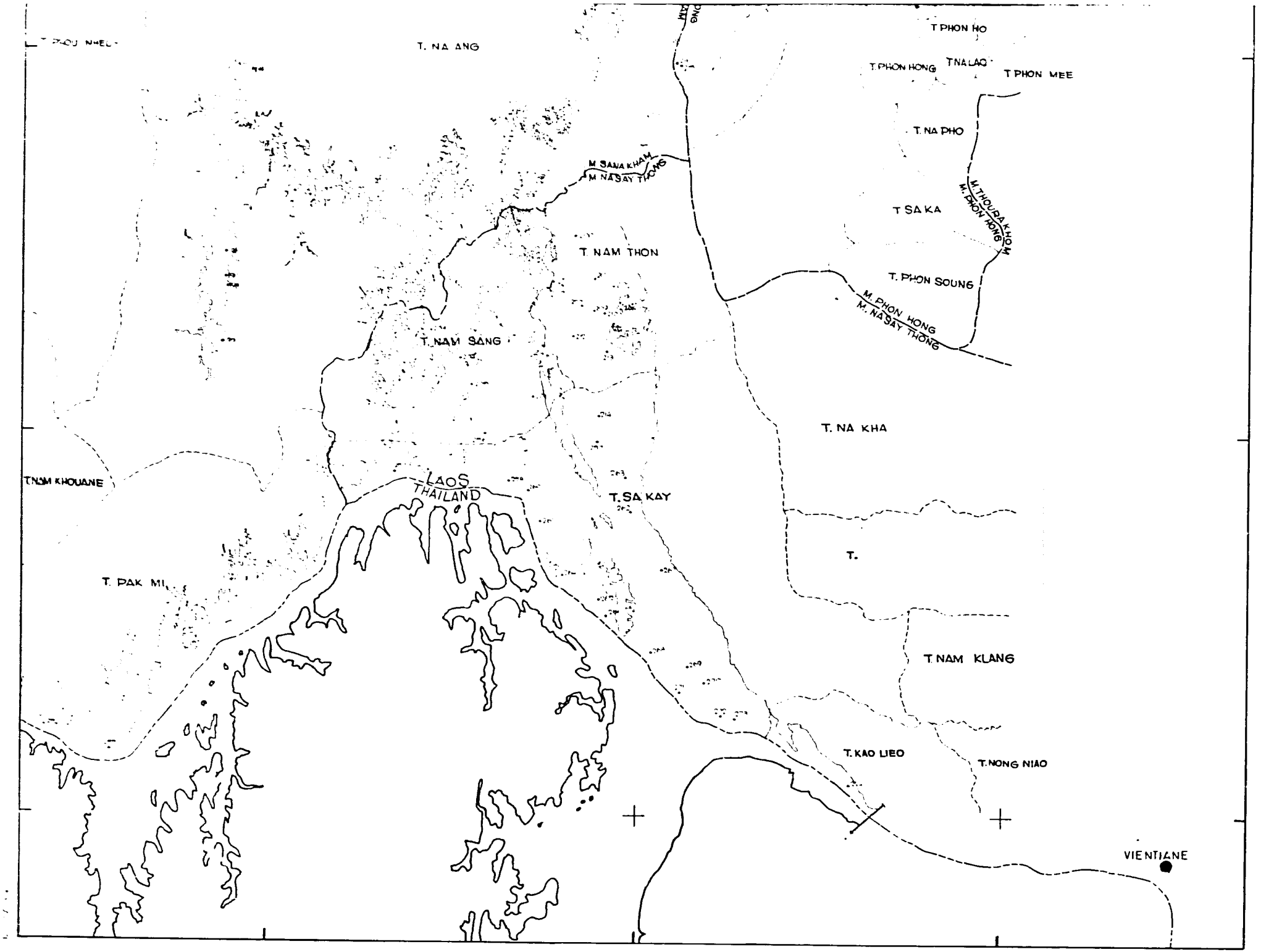

250 M RESERVOIR: UDORN SECTION
Villages
Amphoe Administrative Towns
250 meter Reservoir Area
Amphoe Boundaries
Tambon Boundaries
0 2 4 6 8 10
KILOMETERS
A. BANG KHONI
A. SI CHIANG MAI
A. THA BO
C. NONG KHAI
A. MUANG NONG KHAI
A. NAM SOM
A. BAN PHU
T. NA KHAE
T. NA YUNG
T. PHO TAK
T. KAENG KAI
T. BAN MO
T. NONG PLA PAK
T. NAM HONG
T. KLANG YAI
T. KHOK KHON
T. BAN PHU
T. HAI SOK
T. WAN
T. BAN DUA
T. BAN TON
T. NUANG PHAN
T. NONG NAENG
T. NAM SOI
T. CHIANG KLOM
T. HAT KHAM
T. PHO CHAI
T. MI CHAI
T. WIANG KHUK
T. KHAI BOK WAN
T. THAT PHUNG PHAM
T. NONG SONG HONG
T. SA KHRAI
T. FANG

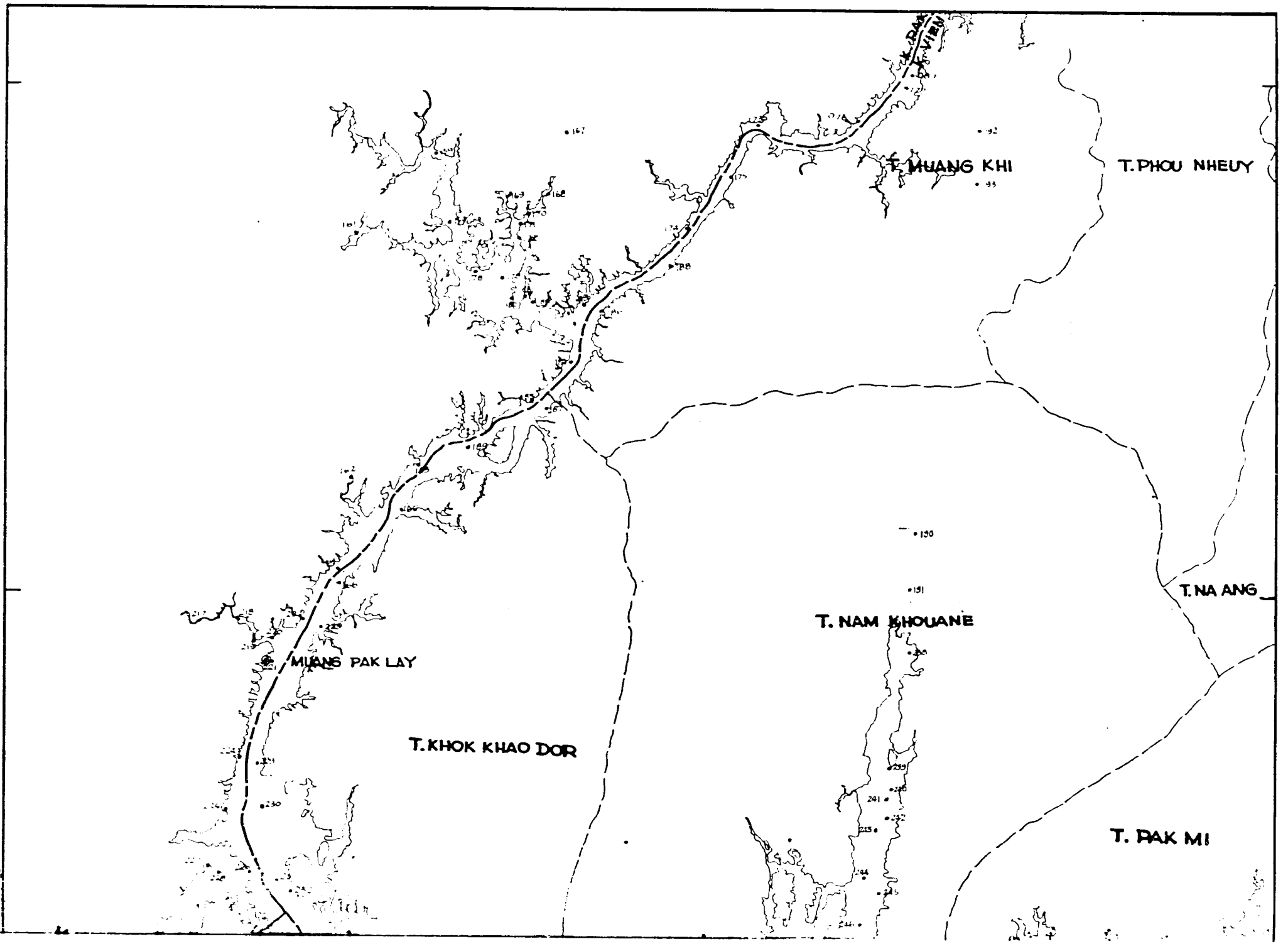

T. NA DUANG
T. BAN CHOK
T. NA DI
T. KUT DIN DAENG
T. NA KHAE
T. NA KLANG
A. NA KLANG
T. NA LAO
T. FANG DAENG
T. NON KHAMIN
T. NON MUANG
T. YANG LO
T. KUT BATHIAN
T. NONG SANAM
T. NONG PHAI SUN
T. KAO KLOI
T. KUT CHAP
A. KUT CHAP
T. PA KO
T. BAN MAK
T. KHAO SAN
T. KHUA MAK
T. KHAM BONG
T. CHIANG PHENG
T. CHIANG YUEN
T. NA PHU
T. CHIANG
T. KU KON
T. KUT SA
T. BAN LUAM
AMUANG UDON
T. MAK KHAENG
T. NONG BU
T. CHIANG PHIN
T. BAN TAT
T. NIKHOM
T. NONG O
T. NONG BUA
T. BAN PHRAO
T. BAN KHAM
T. NONG BUA LAMPHU
A. NONG WUA SO
T. DUB MUNG
T. SAENG SAWANG
T. MAK YA

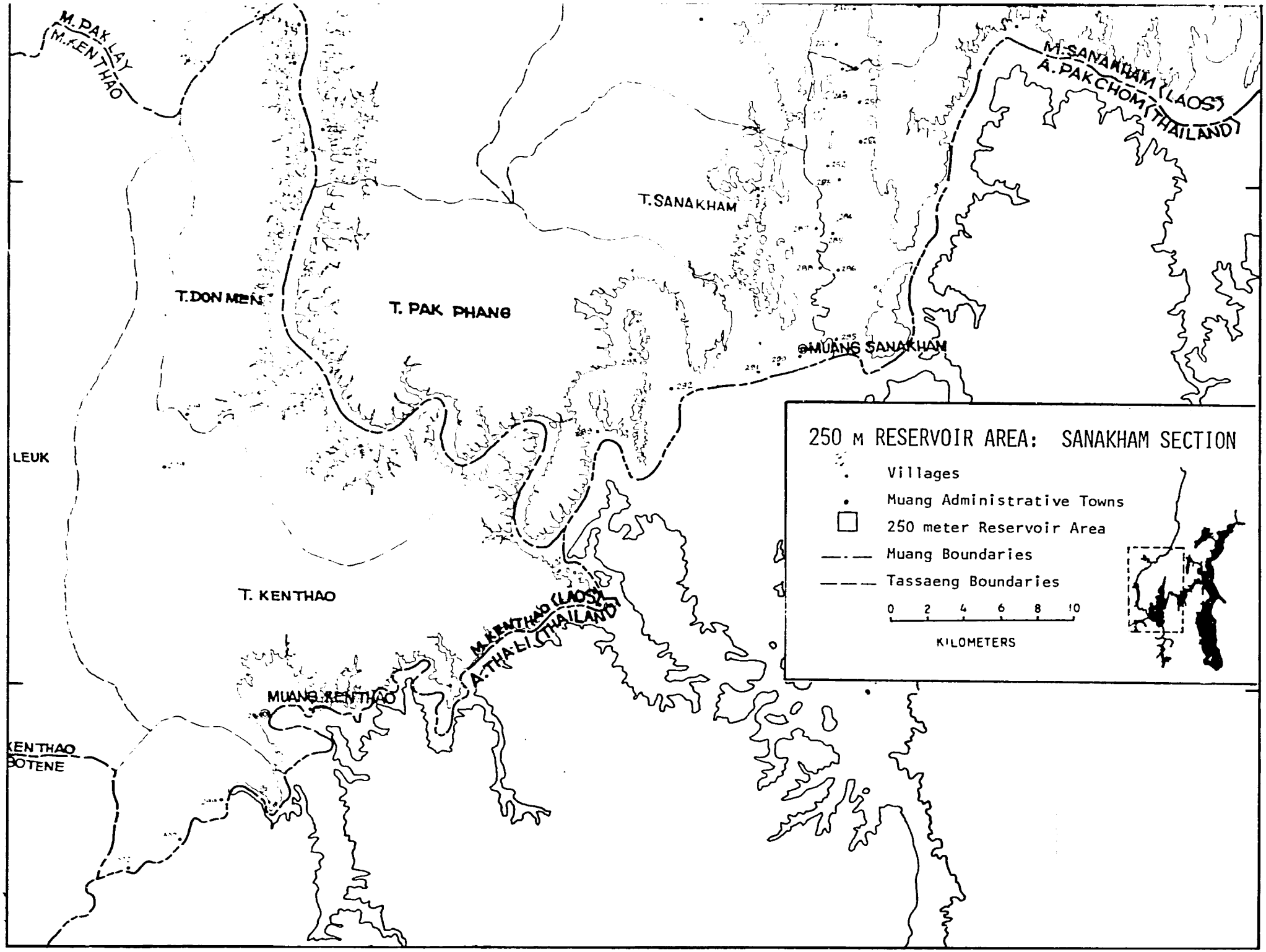

250 M RESERVOIR: LOEI SECTION
Villages
Amphoe Administrative Towns
250 meter Reservoir Area
Amphoe Boundaries
Tambon Boundaries
0 2 4 6 8 10
KILOMETERS
A. PAK CHOM
T BU HOM
T PAK CHOM
T NA KHA
A CHIANG KHAN
CHIANG KHAN
T KHAO KAEO
T CHIANG KLOM
T NAM SOM
T THAT
T NAM KHAEM
C. LOEI
A. NAM SOM
A. SANG KHOM
T BAN MUA

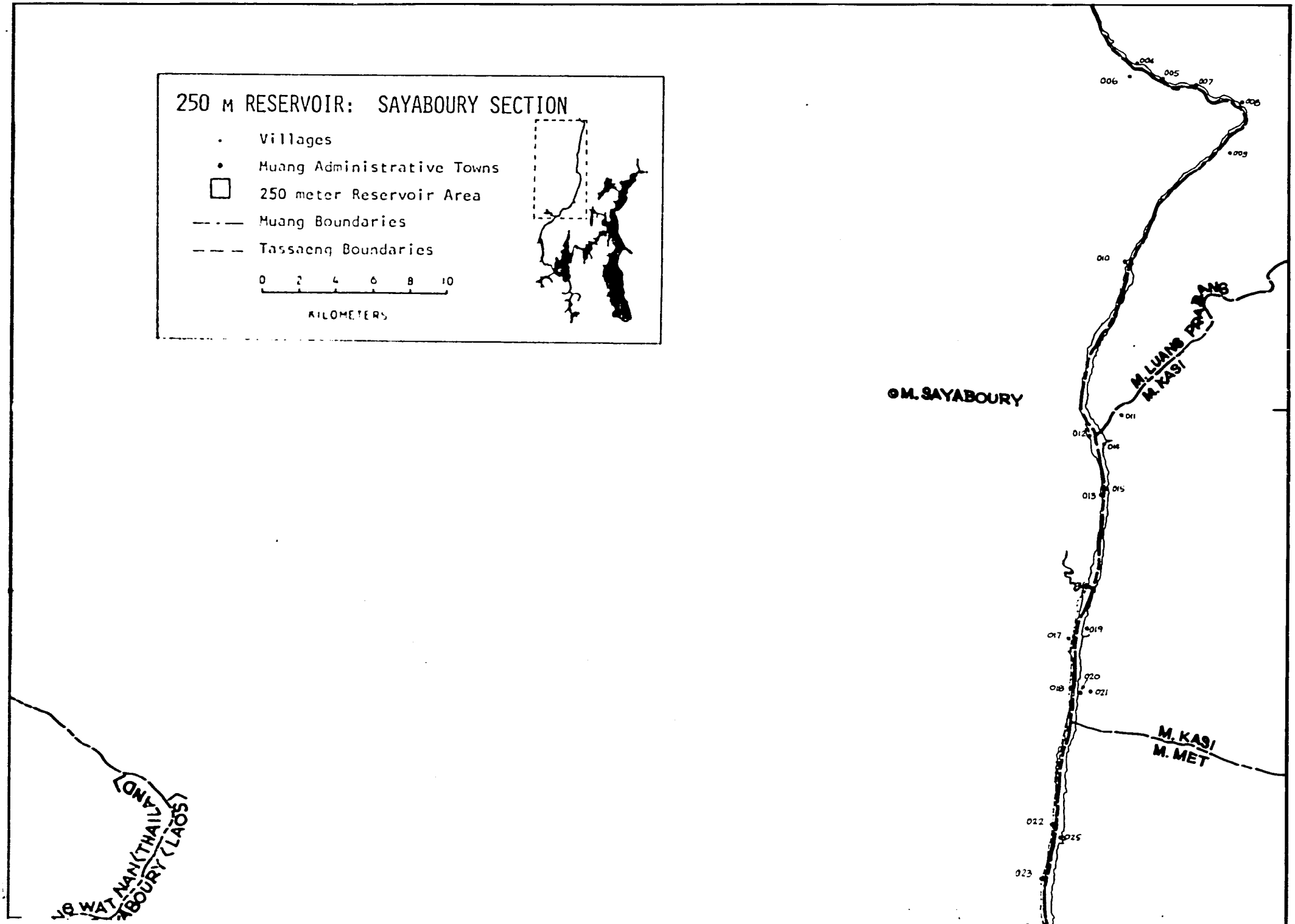

A THA LI
T KOK DU
T NA O
T NAN SUAI
T. NA DUANG
T THA LI
T KLANG
T HUANG
T SIEO
LOEI
MUANG LOEI
T NONG BUA
A PHU RUA
T NA AN
T. KUT DI
T NA DIN DAM
T. NA KHAE
T THA SALA
T NA PONG
T PLA BA
T NONG NGIU
T PHA NOI
T ARAWAN
A. WANG SAPHUNG
T NONG YA PLONG
T WANG SAPHUNG
T WANG YAO
T SAI KHAO
A. NA KLANG
T YANG LO
T PHU HO
T PHA KHAO
T NONG KHAN

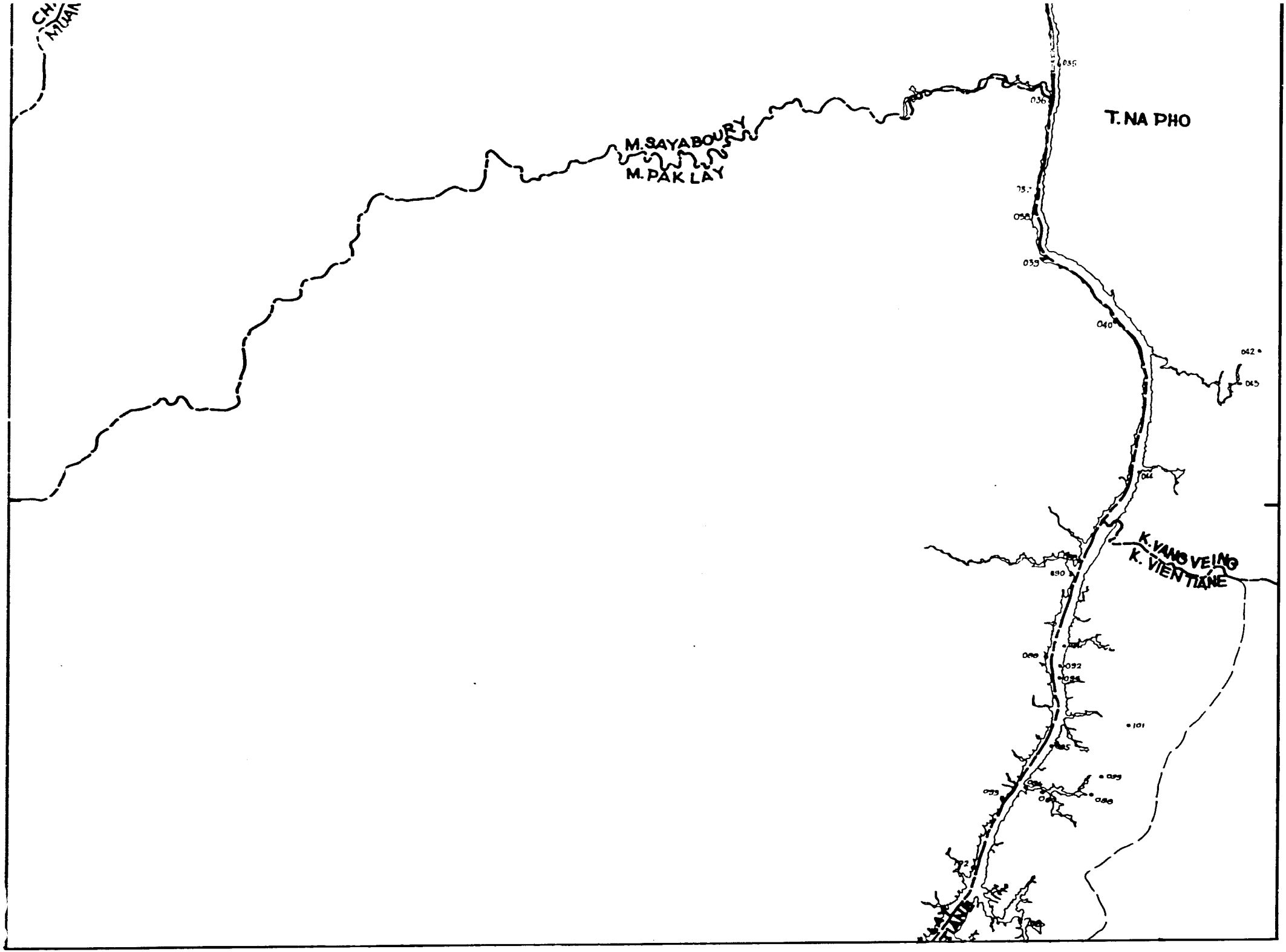

250 M RESERVOIR: NAM LIK SECTION
Villages
Muang Administrative Towns
250 meter Reservoir Area
Muang Boundaries
Tassaeng Boundaries
0 2 4 6 8 10
KILOMETERS
M. KASI
M. PHATANG
M. PHATANG
M. KASI
M. PHATANG
M. VANG VIENG
M. PHOON
M. VANG VIENG
M. POUNG
M. VANG VIENG
M. PHOON
M. VANG VIENG
M. NAM
M. POUNG
M. POUNG
M. SANAKHAM
K. VANG VIENG
K. VIENTIANE
M. PHON HONG
M. NAM KHAM
T. LANG MAO
T. VANG VIENG
T. BAN XON
T NA THAO
MUANG VANG VIENG
T. KHOUA PHAN
T. NA MON
T. HUA NA
T. MUANG SOUM
T. PAK NGUA
T. BAN DONE
T. MUANG KHI
T. NA POUNG
T PHON SEE
T. THIN KEO
T. PHON HO

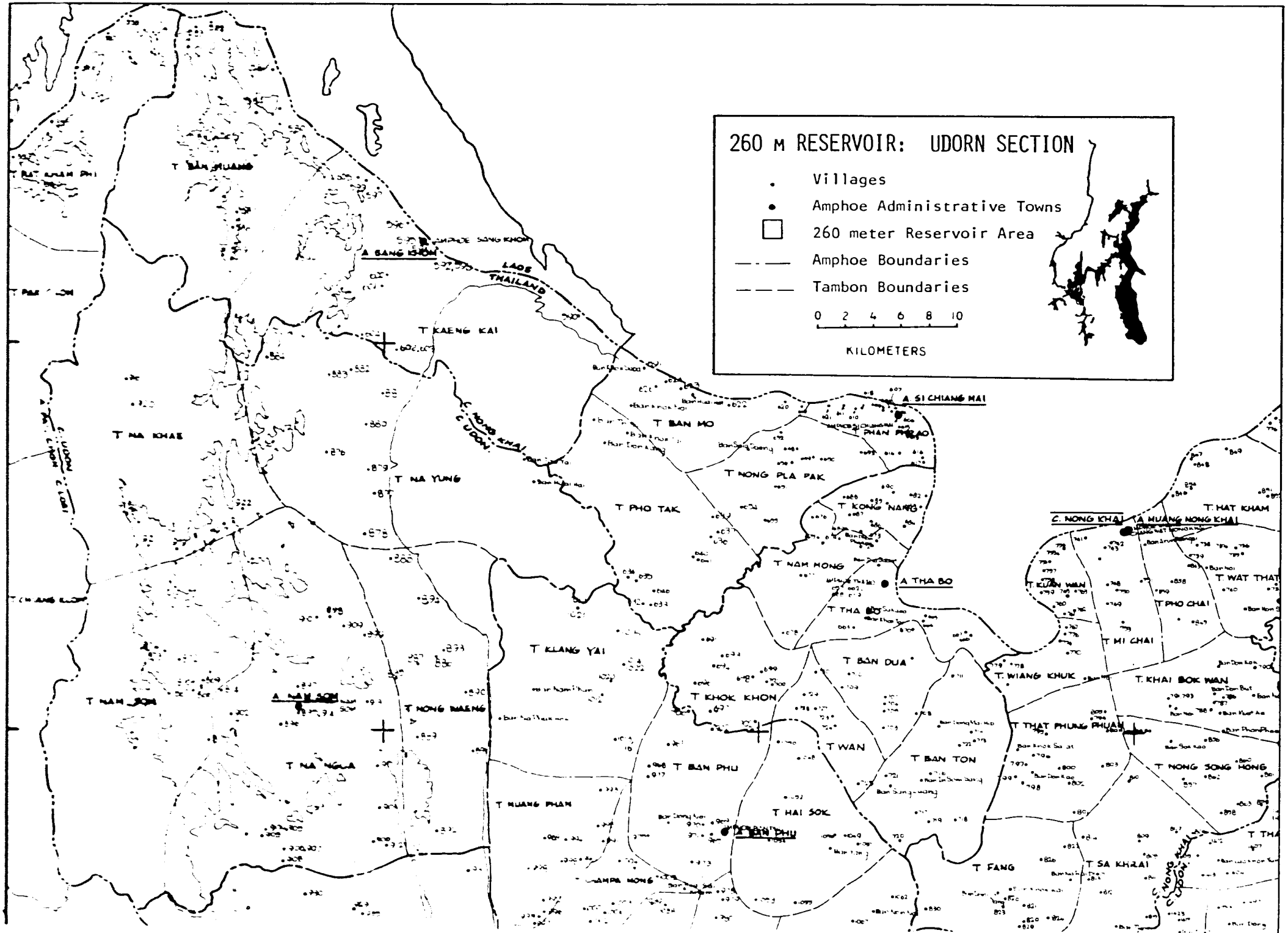

T. NA ANG
T PHON HO
T PHON HONG
T NA LAO
T PHON MEE
T. NA PHO
M. SANA KHAM
M. NASAY THONG
T SA KA
M. THOUBA KHOM
M. PHON HONG
T. NAM THON
T. PHON SOUNG
M. PHON HONG
M. NASAY THONG
T. NAM SANG
T. NA KHA
T NAM KHOUANE
LAOS
THAILAND
T. SA KAY
T.
T. PAK MI
T. NAM KLANG
T. KAO LIEO
T. NONG NIAO
VIENTIANE

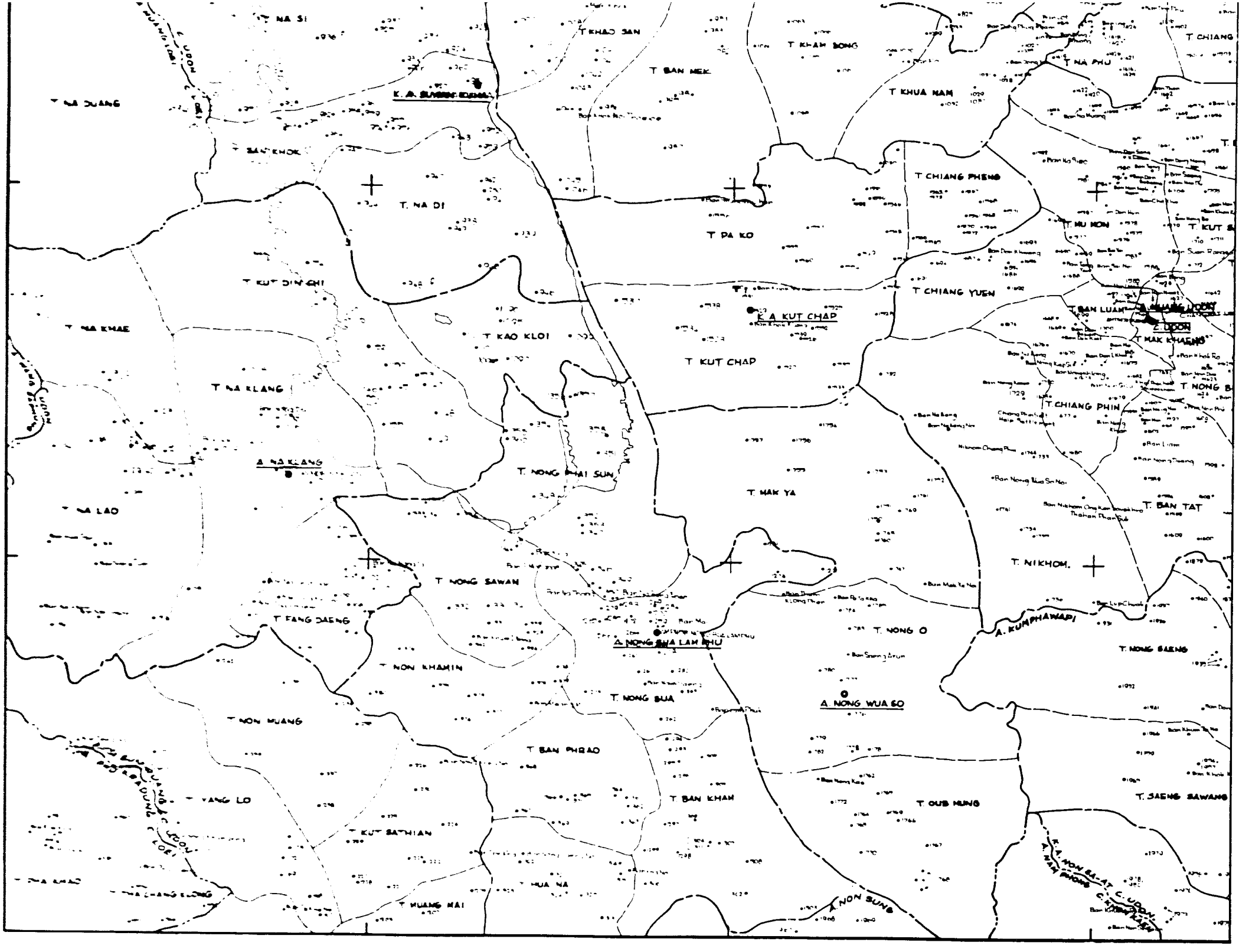

T. PAK VIEN
T. HUANG KHI
T. PHOU NHEUY
T. NA ANG
T. NAM KHOUANE
MUANG PAK LAY
T. KHOK KHAO DOR
T. PAK MI

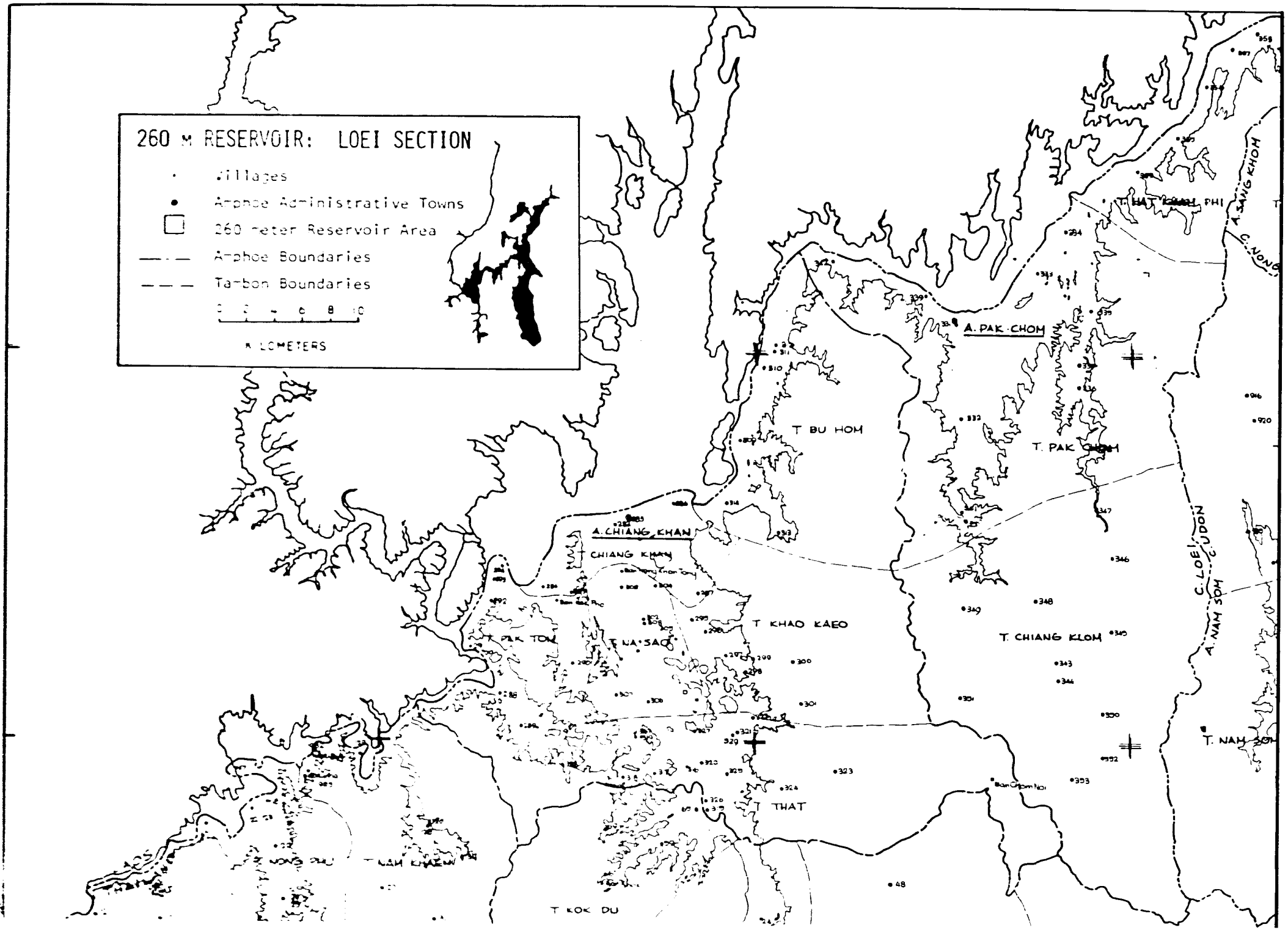

M. PAK LAY
M. KENTHAO
M. SANAKHAM (LAOS)
A. PAK CHOM (THAILAND)
T. SANAKHAM
T. DON MEN
T. PAK PHANG
MUANG SANAKHAM
LEUK
T. KENTHAO
M. KENTHAO (LAOS)
A. THA LI (THAILAND)
MUANG KENTHAO
KENTHAO
BOTENE
250 M RESERVOIR AREA: SANAKHAM SECTION
Villages
Muang Administrative Towns
250 meter Reservoir Area
Muang Boundaries
Tassaeng Boundaries
0 2 4 6 8 10
KILOMETERS

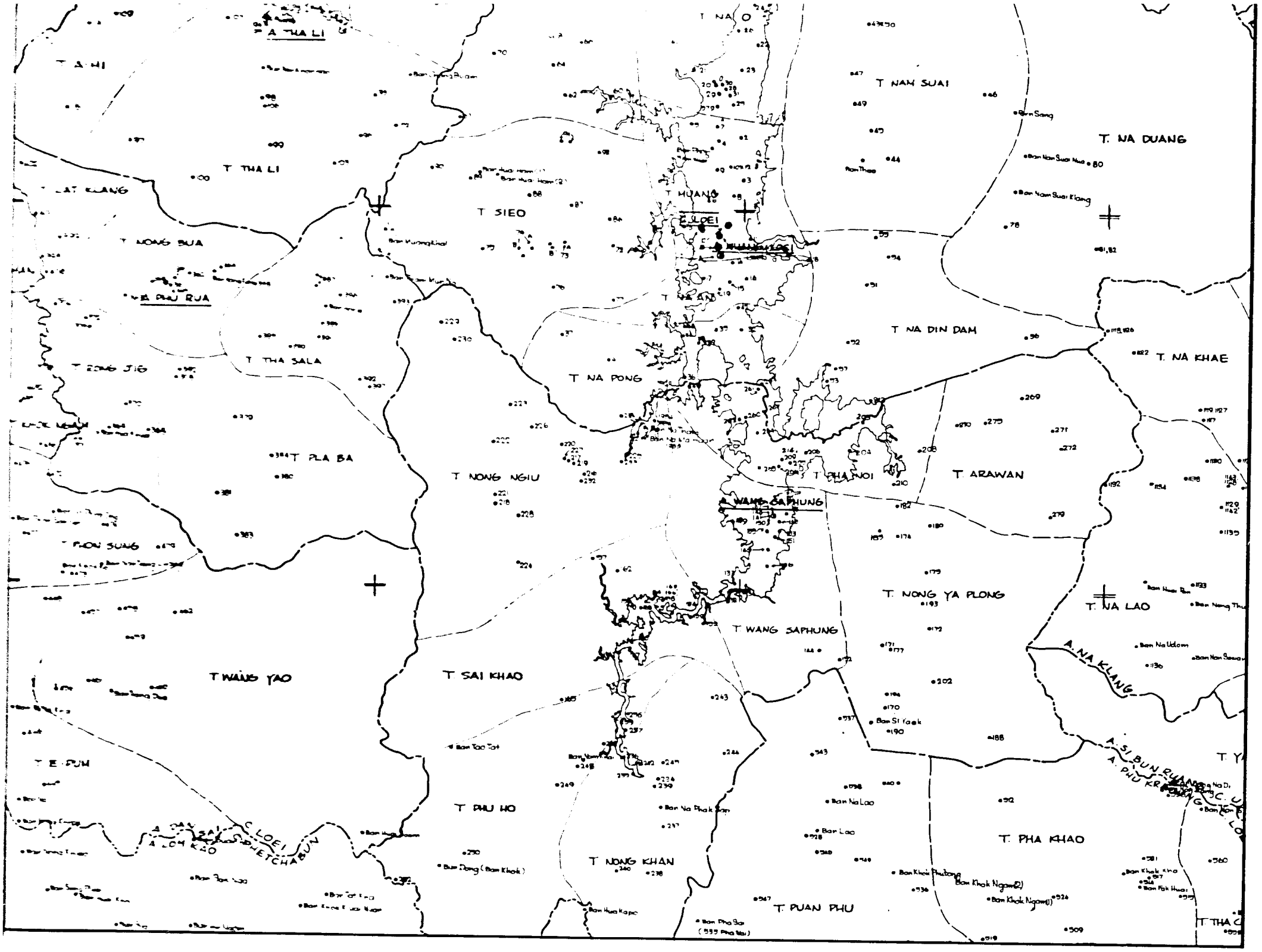

250 M RESERVOIR: SAYABOURY SECTION
Villages
Muang Administrative Towns
250 meter Reservoir Area
Muang Boundaries
Tassaeng Boundaries
0 2 4 6 8 10
KILOMETERS
M. SAYABOURY
M. LUANG PRABANG
M. KASI
M. KASI
M. MET
004
005
006
007
008
009
010
011
012
013
014
015
016
017
018
019
020
021
022
023
025
AND)
SAYABOURY (LAOS)

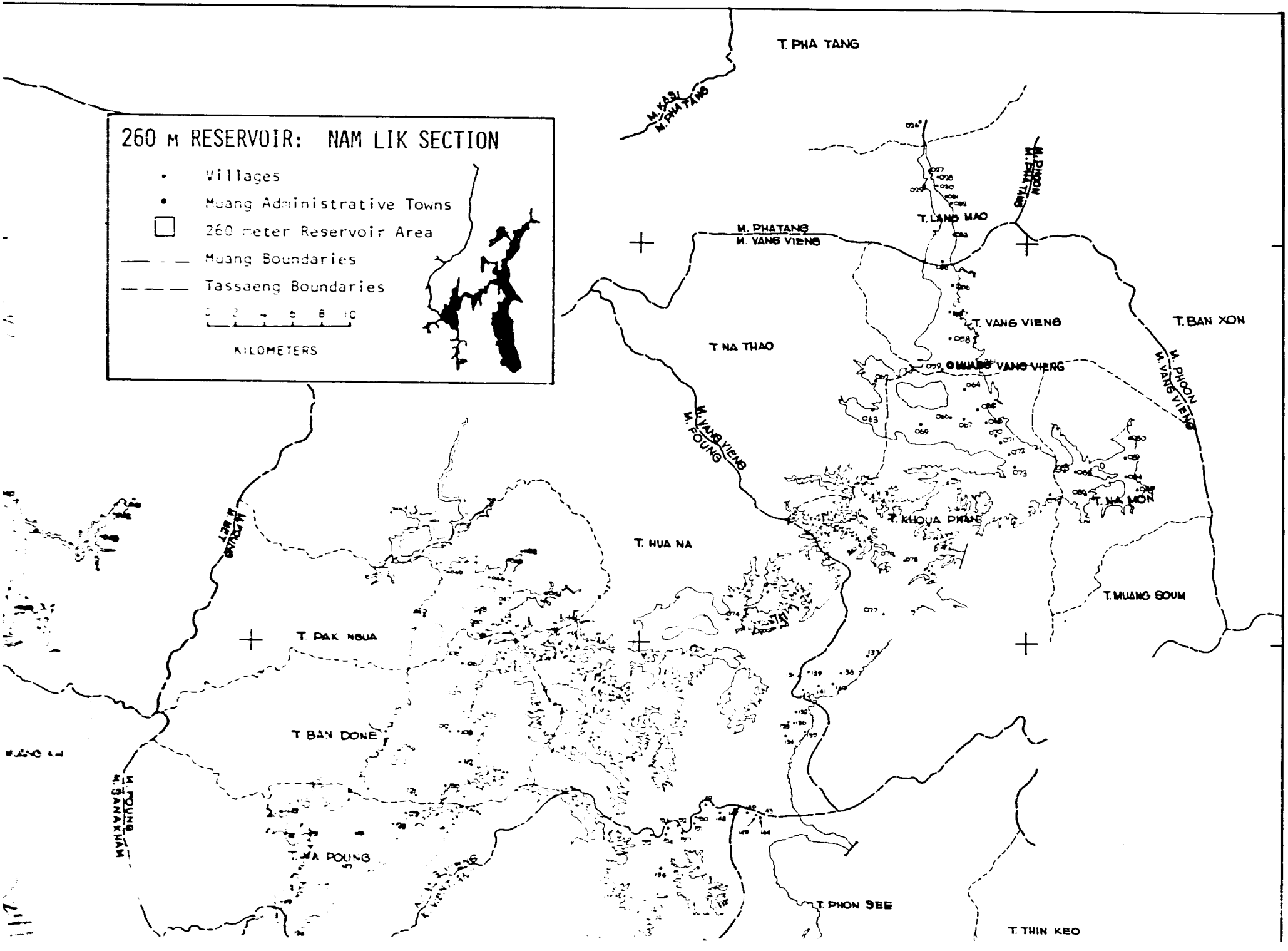

CH. MUAN
M. SAYABOURY
M. PAK LAY
T. NA PHO
K. VANG VE!NG
K. VIENTIANE

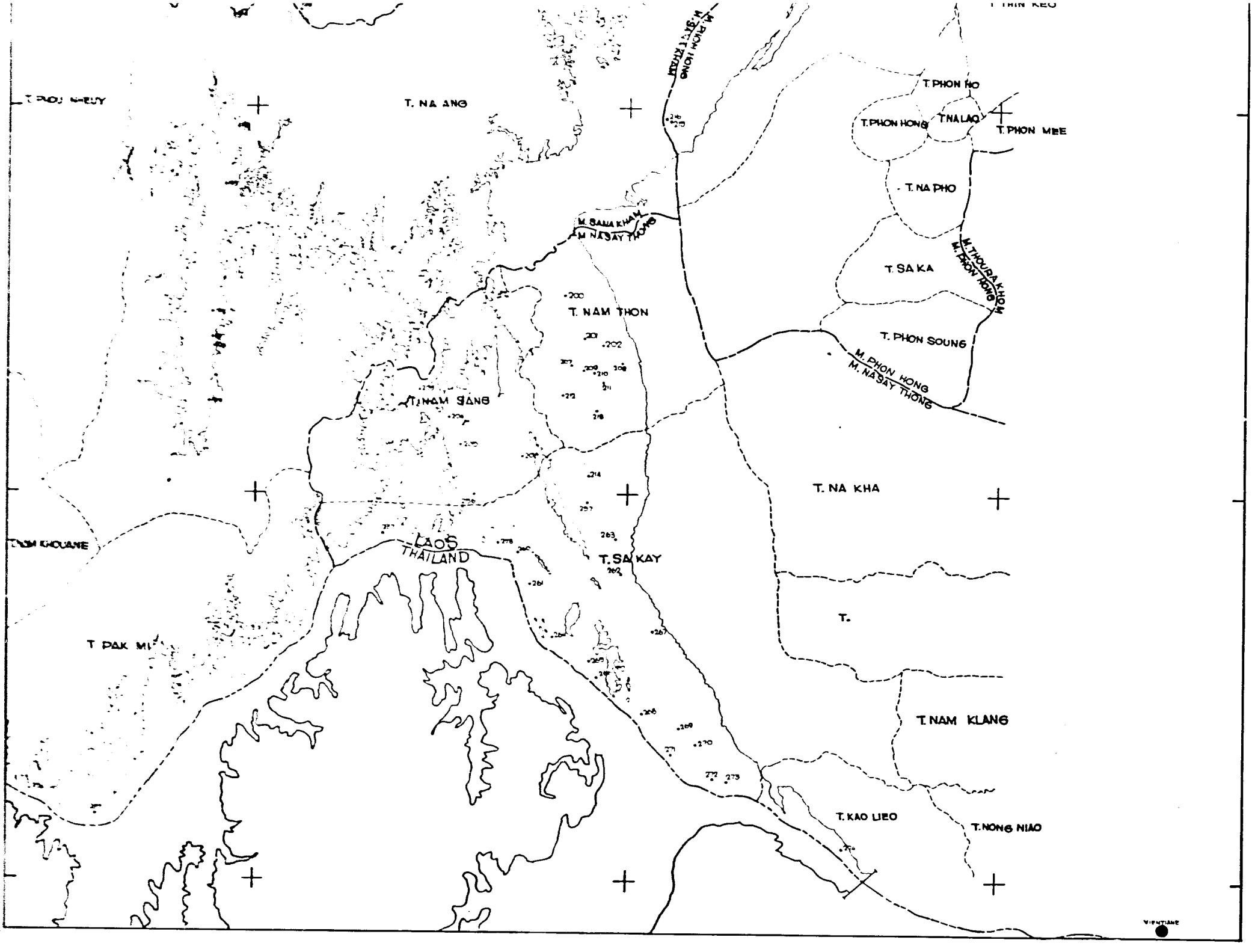

260 M RESERVOIR: UDORN SECTION
Villages
Amphoe Administrative Towns
260 meter Reservoir Area
Amphoe Boundaries
Tambon Boundaries
0 2 4 6 8 10
KILOMETERS
A SANG KHOM
LAOS
THAILAND
T KAENG KAI
C. NONG KHAI
T NA KHAE
T NA YUNG
T PHO TAK
T BAN MO
A SI CHIANG MAI
T NONG PLA PAK
T KONG NANG
T NAM HONG
A THA BO
C. NONG KHAI
A MUANG NONG KHAI
T HAT KHAM
T KLANG YAI
T BAN DUA
T KHOK KHON
T WAN
T BAN PHU
T HUANG PHAN
T NAM SOK
A NAM SOK
T NONG MAENG
T NA NGUA
T WIANG KHUK
T KHAI BOK WAN
T MI CHAI
T PHO CHAI
T WAT THAT
T THAT PHUNG PHUAN
T NONG SONG HONG
T BAN TON
T HAI SOK
T FANG
T SA KHRAI
C. NONG KHAI
C. UDON

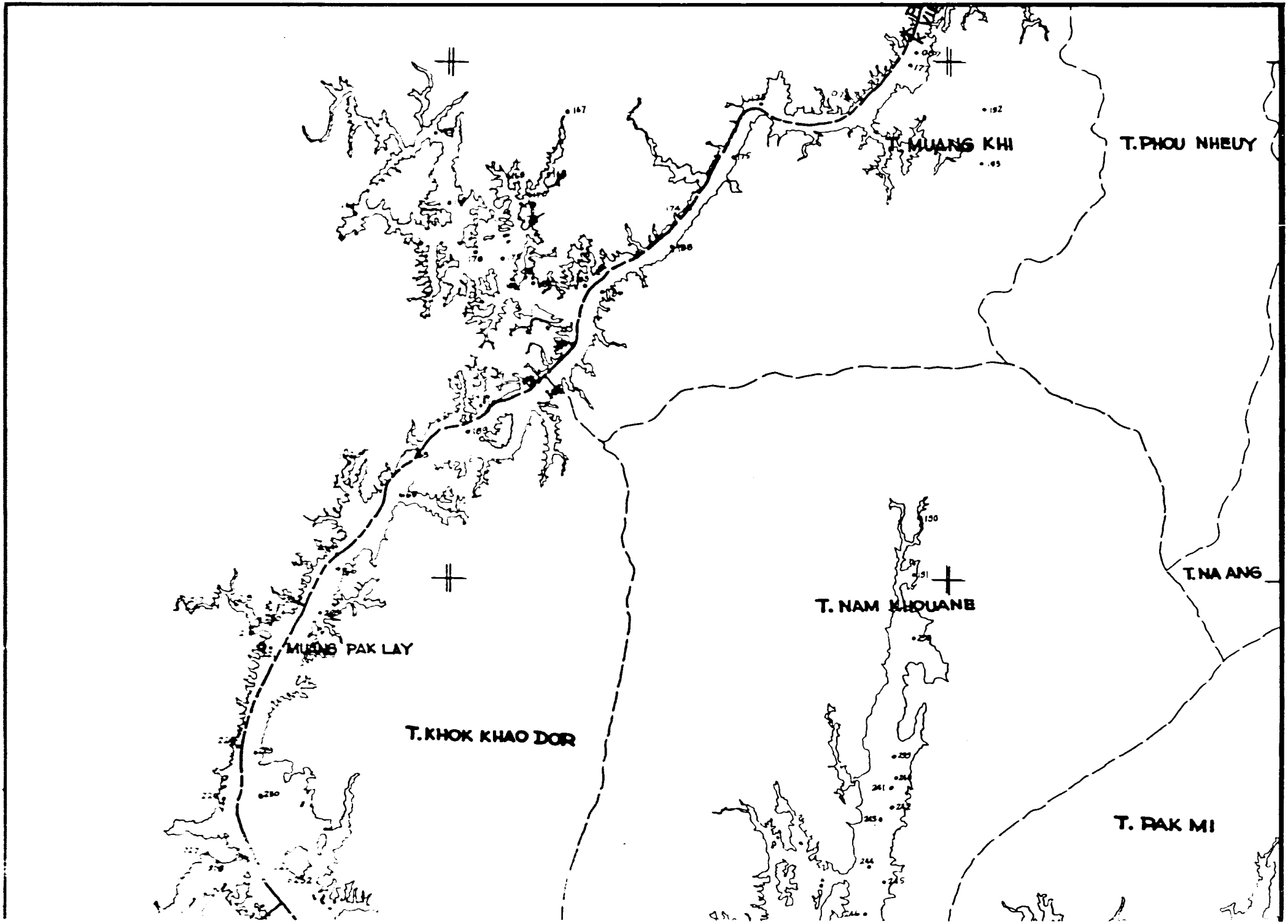

T. NA SI
T. KHAO SAN
T. KHAM BONG
T. CHIANG
T. NA PHU
T. BAN MEK
T. KHUA NAM
T. NA DUANG
K.A. SUNTHON KHOM
T. BAN KHOK
T. NA DI
T. CHIANG PHENG
T. PA KO
T. MU MON
T. KUT DIN CHI
T. CHIANG YUEN
K.A. KUT CHAP
T. BAN LUAM
T. NA KHAE
T. KAO KLOI
T. MAK KHAENG
T. KUT CHAP
T. NA KLANG
T. CHIANG PHIN
A. NA KLANG
T. NONG KHAI SUN
T. MAK YA
T. NA LAO
T. BAN TAT
T. NIKHOM
T. NONG SAWAN
T. FANG DAENG
A. NONG WUA LAM PHU
T. NONG O
A. KUMPHAWAPI
T. NON KHAMIN
T. NONG BUA
A. NONG WUA SO
T. NONG BAENG
T. NON MUANG
T. BAN PHRAO
T. BAN KHAM
T. OUB MUNG
T. SAENG SAWANG
T. VANG LO
T. KUT BAMRIAN
T. HUA NA
T. HUAY MAI
A. NON SUNG

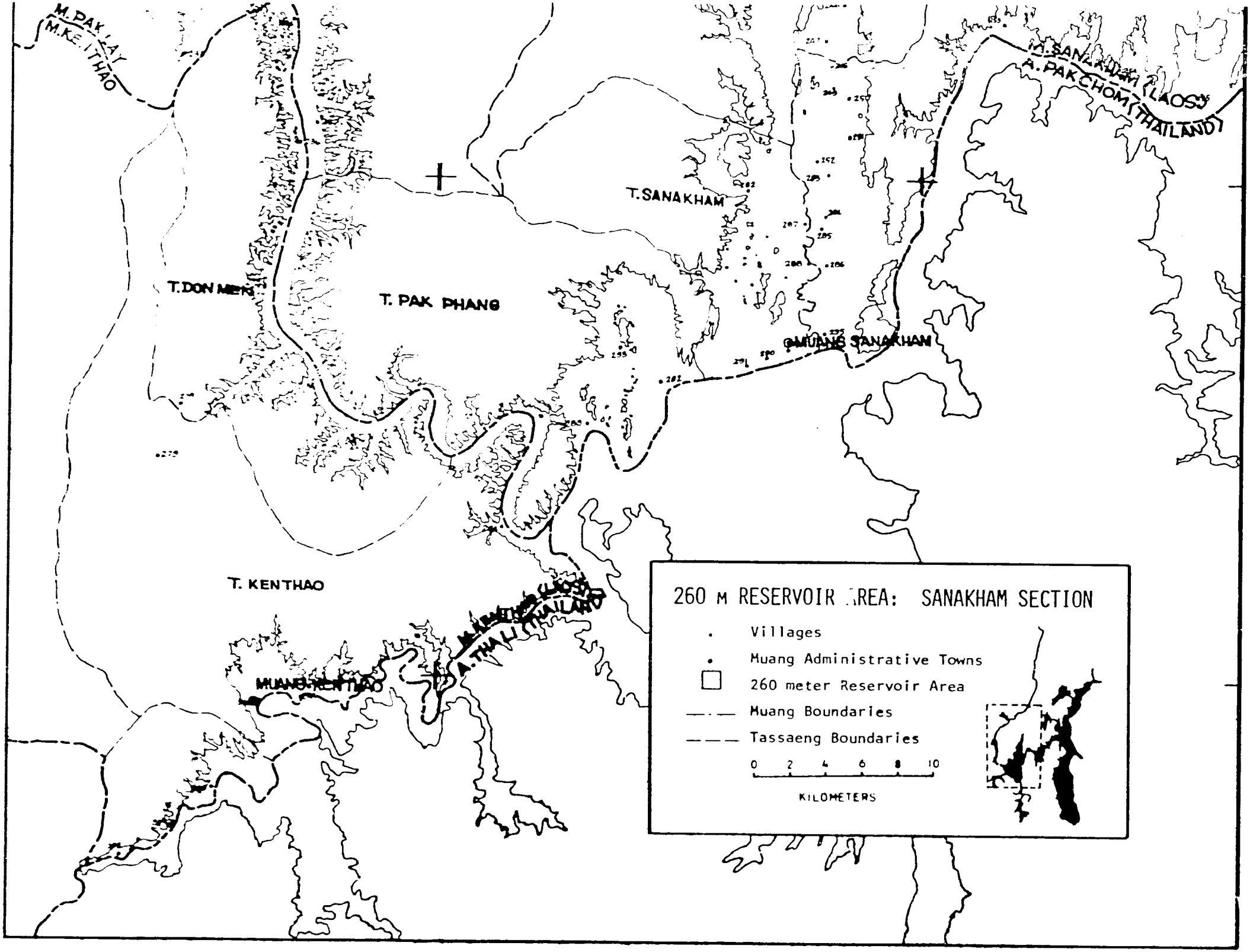

260 M RESERVOIR: LOEI SECTION
Villages
Amphoe Administrative Towns
260 Meter Reservoir Area
Amphoe Boundaries
Tambon Boundaries
0 2 4 6 8 10
KILOMETERS
A. PAK CHOM
T BU HOM
T. PAK CHOM
A. CHIANG KHAN
CHIANG KHAN
T KHAO KAEO
T. PAK TOM
T. NA SAO
T. CHIANG KLOM
T THAT
T KOK DU
T. NAM KHAEM
C. LOEI
C. UDON
A. NAM SOM
A. SANG KHOM
C. NONG
T. NAM SOM

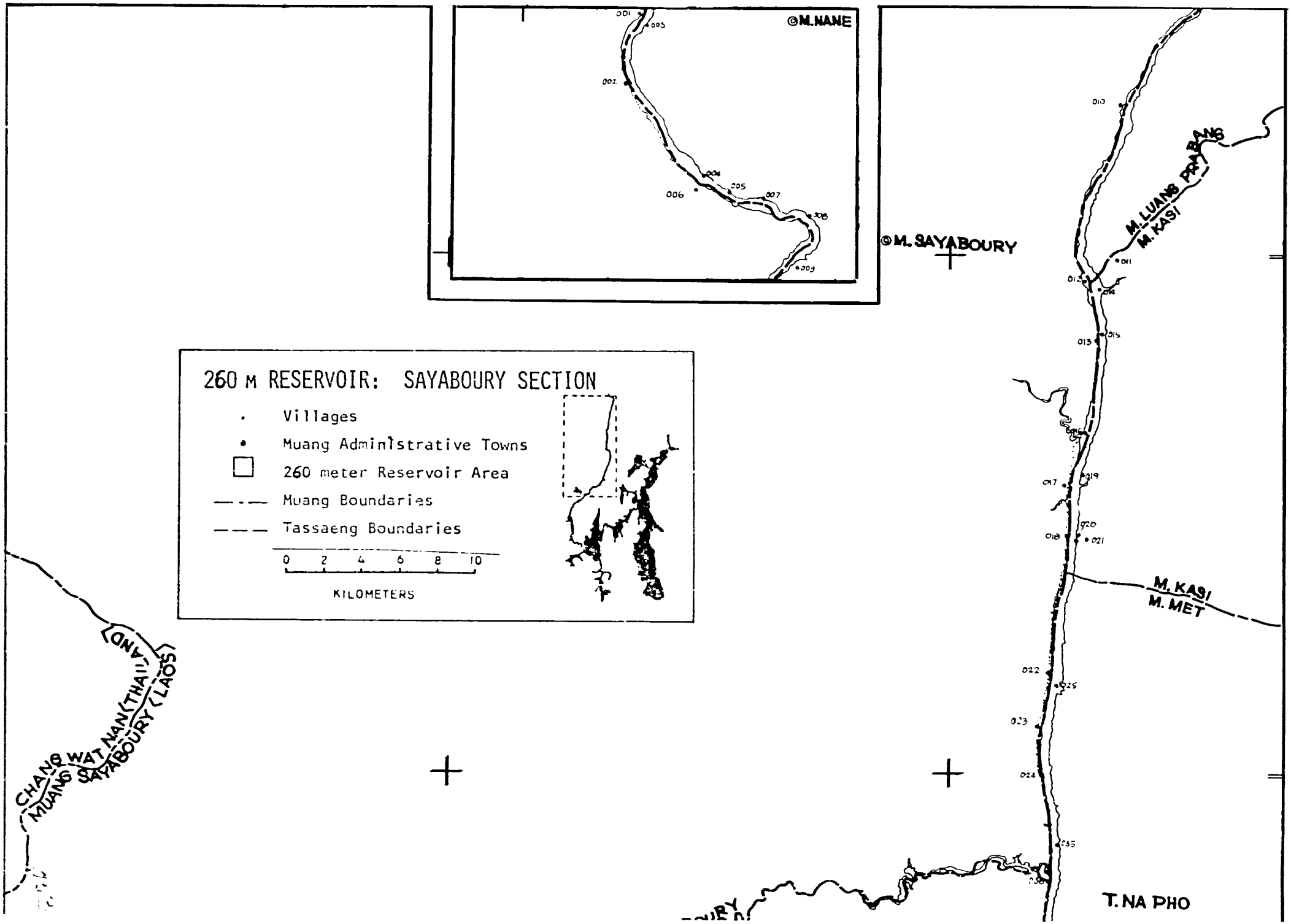

T. NA O
T. NAM SUAI
T. NA DUANG
T. THA LI
T. LAT KLANG
T. HUAI
T. SIEO
C. LOEI
T. NONG BUA
T. NA DIN DAM
T. NA KHAE
T. THA SALA
T. NA PONG
T. PLA BA
T. NONG NGIU
T. PHA NOI
T. ARAWAN
T. WANG SAPHUNG
T. PHON SUANG
T. NONG YA PLONG
T. NA LAO
T. WANG YAO
T. SAI KHAO
T. PHU HO
T. NONG KHAN
T. PUAN PHU
T. PHA KHAO
A. NA KLANG
A. PHU KRADUNG
A. PHU RUA
A. THA LI
A. DAN SAI
A. LOM KAO
C. LOEI
PHETCHABUN

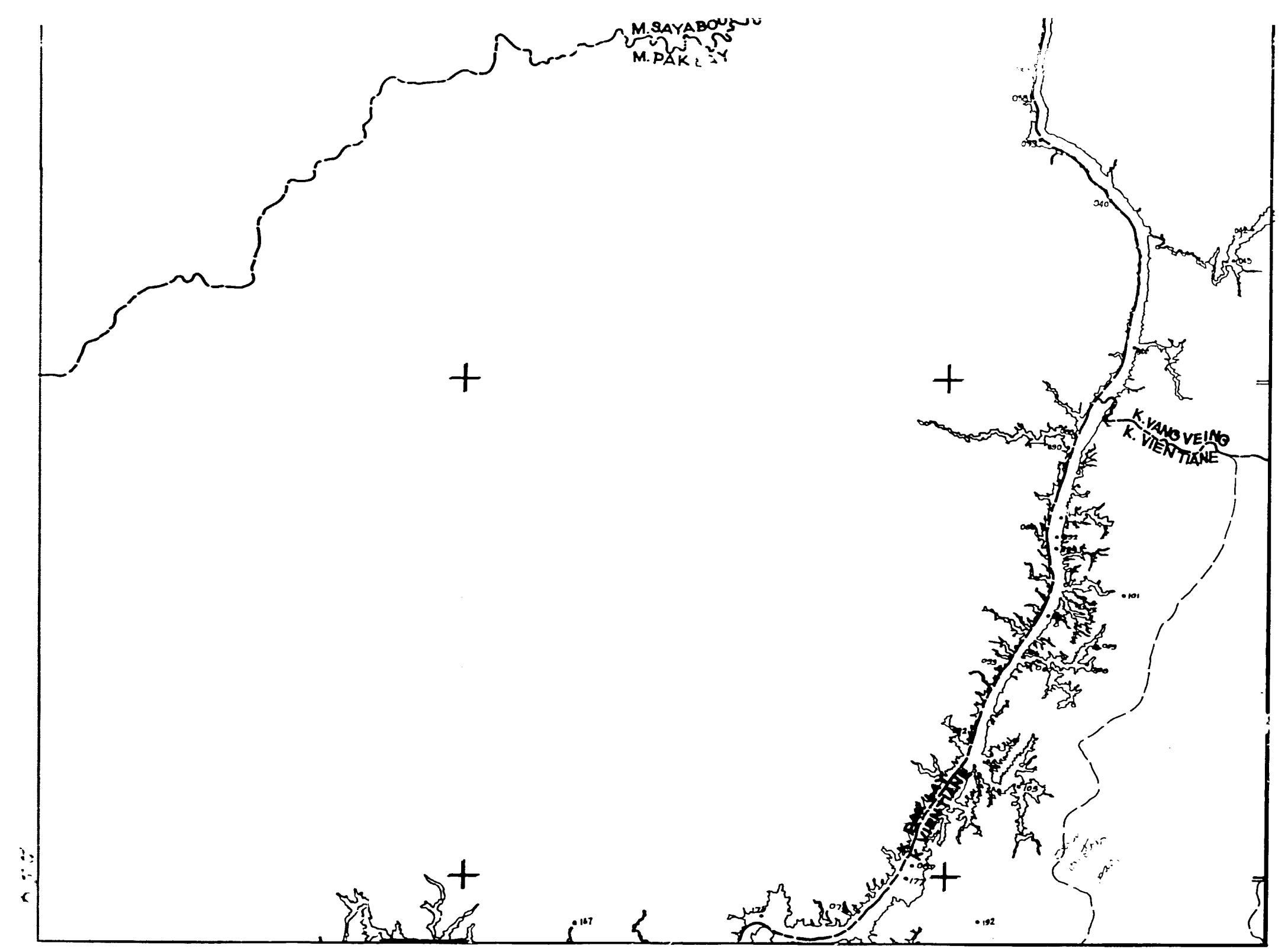

260 M RESERVOIR: NAM LIK SECTION
Villages
Muang Administrative Towns
260 meter Reservoir Area
Muang Boundaries
Tassaeng Boundaries
0 2 4 6 8 10
KILOMETERS
T. PHA TANG
M. KASI
M. PHA TANG
M. PHATANG
M. VANG VIENG
T. LANG MAO
M. PHOON
M. VANG VIENG
T. VANG VIENG
T. BAN XON
T NA THAO
M. VANG VIENG
M. FOUNG
M. PHOON
M. VANG VIENG
T. KHOUA PHAE
T. NA MON
T. HUA NA
T. MUANG SOUM
T. PAK NGUA
T. BAN DONE
M. FOUNG
M. BANAKHAM
T. NA POUNG
T. PHON SEE
T. THIN KEO


T. NA ANG
M. PHON HONG
M. SAY T KHAM
T. PHON HO
T. PHON HONG
T. NA LAO
T. PHON MEE
T. NA PHO
M. SAWA KHAM
M. NA SAY THONG
T. SA KA
M. THOUBA KHOM
M. PHON HONG
T. NAM THON
T. PHON SOUNG
M. PHON HONG
M. NA SAY THONG
T. NAM SANG
T. NA KHA
LAOS
THAILAND
T. SA KAY
T.
T. NAM KLANG
T. KAO LIEO
T. NONG NIAO
VIENTIANE


T. MUANG KHI
T. PHOU NHEUY
T. NA ANG
T. NAM KHOUANE
T. PAK MI
T. KHOK KHAO DOR
MUANG PAK LAY


M. PAK LAY
M. KENTHAO
T. SANAKHAM
A. SANAKHAM (LAOS)
A. PAK CHOM (THAILAND)
T. DON MENG
T. PAK PHANG
MUANG SANAKHAM
T. KENTHAO
A. THALI (THAILAND)
MUANG KENTHAO
260 M RESERVOIR AREA: SANAKHAM SECTION
Villages
Muang Administrative Towns
260 meter Reservoir Area
Muang Boundaries
Tassaeng Boundaries
0 2 4 6 8 10
KILOMETERS


260 M RESERVOIR: SAYABOURY SECTION
Villages
Muang Administrative Towns
260 meter Reservoir Area
Muang Boundaries
Tassaeng Boundaries
0 2 4 6 8 10
KILOMETERS
©M.NANE
©M. SAYABOURY
M. LUANG PRABANG
M. KASI
M. KASI
M. MET
T. NA PHO
CHANG WAT NAN (THAILAND)
MUANG SAYABOURY (LAOS)


M. SAYABOULY
M. PAK LAY
K. VANG VEING
K. VIENTIANE
K. VIENTIANE
187
192

APPENDIX A

Section 2: Lao and Thai Villages/Towns Below 260m, Subject to Flooding by the Pa Mong Reservoir

All villages below the 260m counter are listed in this table, with index numbers to permit location on the index maps in Section 1 of Appendix A, as well as other locational information, such as extent of flooding at various reservoir levels between 230 and 260 meters at 5 meter intervals, and extent of flooding under various protection schemes and construction cofferdams. Recent migration and 1974 population data are also provided for all villages.

Reservoir sectors are identified on Diagram 1, page 7 of the Final Report.

(1) Base Map No.	(2) Province	(3) District	(4) Commune	(6) Village Name	(7) 1:50,000 Map No.	(8) 1:50,000 Sheet No.	(10) U.T.M. Coordinate North	(11) U.T.M. Coordinate East	(12) Reservoir Sector	(13) Affected by Cofferdams	(15) % Flooded at 260m	(16) % Flooded at 255m	(17) % Flooded at 250m	(18) % Flooded at 245m	(19) % Flooded at 240m	(20) % Flooded at 235m	(21) % Flooded at 230m	(22) % Flooded at 180m Cofferdam	(23) % Flooded at 216m Cofferdam	(24) % Flooded at 204m Nam Lik Cofferdam
144	VIENTIANE	PHON HONG	PHON SEE	HIN HEUP	5446	2	218	063	2	9	100	100	100	100	100	100	100			80
158	VIENTIANE	PHON HONG	PHON SEE	HUAIHINLAP	5446	2	221	054	2		100	100	100	100	100	100	100			
145	VIENTIANE	PHON HONG	PHON SEE	-	5446	2	217	063	2	9	100	100	100	100	100	100	100			60
146	VIENTIANE	PHON HONG	PHON SEE	-	5446	2	221	070	2	9	100	100	100	100	100	100	100			100
215	VIENTIANE	PHON HONG	PHON SEE	NON TONG	5445	1	212	046	1		100	100	100	100	100	100	100			
216	VIENTIANE	PHON HONG	PHON SEE	NA SAM	5445	1	212	046	1		100	100	100	100	100	100	100			
206	VIENTIANE	NASAITONG	NAM SANG	NAPHO	5445	4	202	023	1		100	100	100	100	100	100	100			
205	VIENTIANE	NASAITONG	NAM SANG	SO	5445	4	197	024	1	8	100	100	100	100	100	100	100		100	
204	VIENTIANE	NASAITONG	NAM SANG	VANG MA	5445	4	197	025	1	8	100	100	100	100	100	100	100		100	
203	VIENTIANE	NASAITONG	NAM SANG	KOAD	5445	4	195	028	1	8	100	100	100	100	100	100	100		100	
256	VIENTIANE	NASAITONG	NAM SANG	HUAI TOM	5445	4	199	021	1	8	100	100	100	100	100	100	100		100	
213	VIENTIANE	NASAITONG	NAM TONE	NATANE	5445	4	207	026	1	8	100	100	100	100	100	100	100		100	
212	VIENTIANE	NASAITONG	NAM TONE	NABOUA	5445	4	205	027	1	8	100	100	100	100	100	100	100		100	
211	VIENTIANE	NASAITONG	NAM TONE	NATHIEM	5445	4	207	027	1		100	100	100	60	20	0	0			
210	VIENTIANE	NASAITONG	NAM TONE	NALAT	5445	4	207	028	1	8	100	100	100	100	100	100	100		100	
208	VIENTIANE	NASAITONG	NAM TONE	HAIKABAK	5445	4	209	029	1		100	100	100	100	70	0	0			
209	VIENTIANE	NASAITONG	NAM TONE	NASA	5445	4	206	029	1	8	100	100	100	100	100	100	100		100	
202	VIENTIANE	NASAITONG	NAM TONE	NAHOYPANG	5445	4	208	030	1	8	100	100	100	100	100	100	100		100	
201	VIENTIANE	NASAITONG	NAM TONE	TAOHAI	5445	4	206	031	1	8	100	100	100	100	100	100	100		100	
207	VIENTIANE	NASAITONG	NAM TONE	NAMIENG	5445	4	205	029	1	8	100	100	100	100	100	100	100		100	
200	VIENTIANE	NASAITONG	NAM TONE	KOUA	5445	4	205	034	1	8	100	100	100	100	100	100	100		100	
274	VIENTIANE	NASAITONG	KAOLIAO	ANG NHAI	5445	2	225	994	1	10	100	100	100	100	100	100	100	100		
261	VIENTIANE	NASAITONG	SAKAY	KOK HEH	5445	3	202	013	1	10	100	100	100	100	100	100	100	5		
258	VIENTIANE	NASAITONG	SAKAY	THANASA	5445	3	200	016	1	8	100	100	100	100	100	100	100		100	
264	VIENTIANE	NASAITONG	SAKAY	ANG NOI	5445	3	204	009	1	10	100	100	100	100	100	100	100	20		
265	VIENTIANE	NASAITONG	SAKAY	-	5445	3	206	007	1	8	100	100	100	100	100	100	100		100	
262	VIENTIANE	NASAITONG	SAKAY	THANAKHAM	5445	3	209	014	1	8	100	100	100	100	100	100	100		100	
273	VIENTIANE	NASAITONG	SAKAY	SAMPHANNA	5445	2	216	998	1	10	100	100	100	100	100	100	100	5		
251	VIENTIANE	NASAITONG	SAKAY	HIN SED	5445	3	206	019	1	8	100	100	100	100	100	100	100		100	
254	VIENTIANE	NASAITONG	SAKAY	PHIA LAO	5445	3	208	016	1	8	100	100	100	100	100	100	100		100	
272	VIENTIANE	NASAITONG	SAKAY	KENG KO	5445	2	215	998	1	10	100	100	100	100	100	100	100	5		
266	VIENTIANE	NASAITONG	SAKAY	SAKAY	5445	3	207	006	1	10	100	100	100	100	100	100	100	5		
267	VIENTIANE	NASAITONG	SAKAY	PAK TONE	5445	2	213	002	1	10	100	100	100	100	100	100	100	5		
260	VIENTIANE	NASAITONG	SAKAY	HUAI SANOT	5445	3	201	015	1	10	100	100	100	100	100	100	100	5		
257	VIENTIANE	NASAITONG	SAKAY	HUAI LA	5445	3	192	017	1	10	100	100	100	100	100	100	100	10		
214	VIENTIANE	NASAITONG	SAKAY	HAI TAI	5445	4	206	021	1	8	100	100	100	100	100	100	100		100	
268	VIENTIANE	NASAITONG	SAKAY	KHOKPHENG	5445	2	210	003	1	10	100	100	100	100	100	100	100	5		
270	VIENTIANE	NASAITONG	SAKAY	THASANGHIN	5445	2	214	001	1	10	100	100	100	100	100	100	100	0		
269	VIENTIANE	NASAITONG	SAKAY	NA HOY	5445	2	211	009	1	8	100	100	100	100	100	100	100		60	
271	VIENTIANE	NASAITONG	SAKAY		5445	2	212	000	1	10	100	100	100	100	100	100	100	100		

(1)	(2)	(3)	(4)	(6)	(7)	(8)	(10)	(11)	(12)	(13)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
101	VIENTIANE	SANAKHAM	MUANG KHI	SI SAAT	5346	2	794	052	1		100	100	100	100	100	0	0			
102	VIENTIANE	SANAKHAM	MUANG KHI	NAM PHON	5346	2	797	057	1		60	0	0	0	0	0	0			
86	VIENTIANE	SANAKHAM	MUANG KHI	-	5346	2	794	060	1		100	100	100	100	0	0	0			
87	VIENTIANE	SANAKHAM	MUANG KHI	-	5346	2	795	060	1		100	100	100	10	100	100	0			
88	VIENTIANE	SANAKHAM	MUANG KHI	-	5346	2	798	059	1		100	0	0	0	0	0	0			
89	VIENTIANE	SANAKHAM	MUANG KHI	NAM PHU	5346	2	798	060	1		0	0	0	0	0	0	0			
90	VIENTIANE	SANAKHAM	MUANG KHI	SI SAAT	5346	2	796	062	1		100	100	100	100	100	80	20			
94	VIENTIANE	SANAKHAM	MUANG KHI	-	5346	2	796	066	1		100	100	90	50	10	0	0			
92	VIENTIANE	SANAKHAM	MUANG KHI	-	5346	2	796	066	1		100	100	100	100	0	0	0			
93	VIENTIANE	SANAKHAM	MUANG KHI	-	5346	2	796	061	1		100	100	100	100	100	0	0			
141	VIENTIANE	SANAKHAM	MUANG KHI	MUANG KHI	5345	1	792	042	1		100	100	100	100	0	0	0			
142	VIENTIANE	SANAKHAM	MUANG KHI	NA KHUANG	5345	1	792	045	1		100	100	100	0	0	0	0			
136	VIENTIANE	SANAKHAM	MUANG KHI	-	5345	4	771	034	1		100	100	100	100	20	0	0			
175	VIENTIANE	SANAKHAM	MUANG KHI	DON KHENG	5345	4	778	041	1		100	0	0	0	0	0	0			
184	VIENTIANE	SANAKHAM	MUANG KHI	-	5345	4	778	036	1		100	100	100	100	100	100	0			
87	VIENTIANE	SANAKHAM	MUANG KHI	-	5346	3	788	204	1		100	100	100	100	20	0	0			
177	VIENTIANE	SANAKHAM	MUANG KHI	-	5345	4	785	045	1		100	100	100	100	80	30	0			
101	VIENTIANE	SANAKHAM	MUANG KHI	NA SAY	5346	2	800	063	1		0	0	0	0	0	0	0			
104	VIENTIANE	SANAKHAM	NA ANG	NA ANG	5346	2	814	054	3		0	0	0	0	0	0	0			
105	VIENTIANE	SANAKHAM	NA ANG	NA KHAM	5345	1	815	046	1		100	100	100	0	0	0	0			
106	VIENTIANE	SANAKHAM	NA ANG	PAK HANG	5345	1	814	042	1		100	100	100	100	0	0	0			
107	VIENTIANE	SANAKHAM	NA ANG	MUANG MIN	5345	1	814	033	1		100	100	100	100	0	0	0			
108	VIENTIANE	SANAKHAM	NA ANG	NA TIAW	5345	1	814	031	1		100	100	100	0	0	0	0			
109	VIENTIANE	SANAKHAM	NA ANG	NA MO	5345	1	814	030	1		100	100	100	0	0	0	0			
110	VIENTIANE	SANAKHAM	NA ANG	NA LAT	5345	1	814	026	1		100	100	100	0	0	0	0			
165	VIENTIANE	SANAKHAM	KOKKHAODOK	HUAIKANPAO	5245	1	760	024	1		100	100	100	100	100	100	20			
166	VIENTIANE	SANAKHAM	KOKKHAODOK	KOK NGIAM	5245	1	758	020	1		100	100	100	100	100	100	0			
231	VIENTIANE	SANAKHAM	KOKKHAODOK	KOKKHAODOK	5245	2	754	009	1		100	100	100	100	100	100	100			
232	VIENTIANE	SANAKHAM	KOKKHAODOK	HUAI THAO	5245	2	754	007	1		100	100	100	100	100	100	100			
10	VIENTIANE	SANAKHAM	KOKKHAODOK	PAK YHOUM	5245	2	756	003	1		100	100	100	100	100	100	100			
117	VIENTIANE	SANAKHAM	KOKKHAODOK	DON PHUNG	5245	2	757	995	1	8	100	100	100	100	100	100	100		5	
231	VIENTIANE	SANAKHAM	KOKKHAODOK	-	5245	2	755	003	1		100	100	100	100	100	100	100			
105	VIENTIANE	SANAKHAM	KOKKHAODOK	LANG DONE	5345	4	765	027	1		100	100	100	100	100	10	0			
224	VIENTIANE	SANAKHAM	KOK KAO LAO	H -	5245	2	757	017	1		100	100	100	100	100	100	0			
107	VIENTIANE	SANAKHAM	KOK KAO DO	H -	5345	4	768	029	1		100	100	100	100	0	0	0			
169	VIENTIANE	SANAKHAM	PAK PHANG	PHALAT	5344	4	773	978	1	8	100	100	100	100	100	100	100		100	
170	VIENTIANE	SANAKHAM	PAK PHANG	DONSOK	5244	1	758	981	1		100	100	100	100	100	100	100			
202	VIENTIANE	SANAKHAM	PAK PHANG	PAKPHANG	5344	4	777	980	1	8	100	100	100	100	100	100	100		100	
203	VIENTIANE	SANAKHAM	PAK PANG	-	5344	4	774	982	1		100	100	100	100	100	100	100			
215	VIENTIANE	SANAKHAM	PAK MI	PAK MI	5344	4	785	983	1	8	100	100	100	100	100	100	100		100	
216	VIENTIANE	SANAKHAM	PAK MI	VANG NEUA	5345	2	102	998	1	8	100	100	100	100	100	100	100		100	
251	VIENTIANE	SANAKHAM	PAK MI	DON HIENG	5345	2	796	001	1	8	100	100	100	100	100	100	100		100	
252	VIENTIANE	SANAKHAM	PAK MI	NAM MI	5345	2	106	996	1	8	100	100	100	100	100	100	100		100	
253	VIENTIANE	SANAKHAM	PAK MI	PONG NOI	5344	4	784	987	1	8	100	100	100	100	100	100	100		100	
254	VIENTIANE	SANAKHAM	PAK MI	NA PHIENG	5344	4	785	989	1	8	100	100	100	100	100	100	100		100	
255	VIENTIANE	SANAKHAM	PAK MI	PONGKHA	5345	3	787	997	1		100	100	100	100	100	100	100			
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257	VIENTIANE	SANAKHAM	PAK MI	PONG LEUK	5345	3	787	992	1		100	100	100	100	100	100	100			
258	VIENTIANE	SANAKHAM	PAK MI	NA KHA	5345	3	786	998	1		100	100	100	100	100	100	100			
259	VIENTIANE	SANAKHAM	PAK MI	PONG NAI	5344	4	785	987	1	8	100	100	100	100	100	100	100		100	
260	VIENTIANE	SANAKHAM	PAK MI	I SIPISAI	5345	3	786	997	1		100	100	100	100	100	100	95			
261	VIENTIANE	SANAKHAM	PAK MI	-	5344	4	785	990	1		100	100	100	100	100	100	100			
262	VIENTIANE	SANAKHAM	PAK MI	A PUA	5345	3	785	993	1		100	100	100	100	100	100	100			
263	VIENTIANE	SANAKHAM	SANAKHAM	SANAKAMTAI	5344	4	784	982	1	8	100	100	100	100	100	100	100		100	
264	VIENTIANE	SANAKHAM	SANAKHAM	SANAKANEUA	5344	4	782	981	1	8	100	100	100	100	100	100	100		100	
265	VIENTIANE	SANAKHAM	SANAKHAM	PAK DED	5344	4	781	981	1	8	100	100	100	100	100	100	100		100	
266	VIENTIANE	SANAKHAM	SANAKHAM	NAM THOK	5344	4	782	991	1		100	100	100	100	100	0	0			
267	VIENTIANE	SANAKHAM	SANAKHAM	NAPAPHA	5344	4	784	989	1	8	100	100	100	100	100	100	100		100	
268	VIENTIANE	SANAKHAM	NAM KOUANG	NA SAK	5345	3	786	999	1		100	100	100	100	100	100	100			
269	VIENTIANE	SANAKHAM	NAM KOUAN	NADEUA MAI	5345	3	787	002	1		100	95	90	80	70	40	0			

(1)	(2)	(3)	(4)	(6)	(7)	(8)	(10)	(11)	(12)	(13)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
244	VIENTIANE	SANAKHAM	NAM KOUANG	NA DEUA	5345	3	787	004	1		100	100	100	100	100	100	100			
245	VIENTIANE	SANAKHAM	NAM KOUANG	HUAI TAO	5345	3	787	007	1		100	100	100	100	100	100	0			
246	VIENTIANE	SANAKHAM	NAM KOUANG	NA BOC	5345	3	789	016	1		100	100	100	0	0	0	0			
247	VIENTIANE	SANAKHAM	NAM KOUANG	PANANBUNG	5345	3	788	009	1		100	100	100	90	80	10	0			
248	VIENTIANE	SANAKHAM	NAM KOUANG	NA KHOUM	5345	3	788	008	1		100	100	100	100	100	100	0			
249	VIENTIANE	SANAKHAM	NAM KOUANG	NAM KOUANG	5345	3	788	006	1		100	100	100	100	100	100	0			
250	VIENTIANE	SANAKHAM	NAM KOUANG	HUAIKONKEN	5345	3	788	007	1		100	100	100	100	100	100	0			
251	VIENTIANE	SANAKHAM	NAM KOUANG	NA DOU	5345	3	788	003	1		100	100	100	100	100	100	100			
252	VIENTIANE	SANAKHAM	NAM KOUANG	NA GHAB	5345	4	789	020	1		100	0	0	0	0	0	0			
253	VIENTIANE	SANAKHAM	NAM KOUANG	NA KOUM	5345	4	789	023	1		0	0	0	0	0	0	0			
73	VANG VIENG	VANG VIENG	KHOUAPHAN	KHAN MAK	5446	1	236	087	3		100	100	100	100	100	100	100			
69	VANG VIENG	VANG VIENG	KHOUAPHAN	NA KEN	5446	1	230	090	3		100	100	100	0	0	0	0			
66	VANG VIENG	VANG VIENG	KHOUAPHAN	KHONGNIENG	5446	1	234	090	3		100	100	100	100	100	95	0			
65	VANG VIENG	VANG VIENG	KHOUAPHAN	PHON SONG	5446	1	232	091	3		100	100	100	60	30	0	0			
64	VANG VIENG	VANG VIENG	KHOUAPHAN	KHOUAPHAN	5446	1	232	093	3		100	100	100	100	60	0	0			
70	VANG VIENG	VANG VIENG	KHOUAPHAN	VIENG SAI	5446	1	235	089	3		100	100	100	100	100	100	0			
402	VANG VIENG	VANG VIENG	KHOUAPHAN	PAK KUANG	5446	1	233	089	3		100	100	100	100	100	100	80			
65	VANG VIENG	VANG VIENG	KHOUAPHAN	HUAI NGAM	5446	1	234	091	3		100	100	100	100	100	70	0			
404	VANG VIENG	VANG VIENG	KHOUAPHAN	PAKKUANGTY	5446	1	234	089	3		100	100	100	100	100	100	80			
72	VANG VIENG	VANG VIENG	KHOUAPHAN	HOAI NGUM	5446	1	236	088	3		100	100	100	100	100	100	100			
67	VANG VIENG	VANG VIENG	KHOUAPHAN	-	5446	1	233	090	3		100	100	100	100	100	50	0			
71	VANG VIENG	VANG VIENG	KHOUAPHAN	-	5446	1	235	089	3		100	100	100	100	100	100	0			
74	VANG VIENG	VANG VIENG	KHOUAPHAN	-	5446	1	228	081	3		100	100	100	100	100	100	100			
75	VANG VIENG	VANG VIENG	KHOUAPHAN	-	5446	1	228	080	3		100	100	100	100	100	70	30			
406	VANG VIENG	VANG VIENG	VANG VIENG	BAN SAVANG	5446	4	232	094	3		100	100	100	40	0	0	0			
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58	VANG VIENG	VANG VIENG	VANG VIENG	PHON KHENG	5446	1	232	096	3		100	100	100	0	0	0	0			
407	VANG VIENG	VANG VIENG	VANG VIENG	VIENG SONG	5446	1	232	094	3		100	100	100	40	0	0	0			
56	VANG VIENG	VANG VIENG	VANG VIENG	PAK PO	5446	1	232	100	3		100	30	0	0	0	0	0			
408	VANG VIENG	VANG VIENG	VANG VIENG	NAM PO	5446	1	231	100	3		100	100	0	0	0	0	0			
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61	VANG VIENG	VANG VIENG	VANG VIENG	NA NGA	5446	1	234	094	3		0	0	0	0	0	0	0			
62	VANG VIENG	VANG VIENG	VANG VIENG	-	5446	4	231	093	3		100	100	100	100	100	0	0			
63	VANG VIENG	VANG VIENG	VANG VIENG	-	5446	1	232	098	3		100	50	0	0	0	0	0			
84	VANG VIENG	VANG VIENG	NA MON	PHON SI	5546	4	243	066	3		100	100	100	100	20	0	0			
80	VANG VIENG	VANG VIENG	NA PON	NA LAO	5546	4	244	089	3		100	90	0	0	0	0	0			
82	VANG VIENG	VANG VIENG	NA MON	NA MON	5546	4	240	087	3		100	100	100	90	80	0	0			
81	VANG VIENG	VANG VIENG	NA PON	NA PON NUA	5546	4	239	087	3		100	100	100	100	15	0	0			
83	VANG VIENG	VANG VIENG	NA NUA	NA NGA2	5546	4	244	088	3		100	100	90	0	0	0	0			
85	VANG VIENG	VANG VIENG	NA PON	VANG SUA	5546	4	241	085	3		100	100	100	100	100	40	20			
77	VANG VIENG	VANG VIENG	NA MON	VANG KHI	5446	1	227	077	2	9	100	100	100	100	100	100	100			10
79	VANG VIENG	VANG VIENG	NA PON	NA NGAI	5546	4	244	085	3		100	100	100	100	100	0	0			
78	VANG VIENG	VANG VIENG	NA MON	VANG MIANG	5546	4	238	085	3		100	100	100	100	100	100	100			
86	VANG VIENG	VANG VIENG	NA THAO	NA KUA	5446	1	227	093	3		100	100	100	0	0	0	0			
87	VANG VIENG	VANG VIENG	NA PHAO	NAM NUANG	5446	1	226	090	3		100	100	0	0	0	0	0			
193	VANG VIENG	PEUANG	HUA NA	HIN HEUP	5446	2	218	063	2	9	100	100	100	100	100	100	100			100
192	VANG VIENG	PEUANG	HUA NA	-	5446	2	211	059	2	9	100	100	100	100	100	100	100			100
212	VANG VIENG	PEUANG	HUA NA	PAK HOAI	5446	3	209	062	2	9	100	100	100	100	100	100	100			100
127	VANG VIENG	PEUANG	HUA NA	NA PHONG	5446	2	214	071	2		100	100	100	100	100	100	100			
126	VANG VIENG	PEUANG	HUA NA	NA LEUANG	5446	2	215	075	2		100	100	100	100	100	80	10			
125	VANG VIENG	PEUANG	HUA NA	NA SAI	5446	2	213	075	2		100	100	100	100	100	100	20			
117	VANG VIENG	PEUANG	HUA NA	-	5446	2	226	074	2		100	100	100	100	100	100	40			
118	VANG VIENG	PEUANG	HUA NA	-	5446	2	224	073	2		100	100	100	100	100	100	100			
127	VANG VIENG	PEUANG	HUA NA	PHON PHOK	5446	2	213	062	2	9	100	100	100	100	100	100	100			100
130	VANG VIENG	PEUANG	HUA NA	-	5446	2	223	072	2		100	100	100	100	100	100	100			
131	VANG VIENG	PEUANG	HUA NA	-	5446	2	222	072	2		100	100	100	100	100	80	40			
132	VANG VIENG	PEUANG	HUA NA	-	5446	2	222	073	2	9	100	100	100	100	100	100	100			10
133	VANG VIENG	PEUANG	HUA NA	PHON NGAM	5446	2	210	061	2	9	100	100	100	100	100	100	100			100
134	VANG VIENG	PEUANG	HUA NA	SONG KHON	5446	2	211	061	2	9	100	100	100	100	100	100	100			100
135	VANG VIENG	PEUANG	HUA NA	PHON KAM	5446	2	212	062	2	9	100	100	100	100	100	100	100			35

(1)	(2)	(3)	(4)	(6)	(7)	(8)	(10)	(11)	(12)	(13)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
112	[illegible]	PEUANG	HUA NA	HIM NGON	5446	2	217	063	2	9	100	100	100	100	100	100	100			60
113	[illegible]	PEUANG	HUA NA	PHON KHAM	5446	2	213	062	2	9	100	100	100	100	100	100	100			100
114	[illegible]	PEUANG	HUA NA	PHOU SAI	5446	2	216	063	2	9	100	100	100	100	100	100	100			100
115	[illegible]	PEUANG	HUA NA	LAO KHAM	5446	2	214	063	2	9	100	100	100	100	100	100	100			50
116	[illegible]	PEUANG	HUA NA	VIENG KHAM	5446	2	215	063	2	9	100	100	100	100	100	100	100			30
117	[illegible]	PEUANG	HUA NA	-	5446	2	220	069	2	9	100	100	100	100	100	100	100			5
118	[illegible]	PEUANG	HUA NA	-	5446	2	220	068	2	9	100	100	100	100	100	100	100			100
119	[illegible]	PEUANG	HUA NA	-	5446	2	221	072	2	9	100	100	100	100	100	100	100			100
120	[illegible]	PEUANG	HUA NA	VANG MIENG	5446	2	214	063	2	9	100	100	100	100	100	100	100			100
121	[illegible]	PEUANG	HUA NA	KHON KEO	5446	2	213	062	2	9	100	100	100	100	100	100	100			65
122	[illegible]	PEUANG	HUA NA	KHOUA SAI	5446	2	211	062	2	9	100	100	100	100	100	100	100			100
123	[illegible]	PEUANG	HUA NA	-	5446	1	216	077	2		100	100	100	100	100	50	0			
124	[illegible]	PEUANG	HUA NA	-	5446	1	219	079	2		100	100	100	90	80	50	40			
125	[illegible]	PEUANG	HUA NA	-	5446	2	215	068	2		100	100	100	100	100	100	100			
126	[illegible]	PEUANG	HUA NA	-	5446	2	214	068	2		100	100	100	100	100	100	100			
127	[illegible]	PEUANG	HUA NA	-	5446	2	214	069	2		100	100	100	100	100	100	100			
128	[illegible]	PEUANG	HUA NA	-	5446	2	221	072	2	9	100	100	100	100	100	100	100			100
129	[illegible]	PEUANG	HUA NA	-	5446	2	221	069	2	9	100	100	100	100	100	100	100			0
130	[illegible]	PEUANG	HUA NA		5446	2	221	068	2		100	100	100	100	100	80	50			
131	[illegible]	PEUANG	NA PEUANG	NA THOUN	5446	3	188	059	2		100	100	100	40	0	0	0			
132	[illegible]	PEUANG	NA PEUANG	-	5446	3	186	055	2		100	100	0	0	0	0	0			
133	[illegible]	PEUANG	NA PEUANG	NAM HAY	5446	3	185	057	2		100	100	0	0	0	0	0			
134	[illegible]	PEUANG	NA PEUANG	NA DI	5446	3	194	063	2		100	100	100	100	100	100	100			
135	[illegible]	PEUANG	NA PEUANG	PHON SAI	5446	3	193	063	2		100	100	100	100	100	100	100			
136	[illegible]	PEUANG	NA PEUANG	NA PEUANG	5446	3	191	062	2		100	100	100	100	100	100	0			
137	[illegible]	PEUANG	NA PEUANG	PHON THON	5446	3	191	062	2		100	100	100	100	100	100	0			
138	[illegible]	PEUANG	NA PEUANG	NA LANE	5446	3	186	063	2		100	90	0	0	0	0	0			
139	[illegible]	PEUANG	NA PEUANG	NA NONE	5446	3	186	062	2		100	80	0	0	0	0	0			
140	[illegible]	PEUANG	M.PEUANG	NA KHUNUA	5446	3	193	068	2		100	100	10	0	0	0	0			
141	[illegible]	PEUANG	M.PEUANG	SAB HEUN	5446	3	198	074	2		100	100	100	100	100	100	100			
142	[illegible]	PEUANG	M.PEUANG	KENG SIENG	5446	3	198	074	2		100	100	100	100	100	100	100			
143	[illegible]	PEUANG	M.PEUANG	NA THOUA	5446	3	195	069	2		100	100	100	100	100	100	100			
144	[illegible]	PEUANG	M.PEUANG	NA NGENG	5446	3	197	069	2		100	100	100	100	100	100	100			
145	[illegible]	PEUANG	M.PEUANG	SA KANG	5446	3	197	065	2		100	100	100	100	100	100	100			
146	[illegible]	PEUANG	M.PEUANG	M.PEUANG	5446	3	198	072	2		100	100	100	100	100	100	100			
147	[illegible]	PEUANG	M.PEUANG	THA	5446	3	197	067	2		100	100	100	100	100	100	100			
148	[illegible]	PEUANG	M.PEUANG	BAN DONE	5446	3	198	067	2		100	100	100	100	100	100	100			
149	[illegible]	PEUANG	M.PEUANG	NA PHONG	5446	3	195	065	2		100	100	100	100	100	100	100			
150	[illegible]	PEUANG	M.PEUANG	HUAIKAMSEI	5446	3	193	069	2		100	100	0	0	0	0	0			
151	[illegible]	PEUANG	M.PEUANG	NA KALNG	5446	3	193	060	2		100	100	100	0	0	0	0			
152	[illegible]	PEUANG	M.PEUANG	PON BENG	5446	3	188	059	2		100	100	100	100	0	0	0			
153	[illegible]	PEUANG	PAK NGUA	NAM KANI	5446	4	198	080	2		100	100	100	100	90	70	30			
154	[illegible]	PEUANG	PAK NGUA	PAK NGUA	5446	4	194	082	2		100	100	100	100	100	0	0			
155	[illegible]	PEUANG	PAK NGUA	NA AN	5446	4	202	081	2		0	0	0	0	0	0	0			
156	[illegible]	PEUANG	PAK NGUA	NA MAI	5446	4	202	081	2		100	0	0	0	0	0	0			
157	[illegible]	PEUANG	PAK NGUA	NA DONNEUA	5446	4	200	079	2		100	100	100	100	100	100	0			
158	[illegible]	PEUANG	PAK NGUA	NA PONTAI	5446	4	201	078	2		100	100	100	100	100	100	100			
159	[illegible]	PEUANG	PAK NGUA	MONG PET	5446	4	200	077	2		100	100	100	100	100	100	100			
160	[illegible]	PEUANG	PAK NGUA	NA SENG	5446	4	199	076	2		100	100	100	100	100	100	100			
161	[illegible]	PEUANG	PAK NGUA	NA FOI	5446	4	196	077	2		100	100	100	100	100	100	100			
162	[illegible]	PEUANG	PAK NGUA	-	5446	4	204	078	2		100	80	50	0	0	0	0			
163	[illegible]	PEUANG	PAK NGUA	-	5446	4	197	080	2		100	100	100	100	100	100	100			
164	[illegible]	PHATANG	PHATANG	THATANG	5447	2	230	111	3		0	0	0	0	0	0	0			
165	[illegible]	PHATANG	LANG MAO	LANG PAO	5447	2	232	103	3		90	70	0	0	0	0	0			
166	[illegible]	PHATANG	LANG MAO	NA DAI	5447	2	231	107	3		0	0	0	0	0	0	0			
167	[illegible]	PHATANG	LANG PAO	NONG BUA	5447	2	231	105	3		0	0	0	0	0	0	0			
168	[illegible]	PHATANG	LANG MAO	NAM PAT	5447	2	230	107	3		0	0	0	0	0	0	0			
169	[illegible]	PHATANG	LANG PAO	BUA NA	5446	1	232	102	3		100	80	0	0	0	0	0			
170	[illegible]	PHATANG	LANG PAO	NA TAN	5447	2	230	108	3		20	0	0	0	0	0	0			
171	[illegible]	PHATANG	LANG PAO	NA NOI	5447	2	231	10[illegible]	3		0	0	0	0	0	0	0			

(1)	(2)	(3)	(4)	(6)	(7)	(8)	(10)	(11)	(12)	(13)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
12	[illegible]	[illegible]	LAN. MAO	PHON KOK	5347	2	232	105	1		0	0	0	0	0	0	0			
13	[illegible]	PAJI	-	[illegible]	5347	2	796	115	1		80	50	20	10	0	0	0			
14	[illegible]	PAJI	-	-	5347	2	796	119	1		40	0	0	0	0	0	0			
21	[illegible]	PAJI	-	-	5347	2	796	115	1		0	0	0	0	0	0	0			
15	[illegible]	PAJI	-	-	5347	2	798	126	1		20	10	0	0	0	0	0			
11	[illegible]	PAJI	-	-	5347	2	798	130	1		0	0	0	0	0	0	0			
66	[illegible]	NET	NA PHO	PAK [illegible]	5346	1	800	077	1		100	100	100	80	40	0	0			
35	[illegible]	NET	NA PHO	-	5346	1	795	099	1		50	20	10	0	0	0	0			
25	[illegible]	NET	NA PHO	-	5347	2	795	107	1		70	40	30	0	0	0	0			
16	[illegible]	[illegible]	-	PAK NEU.	5347	2	796	129	1		60	30	0	0	0	0	0			
233	PAK LAI	PAK LAI	KEN THAO	KEN THAO	5244	2	755	962	1		100	100	100	100	85	0	0			
237	PAK LAI	PAK LAI	KEN THAO	BOUNG KHA	5344	4	773	968	1		100	100	100	100	100	100	100			
241	PAK LAI	PAK LAI	KEN THAO	NA BOME	5244	2	758	963	1		100	100	100	0	0	0	0			
101	PAK LAI	PAK LAI	KEN THAO	HAT DEN.	5244	2	757	962	1		100	100	100	100	100	100	0			
73	PAK LAI	KEN THAO	KEN THAO	-	5244	1	749	976	1		100	0	0	0	0	0	0			
196	PAK LAI	KEN THAO	KEN THAO	-	5344	4	768	972	1		100	100	100	100	100	100	100			
239	PAK LAI	PAK LAI	PLANG PO	HUANG PO	5244	2	752	957	1		100	0	0	0	0	0	0			
100	PAK LAI	PAK LAI	HUANG PO	NAKENG NA	5244	2	750	955	1		100	0	0	0	0	0	0			
102	PAK LAI	PAK LAI	PLANG PO	KHONTAEU	5244	2	748	953	1		100	0	0	0	0	0	0			
218	PAK LAI	KEN THAO	DON KEN	NA KHAM	5245	2	756	000	1	8	100	100	100	100	100	100	100		10	
235	PAK LAI	KEN THAO	DON KEN	NA KHE	5245	2	756	998	1	8	100	100	100	100	100	100	100		5	
236	PAK LAI	KEN THAO	DON KEN	DON SANG	5245	2	756	994	1	8	100	100	100	100	100	100	100		0	
235	PAK LAI	KEN THAO	DON KEN	DON KEN	5244	1	755	986	1	8	100	100	100	100	100	100	100		20	
219	PAK LAI	KEN THAO	DON KEN	KENG KAI	5244	1	764	979	1		100	100	100	100	100	100	100			
236	PAK LAI	PAK LAI	DON KEN	-	5244	1	757	980	1		100	100	100	100	100	100	100			
200	PAK LAI	PAK LAI	DON KEN	-	5244	1	760	977	1	8	100	100	100	100	0	0	0		100	
278	PAK LAI	PAK LAI	DON KEN	-	5244	1	750	979	1		100	0	0	0	0	0	0			
49	PAK LAI	SUVANAPHUM	SUVANAPHUM	-	5346	1	795	088	1		100	70	30	0	0	0	0			
35	PAK LAI	SUVANAPHUM	SUVANAPHUM	-	5346	1	794	090	1		95	60	30	0	0	0	0			
37	PAK LAI	SUVANAPHUM	SUVANAPHUM	-	5346	1	794	092	1		50	40	0	0	0	0	0			
174	PAK LAI	SUVANAPHUM	SUVANAPHUM	SUVANAPHUM	5345	4	765	036	1		100	100	100	100	100	0	0			
172	PAK LAI	SUVANAPHUM	SUVANAPHUM	HAT DAI	5345	4	767	039	1		100	100	100	100	100	0	0			
161	PAK LAI	SUVANAPHUM	SUVANAPHUM	PHON NGAM	5345	4	768	040	1		100	100	80	30	0	0	0			
164	PAK LAI	SUVANAPHUM	SUVANAPHUM	NOK HUAI	5345	4	767	040	1		100	100	50	0	0	0	0			
173	PAK LAI	SUVANAPHUM	SUVANAPHUM	-	5345	4	767	039	1		100	100	100	100	100	0	0			
60	PAK LAI	SUVANAPHUM	SUVANAPHUM	-	5346	1	799	085	1		100	100	100	100	50	0	0			
30	PAK LAI	SUVANAPHUM	SUVANAPHUM	ECOLLE	5346	1	795	097	1		70	40	0	0	0	0	0			
170	PAK LAI	SUVANAPHUM	SUVANAPHUM	-	5345	4	768	039	1		100	100	100	100	0	0	0			
167	PAK LAI	SUVANAPHUM	SUVANAPHUM	-	5345	4	770	044	1		0	0	0	0	0	0	0			
171	PAK LAI	SUVANAPHUM	LIAP	PHA LIAP	5345	4	781	045	1		100	100	100	100	100	0	0			
163	PAK LAI	SUVANAPHUM	LIAP	PAK PUN	5345	4	771	035	1		100	100	100	100	90	80	0			
162	PAK LAI	SUVANAPHUM	LIAP	THA KO	5345	4	768	035	1		100	100	100	100	100	100	0			
168	PAK LAI	SUVANAPHUM	LIAP	HATKAEAE	5345	4	768	035	1		100	100	100	100	100	0	0			
169	PAK LAI	SUVANAPHUM	LIAP	[illegible]	5345	4	767	035	1		100	100	100	100	100	0	0			
177	PAK LAI	SUVANAPHUM	LIAP	BAN PANG	5345	4	767	036	1		100	100	100	100	100	0	0			
176	PAK LAI	SUVANAPHUM	LIAP	NONG LOEM	5345	4	776	049	1		100	100	100	100	100	100	10			
166	PAK LAI	SUVANAPHUM	LIAP	-	5345	4	785	045	1		100	100	100	100	100	100	0			
[illegible]	PAK LAI	PAK LAI	KOUNG MA	TAP DEO	5245	2	752	001	1		100	100	100	100	100	100	80			
[illegible]	PAK LAI	PAK LAI	KOUNG MA	BAN PAN	5245	2	752	007	1		100	100	100	100	100	70	40			
[illegible]	PAK LAI	PAK LAI	KOUNG MA	[illegible]	5245	2	751	004	1		100	100	100	100	100	100	80			
[illegible]	PAK LAI	PAK LAI	KOUNG MA	BOUNG MA	5245	2	754	004	1		100	100	100	100	100	100	100			
234	PAK LAI	PAK LAI	KOUNG MA	PAK LIEN.	5245	2	750	998	1		10	0	0	0	0	0	0			
[illegible]	PAK LAI	PAK LAI	PAK LAI	NA SAP	5245	2	753	010	1		100	100	100	100	100	100	100			
[illegible]	PAK LAI	PAK LAI	PAK LAI	HUAILANOI	5245	2	756	017	1		100	100	100	100	100	100	50			
[illegible]	PAK LAI	PAK LAI	PAK LAI	BAN. PAK	5245	2	754	018	1		100	100	100	100	0	0	0			
206	PAK LAI	PAK LAI	PAK LAI	NAM SON.	5245	1	758	020	1		100	100	100	100	100	95	10			
201	PAK LAI	PAK LAI	PAK LAI	PAK [illegible]	5245	1	762	026	1		100	100	100	100	100	100	0			
221	PAK LAI	PAK LAI	PAK LAI	PAK LAI	5245	2	755	015	1		100	100	100	100	100	100	98			
218	PAK LAI	PAK LAI	PAK LAI	PAK LAI	5245	2	755	016	1		100	100	100	100	100	100	0			
[illegible]	PAK LAI	PAK LAI	PAK LAI	PAK LAI	5245	2	754	016	1		100	100	100	100	100	0	0			

(1)	(2)	(3)	(4)	(6)	(7)	(8)	(10)	(11)	(12)	(13)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
162	[illegible]	[illegible]	[illegible]	-	5245	1	756	025	1		100	50	0	0	0	0	0			
[illegible]	[illegible]	[illegible]	[illegible]	-	5346	2	737	072	1		100	100	100	100	100	100	0			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2	797	071	1		100	100	100	100	60	0	0			
[illegible]	[illegible]	[illegible]	[illegible]	NUMA KAI	5346	2	792	056	1		100	100	100	50	10	0	0			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4	770	031	1		100	100	100	100	100	95	10			
[illegible]	[illegible]	[illegible]	[illegible]	SAPEDA	5345	4	768	029	1		100	100	100	100	100	50	0			
91	[illegible]	[illegible]	[illegible]	-	5346	2	793	059	1		0	0	0	0	0	0	0			
34	[illegible]	[illegible]	[illegible]	-	5346	2	795	066	1		100	100	100	100	100	80	0			
137	[illegible]	[illegible]	[illegible]	VANA THOLO	5245	2	751	018	1		60	0	0	0	0	0	0			
160	[illegible]	[illegible]	[illegible]	SANA MAI	5245	1	764	040	1		100	100	100	100	0	0	0			
163	[illegible]	[illegible]	[illegible]	-	5245	1	759	038	1		100	100	100	100	100	0	0			
159	[illegible]	[illegible]	[illegible]	-	5245	1	761	043	1		100	100	100	100	0	0	0			
22	[illegible]	[illegible]	[illegible]	-	5347	2	795	105	1		30	0	0	0	0	0	0			
21	[illegible]	[illegible]	[illegible]	-	5347	2	795	108	1		40	20	10	0	0	0	0			
16	[illegible]	[illegible]	[illegible]	-	5347	2	796	121	1		80	30	10	0	0	0	0			
15	[illegible]	[illegible]	[illegible]	-	5347	2	797	126	1		100	50	0	0	0	0	0			
12	[illegible]	[illegible]	[illegible]	-	5347	2	797	129	1		100	100	20	10	0	0	0			
14	[illegible]	[illegible]	[illegible]	-	5346	4	787	097	1		20	0	0	0	0	0	0			
20	[illegible]	[illegible]	[illegible]	-	5347	2	794	101	1		70	40	10	0	0	0	0			
18	[illegible]	[illegible]	[illegible]	-	5347	2	795	115	1		80	40	20	10	0	0	0			
17	[illegible]	[illegible]	[illegible]	-	5347	2	795	118	1		0	0	0	0	0	0	0			

(1) Base Map No.	(27) 1974 Households	(28) 1974 Population	(31) In-Migration (Households) 1974	(32) Out-Migration (Households) 1974	(33) Aggregate In-Migration (5 yrs.)	(34) Aggregate Out-Migration (5 yrs.)	(35) Other Names of Associated Villages	(36) Refugee Village
144	41	320	0	[illegible]	0	[illegible]		
158	15	95						
145	24	144						
146	51	306						
215	16	101						
216	24	148						
206	10	44						
205	20	90						
204	10	62						
203	23	130						
256	18	75						
213	27	127						
212	15	83						
211	21	110						
210	17	88						
208	10	60						
209	27	161						
202	19	97						
201	35	179						
207	14	72						
200	23	97						
274	87	480	0	0	[illegible]	2		
261	68	350	0	0		[illegible]		
258	51	259						
264	61	350	0	0	0	1		
265	10	62						
262	24	70	0	0	0	0		
271	124	614	0	0	0	3		
259	15	72						
268	48	273						
272	70	369	2	0	3	0		
266	61	394	0	0	[illegible]	0		
69	65	356	0	2	5	2		
260	30	150	0	0		0		
257	11	45						
214	41	201						
268	49	315						
270	27	161						
267	22	112						
271	7	46						

KOUAI

①	㉗	㉘	㉛	㉜	㉝	㉞	㉟	㊱
151	6	16	-	-				
100	15	202	-	-				
96	9	54	-	-				
97	10	62	-	-				
98	7	45	-	-				
89	22	136	-	-				
95	10	57	-	-				
96	7	46	-	-				
92	6	16	-	-				
81	9	54	-	-				
191	32	202	-	-				
182	29	166	-	-				
186	18	109	-	-				
175	7	46	-	-				
188	27	161	-	-				
87	6	19	-	-				
177	9	54	-	-				
181	9	54	-	-				
184	29	161	-	-				
194	14	150	-	-				
195	17	105	-	-				
186	24	155	-	-				
117	12	77	-	-				
198	11	72	-	-				
199	30	121	-	-				
165	11	65	-	-			NWAINGAH	
166	35	210	-	-				
229	65	269	-	-				
236	38	220	-	-				
210	21	113	-	-				
217	38	256	-	-				
211	14	85	-	-				
183	15	90	-	-				
221	7	46	-	-				
187	6	18	-	-				
231	11	221	0	0	0	0		
277	18	59	-	-				
292	241	1873	4	0	9	0		
291	10	62	-	-				
285	165	960	0	0	19	0		
254	51	299	0	0	0	2		
251	17	97	2	0	2	0		
255	35	201	0	0	1	0		
288	56	431	0	0	2	0		
285	140	820	5	0	20	0		
241	69	612	2	0	17	13		
281	75	600	0	1	21	4		
251	55	400	0	7	30	7		
248	55	120	0	0	2	0		
246	0	0	0	0	0	0		
256	15	80	2	0	15	0	UCHKABAI	
284	16	101	-	-				
252	6	18	-	-				
294	100	591	-	-				
290	108	511	-	-				
297	71	427	0	2	0	2		
282	27	178	-	-				
287	161	840	4	0	4	0		
247	210	1010	6	0	76	0		
245	51	307	0	0	6	5		

①	㉗	㉕	㉛	㉜	㉝	㉞	㉟	㊱
244	55	150	0	0	0	2		
241	16	219	-	-				
238	35	207	-	-				
239	11	131	-	-				
243	17	227	-	-				
240	33	553	-	-				
242	7	46	-	-				
246	50	122	1	0	14	0		
191	12	77	-	-				
190	18	231	-	-				
71	69	400	-	-				
63	51	279	-	-				
68	25	250	-	-			PHON LE	
66	11	260	-	-				
64	0	711	-	-				
70	55	150	-	-				
402	70	157	-	-				
65	59	170	-	-				
404	35	160	-	-				
72	3	21	-	-				
67	9	54	-	-				
71	5	31	-	-				
76	14	85	-	-				
78	10	62	-	-				
406	0	1195	-	-				
60	785	4520	-	-				
58	70	392	-	-				
407	0	111	-	-				
56	37	217	-	-				
408	41	246	-	-				
409	50	150	-	-				
61	27	161	-	-				
59	19	176	-	-				
57	5	31	-	-				
84	46	245	-	-				
80	44	262	-	-				
82	60	412	-	-				
81	16	111	-	-				
81	15	85	-	-			NARNGAT	
86	66	162	-	-				
77	41	118	-	-				
85	12	61	-	-			NARNGA	
74	58	149	-	-				
62	43	106	-	-				
63	38	169	-	-				
141	96	578	-	-				
156	10	62	-	-				
412	17	86	-	-				
127	27	160	-	-				
125	23	102	-	-				
125	16	105	-	-				
117	18	108	-	-				1
118	15	90	-	-				1
157	26	120	2	0	2	0		
140	19	114	-	-				1
141	49	514	-	-				1
119	14	84	-	-				1
155	29	136	6	2	6	2		1
154	19	200	0	0	0	0		1
152	8	42	0	9	17	4		1

(1)	(27)	(28)	(31)	(32)	(33)	(34)	(35)	(36)
132	42	200	5	6	5	6		1
150	64	441	0	10	0	10		1
147	28	154	10	0	10	0		1
141	65	446	0	7	0	7		1
148	114	970	0	7	0	7		1
133	161	466	-	-				1
134	144	564	-	-				1
131	26	156	-	-				1
413	17	102	-	-				
151	30	174	0	5	0	5		
153	23	158	4	4	4	4		
74	16	131	-	-				
75	18	233	-	-				
130	20	124	-	-				
129	12	77	-	-				
128	20	124	-	-				
142	10	60	-	-				1
116	50	330	-	-				1
135	28	171	-	-				
119	35	188	-	-				
120	6	36	-	-				
118	33	161	-	-				
122	9	55	-	-				
121	34	215	-	-				
414	28	147	-	-				
110	49	350	-	-				
113	29	144	-	-				
114	20	111	-	-				
111	9	40	0	0	0	0	HUAIKOK	
107	34	179	0	0	0	0	KONLUANG	
106	29	161	0	0	0	0		
108	14	70	2	0	2	0		
109	12	69	0	0	0	0		
120	86	508	0	0	2	2		
137	28	127	0	0	0	0		
112	62	271	-	-				
415	42	150	-	-				
121	23	165	-	-				
110	14	72	-	-				
115	41	249	-	-				
117	22	132	-	-				
45	61	366	-	-				
416	9	58	-	-				
52	10	60	-	-				
51	53	318	-	-				
46	9	54	-	-				
47	21	118	-	-			MABONNOI	
48	36	216	-	-			MABONYAI	
50	65	513	0	0	0	0		
49	24	144	-	-				
56	15	91	-	-				
57	23	140	-	-				
26	123	178	1	0	4	0		
33	58	287	-	-				
30	18	69	-	-				
31	25	145	-	-				
29	10	59	-	-				
35	17	102	0	2	0	2	KOK SAN	
27	50	304	-	-				
28	11	70	-	-				

(1)	(27)	(28)	(31)	(32)	(33)	(34)	(35)	(36)
12	52	295	-	-				
20	31	202	-	-				
19	12	77	-	-				
21	10	62	-	-				
15	18	109	-	-				
11	45	272	-	-				
44	18	98	-	-				
15	7	46	-	-				
25	19	116	-	-				
14	57	343	-	-				
298	507	2089	-	-				
297	7	58	-	-				
281	107	694	0	0	0	2		
101	70	176	1	0	1	1		
279	36	218	-	-				
296	9	54	-	-				
299	226	1331	0	0	22	1		
100	53	265	0	0	0	0		
102	91	650	2	0	2	0		
134	26	121	-	-				
235	45	276	-	-				
236	51	213	-	-				
275	67	418	-	-				
418	32	91	-	-				
276	10	62	-	-				
280	6	38	-	-				
278	24	148	-	-				
11	70	421	-	-				
38	19	116	-	-				
37	32	194	-	-				
176	340	2040	-	-				
172	35	210	-	-				
168	18	109	-	-				
169	62	374	-	-				
171	10	62	-	-				
40	9	54	-	-				
16	6	38	-	-				
170	23	140	-	-				
167	79	475	-	-				
173	60	360	-	-				
161	30	180	-	-				
162	40	240	-	-				
161	15	90	-	-				
130	40	240	-	-				
179	120	720	-	-				
174	18	109	-	-				
176	9	54	-	-				
228	47	250	0	0	1	0		
225	62	300	0	0	0	0		
227	34	200	2	0	2	0		
226	122	800	0	0	0	0		
231	63	363	0	0	0	0		
224	62	420	0	0	1	0		
222	41	275	0	0	0	0		
218	51	263	0	0	0	0		
164	137	791	0	0	0	0		
163	30	180	-	-				
221	486	2791	0	0	0	0		
219	10	62	-	-				
220	7	46	-	-				

(1)	(27)	(28)	(31)	(32)	(33)	(34)	(35)	(36)
162	27	164	-	-				
88	3	54	-	-				
90	15	210	-	-				
102	25	150	-	-				
184	160	960	-	-				
185	11	70	-	-				
91	7	46	-	-				
89	6	18	-	-				
217	117	750	0	0	0	0		
160	15	193	-	-				
161	49	296	-	-				
159	62	374	-	-				
23	10	62	-	-				
22	29	179	-	-				
16	24	148	-	-				
13	14	85	-	-				
12	20	124	-	-				
14	20	124	-	-				
24	36	236	-	-				
18	6	38	-	-				
17	7	46	-	-				

(1) Base Map No.	(2) Province	(3) District	(4) Commune	(5) Village No.	(6) Village Name	(7) 1:50,000 Map No.	(8) 1:50,000 Sheet No.	(9) 1:20,000 Sheet No.	(10) U.T.M. Coordinate North	(11) U.T.M. Coordinate East	(12) Reservoir Sector	(13) Affected by Cofferdams	(14) Affected by Protection Schemes	(15) % Flooded at 260m	(16) % Flooded at 255m	(17) % Flooded at 250m	(18) % Flooded at 245m	(19) % Flooded at 240m	(20) % Flooded at 235m	(21) % Flooded at 230m	(22) % Flooded at 180m Cofferdam	(23) % Flooded at 216m Cofferdam	(24) % Flooded at 200m Nam Mong Cofferdam
2	LOEI	MUANG	MUANG	1	THA KHAM	5344	3	9	420	914	03	--	01	100	100	100	100	80	5	0			
3	LOEI	MUANG	MUANG	2	HUA PAI	5344	3	9	390	921	02	--	02	100	100	100	100	35	0				
4	LOEI	MUANG	MUANG	3	PAK PHO	5344	3	9	418	899	03	--	01	100	100	100	100	100	50	0			
5	LOEI	MUANG	MUANG	4	NAM PHO	5344	3	9	427	879	03	--	00	100	100	100	100	30	0				
6	LOEI	MUANG	MUANG	5	NONGPAKKAD	5344	3	9	382	895	02	--	--	100	100	100	0						
7	LOEI	MUANG	MUANG	6	SAMYAKP.PO	5344	3	9	429	899	03	--	01	100	100	100	100	100	100	0			
8	LOEI	MUANG	MUANG	7	NA BON	5344	3	9	378	910	03	--	01	100	100	100	100	100	10	0			
9	LOEI	MUANG	MUANG	8	KAMNOETPET	5344	3	9	397	900	03	--	01	100	100	100	100	100	20	0			
10	LOEI	MUANG	MUANG	9	KANGPLATAI	5344	3	9	399	908	03	--	01	100	100	100	100	100	60	0			
11	LOEI	MUANG	MUANG	10	PHU PO PIT	5343	1	1	347	924	01	--	02	100	100	90	0						
12	LOEI	MUANG	MUANG	11	KANGPLANOA	5344	3	9	394	912	03	--	01	100	100	100	100	100	100	0			
13	LOEI	MUANG	MUANG	12	THA PHAE	5343	4	3	356	876	02	--	--	100	100	80	50	0					
14	LOEI	MUANG	NA AN	1	PIT TO	5343	4	3	310	911	03	--	00	100	100	100	100	100	0				
15	LOEI	MUANG	NA AN	2	KHORPAENG	5343	4	3	316	911	02	--	--	100	100	100	90	0					
16	LOEI	MUANG	NA AN	3	LAENGKHWAI	5343	1	1	319	923	02	--	02	100	100	100	100	0					
17	LOEI	MUANG	NA AN	4	PAK NA	5343	4	3	318	891	02	--	--	100	100	10	0						
18	LOEI	MUANG	NA AN	5	PAI THAM	5343	1	1	333	969	02	--	--	30	0								
19	LOEI	MUANG	NA AN	6	NA AN	5343	4	3	311	902	02	--	--	100	100	45	0						
20	LOEI	MUANG	NA O	1	NA O	5344	3	6	461	895	02	--	--	100	30	0							
21	LOEI	MUANG	NA O	2	NA KHOK	5344	3	6	469	881	02	--	--	80	0								
22	LOEI	MUANG	NA O	3	WANG PONG	5344	2	4	490	929	02	--	--	100	100	100	70	0					
23	LOEI	MUANG	NA O	4	THA MANAO	5344	3	6	467	915	02	--	--	100	100	100	100	100	10	0			
24	LOEI	MUANG	NA O	5	PAK MAK	5344	2	4	519	921	02	--	--	100	100	100	100	50	0				
25	LOEI	MUANG	NA O	6	THON KHAI	5344	3	9	448	910	03	--	00	100	100	100	70	30	0				
26	LOEI	MUANG	NA O	7	THA BUNG	5344	3	6	500	911	02	--	--	100	100	100	100	10	0				
28	LOEI	MUANG	NA O	9	NA O	5344	3	9	455	905	03	--	00	100	100	100	100	5	0				
29	LOEI	MUANG	NA O	10	NA O	5344	3	9	454	899	03	--	00	100	100	100	100	5	0				
30	LOEI	MUANG	NA O	11	NA O	5344	3	9	458	901	03	--	00	100	100	100	100	5	0				
31	LOEI	MUANG	NA O	12	NA O	5344	3	9	452	907	03	--	00	100	100	100	100	10	0				
33	LOEI	MUANG	NA O	A11	NA PHANG	5344	3	9	447	898	02	--	--	100	100	100	100	0					
34	LOEI	MUANG	NA PONG	1	HUAI DOK	5343	1	1	287	921	02	--	02	100	100	100	100	10	0				
35	LOEI	MUANG	NA PONG	2	NA PONG	5343	4	6	272	885	02	--	--	100	100	10	0						
36	LOEI	MUANG	NA PONG	3	TUEN	5343	4	3	276	877	02	--	--	100	0								
37	LOEI	MUANG	NA PONG	4	KHONPAEN	5343	4	3	282	902	02	--	02	100	100	100	90	0					
38	LOEI	MUANG	NA PONG	5	PIU NOI	5343	4	6	245	880	02	--	--	100	100	10	0						
39	LOEI	MUANG	NA PONG	7	HUA NA	5343	4	3	282	878	02	--	--	85	0								
40	LOEI	MUANG	NA PONG	8	NONG BON	5343	4	6	272	892	02	--	--	90	0								
42	LOEI	MUANG	NA PONG	9	NAM HUAI	5343	4	6	239	883	02	--	--	100	85	0							
43	LOEI	MUANG	NA PONG	11	PONG	5343	4	3	297	916	02	--	02	100	100	100	10	0					
44	LOEI	MUANG	NA CHA LAM	1	NONG PHAK	5343	1	4	245	982	02	--	--	20	0								

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
59	LOEI	MUANG	NOK LU	1	NA KHAEM	5144	1	3	571	853	02	--	--	100	100	10	0						
60	LOEI	MUANG	KOK DU	2	TUP KOP	5144	1	8	450	822	02	--	04	10	0								
61	LOEI	MUANG	NOK LU	3	HUAI SAI	5144	1	5	550	811	02	--	--	70	0								
63	LOEI	MUANG	KOK PO	7	PONG	5144	1	1	602	878	01	--	--	100	100	100	100	100	50	0			
64	LOEI	MUANG	KOK LO	11	WANG YAO	5144	1	2	581	813	02	--	--	100	10	0							
65	LOEI	MUANG	NAM NAN	1	NAI MUANG	5141	4	3	357	856	02	--	--	100	85	0							
1	LOEI	MUANG	NA PONG	616	MUNICIPAL	5144	1	9	370	894	01	--	01	100	100	100	100	78	2	0			
94	LOEI	THA LI	THA LI	52	THALI	5244	2	6	500	574	01	--	--	25	0								
108	LOEI	THA LI	THA LI	12	NON SAVANG	5244	2	6	498	590	01	--	--	40	0								
108	LOEI	THA LI	AHI	1	AHI	5244	2	5	536	494	01	--	--	100	70	0							
111	LOEI	THA LI	AHI	4	KHASENG	5244	2	2	577	534	01	--	--	100	100	100	0						
115	LOEI	THA LI	AHI	8	AHI	5244	2	5	536	494	01	--	--	100	70	0							
117	LOEI	THA LI	NONG PHYA	1	NONG PHYA	5244	2	2	620	552	01	--	--	100	100	100	100	90	30	0			
118	LOEI	THA LI	NONG PHYA	2	PAK KHAN	5244	2	2	594	573	01	--	--	100	100	100	100	15	0				
1985	LOEI	THA LI	NONG PHYA	A3	HAAT LING	5244	2	3	614	599	01	02	--	100	100	100	100	100	100	100		100	
120	LOEI	THA LI	NONG PHYA	4	KHONKAEN	5244	2	3	561	580	01	--	--	100	100	100	0						
121	LOEI	THA LI	NONG PHYA	5	MIANG	5244	2	6	522	585	01	--	--	100	100	100	5	0					
122	LOEI	THA LI	NONG PHYA	6	PAK HUAI	5244	2	3	585	558	01	--	--	100	100	100	20	0					
123	LOEI	THA LI	NONG PHYA	7	PAK HUAI	5244	2	1	585	558	01	--	--	100	100	100	20	0					
124	LOEI	THA LI	NONG PHYA	8	MIANG	5244	2	6	522	585	01	--	--	100	100	100	5	0					
125	LOEI	THA LI	NONG PHYA	9	MIANG	5244	2	6	522	585	01	--	--	100	100	100	5	0					
126	LOEI	THA LI	NAM KHAEM	1	NAM KHAEM	5144	3	-	581	685	01	--	--	70	0								
128	LOEI	THA LI	NAM KHAEM	3	NAM KHAEM	5144	3	-	581	685	01	--	--	70	0								
129	LOEI	THA LI	NAM KHAEM	4	HAAT HA	5244	2	3	634	641	01	02	--	100	100	100	100	100	100	100		50	
131	LOEI	THA LI	NAM KHAEM	6	PAK YANG	5144	3	-	560	713	01	--	--	10	0								
112	LOEI	WANGSAPHUNG	WANGSAPUNG	1	NAM JO	5143	3	3	084	895	02	--	--	45	0								
133	LOEI	WANGSAPHUNG	WANGSAPUNG	2	LAO	5143	4	9	093	920	02	--	--	95	0								
114	LOEI	WANGSAPHUNG	WANGSAPUNG	3	KOKKLIANG	5143	2	1	088	926	02	--	--	20	0								
115	LOEI	WANGSAPHUNG	WANGSAPUNG	54	PAK PENG	5143	1	7	133	943	02	--	--	100	100	0							
116	LOEI	WANGSAPHUNG	WANGSAPUNG	5	H.SAI KHAM	5143	1	7	106	942	02	--	--	100	0								
117	LOEI	WANGSAPHUNG	WANGSAPUNG	56	NA LAK	5143	1	7	159	944	02	--	--	100	100	0							
119	LOEI	WANGSAPHUNG	WANGSAPUNG	57	NA I LOET	5143	4	9	142	918	02	--	--	40	0								
140	LOEI	WANGSAPHUNG	WANGSAPUNG	8	BUNG FAN	5143	1	7	118	942	02	--	--	100	0								
141	LOEI	WANGSAPHUNG	WANGSAPUNG	59	WANGSAPUNG	5143	1	7	145	946	02	--	--	100	100	5	0						
142	LOEI	WANGSAPHUNG	WANGSAPUNG	10	NOI NA	5143	1	7	156	950	02	--	--	100	100	0							
143	LOEI	WANGSAPHUNG	WANGSAPUNG	11	PAK LOEI	5143	1	7	138	950	02	--	--	100	100	5	0						
145	LOEI	WANGSAPHUNG	WANGSAPUNG	18	BUNG SALAI	5143	1	7	147	955	02	--	--	100	100	5	0						
147	LOEI	WANGSAPHUNG	WANGSAPUNG	514	LERNG	5143	1	7	152	943	02	--	--	100	100	5	0						
148	LOEI	WANGSAPHUNG	WANGSAPUNG	515	MUNG KHA	5143	1	7	148	945	02	--	--	100	100	0							
149	LOEI	WANGSAPHUNG	WANGSAPUNG	516	SRUNGRUANG	5143	1	7	155	943	02	--	--	100	100	0							
150	LOEI	WANGSAPHUNG	WANGSAPUNG	517	BUNGPUKKAM	5143	1	7	131	938	02	--	--	100	100	0							
151	LOEI	WANGSAPHUNG	WANGSAPUNG	18	PAK LOEI	5143	1	7	129	948	02	--	--	100	5	0							
153	LOEI	WANGSAPHUNG	WANGSAPUNG	20	NON SAWANG	5143	1	7	132	953	02	--	--	15	0								
118	LOEI	WANGSAPHUNG	WANGSAPUNG	526	SAMNAMTANG	5143	1	7	159	944	02	--	--	100	100	0							
154	LOEI	WANGSAPHUNG	SAI KHAO	1	BUNG KHO	5143	3	3	080	881	02	--	--	0									
156	LOEI	WANGSAPHUNG	SAI KHAO	3	PHON GNAM	5143	3	1	077	800	02	--	--	10	0								
158	LOEI	WANGSAPHUNG	SAI KHAO	5	SAI KHAO	5143	3	3	077	467	02	--	--	0									
160	LOEI	WANGSAPHUNG	SAI KHAO	7	NA WUA	5143	3	3	050	848	02	--	--	80	0								
161	LOEI	WANGSAPHUNG	SAI KHAO	8	NA WOE	5143	3	3	043	848	02	--	--	15	0								
161	LOEI	WANGSAPHUNG	SAI KHAO	10	PAK LOEI	5143	3	3	075	854	02	--	--	100	0								
164	LOEI	WANGSAPHUNG	SAI KHAO	11	NON	5143	3	3	076	863	02	--	--	100	15	0							
166	LOEI	WANGSAPHUNG	SAI KHAO	13	SAI KHAO	5143	3	3	079	864	02	--	--	10	0								
167	LOEI	WANGSAPHUNG	SAI KHAO	14	PAK HUAI	5143	3	3	044	819	02	--	--	0									
169	LOEI	WANGSAPHUNG	SAI KHAO	16	SAI KHAO	5143	3	3	080	868	02	--	--	0									
201	LOEI	WANGSAPHUNG	PHA NOI	1	PHA NOI	5143	1	5	213	012	02	--	--	70	40	0							
204	LOEI	WANGSAPHUNG	PHA NOI	2	PUT SAE	5143	1	4	192	001	02	--	--	20	15	0							
205	LOEI	WANGSAPHUNG	PHA NOI	3	NON	5143	1	4	193	979	02	--	--	100	5	0							
206	LOEI	WANGSAPHUNG	PHA NOI	4	WANG THAN	5143	1	4	191	969	02	--	--	100	50	0							
209	LOEI	WANGSAPHUNG	PHA NOI	7	PAK LOEI	5143	1	4	186	951	02	--	--	100	100	0							
211	LOEI	WANGSAPHUNG	PHA NOI	16	NONKOPCHAN	5143	1	5	232	014	02	--	--	20	0								

269

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
284	[illegible]	[illegible]	PHA NOI	11	PAK LOEI	5343	1	4	134	955	02	--	--	100	30	0							
285	[illegible]	[illegible]	[illegible]	1	HUAI PAO	5343	4	6	200	843	02	--	--	40	0								
286	[illegible]	[illegible]	[illegible]	11	PAK SAIBON	5343	4	6	133	840	02	--	--	0									
287	[illegible]	[illegible]	[illegible]	A17	NA MA HUAN	5343	4	6	205	846	02	--	--	30	0								
288	[illegible]	[illegible]	[illegible]	-	NA THAM	5343	4	6	209	845	02	--	--	100	100	0							
289	[illegible]	[illegible]	[illegible]	3	UM MANAO	5343	3	6	953	846	02	--	04	0									
290	[illegible]	[illegible]	PHU HO	7	HONGTENG	5343	3	6	931	839	02	--	04	0									
291	[illegible]	[illegible]	PAK PUAN	1	PAK PUAN	5343	1	4	218	924	02	--	--	100	100	10	0						
292	[illegible]	[illegible]	PAK PUAN	2	HONGTAKHAM	5343	1	4	217	933	02	--	02	100	100	100	20	0					
293	[illegible]	[illegible]	PAK PUAN	3	HOK	5343	4	6	216	920	02	--	--	100	30	0							
294	[illegible]	[illegible]	PAK PUAN	4	WANG DUA	5343	1	4	219	916	02	--	02	100	100	100	100	0					
295	[illegible]	[illegible]	PAK PUAN	5	TA PAO	5343	1	4	205	933	02	--	--	100	100	100	5	0					
296	[illegible]	[illegible]	PAK PUAN	6	NOK KLUA	5343	1	7	179	917	02	--	--	100	100	100	0						
297	[illegible]	[illegible]	PAK PUAN	7	PHIPHUAKO	5343	1	7	131	949	02	--	--	100	100	100	0						
298	[illegible]	[illegible]	PAK PUAN	8	KUT NGON	5343	1	4	222	918	02	--	02	100	100	100	10	0					
299	[illegible]	CHIENG KHAN	CHIENGKHAN	51	CH.KHANNUA	5344	4	5	803	820	01	02	--	100	100	100	100	100	100	100		95	
300	[illegible]	CHIENG KHAN	CHIENGKHAN	52	CH.KHANTAI	5344	4	5	800	811	01	02	--	100	100	100	100	100	100	100		100	
301	[illegible]	CHIENG KHAN	CHIENGKHAN	1	KHOK MAT	5344	4	5	754	763	01	02	--	100	100	100	100	100	100	100		20	
302	[illegible]	CHIENG KHAN	CHIENGKHAN	4	NOI	5344	4	6	817	853	01	02	--	100	100	100	100	100	100	100		100	
303	[illegible]	CHIENG KHAN	CHIENGKHAN	5	JA CHAN	5344	4	6	751	871	01	--	--	100	100	100	100	100	10	0			
304	[illegible]	CHIENG KHAN	PAK TOM	1	NA CHAN	5344	4	7	679	735	01	02	--	100	100	100	100	100	100	90		40	
305	[illegible]	CHIENG KHAN	PAK TOM	2	NAM PHON	5344	4	8	654	749	01	--	--	100	100	100	100	100	65	0			
306	[illegible]	CHIENG KHAN	PAK TOM	1	KLANG	5344	4	8	699	784	01	02	--	100	100	100	100	100	100	95		50	
307	[illegible]	CHIENG KHAN	PAK TOM	4	THA DI MI	5344	4	7	706	713	01	02	--	100	100	100	100	100	100	95		100	
308	[illegible]	CHIENG KHAN	PAK TOM	5	KHOK NGIU	5344	4	4	744	726	01	02	--	100	100	100	100	100	100	100		5	
309	[illegible]	CHIENG KHAN	PAK TOM	A5	HAT THIENG	5344	4	4	750	727	01	--	--	100	100	100	100	100	100	100			
310	[illegible]	CHIENG KHAN	PAK TOM	A5	HAT HAE	5344	4	4	758	733	01	02	--	100	100	100	100	100	100	100		100	
311	[illegible]	CHIENG KHAN	KHAO KAEO	1	SOK KAO	5344	4	9	731	867	01	--	--	100	100	100	70	20	0				
312	[illegible]	CHIENG KHAN	KHAO KAEO	2	SOK NAI	5344	4	9	725	877	01	--	--	100	100	70	30	0					
313	[illegible]	CHIENG KHAN	KHAO KAEO	3	NA BAN	5344	4	9	707	892	01	--	--	100	100	50	0						
314	[illegible]	CHIENG KHAN	KHAO KAEO	4	KHAO KAEO	5344	4	9	695	907	02	--	--	10	0								
315	[illegible]	CHIENG KHAN	KHAO KAEO	5	WANGAPCANG	5344	4	9	703	912	01	--	--	5	0								
316	[illegible]	CHIENG KHAN	NA SAO	1	NA SAO	5344	4	9	731	833	01	--	--	100	100	100	90	70	35	10			
317	[illegible]	CHIENG KHAN	NA SAO	2	NA BON	5344	4	5	755	818	01	--	--	100	100	100	100	100	100	90			
318	[illegible]	CHIENG KHAN	NA SAO	3	PHON	5344	4	6	756	840	01	--	--	100	100	100	100	100	100	100			
319	[illegible]	CHIENG KHAN	NA SAO	4	MAITASAENG	5344	4	9	718	857	01	--	--	100	100	100	100	40	0				
320	[illegible]	CHIENG KHAN	NA SAO	5	N.SLAPDENG	5344	4	9	674	839	02	--	--	100	100	100	100	100	100	80			
321	[illegible]	CHIENG KHAN	NA SAO	6	KAENG MI	5344	4	8	677	816	02	02	--	100	100	100	100	100	100	100		2	
322	[illegible]	CHIENG KHAN	NA SAO	7	SRIPHONTAN	5344	4	9	726	834	01	--	--	100	100	100	80	70	0				
323	[illegible]	CHIENG KHAN	BO HOM	1	BO HOM	5344	4	3	862	899	01	02	--	100	100	100	100	100	100	100		100	
324	[illegible]	CHIENG KHAN	BO HOM	2	KHOKLAOMUA	5344	1	1	909	913	01	02	--	100	100	100	100	100	100	100		100	
325	[illegible]	CHIENG KHAN	BO HOM	3	KHOKLAOTAI	5344	1	1	920	922	01	02	--	100	100	100	100	100	100	100		100	
326	[illegible]	CHIENG KHAN	BO HOM	4	HUAI SUAE	5345	2	7	930	924	01	02	--	100	100	100	100	100	100	100		100	
327	[illegible]	CHIENG KHAN	BO HOM	5	U MONG	5344	1	4	738	929	01	--	--	100	100	80	0						
328	[illegible]	CHIENG KHAN	BO HOM	6	PHA PAEN	5344	4	6	818	890	01	02	--	100	100	100	100	100	100	100		100	
329	[illegible]	CHIENG KHAN	PHAT	1	PHAT	5344	3	3	604	882	02	--	--	100	100	100	100	100	100	0			
330	[illegible]	CHIENG KHAN	THAT	2	HUAI HINSA	5344	3	3	625	868	02	--	--	100	100	100	100	100	50	0			
331	[illegible]	CHIENG KHAN	PHAT	3	HUA KENG	5344	3	3	622	846	02	--	--	100	100	100	100	100	100	0			
332	[illegible]	CHIENG KHAN	THAT	4	SARAPHAE	5344	3	2	620	804	02	--	--	100	100	100	100	100	100	50			
333	[illegible]	CHIENG KHAN	THAT	5	NATSAIPHAO	5344	4	9	647	831	02	--	--	100	100	100	100	100	100	100			
334	[illegible]	CHIENG KHAN	THAT	6	NAM OM	5344	3	3	631	879	02	--	--	100	100	100	100	100	100	0			
335	[illegible]	CHIENG KHAN	THAT	7	KASI	5344	4	9	652	901	02	--	--	100	100	100	100	30	0				
336	[illegible]	CHIENG KHAN	PHAT	8	HIN TANG	5344	4	9	653	913	02	--	--	100	100	45	0						
337	[illegible]	CHIENG KHAN	THAT	11	HUAI PHOI	5344	3	3	624	896	02	--	--	100	100	100	100	40	0				
338	[illegible]	CHIENG KHAN	PHAT	12	THAT	5344	3	3	604	882	02	--	--	100	100	100	100	100	100	0			
339	[illegible]	CHIENG KHAN	THAT	13	SAN SAMBAN	5344	3	3	653	871	02	--	--	100	100	45	10	0					
340	[illegible]	CHIENG KHAN	PHAT	14	HUAI SRIDA	5344	3	2	677	783	02	--	--	25	0								
341	[illegible]	CHIENG KHAN	THAI	15	CHOM SRI	5344	4	9	650	900	02	--	--	100	100	100	100	50	10	0			
342	[illegible]	CHIENG KHAN	PHAT	16	PHA HOM	5344	4	9	646	814	02	--	--	100	100	100	100	100	100	100			
343	[illegible]	PAK CHOM	PAK CHOM	31	PAK CHOM	5345	2	8	948	054	01	02	--	100	100	100	100	100	100	100		100	

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
332	LOEI	PAK CHOM	PAK CHOM	2	KHO	5344	1	2	882	058	01	--	--	100	100	100	100	100	100	70			
333	LOEI	PAK CHOM	PAK CHOM	3	PAK NIAM	5345	2	9	984	102	01	02	--	100	100	100	100	100	100	100		100	
334	LOEI	PAK CHOM	PAK CHOM	4	SA NGAO	5345	2	9	016	123	01	02	--	100	100	100	100	100	100	100		100	
335	LOEI	PAK CHOM	PAK CHOM	5	PAK PAT	5345	2	9	956	147	01	02	--	100	100	100	100	100	100	80		20	
336	LOEI	PAK CHOM	PAK CHOM	6	HUAIPICHAI	5344	1	1	304	137	01	--	--	100	100	100	100	100	100	80			
338	LOEI	PAK CHOM	PAK CHOM	7	HUAIHINKAO	5344	1	1	964	148	01	--	--	100	100	100	0						
339	LOEI	PAK CHOM	PAK CHOM	8	KHOKPHAI	5345	2	8	966	028	01	02	--	100	100	100	100	100	100	100		100	
340	LOEI	PAK CHOM	PAK CHOM	9	HUAI THIAN	5344	1	5	410	060	01	--	--	100	80	20	0						
342	LOEI	PAK CHOM	PAK CHOM	10	NAK BIA	5345	1	7	984	970	01	02	--	100	100	100	100	100	100	100		100	
337	LOEI	PAK CHOM	PAK CHOM	A6	PONG NAE	5344	1	1	323	136	01	--	--	100	100	100	100	100	100	100			
347	LOEI	PAK CHOM	CHENGKHLON	5	HUAI NA	5344	1	6	817	151	01	--	--	5	0								
355	LOEI	PAK CHOM	NAI KHAMPI	1	NAIKHAMPI	5445	3	4	083	853	01	01	--	100	100	100	100	100	100	100	5	100	
356	LOEI	PAK CHOM	NAI KHAMPI	2	KHOK NAO	5445	3	1	122	874	01	02	--	100	100	100	100	100	100	100		100	
357	LOEI	PAK CHOM	NAI KHAMPI	3	NAUI KHOP	5445	3	1	144	896	01	02	--	100	100	100	100	100	100	100		100	
358	LOEI	PAK CHOM	NAI KHAMPI	4	HUAI NIAM	5445	3	1	156	908	01	01	--	100	100	100	100	100	100	100	5	100	
359	LOEI	PAK CHOM	NAI KHAMPI	5	PAK MANG	5445	3	4	057	828	01	02	--	100	100	100	100	100	100	100		100	
360	LOEI	PAK CHOM	NAI KHAMPI	6	NA MO	5445	3	4	037	847	01	02	--	100	100	100	100	100	80	50		100	
560	NONGKHAI	SANG KHOM	BAN MUANG	1	TAT SOEM	5445	3	6	079	027	01	01	--	100	100	100	100	100	100	100	5	100	
561	NONGKHAI	SANG KHOM	BAN MUANG	2	MUANG	5445	3	3	118	010	01	01	--	100	100	100	100	100	100	100	5	100	
562	NONGKHAI	SANG KHOM	BAN MUANG	3	NONG	5445	3	2	152	966	01	01	--	100	100	100	100	100	100	100	5	100	
563	NONGKHAI	SANG KHOM	BAN MUANG	4	HUAI KHO	5445	3	2	148	957	01	01	--	100	100	100	100	100	100	100	5	100	
564	NONGKHAI	SANG KHOM	BAN MUANG	5	WANG MON	5445	3	5	089	999	01	02	--	100	100	100	100	100	100	100		100	
565	NONGKHAI	SANG KHOM	BAN MUANG	6	NA NGIU	5445	3	5	070	971	01	--	--	100	100	100	100	100	100	80			
567	NONGKHAI	SANG KHOM	BAN MUANG	7	THAO NOI	5445	3	5	016	984	01	--	--	100	100	100	0						
568	NONGKHAI	SANG KHOM	BAN MUANG	8	THAO YAI	5445	3	8	005	981	01	--	--	100	100	100	0						
569	NONGKHAI	SANG KHOM	BAN MUANG	9	NA BON	5445	3	8	988	980	01	--	--	70	20	0							
566	NONGKHAI	SANG KHOM	BAN MUANG	A6	SUM CHIENG	5445	3	5	069	966	01	--	--	100	100	100	100	100	100	100			
590	NONGKHAI	SANG KHOM	KAENG KAI	1	PHA TANG	5445	2	8	941	226	01	01	--	100	100	100	100	100	100	100	100	100	
594	NONGKHAI	SANG KHOM	KAENG KAI	2	PAK SOM	5445	2	7	976	135	01	01	--	100	100	100	100	100	100	100	20	100	
595	NONGKHAI	SANG KHOM	KAENG KAI	53	KAENG KAI	5445	2	7	989	120	01	01	--	100	100	100	100	100	100	100	20	100	
596	NONGKHAI	SANG KHOM	KAENG KAI	54	CHUANG	5445	2	7	993	115	01	01	--	100	100	100	100	100	100	100	5	100	
597	NONGKHAI	SANG KHOM	KAENG KAI	55	SANG KHOM	5445	2	7	004	105	01	01	--	100	100	100	100	100	100	100	5	100	
599	NONGKHAI	SANG KHOM	KAENG KAI	6	PHA DANG	5445	2	4	017	095	01	02	--	100	100	100	100	100	100	100			
600	NONGKHAI	SANG KHOM	KAENG KAI	7	KAENG MAI	5445	3	6	036	076	01	02	--	100	100	100	100	100	100	100		100	
601	NONGKHAI	SANG KHOM	KAENG KAI	8	SANG KAMI	5445	2	7	967	090	01	02	--	100	100	100	100	100	100	100		100	
602	NONGKHAI	SANG KHOM	KAENG KAI	9	NA KHAM	5445	3	9	963	088	01	02	--	100	100	100	100	100	100	100		100	
604	NONGKHAI	SANG KHOM	KAENG KAI	10	NA KHOK	5444	1	1	920	100	01	02	--	100	100	100	100	100	100	100		100	
605	NONGKHAI	SANG KHOM	KAENG KAI	11	SOK KLA	5445	3	9	925	073	01	02	--	100	100	100	100	100	100	100		100	
598	NONGKHAI	SANG KHOM	KAENG KAI	12	PAKNAMPHAI	5445	3	6	039	068	01	02	--	100	100	100	100	100	100	100		100	
1144	UDORN	NONGBUALAMPU	NONGPAISAN	A6	MUNGNAMPAI	5445	3	9	992	029	01	--	--	100	100	100	100	100	100	100		100	
1144	UDORN	NONGBUALAMPU	NONGPAISAN	4	NON UDOM	5443	1	8	136	196	04	--	--	30	0								
1154	UDORN	NONGBUALAMPU	NONGPAISAN	7	PONSISA-AT	5443	1	8	168	242	04	--	--	100	0								
1155	UDORN	NONGBUALAMPU	NONGPAISAN	10	NUT CHIK	5443	1	5	189	195	04	--	--	100	100	100	100	100	100	100			
1156	UDORN	NONGBUALAMPU	NONGPAISAN	11	YANG LUANG	5443	1	5	187	177	04	--	--	100	100	100	100	100	100	100			
1157	UDORN	NONGBUALAMPU	NONGPAISAN	12	TUNG PONG	5443	1	5	209	224	04	--	--	100	100	100	100	100	100	100			
1158	UDORN	NONGBUALAMPU	NONGPAISAN	13	T.PONG NUA	5443	1	5	210	226	04	--	--	100	100	100	100	60	8	0			
1160	UDORN	NONGBUALAMPU	NONGPAISAN	14	NON SAWANG	5443	1	5	183	229	04	--	--	100	100	100	100	100	5	0			
1161	UDORN	NONGBUALAMPU	NONGPAISAN	16	Y.LUANGTAI	5443	1	8	177	177	04	--	--	100	100	100	0						
1145	UDORN	NA KLANG	KUT DIN JI	1	KUT DIN JI	5443	1	4	217	092	04	--	--	100	100	100	100	100	100	100			
1146	UDORN	NA KLANG	KUT DIN JI	2	THUNG PO	5443	1	4	216	086	04	--	--	100	100	100	100	100	100	45			
1147	UDORN	NA KLANG	KUT DIN JI	3	NANGNGTHUP	5443	1	4	219	119	04	--	--	100	100	100	100	100	5	0			
1148	UDORN	NA KLANG	KUT DIN JI	4	NONG TAE	5443	1	4	199	127	04	--	--	100	100	100	100	100	100	70			
1149	UDORN	NA KLANG	KUT DIN JI	5	AE CHANG	5443	1	7	179	123	04	--	--	100	100	100	100	100	100	15			
1150	UDORN	NA KLANG	KUT DIN JI	6	SAI NIMITR	5443	1	4	214	090	04	--	--	100	100	100	50	0					
1151	UDORN	NA KLANG	KUT DIN JI	8	MAN	5443	1	4	227	113	04	--	--	100	100	100	100	100	20	0			
1154	UDORN	NA KLANG	KUT DIN JI	9	BONG SAWAN	5443	4	3	314	029	04	--	--	100	100	100	100	100	100	100			
1155	UDORN	NA KLANG	KUT DIN JI	10	PHOK AWANG	5443	1	4	190	088	04	--	--	100	100	100	100	100	100	5			
1156	UDORN	NA KLANG	KUT DIN JI	11	LONGNAMSAI	5443	1	4	217	082	04	--	--	100	100	100	100	100	100	45			
1152	UDORN	NA KLANG	KUT DIN JI	12	NONG SANO	5443	1	4	216	086	04	--	--	100	100	100	100	100	5	0			
1162	UDORN	NA KLANG	KUT DIN JI	A6	PONSIVILAI	5443	4	6	247	077	04	--	--	100	100	100	0						

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬	⑭	⑮	⑯	⑰	⑱	⑲	⑳	㉑	㉒	㉓	㉔
1095	UDORN	NA KLANG	KAC KHLOI	1	KAC KHLOI	5443	1	5	265	174	04	--	--	100	1C0	1C0	100	100	1C0	100			
1096	UDORN	NA KLANG	KAO KHLOI	2	KUT KASO	5443	1	5	272	170	04	--	--	100	100	1C0	100	1CC	1C0	100			
1097	UDORN	NA KLANG	KAC KHLOI	3	NONG SAENG	5443	1	5	238	170	04	--	--	100	100	100	100	100	1C0	1C0			
1098	UDORN	NA KLANG	KAO KHLOI	4	YANG CHUM	5443	1	5	236	170	04	--	--	1CC	1C0	1C0	100	1CC	1C0	100			
1099	UDORN	NA KLANG	KAC KHLOI	5	N.MENGKHAM	5443	1	5	255	219	04	--	--	100	100	100	100	100	1C0	100			
1100	UDORN	NA KLANG	KAO KHLOI	6	KHOB LEK	5443	1	4	254	148	04	--	--	100	1C0	1C0	100	1CC	1C0	100			
1101	UDORN	NA KLANG	KAO KHLOI	7	NA SIMJAI	5443	1	5	238	170	04	--	--	100	100	100	100	100	100	1C0			
866	UDORN	NAM SOM	NAM SCM	1	NAM SOM	5444	4	8	680	956	01	02	--	100	1C0	100	100	10C	1C0	100		15	
867	UDORN	NAM SOM	NAM SOM	2	HUANG	5444	4	8	676	949	01	--	--	100	100	100	100	100	100	100			
869	UDORN	NAM SOM	NAM SCM	3	NAM POT	5444	4	8	694	955	01	--	--	100	100	100	100	100	1C0	100			
870	UDORN	NAM SOM	NAM SOM	4	PHON	5444	4	8	681	951	01	--	--	100	100	100	100	100	100	100			
871	UDORN	NAM SOM	NAM SCM	5	KONG	5444	4	8	712	927	01	--	--	100	100	100	100	80	60	30			
872	UDORN	NAM SOM	NAM SOM	6	HUAI HAI	5444	4	8	698	942	01	--	--	100	100	100	100	100	100	10			
873	UDORN	NAM SOM	NAM SOM	7	BIN LAT	5444	4	8	659	976	01	--	--	100	1C0	100	100	1CC	1C0	100			
874	UDORN	NAM SOM	NAM SOM	8	KHOK NOI	5444	4	8	675	972	01	02	--	100	100	100	100	100	100	100		10C	
875	UDORN	NAM SOM	NAM SCM	9	NON SOMBUN	5444	3	2	642	961	01	--	--	100	1C0	100	10C	10C	80	10			
876	UDORN	NAM SOM	NA YUNG	1	NA YUNG	5444	4	3	845	045	01	02	--	100	100	100	100	100	1C0	100		100	
877	UDORN	NAM SOM	NA YUNG	2	SAWANG	5444	4	6	815	079	01	02	--	100	100	100	100	100	100	100		1CC	
878	UDORN	NAM SOM	NA YUNG	3	HUAI SAI	5444	4	6	784	072	01	02	--	100	1C0	1C0	100	10C	1C0	100		100	
879	UDORN	NAM SOM	NA YUNG	4	PAK NANG	5444	4	3	833	074	01	02	--	100	100	100	100	100	100	100		1CC	
880	UDORN	NAM SOM	NA YUNG	5	NA DONG	5444	4	3	865	072	01	02	--	100	100	100	100	10C	1C0	100		100	
881	UDORN	NAM SOM	NA YUNG	6	WANG LAO	5444	4	3	887	086	01	02	--	100	100	100	100	100	100	100		1CC	
882	UDORN	NAM SOM	NA YUNG	7	CHIANG DI	5444	4	3	904	064	01	02	--	100	100	1C0	100	1C0	1C0	100		100	
883	UDORN	NAM SOM	NA YUNG	8	KUT CHUAM	5444	4	3	900	048	01	02	--	100	100	100	100	100	100	1C0		1CC	
884	UDORN	NAM SOM	NA YUNG	9	PAK CHIANG	5444	4	3	914	006	01	02	--	100	1C0	100	100	10C	1C0	100		100	
885	UDORN	NAM SOM	NONG WAENG	1	NONG WAENG	5444	1	7	680	100	01	02	--	100	100	100	100	100	100	100		100	
886	UDORN	NAM SOM	NONG WAENG	2	NAM SUM	5444	1	7	700	124	01	02	--	100	100	100	100	100	100	100		1CC	
888	UDORN	NAM SOM	NONG WAENG	3	NA KAN	5444	1	4	768	095	01	02	--	100	100	10C	100	10C	100	100		100	
889	UDORN	NAM SOM	NONG WAENG	4	THAKLANGNA	5444	2	1	642	108	01	--	--	100	100	100	100	100	100	5			
890	UDORN	NAM SOM	NONG WAENG	5	SAMAKKHI	5444	1	7	675	145	01	02	--	100	100	100	100	100	1C0	100		100	
891	UDORN	NAM SOM	NONG WAENG	6	SAWATDI	5444	2	1	633	146	01	--	--	100	100	100	100	100	100	100			
892	UDORN	NAM SOM	NONG WAENG	7	HUAI HIA	5444	2	1	593	127	04	--	--	100	1C0	100	100	80	15	0			
893	UDORN	NAM SOM	NONG WAENG	8	NAM SUMNOI	5444	1	7	544	140	01	02	--	100	100	100	100	100	1C0	100		1CC	
894	UDORN	NAM SOM	NONG WAENG	9	KHOK SA-AD	5444	1	4	740	114	01	02	--	100	100	1C0	100	100	1C0	100		100	
887	UDORN	NAM SOM	NONG WAENG	A2	SKONPATANA	5444	1	7	696	111	01	02	--	100	100	100	100	100	1C0	100		1CC	
895	UDORN	NAM SOM	NA NGUA	S1	NA NGUA	5444	4	9	661	026	01	02	--	100	1C0	100	100	100	100	100		15	
896	UDORN	NAM SOM	NA NGUA	2	NA CHAN	5444	4	9	661	012	01	02	--	100	100	1C0	100	100	100	1C0		20	
897	UDORN	NAM SOM	NA NGUA	S3	TRA SOM	5444	4	9	679	023	01	02	--	100	100	100	100	100	10C	100		1CC	
898	UDORN	NAM SOM	NA NGUA	4	HUA CHANG	5444	4	9	729	046	01	02	--	100	100	1C0	100	100	1C0	100		5	
899	UDORN	NAM SOM	NA NGUA	5	SOM YIAM	5444	4	9	715	070	01	02	--	100	100	100	100	100	100	100		1CC	
900	UDORN	NAM SOM	NA NGUA	6	NAM PU	5444	2	1	563	085	04	--	--	100	1C0	1C0	100	100	100	100			
902	UDORN	NAM SOM	NA NGUA	7	NAM SONG	5444	4	8	659	976	01	02	--	100	100	100	100	100	100	100		2C	
903	UDORN	NAM SOM	NA NGUA	8	YUAK	5444	3	3	572	996	04	--	--	10C	1C0	100	1C0	1CC	100	100			
904	UDORN	NAM SOM	NA NGUA	9	YUAK NOI	5444	3	3	575	001	04	--	--	100	100	100	100	100	100	1C0			
906	UDORN	NAM SOM	NA NGUA	10	THUNG	5444	3	3	561	013	04	--	--	100	100	100	10C	1CC	100	100			
908	UDORN	NAM SOM	NA NGUA	11	THALI	5444	3	3	554	011	04	--	--	100	100	100	100	100	100	100			
909	UDORN	NAM SOM	NA NGUA	12	NON SA-AD	5444	4	9	722	055	01	02	--	1C0	1C0	100	100	10C	1C0	100		15	
910	UDORN	NAM SOM	NA NGUA	13	NON MUANG	5444	4	9	726	037	01	02	--	100	100	100	100	100	1C0	100		2	
911	UDORN	NAM SOM	NA NGUA	14	DONGPATANA	5444	3	3	618	066	01	--	--	100	0								
912	UDORN	NAM SOM	NA NGUA	15	NONGNAMKON	5444	2	4	550	091	04	--	--	100	100	100	100	100	1C0	100			
913	UDORN	NAM SOM	NA NGUA	16	CHAROENSUP	5444	4	9	663	048	01	--	--	100	100	100	100	100	100	1C0			
914	UDORN	NAM SOM	NA NGUA	S17	NA NGUA	5444	4	9	661	026	01	--	--	100	100	10C	100	10C	1C0	100			
901	UDORN	NAM SOM	NA NGUA	A6	DONG TONG	5444	3	3	589	077	04	--	--	100	100	100	100	15	0				
915	UDORN	NAM SOM	NA KHAE	1	NA KHAE	5444	4	4	803	906	01	--	--	100	0								
917	UDORN	NAM SOM	NA KHAE	3	NA KHAM	5444	4	5	796	972	01	02	--	100	100	100	100	100	100	100		1CC	
919	UDORN	NAM SOM	NA KHAE	5	NA DUUM	5444	4	5	776	940	01	--	--	100	1C0	100	100	10C	100	100			
921	UDORN	NAM SOM	NA KHAE	7	[illegible] SONG	5444	4	5	780	920	01	--	--	100	100	100	100	100	35	0			
922	UDORN	NAM SOM	NA KHAE	8	NAKHAM NOI	5444	4	5	805	988	01	02	--	100	100	100	100	10C	100	100		60	
923	UDORN	K.SUVANKUHA	NA SI	1	NA SI	5444	2	4	483	153	04	03	--	100	100	100	100	10C	1C0	100			80
924	UDORN	K.SUVANKUHA	NA SI	2	KHAM	5444	2	4	467	135	04	03	--	100	100	100	100	100	1C0	100			1CC

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
925	UDORN	K.SUVANKUHA	NA SI	1	NANG HINSA	5444	2	4	484	083	04	--	--	100	100	100	100	100	100	100			
926	UDORN	K.SUVANKUHA	NA SI	4	NA TA LAEO	5444	2	7	454	107	04	--	--	100	100	100	100	100	100	100			
928	UDORN	K.SUVANKUHA	NA SI	5	NANG KHAEM	5444	3	9	417	035	04	--	--	100	100	100	100	100	100	100			
929	UDORN	K.SUVANKUHA	NA SI	6	DONG MAPAI	5444	3	6	519	063	04	--	--	100	100	100	100	100	100	100			
930	UDORN	K.SUVANKUHA	NA SI	7	NA RAI	5444	3	6	530	028	04	--	--	100	100	100	100	100	100	100			
931	UDORN	K.SUVANKUHA	NA SI	8	HIN HAO	5444	2	4	544	140	04	--	--	100	100	100	100	100	100	100			
932	UDORN	K.SUVANKUHA	NA SI	9	BUN THAN	5444	3	8	426	983	04	--	--	100	100	100	20	C					
933	UDORN	K.SUVANKUHA	NA SI	10	NON SOMBUN	5444	2	4	474	116	04	--	--	100	100	100	100	100	100	100			
934	UDORN	K.SUVANKUHA	NA SI	11	DONG YANG	5444	2	7	459	104	04	--	--	100	100	100	100	100	100	100			
935	UDORN	K.SUVANKUHA	NA SI	12	DONG MAPAI	5444	3	6	516	068	04	--	--	100	100	100	100	100	100	100			
936	UDORN	K.SUVANKUHA	NA SI	13	PHA SON	5444	3	6	477	029	04	--	--	100	100	100	100	100	100	100			
937	UDORN	K.SUVANKUHA	NA SI	14	NON SA-NGA	5444	2	4	489	088	04	--	--	100	100	100	100	100	100	100			
927	UDORN	K.SUVANKUHA	NA SI	15	NONG KUNG	5444	2	7	439	121	04	--	--	100	100	100	100	100	100	100			
938	UDORN	K.SUVANKUHA	NA DI	1	NA DI	5443	1	1	340	143	04	03	--	100	100	100	100	100	100	100			C
939	UDORN	K.SUVANKUHA	NA DI	2	NA DAN	5443	1	2	330	186	04	--	--	100	100	100	100	100	100	100			
940	UDORN	K.SUVANKUHA	NA DI	3	KUT HU	5443	1	1	305	159	04	--	--	100	100	100	100	100	100	100			
941	UDORN	K.SUVANKUHA	NA DI	4	NONGHUANOI	5443	1	1	358	165	04	03	--	100	100	100	100	100	100	100			0
942	UDORN	K.SUVANKUHA	NA DI	5	NON CHAT	5444	2	7	369	161	04	03	--	100	100	100	100	100	100	100			C
943	UDORN	K.SUVANKUHA	NA DI	6	NA KAI	5444	2	7	403	140	04	--	--	100	100	100	100	100	100	100			
944	UDORN	K.SUVANKUHA	NA DI	7	CHOEN	5443	4	3	358	069	04	--	--	100	100	100	100	100	5	0			
946	UDORN	K.SUVANKUHA	NA DI	8	SOM PLOY	5443	1	2	287	200	04	--	--	100	100	100	100	100	100	100			
947	UDORN	K.SUVANKUHA	NA DI	9	NON SAMRAN	5444	2	7	372	121	04	--	--	100	100	100	100	100	100	100			
948	UDORN	K.SUVANKUHA	NA DI	10	VIJITPTANA	5443	1	1	296	105	04	--	--	100	100	100	100	100	100	100			
949	UDORN	K.SUVANKUHA	NA DI	11	KHAISAMANG	5443	1	1	335	137	04	03	--	100	100	100	100	100	100	100			
950	UDORN	K.SUVANKUHA	NA DI	12	NONG HEN	5443	1	1	364	162	04	--	--	100	100	100	100	100	100	100			C
945	UDORN	K.SUVANKUHA	NA DI	A7	NON NGAM	5444	3	9	392	059	04	--	--	100	100	100	100	100	100	100			
951	UDORN	K.SUVANKUHA	BAN KHOK	1	KUT PHONG	5444	2	7	444	152	04	03	--	100	100	100	100	100	100	100			100
952	UDORN	K.SUVANKUHA	BAN KHOK	2	CHIANG HAI	5444	2	7	408	162	04	01	--	100	100	100	100	100	100	100			100
953	UDORN	K.SUVANKUHA	BAN KHOK	3	PA WAN	5444	2	7	396	160	04	03	--	100	100	100	100	100	100	100			0
954	UDORN	K.SUVANKUHA	BAN KHOK	4	DONG BANG	5444	2	7	410	089	04	--	--	100	100	100	100	100	100	100			
957	UDORN	K.SUVANKUHA	BAN KHOK	5	KHOK	5444	3	9	417	036	04	--	--	100	100	100	100	100	100	100			
958	UDORN	K.SUVANKUHA	BAN KHOK	6	KOK THONG	5444	3	9	427	076	04	--	--	100	100	100	100	100	100	100			
960	UDORN	K.SUVANKUHA	BAN KHOK	7	NONG LUANG	5444	2	7	453	137	04	03	--	100	100	100	100	100	100	100			
961	UDORN	K.SUVANKUHA	BAN KHOK	8	NA MONG	5444	3	9	429	079	04	--	--	100	100	100	100	100	100	100			
962	UDORN	K.SUVANKUHA	BAN KHOK	9	THUNG NOI	5444	3	9	421	051	04	--	--	100	100	100	100	100	100	100			
963	UDORN	K.SUVANKUHA	BAN KHOK	10	NONPOEDUANG	5444	3	9	411	029	04	--	--	100	100	100	100	100	100	100			
964	UDORN	K.SUVANKUHA	BAN KHOK	11	SANG PHRAU	5444	3	9	404	047	04	--	--	100	100	100	100	100	100	100			
956	UDORN	K.SUVANKUHA	BAN KHOK	A4	NON SA-AD	5444	2	7	410	091	04	--	--	100	100	100	100	100	100	100			
955	UDORN	K.SUVANKUHA	BAN KHOK	A4	LAO YAI	5444	2	7	414	090	04	--	--	100	100	100	100	100	100	100			

(1) Base Map No.	(25) % Flooded: Loei Valley Protection	(26) % Flooded: Loei City Protection	(27) 1974 Malaria Statistics Households	(28) 1974 Malaria Statistics Population	(29) 1973 NSO Statistics Households	(30) 1973 NSO Statistics Population	(31) In-Migration (Households) 1974	(32) Out-Migration (Households) 1974	(35) Other Names or Names of Associated Villages
2	5		156	881	140	750	0	6	
3		100	82	562	84	562	0	0	
4	50		175	960	227	1008	0	0	
5			142	938	128	905	0	0	
6			302	1426	291	1054	4	5	
7	100		112	520	280	1520	0	0	
8	10		264	1650	89	466	16	24	
9	20		315	1815	285	1730	1	0	
10	60		195	1242	267	1640	0	2	
11		100	110	612	198	1537	0	0	
12	100		149	707	95	547	-	-	
13			195	1580	99	622	-	-	
14			288	1827	293	1723	0	0	
15			251	1378	243	1661	0	0	
16		100	154	820	164	876	0	3	
17			201	1727	162	1296	0	4	
18			96	601	86	549	0	0	INC.B.HUAI HUANG SAI
19			69	417	70	404	0	0	
20			94	574	90	589	4	1	
21			201	1069	198	1219	0	1	
22			51	252	40	233	-	-	
23			219	1234	210	1417	-	-	
24			219	1109	212	1040	3	2	
25			96	479	99	542	1	0	
26			53	319	46	365	0	0	
28			227	1017	171	1028	-	-	
29			106	610	110	635	0	0	
30			161	765	110	722	0	1	
31			109	611	95	619	-	-	
579			36	156	-	-	-	-	
32		100	98	629	95	620	0	0	
33			117	727	120	854	3	1	INC.B.WANG PONG, PONG
34			116	684	116	843	-	-	
35		100	141	917	128	812	0	0	
36			122	825	103	817	0	0	
38			262	1801	203	1421	2	2	
39			84	519	97	683	1	0	
40			62	390	60	416	3	2	
42		100	41	258	38	256	0	0	
51			140	869	143	951	0	0	

(1)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(35)
59			221	1103	180	1052	0	1	
60	75		55	462	63	459	0	0	B.DON KOE, ICE KOE
61			157	843	150	1167	1	1	
65			499	1214	243	2073	4	0	
84			11[illegible]	640	91	748	-	-	
85			1 1	741	150	966	0	0	
1	2	2	2067	12540	-	-	-	-	
94			229	1136	150	880	-	-	HEALTH DISTRICT
104			73	401	77	436	0	0	B.PHON SAMANG
106			229	1003	214	1467	-	-	
111			173	779	163	881	-	-	B.NA KRASENG
115			214	841	167	928	-	-	
117			47	221	36	254	-	-	
118			145	631	113	570	1	0	B.PAK DAN
1955			1	-	-	-	-	-	
120			194	916	204	1007	0	0	
121			151	706	150	709	0	2	
122			146	619	106	465	0	0	
123			143	743	143	784	0	0	
124			196	936	167	860	10	0	
125			130	620	115	604	0	0	
126			156	654	137	755	1	0	
128			124	742	132	737	-	-	
129			24	106	27	122	1	0	
131			112	648	110	666	0	0	
132			88	512	78	508	0	0	
133			56	340	55	349	2	0	
134			71	498	64	417	0	0	
135			216	1344	167	1309	-	-	HEALTH DISTRICT
136			107	701	93	600	-	-	
137			220	1394	165	996	-	-	HEALTH DISTRICT
139			70	410	60	375	0	0	HEALTH DISTRICT
140			74	468	60	447	2	0	B.BUNG KOK TAN
141			355	1845	308	2464	-	-	HEALTH DISTRICT
142			97	610	92	552	0	0	B.NA NOI
143			94	644	91	728	0	0	
145			154	905	129	845	0	0	
147			200	1221	23	900	-	-	HEALTH DISTRICT
148			145	858	102	804	-	-	HEALTH DISTRICT
149			137	1389	248	1278	-	-	HEALTH DISTRICT
150			178	1098	150	779	-	-	HEALTH DISTRICT
151			110	765	80	-	0	0	
153			50	321	39	303	2	2	
138			20	96	-	-	-	-	HEALTH DISTRICT
154			-	-	76	470	-	-	
156			201	1643	160	1102	0	0	
158			-	-	151	1046	-	-	
160			286	1648	272	1921	0	151	
161			109	532	108	534	0	0	B.NA MOE
163			57	291	52	287	-	-	
164			29	219	74	156	0	0	
166			241	1438	225	1421	1	1	
167			-	-	86	447	-	-	
169			-	-	140	920	-	-	
201			161	996	155	1065	20	10	
204			164	967	141	1126	0	0	
205			66	438	50	374	0	1	B.NON WAENG THAEN
206			236	1467	214	1604	0	0	
209			87	597	81	511	1	0	I.S.STUDY MOO 9
211			95	574	96	61	12	15	I.S.STUDY MOO 8

(1)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(35)
214			95	238	-	-	0	C	I.S.STUDY AREA 10
215			111	876	122	1006	0	0	
225			-	-	158	941	-	-	
1183			-	-	-	-	-	-	
1184			-	-	-		-	-	
236	100		63	298	41	196	-	-	
255	100		116	648	34	505	-	-	
260			146	2064	202	1184	1	0	
261		20	58	412	57	327	1	2	
262			57	312	41	246	1	0	P.NON SAWANG, NON PAK POAN
264		100	47	321	42	214	0	C	
264			140	862	135	608	0	0	
265			91	499	84	480	0	C	
266			89	510	80	520	0	0	
267		10	31	179	168	999	0	C	B.PAK POAN
282			662	3667	458	1140	-	-	HEALTH DISTRICT
283			628	3509	551	4391	-	-	HEALTH DISTRICT
284			85	469	56	321	0	0	INC.B.HIN SC
286			83	489	72	573	-	-	UNC.B.SOR THONG
287			57	360	53	351	-	-	B.NON SAWANG
288			186	1095	207	1212	0	3	
289			194	1055	178	1126	-	-	
290			206	1182	205	1189	7	3	
291			143	793	130	732	-	-	
292			60	304	64	321	4	C	
293			13	47	-	-	-	-	
294			10	31	-	-	-	-	
295			149	903	150	891	-	-	
296			149	737	145	852	-	-	
297			134	711	120	701	-	-	
298			125	743	117	730	-	-	B.NA BANAAT
299			40	225	41	245	-	-	
302			305	1756	245	1253	-	-	
303			398	2370	175	2386	0	0	INC.B.NONGKHUMTHOI
304			241	1443	228	1413	-	-	
305			34	197	33	190	0	0	
306	100		265	1447	237	1506	-	-	
307	100		81	466	68	496	0	2	
308			251	1421	223	1330	-	-	
309			244	1445	252	1600	-	-	
310			123	816	110	745	-	-	
311			108	611	90	591	-	-	
312			53	307	51	330	-	-	
313			168	967	-	612	0	0	
314			231	1415	226	1150	-	-	B.PHA NAEM
315	100		317	1568	287	1750	0	0	
316	50		81	458	75	413	0	1	
317	100		31	162	24	150	2	2	
318	100		67	418	45	341	0	C	
319	100		89	564	81	484	0	0	
320	100		52	260	44	230	0	C	
321			203	1119	202	1122	-	-	
322			147	973	137	786	0	C	
323			164	965	164	830	0	0	P.NUAI PHOP
324	100		135	1614	135	1674	10	C	
327			44	220	42	250	0	1	
328			48	233	16	219	-	-	
329	10		144	874	118	924	-	-	
330	100		32	197	27	163	0	C	
331			114	1566	-	-	-	-	HEALTH DISTRICT

(1)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(35)
582			214	1353	-	-	-	-	
583			61	462	-	-	-	-	
584			236	1164	-	-	-	-	
585			57	111	-		0	0	
586			111	638	-	-	7	4	
587			42	249	-	-	2	1	
588			58	333	-	-	0	0	
589			50	253	-	-	2	1	BAC.B.NOAI PAC
590			44	202	-	-	-	-	
591				61	-	-	-	-	
592			2	495	-	-	30	16	
593			81	420	-	-	-	-	
594			49	276	-	-	-	-	B.KOK MAO, KOK BAO
595			94	515	-	-	0	0	B.NUAI PHOK
596			67	376	-	-	-	-	
597			36	225	-	-	-	-	
598			61	319	-	-	7	4	
599			54	411	49	662	0	0	
600			124	631	107	585	0	2	
601			68	569	78	518	2	0	B.NONG CHAN
602			35	230	38	192	0	0	
603			55	159	52	411	1	2	
604			161	778	157	901	1	0	
605			39	220	32	230	0	0	I.S.STUDY B.THAO TAI
606			29	188	28	179	0	0	I.S.STUDY B.THAO NOI
607			141	678	90	420	11	1	
608			24	136	-	-	-	-	
609			166	962	90	647	4	0	B.IBA NOI
610			182	778	101	604	0	0	UNC.B.NUAI SAI NUA
611			61	402	78	400	-	-	HEALTH DISTRICT
612			112	738	122	757	-	-	HEALTH DISTRICT
613			201	1281	161	1121	-	-	HEALTH DISTRICT
614			6	50	11	61	0	0	
615			58	320	55	423	0	2	
616			84	473	61	367	0	1	
617			74	543	25	502	2	2	
618			61	382	65	331	5	5	UNC. B.CHOK DOMNG
619			69	426	69	423	14	2	
620			24	157	27	156	0	0	
621			25	132	-	-	-	-	
1345			96	641	69	596	1	0	
1351			135	921	110	849	0	0	
1356			104	654	103	612	0	0	
1365			160	1135	107	959	2	1	B.XANG LUANG NUA
1366			171	1064	167	1024	5	0	B.THUNG PHONG TAI
1367			182	1403	156	900	0	0	B.THUNG PHONG NUA
1368			67	392	67	378	1	0	B.SAWANG
1369			55	403	50	510	0	0	
1370			156	1031	147	1014	0	0	
1371			217	1474	155	887	0	0	
1372			156	974	155	876	0	0	B.NONG THUN
1373			182	1262	145	1111	0	0	
1374			104	703	115	711	1	1	
1375			66	450	73	506	4	1	B.SAI DUCH
1376			227	1436	129	1039	4	0	
1377			116	2057	-	-	40	4	
1378			222	1411	-	-	0	0	
1379			211	1216	169	1015	20	10	
1380			216	1496	126	985	5	2	
1382			19	106	-	-	-	-	

(1)	(28)	(29)	(27)	(34)	(25)	(30)	(31)	(32)	(35)
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	1	1	
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	2	0	
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[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	4	1	
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[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	4	1	INC.B.NON SA-ANE
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	0	1	
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[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	2	2	INC.B.NUAI LAED
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	0	0	
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[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	0	2	
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	0	0	B.NUAI LAT
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[illegible]			[illegible]	-	-	-	-	-	
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	-	-	HEALTH DISTRICT
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	17	0	
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	-	-	HEALTH DISTRICT
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[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	0	3	INC.B.JAPPATHONG B.B.SANO
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	2	0	INC.B.THAEN
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	2	0	
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[illegible]			[illegible]	-	-	-	-	-	HEALTH DISTRICT
[illegible]			[illegible]	-	-	-	-	-	
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[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	0	0	
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	0	1	
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	0	2	

(1)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(35)
942			209	1122	116	1176	6	0	
943			64	336	-	-	0	0	
944			110	675	106	494	10	0	
945			117	511	-	-	12	5	
946			72	337	-	-	1	1	
947			132	765	135	892	6	4	
948			104	692	40	680	-	-	
949			116	712	117	845	11	0	
950			54	372	76	-	4	0	
951			87	564	-	-	0	0	
952			36	235	50	208	0	0	
953			45	257	41	233	5	0	
954			20	145	-	-	-	-	
955			110	716	105	695	2	0	
956			207	1204	197	107	6	5	
957			164	1013	-	-	5	8	
958			151	774	118	1004	5	4	
959			68	374	68	389	1	0	
960			153	971	-	-	6	0	
961			228	1510	272	1801	10	0	
962			116	694	124	700	3	7	
963			101	561	-	-	0	11	
964			112	821	116	937	20	0	
965			221	1466	217	1380	10	10	
966			47	309	-	-	0	1	
967			12	67	-	-	-	-	
968			200	1195	172	845	20	3	
969			74	484	64	450	0	1	B.HIN NON YUNG
970			87	571	67	482	2	0	B.NON PA MAAN
971			129	824	154	986	7	0	
972			265	1539	220	1300	10	0	
973			122	817	101	518	3	0	B.DONG, INC.B.NON KHA
974			61	358	69	453	0	1	
975			84	426	79	507	10	0	
976			95	430	86	531	2	4	
977			82	558	82	587	23	0	
978			24	123	24	140	16	0	B.NA UDOM,B.PHA LOM
979			14	92	-	-	-	-	B. KHUN TAI
980			16	110	-	-	-	-	B. KHUM MUA

Appendix B

FIELD SURVEYS IN THAILAND AND LAOS

A wide range of data was collected in Northeast Thailand and adjacent parts of Laos, as the basis for our analysis of resettlement process and problems, as well as the cost of various resettlement alternatives. The original copies of completed questionnaires for all surveys were deposited with the Mekong Secretariat in Bangkok, Thailand. In addition, a tape containing data which required computer analysis also has been deposited with the Mekong Secretariat. Inquiries regarding project data are welcome, and after proper permission has been obtained from the Mekong Secretariat we will provide data to any interested party.

The following table summarizes the major surveys conducted in connection with the project. All surveys were translated into the Thai and Lao languages, and administered by Thai and Lao project staff.

APPENDIX B

Field Surveys in Thailand and Laos

SURVEY NAME	NUMBER OF QUESTIONNAIRES ADMINISTERED	
	Laos	Thailand
A. Reservoir Area Inventory (Final Report, Section 2)		
1. Survey of Village Headmen (Inventory of village property and population for villages in the proposed reservoir area)	56	121
2. Socio-Economic Survey (Demographic, social, income, assets and other basic data by household for villages in the proposed reservoir area)	1718	2054
3. Income from Household Activities (Detailed analysis of income and labor input in reservoir area villages)	254	0
4. Inventory and Costing of Public and Private Property (Inventory of private and public property in villages in the reservoir area, including houses, temples, school and government buildings, wells and other improvements, and village roads)	224	392
B. Resettlement Experience (Final Report, Section 3)		
1. Surveys of population resettled from past reservoir projects		
Nam Pong	0	252
Lam Dam Noi	0	83
Nam Ngum	213	0

	Laos	Thailand
(These surveys were designed to record resettlement experience, prior and post resettlement income and assets, and resettlement problems)		
2. Control surveys of voluntary migrants	0	50
(Control survey to provide comparable data for voluntary migrants in the same area as resettled reservoir population)		
C. Rural Resettlement Alternatives (Final Report, Section 5)		
1. Government-Managed Settlement Survey		
1a. (Survey of land available in government land settlements in Thailand)	0	42
1b. (Survey of incomes obtained in government-managed land settlements)	0	119
2. Fisheries Survey	0	37
(Survey of reservoir fisheries production)		
3. Cattle Production Survey	0	14
(Survey of cattle production on drawdown zone land)		
4. Agricultural Survey of Drawdown Zone	0	84
D. Self-Managed Resettlement in the Private Land Market (Final Report, Section 6)		
1. Baseline Socio-Economic Survey of Village Populations Undergoing or About to Undergo Resettlement		
Huai Luang, Thailand	0	153
Kwai Yai, Thailand	0	287
2. Land Searchers Survey	0	28
(Survey of population to be resettled, who have searched for land in the private land market)		

	Laos	Thailand
3. Land Market Survey (Survey of land availability and land prices in Thailand, from Nai Amphurs and Kamnans)	0	224
4. Land Price Survey (Survey of land transaction and pricing in villages)	0	118
5. Land Sellers Survey (Survey to determine the amount of land available at given prices)	0	70
E. Urban Resettlement (Final Report, Section 7)		
1. Urban Adjustment Survey (Survey of urban migrants, to determine sponsorship, adjustment time, employment, income, assets, etc. in nine Thai towns)	0	554
2. Urban Socio-Economic Survey (Survey of urban population income and assets in urban areas to be flooded by proposed reservoir)	206	3463
3. Relocated Town Survey (two stages) (Survey in new towns replacing towns flooded by reservoir construction in Thailand, to determine resettlement and economic adjustment problems) (Sahat Sakhan, Tha Pla, Hod)	0	1430
4. Construction Worker Survey (To determine the background, income and experience of dam construction workers as possible employment for evacuees)	0	53
5. Satellite Town Surveys (To determine if employment and income levels in satellite villages near towns provide a viable resettlement alternative)	0	187

	Laos	Thailand
F. Interaction and Replacement of Infrastructure (Final Report, Section 8)		
1. Transport Operators Survey (To determine the range of transportation systems based in towns to be flooded by the reservoir, to designate their service area)	34	62
2. Merchant/Broker Survey (To determine the service area of merchants and brokers located in towns to be flooded by the reservoir)	109	189
3. Market Vendor Survey (To determine which villages in the reservoir region are linked to towns to be flooded by the reservoir)	137	227
4. Village Headman Interaction Survey (To obtain data on village social and economic interaction with towns in the reservior region)	56	121

Appendix C

ACKNOWLEDGEMENTS

The main source of information used in this project was the people of the reservoir region in Laos and Thailand, who patiently responded to our questionnaires and queries, and educated us in the realities of resettlement. To these thousands of respondents we owe a vast debt. In addition, we were fortunate to have Lao and Thai field teams with exceptional skill and dedication. The Thai members of our project are listed below. Finally, there were countless government officials, and private individuals, who shared their knowledge and experience with us, and often offered important guidance in our effort. The list of Thai who assisted in our work is found below. We apologize for any omissions or errors in proper designation; the order of listing is one of convenience and does not indicate any measure of the role played by these people who so kindly provided assistance.

APPENDIX C

Acknowledgements

A. Project Employees

Damrong Anisonk
Sumalee Anupotwontri
Somboon Boon Bueng Foo
Booncharn Chaikasatsin
Benjamas Chaiyagit
Chagard Chamroenprok
Pravat Chanpabhar
Chalerm Chantavong
Rungrong Charoenkhit
Pradit Chasombat
Vraluck Chatrupavanich
Prakit Dejkra
Supatra Dolsopoi
Sally Hafner
Suphalak Horkawat
Supan Jaikam
Jaroensri Jaroenwat
Paiboon Jongsuwat
Sudaeng Kaentrakul
Kob Kaeo Srimoh
Muanchai Kantharamongkol
Kanong Keomahakarn
Suwat Kharnwong
Boonrod Kiawyu
Churutu Kittikomolsook
Bamrung Kollawong
Dechapan Kougsakorn
Kasem Konsomboon
Udom Koonmongkorn
Kitti Kosalwat
Thongchai Kulthap
Smak Lamlua
Shest Lertseree
Trithep Lohavisavapanich
Sanit Luadtong
Piya Mahapy
Sumeke Ngowtrakul
Naronggrit Onchoi
Niwat Onhanunt
Yodthawan Orktakul
Khanti Orthong
Suphak Paiboon
Prayad Pannukul
Nipon Panomkarn
Opart Panya
Boonsueb Patnawin
Aran Phatanothaya
Veera Photiracha
Lieng Poota
Amnat Promsutra
Rongkhan Punya
Termkiat Ratanarasi
Willee Rattanamavichai
Waranya Rewan
Boonyuen Rugtrakool
Sopong Saengthong

Somchit Saithip
Daeng Sanitraksa
Sorot Sangnan-anan
Kalaya Sarasak
Phairoj Sawasdisava
Sawat Silapanitayatorn
Dejchai Siriswatana
Surasri Sitthisuk
Sawaeng Sittikornpaiboon
Montri Smitmok
Jarin Srihuayyod
Gowit Srinugool
Supote Srisa-ard
Amnuary Srisunart
Wirote Stansaovapak
Somboon Supasilapa
Wattana Surasak
Tasnee Sutasnee
Sunee Suwanna
Pichit Teerapongsa
Arun Thamkroopud
Uthai Tongkhotr
Ladda Tonglamul
Sunthorn Tulyasugh
Boonruen Unsingh
Rapee Urasayanandana
Sanga Uttisin
Metha Wanapat
Vichien Yushanam

B. Governmental Organizations of Thailand

Department of Public Welfare

Savong Tupkrisana, Chief, Settlement Programming and Planning Division

National Economic and Social Development Board

Vira Osatananda, Head, Manpower Planning Division

Dr. Phisit Pakkasem, Head, Regional and Urban Planning Division

Suta Chatcharalvongse, Regional and Urban Planning Division

Utis Kaotien, Regional and Urban Planning Division

Charit Tingsabadh, Regional and Urban Planning Division

Karnchit, Head, Khon Kaen Regional Planning Office, Regional and Urban Planning Division

Chaktip Nithibhon

Department of Labour (Ministry of Interior)

Nikom Chantaravitool, Director-General

Vichitra Prompunthum, Chief, Research Branch

Vichit Sangthon, Deputy Director-General, and Director, National Institute for Skill Development

Ministry of Industry

Sivavong Changkasiri, Special Grade Officer, Department of Industrial Promotion

Ministry of Commerce

Board of Investment

Promote Permpanich, Chief, Project Analysis Division

Vanee, Chief, Research Division

National Statistical Office

Anuri Wanglee, Chief, Population Unit

Applied Scientific Research Centre of Thailand

Khun Chaisin

Ministry of Agriculture and Cooperatives

Thawat Leelanuj, Agricultural Economics Division

Land Development Department

Bantoeng Pryaphant

Tip Ruangchotvit, Economist

Chalvern Sawanset, Special Grade Classification Officer

Accelerated Rural Development Office

Prasit Vilailak, Chief, Water Resources Training Centre, Khon Kaen

Land Department

Chao Chirasook, Land Officer, Khon Kaen Province

Arpom Nimsiri, Chief, Survey Section, Khon Kaen Province

Prayong Chaivongsa, Assistant Chief, Survey Section, Khon Kaen Province

Prayad Therdthai, Land Officer, Udorn Province

Thaval Klipsuwan, Chief, Survey Section, Udorn Province

Khammi Bunla, Amphur Land Officer, Wang Saphung

Phichai Vaiwathana, Chief, Survey Section, Loei Province

Prasat na Udorn, Amphur Land Officer, Wang Saphung

Irrigation Department

Sangivian Boonmee, Law and Land Procurement Division

Choob Lalitavongse, Legal Division

Electrical Generating Authority of Thailand

Kasem Chatikavanij, General Manager

Lek Kanchanaphol, Director, Hydro-Electric Power Construction

Provincial Electricity Authority

Lt. Sakol Wongbuddha, Director, Manning and Project Division

Manit Boonkua, Manager, Khon Kaen Office

The Managers, Loei Office, Chieng Khan Office, Wang Saphung Office

Department of Public Works

Kasian Anambutr, Director, Provincial Water Supply Division

Visuthi Rakthaidi, Chief, Potable Water Centre 4, Khon Kaen

Rithirong Chaisin, Engineer, Potable Water Centre 4, Khon Kaen

Metropolitan Water Works Authority

Birabandthu Tungasvadi, Deputy Project Director

National Housing Authority

Premsakdi Buranasiri, Chief, Planning and Projects

Highways Department

Prathom Buranasiri, Chief, Planning Division

Virapongse Promsakhana Sakp, Nakhon Regional Chief, Khon Kaen

Thanon Butirat, Assistant Chief Engineer, Loei

Vaeo Buranapakdi, Chief, Statistics and Records, Khon Kaen

Municipal and Health District Offices

Promma Homchoo, Chief, Engineering Section, Khon Kaen Municipality

Phisan Keosomboon, Water Supply Engineer, Khon Kaen Municipality

Trakoon Ruanmai, Chief, Engineering Section, Udorn Municipality

Chatchawat Klanpracha, Water Supply Engineer, Udorn Municipality

Songcham Sawasdikosol, Bangkok Office, assigned to Udorn Project

Thongchai Chairungruang, Engineer, Engineering Section, Udorn Municipality

Sub-Lt. Chaweng Chuachote, Assistant District Officer, Nong Bua Lamphu H.D.

Somkit Somchit, Finance Officer, Nong Bua Lamphu H.D.

Sinn Phituso, Chief, Engineering Section, Loei Municipality

Chamlong Keomongkol, Water Supply Engineer, Loei Municipality

Niwat Srithongdi, Assistant District Officer, Wang Saphung H.D.

Samat Pongspimon, Water Supply Engineer, Wang Saphyng H.D.

Department of Public Health

Dr. Paichit Pavabutr, Deputy Health Officer, Khon Kaen Province

Khant Thetprasit, 2nd Grade Health Officer, Khon Kaen

Department of Local Administration

Presit Kengtone, Acting Chief, Education Section, Provincial Administration Organization, Khon Kaen

Department of Ordinary Education

Siri Thedprasit, Education Officer, Khon Kaen Province

Pilai Bunchoovit, Assistant Education Officer, Khon Kaen Province

C. Research and Academic Organizations

National Institute for Development Administration

Dr. Somsakdi Xuto, Rector

Dr. Chirayu Issrangbul, Lecturer

Dr. Titaya Sunanajala, Acting Deputy Director, Research Center

Khon Kaen University

Bimala Kalakicha, Rector

Dr. Kavi Chutikul, Dean of Agriculture

Dr. Supachai Suetrong

Khiriket Patchirit

Aran Patanothai

Sanit Loadthong

Chulalongkorn University

Dr. Virabongsa Ramangkura, Senior Lecturer, Faculty of Economics

Supachai Manuspiboon, Lecturer and Director of Labor Relations, Faculty of Economics

Acharn Sauvaluck Piampiti, Institute of Population Studies

Thammasat University

Dr. Narongchai Ukkaserani, Dean, Faculty of Economics

Kasetsart University

Chumnong Somprasong, First Class Lecturer, Faculty of Economics and Business

Ruangdej Srivardhana, Second Class Lecturer, Faculty of Economics and Business

Tongroj Onchan, Department of Agricultural Economics

Professor Arb Nakajud, Department of Agricultural Economics

Economic and Social Commission for Asia and the Pacific (ESCAP)

Prachoom Chomchai, Director, Economic and Social Studies Division, Mekong Secretariat

Phadej Savasdibutr, Analyst/Programmer, Mekong Secretariat

Dr. Chinnawoot Soonthornsima

Sultan Hashi, Population Section

World Bank

Manfred Blobel, Chief of Mission

Staff of Asian Institute of Technology

Staff of Bangkok Data Center

D. Local Government Officials

Nai Amphurs of

Wang Saphung, Nong Bua Lamphu, Lomsak, Petchaboon, Chumpae, Kumpawapi, Ban Phai, Chaturat, Nong Khai, Chiang Mai, Uttaradit, Kalasin, Loei, Udorn

Mayors of

Khon Kaen, Korat, Nakorn Phanom, Sakorn Nakorn, Chaiyapoom (Assistant Mayor)