

**JAPAN INTERNATIONAL COOPERATION AGENCY
MINISTRY OF HEALTH
NATIONAL CENTER FOR ENVIRONMENTAL HEALTH
AND WATER SUPPLY**

**THE STUDY
ON
RURAL WATER SUPPLY AND SANITATION IMPROVEMENT
IN
NORTH-WEST REGION
IN
LAO PEOPLE'S DEMOCRATIC REPUBLIC**

**FINAL REPORT
MAIN REPORT**

MARCH 2001

JAPAN TECHNO CO., LTD.



1164400[2]

PREFACE

In response to the request of the Government of Lao People's Democratic Republic, the Government of Japan decided to conduct the Study on Rural Water Supply and Sanitation Improvement in North-West Region in Lao People's Democratic Republic and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Shoji Fujii of Japan Techno Co. Ltd. to Lao PDR four times between February 1999 and March 2001.

The team held discussions with the officials concerned of the Government of Lao PDR and conducted field surveys in the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between the two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Lao PDR for their close cooperation extended to the Team.

March 2001



Kunihiko Saito
President

Japan International Cooperation Agency

March 2001

Mr. Kunihiko Saito
President
Japan International Cooperation Agency
Tokyo, Japan

Letter of Transmittal

Dear Mr. Saito:

We are pleased to submit to you the study report on Rural Water Supply and Sanitation Improvement in North-West Region in the Lao People's Democratic Republic.

The report presents the study results on the present conditions of water supply and sanitation in the 81 target villages in 4 Districts in Bokeo and Luang Namtha Provinces. The report includes development plans for improvement in water supply and sanitation as well as prioritized projects for their implementation.

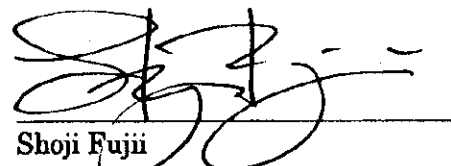
This report consists of the following volumes:

- Summary Report A concise report on the whole study results
- Main Report Description of the study results including development plans, project implementation plan and evaluation
- Supporting Report Results of training activities, pilot study activities, workshops, monitoring and case study of a previous project
- Data Book Survey form examples, well construction data, concerned persons list, participants and minutes of meetings

We are confident that the implementation of the pilot studies and the proposed project would greatly contribute to the improvement of water supply and sanitation conditions in the North-West region of the Lao People's Democratic Republic.

We wish to take this opportunity to express our sincere gratitude to your agency and the Embassy of Japan in Vientiane, Lao PDR. We also wish to express our deep appreciation to the National Center for Environmental Health and Water Supply (Nam Saat) of the Ministry of Health as well as other authorities concerned of the Government of the Lao People's Democratic Republic for the close cooperation and assistance extended to us during our study activities in your country.

Very truly yours

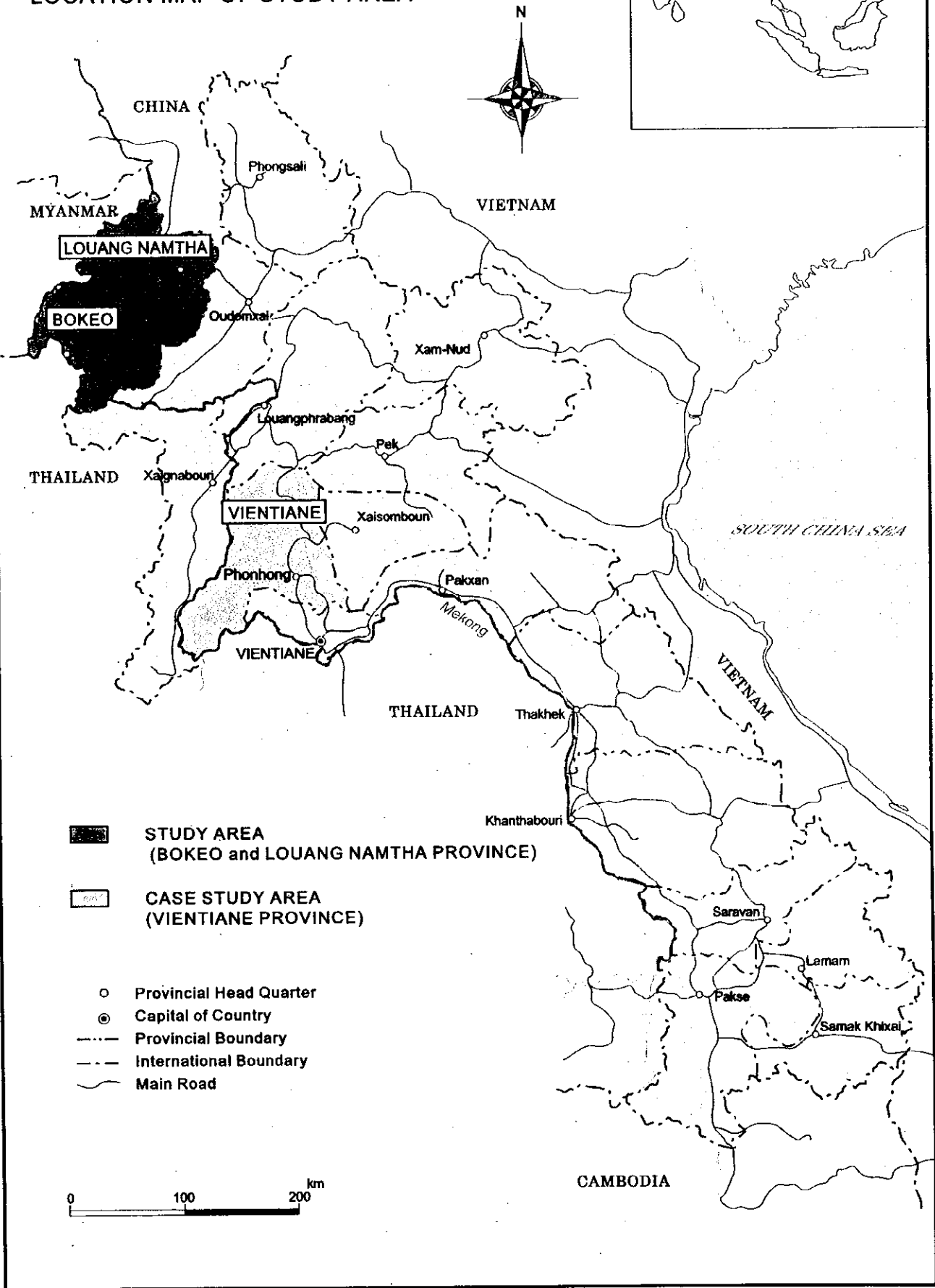
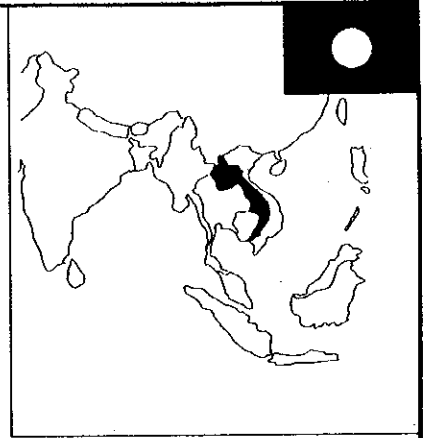









Shoji Fujii
Team Leader

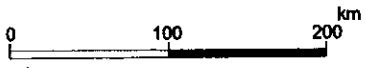
The Study on Rural Water Supply
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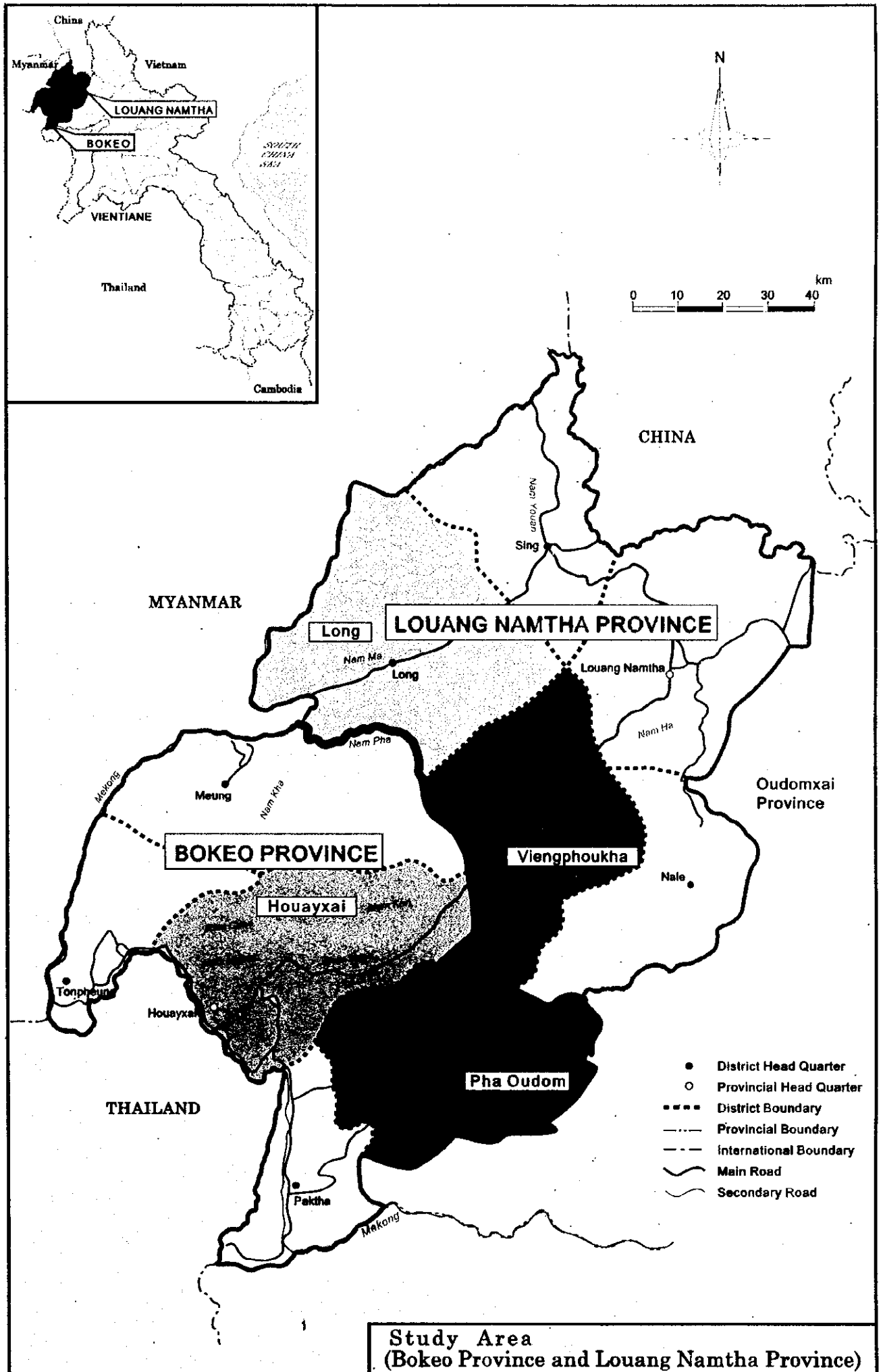
**STUDY ON RURAL WATER SUPPLY
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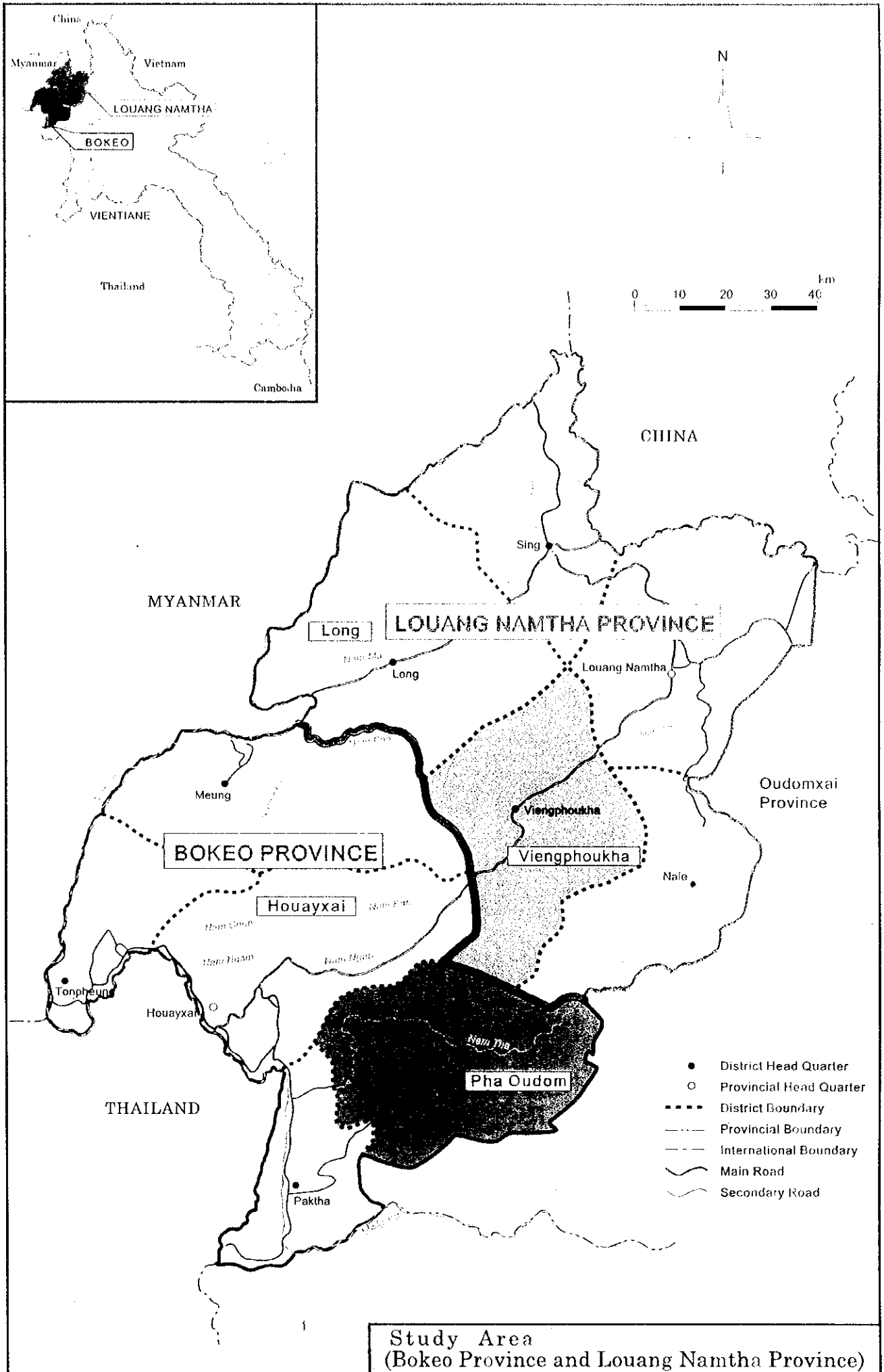
LOCATION MAP OF STUDY AREA



-  **STUDY AREA
(BOKEO and LOUANG NAMTHA PROVINCE)**
-  **CASE STUDY AREA
(VIENTIANE PROVINCE)**
-  Provincial Head Quarter
-  Capital of Country
-  Provincial Boundary
-  International Boundary
-  Main Road







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ABBREVIATIONS

ACF	Action Contre la Faim
ADB	Asian Development Bank
ADRA	Adventist Development Relief Agency
BHN	Basic human needs
CTA	Chief Technical Advisor
DF/R	Draft Final Report
EU	European Union
F/R	Final Report
GDP	Gross domestic product
GFS	Gravity Fed System
GI	Galvanized iron
GNP	Gross national product
HASWAS	Hygiene Awareness, Sanitation and Water Supply
HDPE	High density polyethylene
IC/R	Inception Report
ID/OS	Institutional development and organizational strengthening
IEE	Initial Environmental Examination
IEC	Information, Education and Communication
IRAP	Integrated Rural Accessibility Planning
JFY	Japanese fiscal year
JICA	Japan International Cooperation Agency
JOCV	Japan Overseas Cooperation Volunteers
KAP	Knowledge, Attitude and Practice
LWU	Lao Women's Union
LYO	Lao Youth Organization
MOH	Ministry of Public Health
MSF	Medecins sans frontières
Nam Papa	Lao Water Supply Authority
Nam Saat or NEW	National Center for Environmental Health and Water Supply

NCA	Norwegian Church Aide
NGO	Non-governmental organizations
NTU	Nephelometric Turbidity Unit
OJT	On-the-job training
PCM	Project Cycle Management
PDM	Project Design Matrix
PI/R	Phase I Report
PII/R	Phase II Report
P/R	Progress Report
PRA	Participatory Rapid (or Rural) Appraisal
PVC	Polyvinyl chloride
RRA	Rapid Rural Appraisal
SIDA	Swedish International Development Authority
S/W	Scope of Work
TFR	Total fertility rate
TOT	Training of trainers
UNDP	United Nations Development Programme
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
VIP	Ventilated improved pit (latrine)
VLOM	Village Level Operation and Maintenance
WATSAN	Water and sanitation (committee)
WB WSP-EAP	World Bank Water and Sanitation Program-East Asia and the Pacific
WHO	World Health Organization
WID	Women in development

CHAPTER 1 INTRODUCTION

1.1 General

This report was compiled for the Study on Rural Water Supply and Sanitation Improvement in North-West Region in Lao People's Democratic Republic (hereinafter referred to as "the Study") in accordance with the Scope of Work agreed upon by the Ministry of Health and the Japan International Cooperation Agency (hereinafter referred to as "JICA").

The Study commenced in February 1999 and will terminate upon submission of the Final Report in March 2001. The Study is divided into three phases as follows.

- Phase I: Baseline Study and Analysis
- Phase II: Implementation of Pilot Study
- Phase III: Pilot Study Monitoring/Evaluation and Formulation of Development Plan for Rural Water Supply and Sanitation

This report covers the activities and outline of the study outputs obtained during the study period from Phase I through Phase III, as well as development plans. During the course of the Study, the JICA Study Team has carried out the work in close cooperation with counterpart personnel from Nam Saat (National Center for Environmental Health and Water Supply) under the Ministry of Health, putting emphasis on technology transfer.

1.2 Outline of the Study

1.2.1 Background of the Study

Lao People's Democratic Republic, having a total land area of 236,800 km², is bordered by Vietnam to the East, Thailand to the West, Cambodia to the South, China to the North and Myanmar to the North-West. The population of the country is estimated at 4.8 million in 1997. The country is situated in the tropical monsoon climate zone with two distinct seasons: the rainy season lasting from May to October and the dry season occurring from November to April. The mean annual precipitation is 1,800 mm, the maximum temperature is 30°C with a mean annual temperature of 20 °C, and the humidity during the rainy season surpasses 90%.

The Provinces of Bokeo and Luang Namtha, the Study area, is located in the North-West region of the country. According to the 1995 census, the population of Luang Namtha Province was 115,000 with almost 82% being rural population, and the population of Bokeo Province was 114,000 with the rural population covering about 95%. This mountainous area, bordering on Thailand, Myanmar and China, is the least developed area in the country.

In its Fourth Five Year National Plan (1996–2000), social development is emphasized along with the following objectives.

- Achieve an 8 to 8.5% per annum economic growth, restrain inflation to 10%, and aim for a per capita annual income of US\$500 by the year 2000.
- Further develop the sectors of social development, education, health and welfare, and invest over 20% of the public investment into these sectors.
- Promote eradication of poverty, and place emphasis on improvement of basic infrastructures (road, water supply, power supply) in remote rural areas and expansion of social services (improve accessibility to health and medical facilities, increase employment and income opportunities, expand food and goods production)

Furthermore, in the Fourth Plan, the objectives for the rural water supply sector are to supply 60 lit/cap/day for communal tap users and 40 lit/cap/day for handpump users, and the improvement of the sanitary environment. Moreover, in line with the above Plan, the Ministry of Health launched the "Health for All" campaign to upgrade the public sanitation situation through the expansion of water service coverage in the rural areas.

With this background, the Government of Lao People's Democratic Republic requested a technical assistance from the Japanese government in 1995 to conduct a study for improvement of rural water supply and sanitation. In response to this request, JICA dispatched a Preparatory Study Team in October 1998 and formulated the Scope of Work for this Study.

1.2.2 Objectives of the Study

The objectives of the Study are:

- 1) to investigate the present situation of rural water supply and sanitation in the target villages, and identify the existing issues and problems.
- 2) to formulate a suitable water supply and sanitation improvement plan in the target villages, with mutual consent of the villagers and community.
- 3) to transfer technology on sustained development and management of water resources and sanitation for skills development and institutional reinforcement of Lao counterpart personnel (especially on the provincial and district levels) through participatory involvement throughout the course of the Study in pursuit of capacity building
- 4) to hold workshops during the course of the Study in order to share study results with concerned personnel and exchange views.

1.2.3 Study Area and Target Villages

Lao People's Democratic Republic is composed of a total of 18 administrative divisions with 16 Provinces, Vientiane Municipality and Xaisomboun Special Region. The Study area covers two of the Provinces, Luang Namtha and Bokeo, in accordance with the Scope of Work (refer to the Minutes of Meetings for the Scope of Work in Data Book), and these are located in the north-west region of the country bordering with Thailand, Myanmar and China. The road distance from the capital Vientiane to Luang Namtha and Bokeo Provinces are about 830 km (through Luang Prabang and Oudomxay) and 630 km (through Thailand), respectively. There are few bridges across rivers along the approximately 200 km of road between Luang Namtha and Bokeo making road traffic almost impossible during the rainy season. Furthermore, the Study will target 4 Districts of Houayxai and Pha Oudom Districts in Bokeo Province, and Long and Viengphoukha Districts in Luang Namtha Province. These areas were selected because of their remoteness in line with the Sector Strategy.

At the beginning of the Study, 80 villages were targeted for the Study, but during the survey, one site in Houayxai, namely Ban Nale + Chomchouk, needed to be separated into two villages owing to the distance and completely different culture of the two villages. As a result, one more village name was added to the list giving a total of 81 villages in 2 Districts of Bokeo Province and 2 Districts of Luang Namtha Province distributed as shown below.

Table 1-1 Distribution of Study Target Villages

Province	District	Number of Target Villages
Bokeo	Houayxai	39
	Pha Oudom	9
Luang Namtha	Long	25
	Viengphoukha	8
Total		81

The villages targeted for this Study are listed in the following table.

Table 1-2 List of Study Villages

District	No.	Village	Comment
Bokeo Province			
Houayxai	H-1	Ban Poug	
	H-2	Ban Phokham	
	H-3	Ban Nam Ngao	
	H-4	Ban Houai Makeo	
	H-5	Ban Done Phao	
	H-6	Ban Nam Deua	
	H-7	Ban Namma	
	H-8	Ban Nampou	
	H-9	Ban May Phatthana	
	H-10	Ban Phousene	
	H-11	Ban Bolek	
	H-12	Ban May Ngang	
	H-13	Ban Done Gneng	
	H-14	Ban Mayhya	
	H-15	Ban Namtoi	
	H-16	Ban Xaychaleun	
	H-17	Ban Maynignom	
	H-18	Ban Thongsengchan	
	H-19	Ban Xiengnam	
	H-20	Ban Nongneun	
	H-21	Ban Nale	
	H-22	Ban Chomchouk	Separated from H-21 Ban Nale
	H-23	Ban Paksang	
	H-24	Ban Maypoukha	
	H-25	Ban Namhotay	
	H-26	Ban Phibounthong	
	H-27	Ban Houakhoua	
	H-28	Ban Pakhaotay	
	H-29	Ban Thongbia	
	H-30	Ban Viengmay	
	H-31	Ban Done Keo	Replaced Ban Houayxainoi due to overlap with UNHCR
	H-32	Ban Hat Phouan	Replaced Ban Xaysomboun due to overlap with UNHCR
	H-33	Ban Nampouktay	
	H-34	Ban Nampoukkang	
	H-35	Ban Done Xay	
	H-36	Ban Nam Samoktay	
	H-37	Ban Leang	Name changed from Ban Donekeo
	H-38	Ban Done Xavanh	
	H-39	Ban Nam Saen	Replaced Ban Khok Luang due to overlap with private donor
Pha Oudom	P-1	Ban Phiengkham	
	P-2	Ban Thinkeoneua	
	P-3	Ban Thinkeokang	
	P-4	Ban Thinkeotay	
	P-5	Ban Phaoudom	
	P-6	Ban Nathong	
	P-7	Ban Phonexay	
	P-8	Ban Somsavang	
	P-9	Ban Sonexay	

Luang Namtha Province			
Viengphoukha	V-1	Ban Nam Mai	
	V-2	Ban Nam Paman	
	V-3	Ban Donmay	
	V-4	Ban Nam Phae	
	V-5	Ban Phoulan	
	V-6	Ban Pangxai	
	V-7	Ban Sakon/Layloth	Ban Sakon overlap with ADRA
	V-8	Ban Namseua	
Long	L-1	Ban Xiengkok May	
	L-2	Ban Xiengkok Kao	
	L-3	Ban Pang An	
	L-4	Ban Luang	
	L-5	Ban Don Savang	
	L-6	Ban Nong Kham	
	L-7	Ban Nam Bak	
	L-8	Ban Luang Phokham	
	L-9	Ban Phaya Luang	
	L-10	Ban Sivilay	
	L-11	Ban Nam Ma	
	L-12	Ban Hoai Mo	
	L-13	Ban Chakhamping	
	L-14	Ban Khok Hin	
	L-15	Ban Tinthat	
	L-16	Ban Phatae Kao	
	L-17	Ban Silimoun	
	L-18	Ban Pheo Yae	
	L-19	Ban Cha Yi	
	L-20	Ban Khalung	
	L-21	Ban Daen Kang	Replaced Ban Sopikao, because not permanent
	L-22	Ban Namoun	
	L-23	Ban Kang	
	L-24	Ban Paxang	Name changed name from Ban Xienghung
	L-25	Ban Phataemay	

Overlapping of villages with other donors and NGOs was of concern before the Study had started and this was conveyed to the Lao side. When the final list of villages was submitted, the Lao side confirmed no overlapping, however in the course of the study, implementation of some villages was already recognized by a few supporting organizations. The District replaced the overlapping villages to alternate villages before the survey was carried out for those villages. However, for one target site in Viengphoukha, V-7 Ban Sakon/Layloth, the village Ban Sakon was overlapping with an NGO, but no plans were made for Ban Layloth, and the village is kept on the list for possibilities of supplying water to both villages.

The locations of the Study target villages are shown in the adjoining maps.

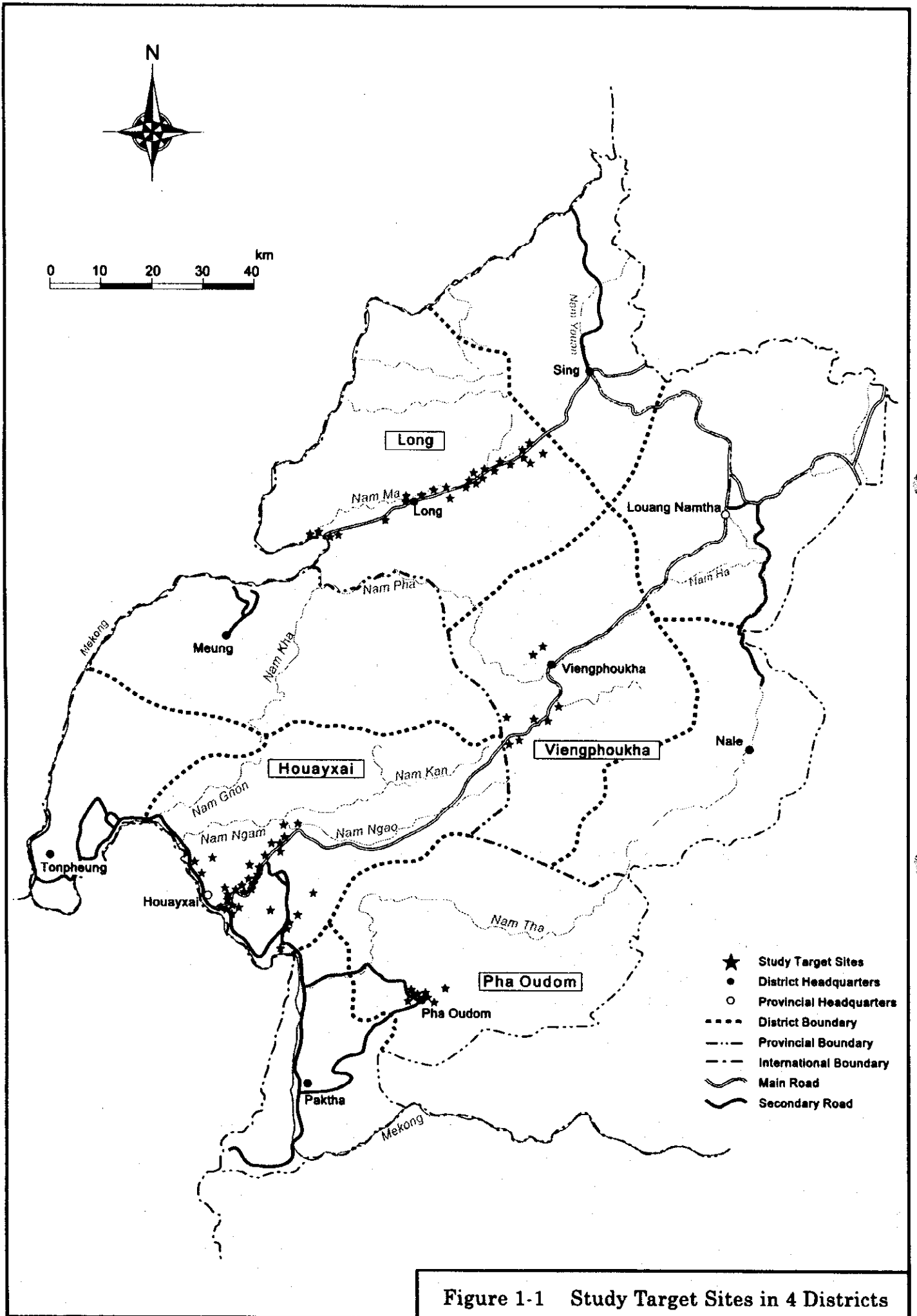


Figure 1-1 Study Target Sites in 4 Districts

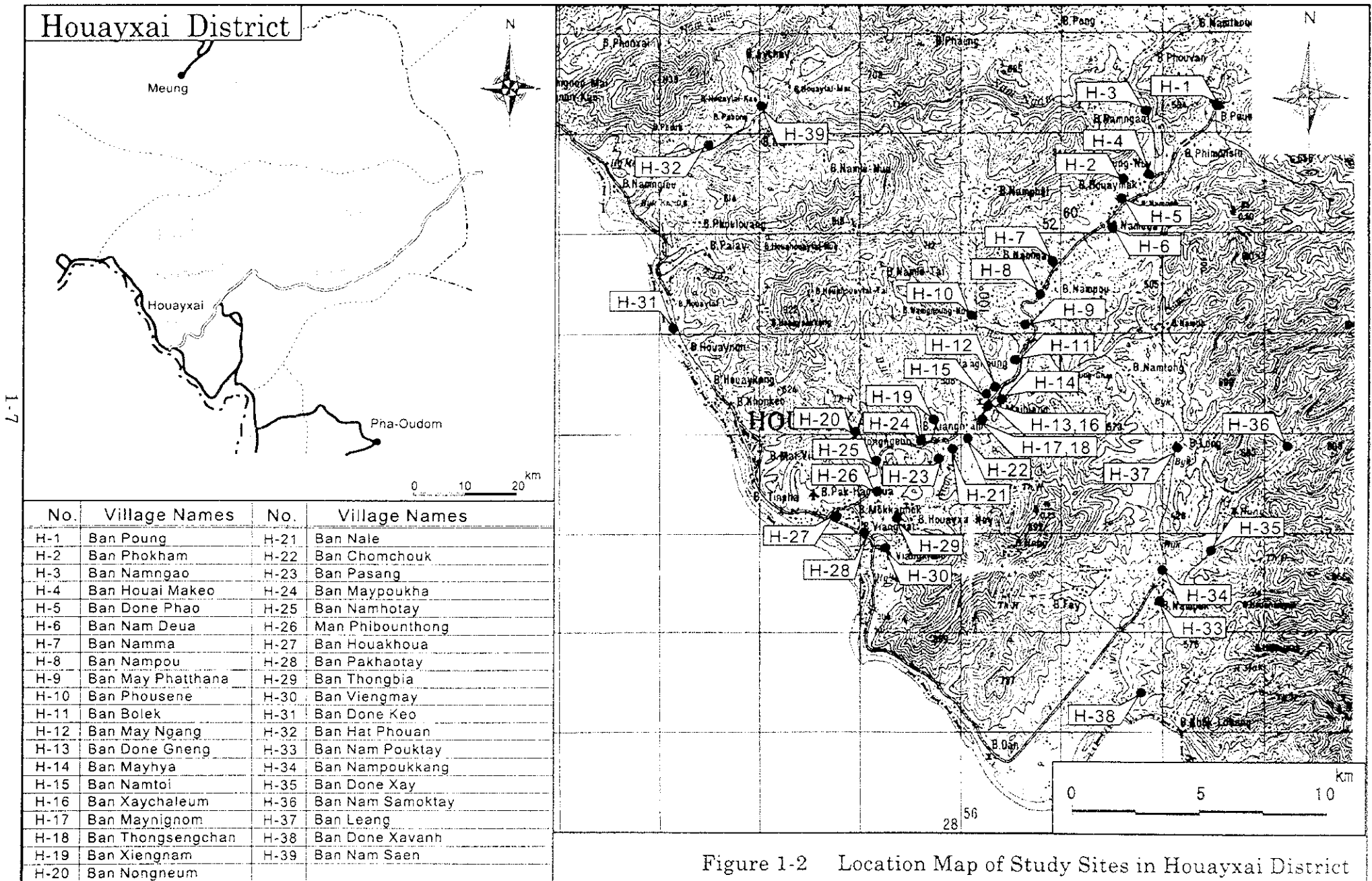


Figure 1-2 Location Map of Study Sites in Houayxai District

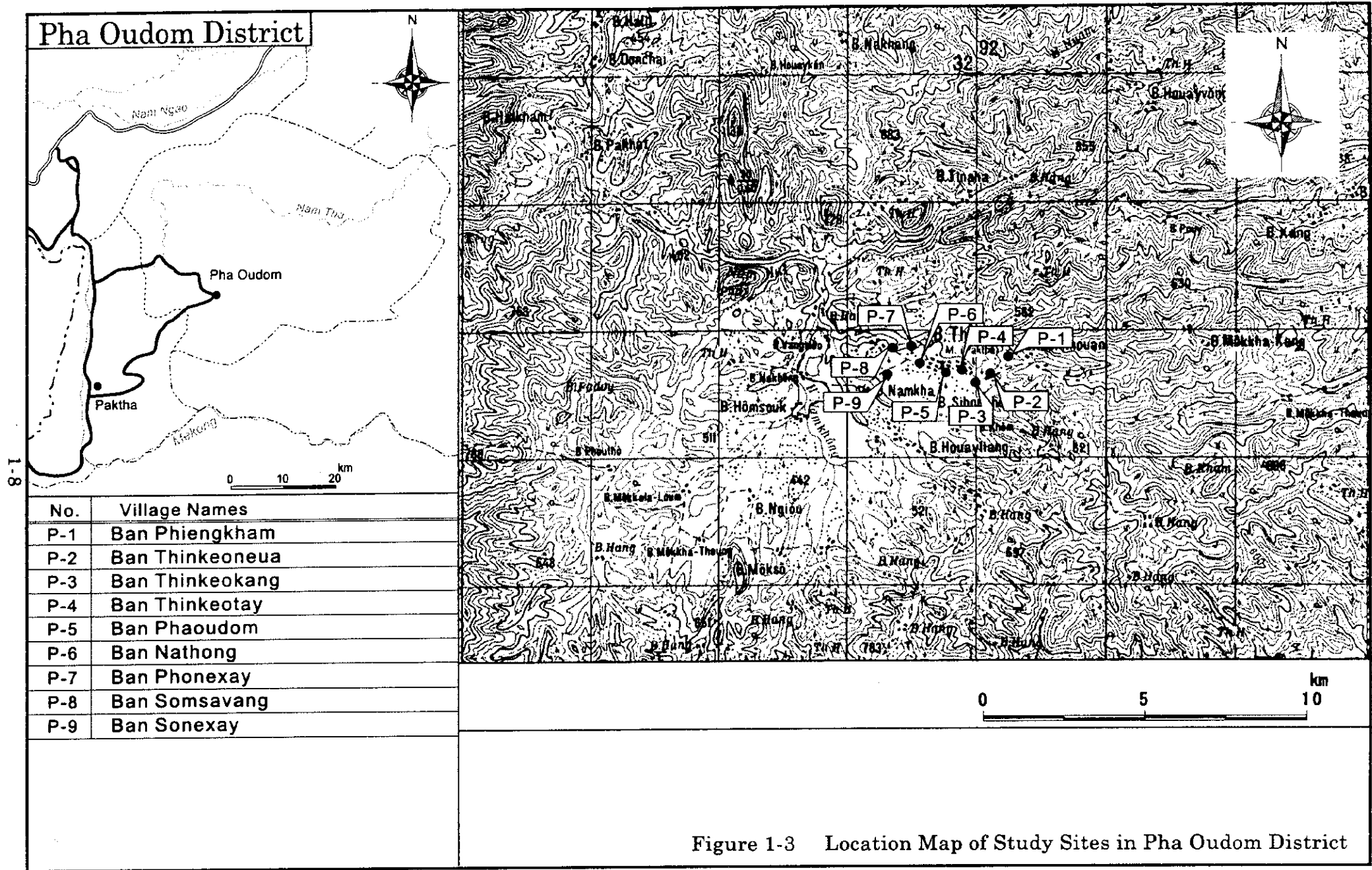


Figure 1-3 Location Map of Study Sites in Pha Oudom District

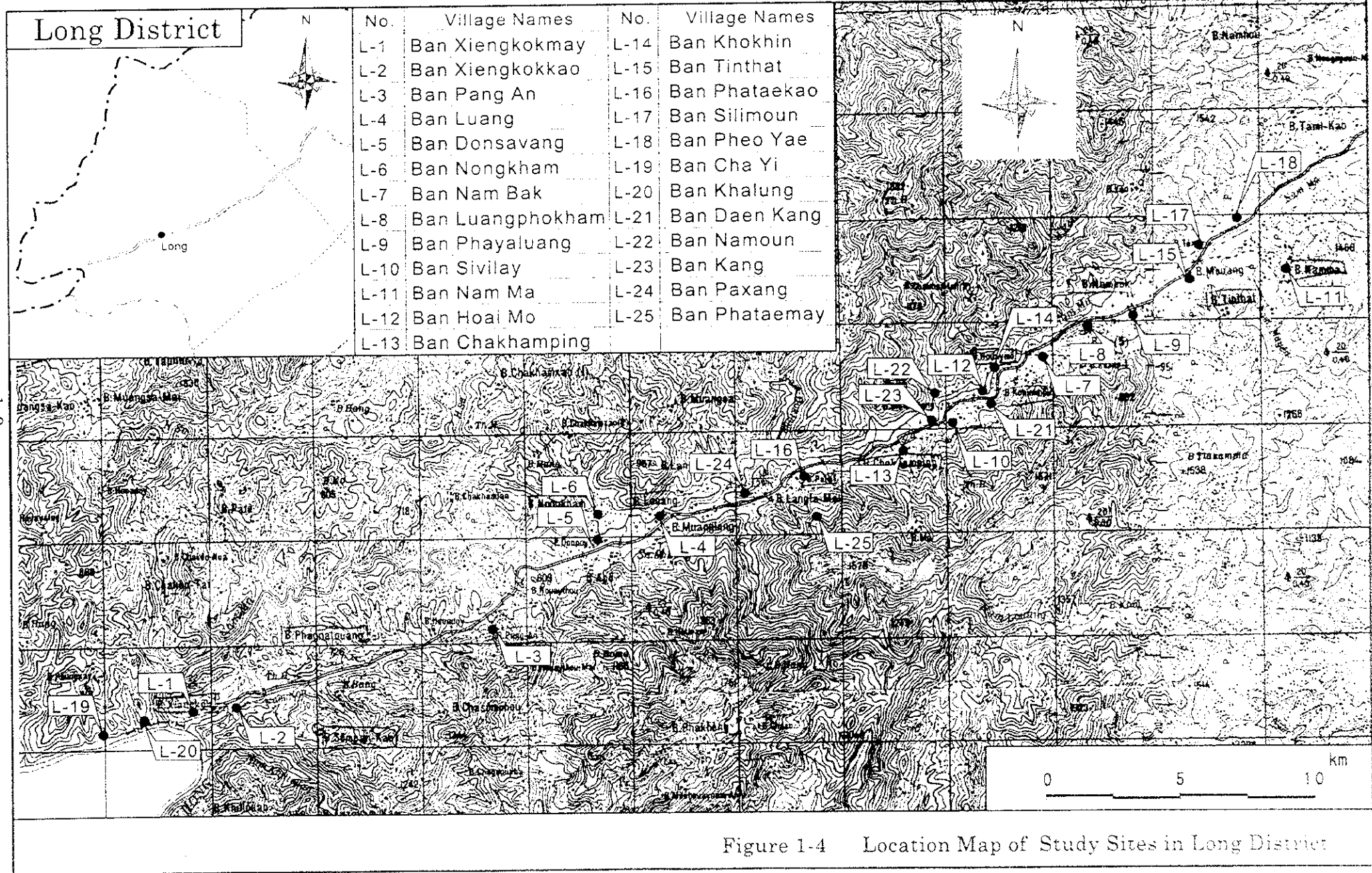
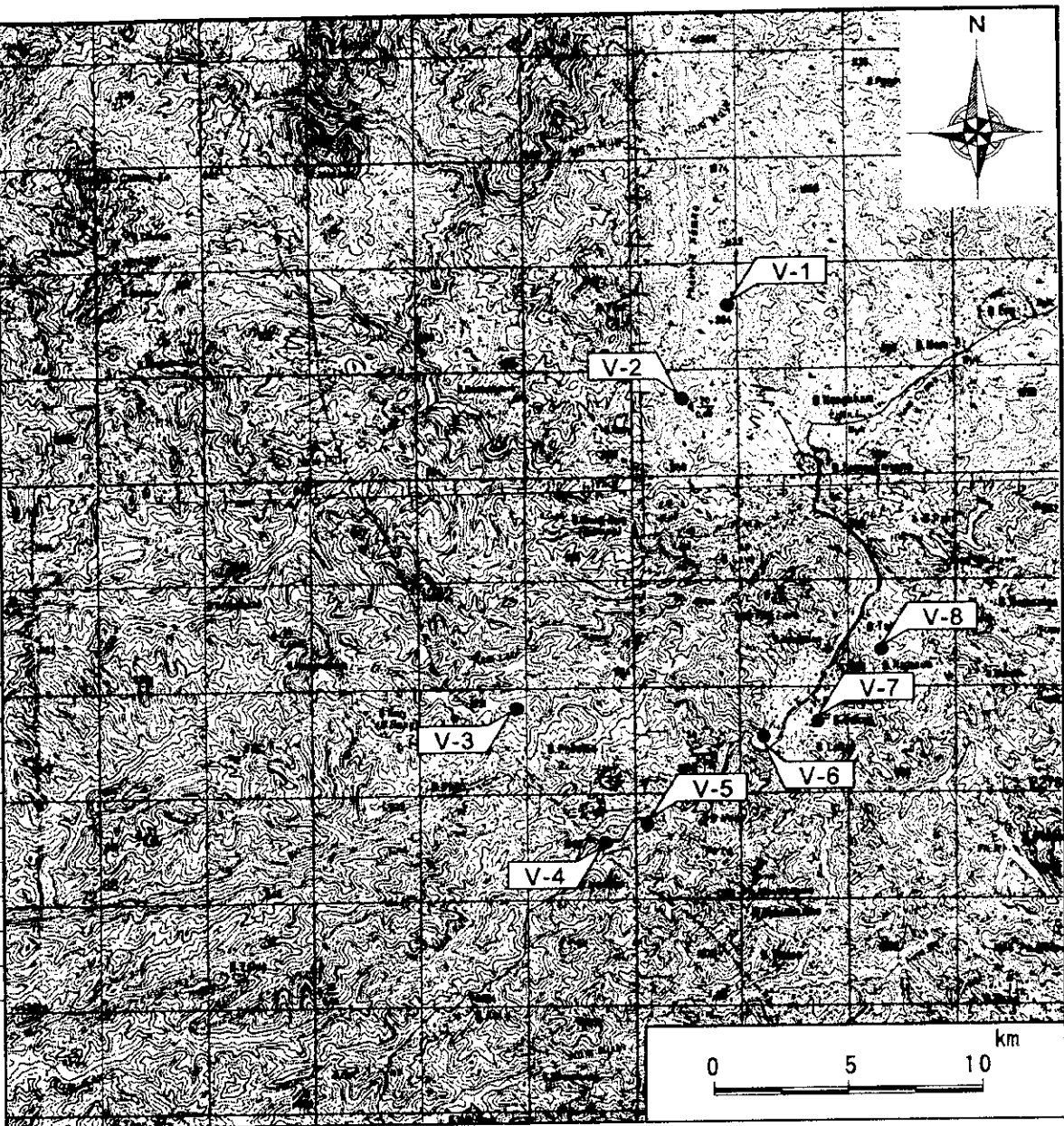
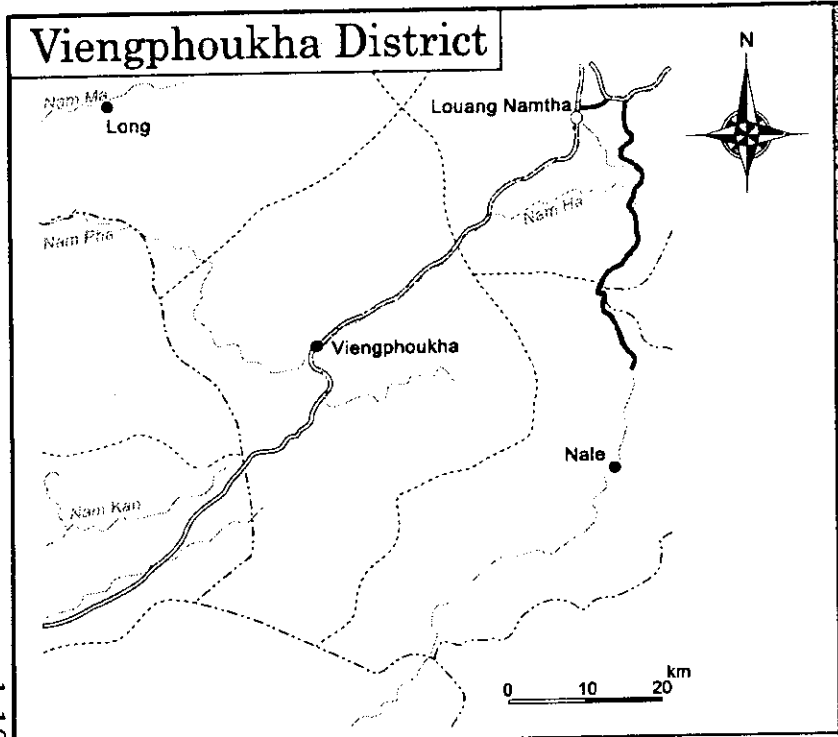


Figure 1-4 Location Map of Study Sites in Long District



No.	Village Names
V-1	Ban Nam Mai
V-2	Ban Nam Paman
V-3	Ban Donmay
V-4	Ban Nam Phae
V-5	Ban Phoulan
V-6	Ban Pangxai
V-7	Ban Sakon/Layloth
V-8	Ban Namseua

Figure 1-5 Location Map of Study Sites in Viengphoukha District

1.3 Study Description

1.3.1 Study Components and Sequence

The JICA Study Team will execute the Study in accordance with the following components:

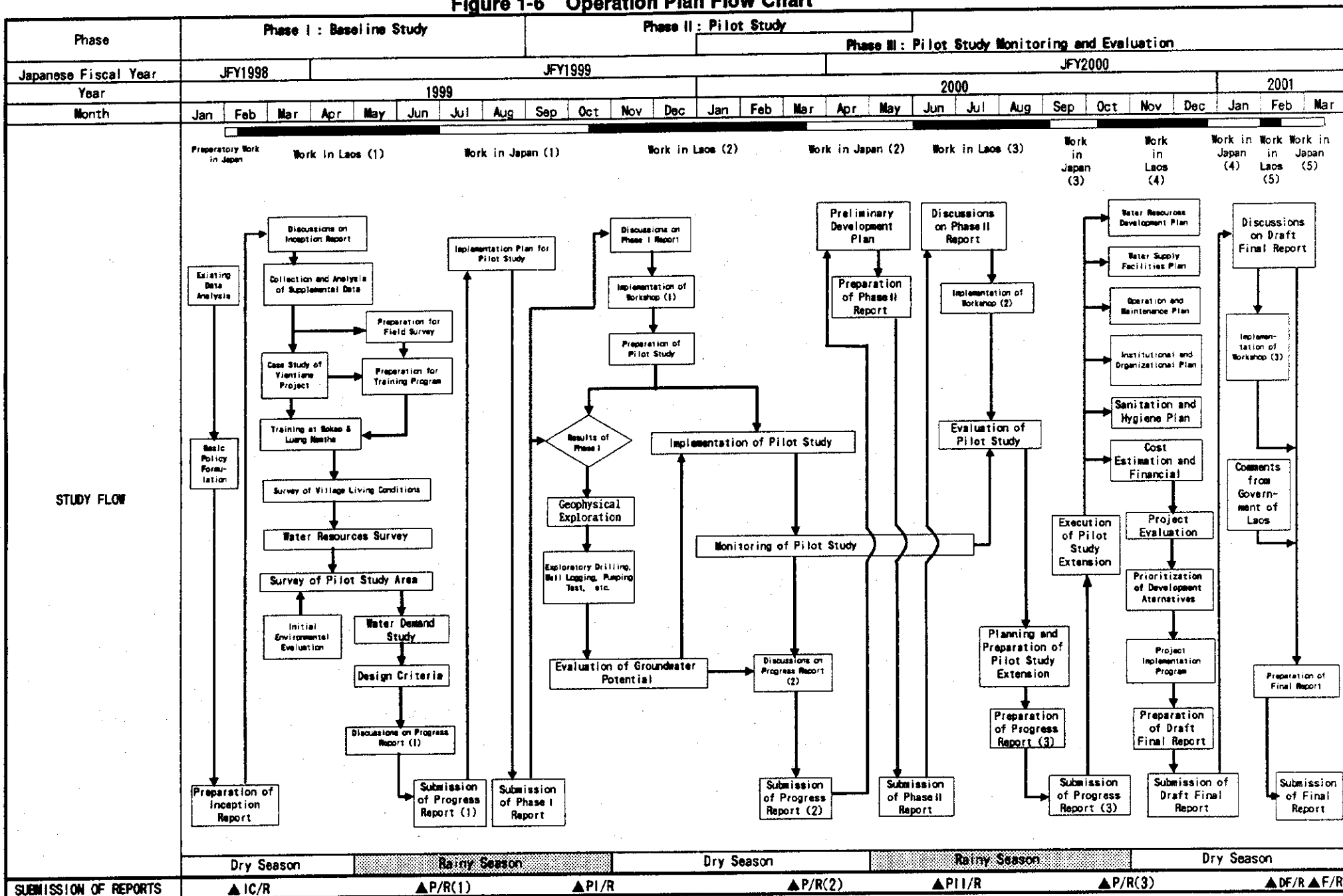
- 1) Existing data and information shall be organized systematically and used effectively to fully comprehend local conditions related to living environment, water supply, sanitation, hydrogeology and other relevant subjects, and accurate field survey results shall be acquired to formulate an optimum development plan for improvement of rural water supply and sanitation. In addition, a previous project implemented through a Japanese grant assistance will be reviewed and reflected in the present Study.
- 2) The Pilot Study and workshops shall be effectively carried out for mutual understanding of current rural water supply/sanitation conditions and local requirements, in order to: (a) establish optimum solutions to the prevailing problems; (b) formulate a water supply and sanitation improvement plan most suitable in terms of water resources development potential; and (c) prepare an optimum operation and maintenance plan for a sustainable water supply and sanitation system.
- 3) The Study shall be executed in cooperation with counterpart personnel and target area villagers in order to complete the Study according to the schedule and with emphasis on technology transfer to build institutional capacity.
- 4) The concepts described in the Sector Strategy relating to community participation, informed choice and technology transfer shall be applied for this Study and necessary elaboration will be made. This Study can contribute to the promotion of the Sector Strategy.

Through the implementation of the pilot studies, the villagers were involved in the participatory process from the planning stage through the construction, and contributed labor, local materials and cash. As a result of this community participation, the following facilities were constructed (see Table 5-18 in Chapter 5 for the list of village-wise facilities).

- Water Supply Facilities: Gravity fed systems (GFS), dug wells, boreholes
- Sanitation Facilities: Pour flush type latrines

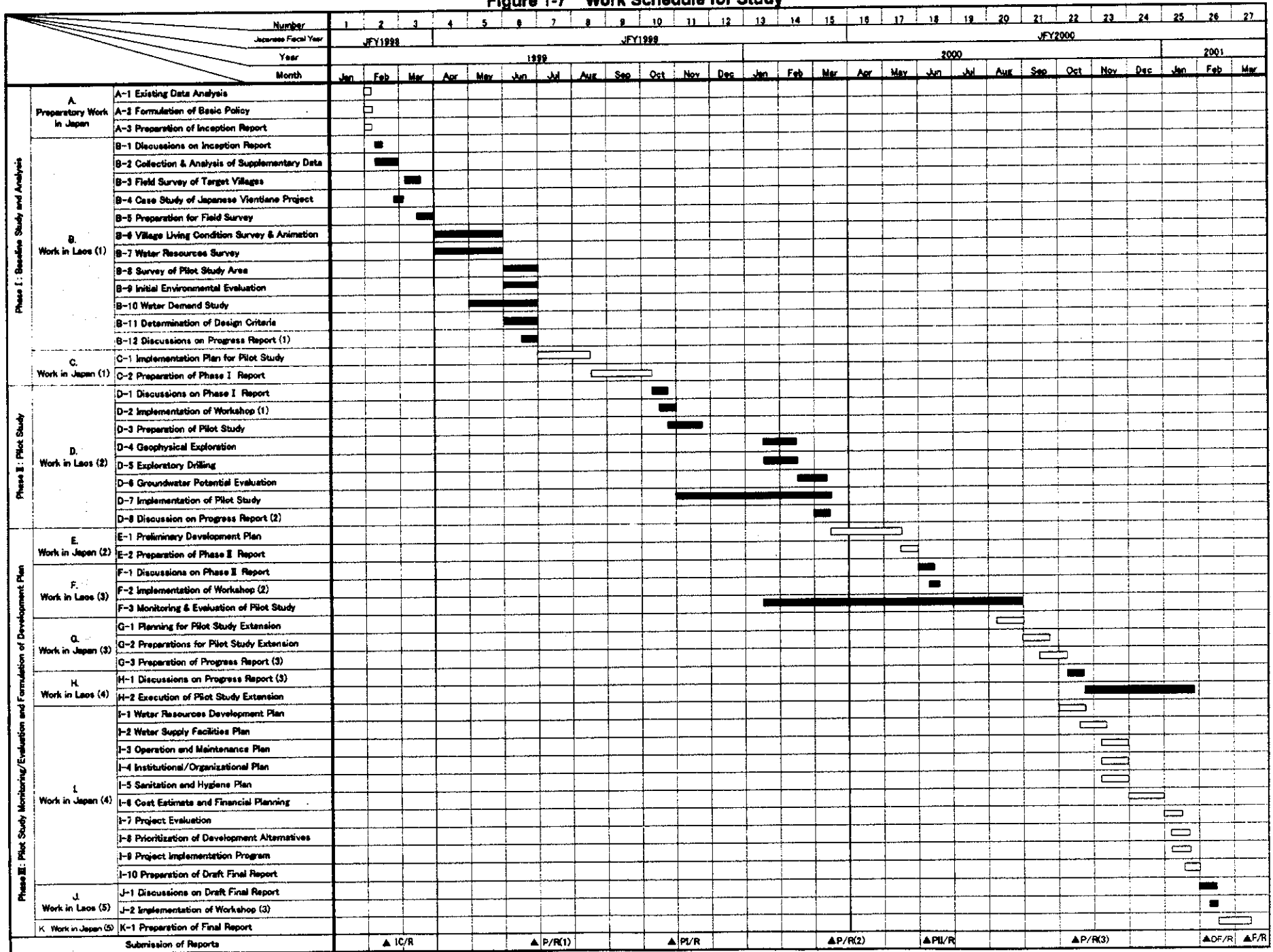
The detailed work items and the Study sequence are depicted in the following flow chart and the work schedule.

Figure 1-6 Operation Plan Flow Chart



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Figure 1-7 Work Schedule for Study



Submission of Reports

▲ IC/R

▲ P/R(1)

▲ P/R

▲ P/R(2)

▲ P/R

▲ P/R(3)

▲ DF/R

▲ F/R

1.3.2 Scope of Work

The scope of work for the Study is described below for each phase.

Phase I: Baseline Study and Analysis

- a) Preparatory Work in Japan
 - 1) Collection, review and analysis of existing data and information
 - 2) Formulation of basic policy and field survey method
 - 3) Preparation of Inception Report
- b) Work in Laos (1)
 - 1) Explanation of and discussions on the Inception Report
 - 2) Collection and analysis of supplementary information
 - 3) Field survey of target villages
 - 4) Case Study of Japanese Vientiane Project
 - 5) Preparatory work for investigation of rural living conditions and water resources
 - 6) Investigation of rural living conditions
 - 7) Water resources survey
 - 8) Preliminary planning and investigation for the Pilot Study
 - 9) IEE (initial environmental examination)
 - 10) Projection of water demands
 - 11) Determination of design criteria
 - 12) Preparation of and discussions on Progress Report (1)
- c) Work in Japan (1)
 - 1) Establishment of Pilot Study implementation plan
 - 2) Preparation of Phase I Report

Phase II: Pilot Study

- d) Work in Laos (2)
 - 1) Explanation of and discussions on Phase I Report
 - 2) Execution of Workshop (1)
 - 3) Preparation of Pilot Study
 - 4) Geophysical exploration
 - 5) Exploratory well boring and subsequent well logging, pumping test, etc.
 - 6) Evaluation of groundwater resources potential
 - 7) Execution of Pilot Study
 - 8) Preparation of and discussions on Progress Report (2)

Phase III: Pilot Study Monitoring/Evaluation and Formulation of Development

Plan for Rural Water Supply and Sanitation

- e) Work in Japan (2)
 - 1) Preliminary formulation of development plan
 - 2) Preparation of Phase II Report
- f) Work in Laos (3)
 - 1) Explanation of and discussions on Phase II Report
 - 2) Execution of Workshop (2)
 - 3) Monitoring and evaluation of Pilot Study
- g) Work in Japan (3)
 - 1) Planning for Pilot Study extension
 - 2) Preparations for Pilot Study extension
 - 3) Preparation of Progress Report (3)
- h) Work in Laos (4)
 - 1) Explanation of and discussions on Progress Report (3)
 - 2) Execution of Pilot Study extension
- i) Work in Japan (4)
 - 1) Formulation of water resources development plan
 - 2) Formulation of water supply facilities plan
 - 3) Formulation of operation and maintenance plan
 - 4) Formulation of organizational reinforcement plan
 - 5) Formulation of sanitation improvement and hygiene education plan
 - 6) Cost estimation and financial planning
 - 7) Project evaluation
 - 8) Prioritization of development alternatives
 - 9) Formulation of project implementation program
 - 10) Preparation of Draft Final Report
- j) Work in Laos (5)
 - 1) Explanation of and discussions on Draft Final Report
 - 2) Execution of Workshop (3)
- k) Work in Japan (5)
 - Preparation of Final Report

1.3.3 Reports

The JICA Study Team will prepare and submit the following reports to the Government of Lao People's Democratic Republic.

1) Inception Report

Thirty (30) copies in English were submitted at the beginning of Work in Laos (1) (middle of February 1999).

2) Progress Report (1)

Thirty (30) copies in English were submitted at the end of Work in Laos (1) (end of June 1999).

3) Phase I Report

The Phase I Report consisting of the documents listed below was submitted at the beginning of Work in Laos (2) (middle of October 1999).

- Main Report Thirty (30) copies in English
- Reference Report Ten (10) copies in Lao
- Sanitation Education Manual Five (5) copies in Lao

4) Progress Report (2)

Thirty (30) copies in English were submitted at the end of Work in Laos (2) (middle of March 2000).

5) Phase II Report

The Phase II Report consisting of the reports listed below was submitted at the beginning of Work in Laos (3) (beginning of June 2000).

- Main Report Thirty (30) copies in English
- Reference Report Ten (10) copies in Lao

6) Progress Report (3)

Thirty (30) copies in English were submitted at the beginning of Work in Laos (4) (middle of October 2000).

7) Draft Final Report

The Draft Final Report consisting of the documents listed below was submitted at the beginning of Work in Laos (5) (beginning of February 2001).

- Summary Report Fifteen (15) copies in English
 Fifteen (15) copies in Lao (as reference)
- Main Report Thirty (30) copies in English
 Fifteen (15) copies in Lao (as reference)
- Supporting Report Thirty (30) copies in English
- Data Book Thirty (30) copies in English
- Sanitation Education Manual Fifteen (15) copies in Lao
- Operation and Maintenance Manual
 Fifteen (15) copies in Lao

8) Final Report

The Final Report consisting of the documents listed below was sent to Laos through diplomatic channels in March 2001.

- Summary Report Fifteen (15) copies in English
 Thirty (30) copies in Lao (as reference)
- Main Report Fifty (50) copies in English
 Thirty (30) copies in Lao (as reference)
- Supporting Report Fifty (50) copies in English
- Data Book Fifty (50) copies in English
- Sanitation Education Manual Thirty (30) copies in Lao
- Operation and Maintenance Manual
 Thirty (30) copies in Lao

1.4 Study Team Members and Work Assignment

The Study Team members are listed below and the work assignment of the team members is as shown in the attached assignment schedule.

Name	Function	Affiliation
Shoji FUJII	Team Leader/ Rural Water Supply/ Operation and Maintenance	Japan Techno
Shigeyoshi KAGAWA	Hydrogeology/ Environmental Analysis	Japan Techno
Noriyo AOKI	Social Survey/ WID - Community Participation I	Japan Techno*
Khamtanh CHANTY (Phase I) Sybounheung PHADANOUVONG (Phase II & III)	Social Survey/ WID - Community Participation II	Japan Techno**
Izumi ATSUTA	Sanitation Education/ Public Hygiene	Japan Techno***
Nobuyuki ISHII	Facilities Design I	Japan Techno
Toshimichi NAGANUMA	Geophysics/Drilling Advice	Japan Techno
Kiyoko TAKAMIZAWA	Facilities Design II/ Construction Supervision I/ Procurement II	Japan Techno
Akihiko UCHIYAMA	Cost Estimation/Procurement I/ Financial Planning	Japan Techno
Akinori MIYOSHI	Construction Supervision II	Japan Techno
<i>JICA Technical Advisor</i>		
Dr. Yuji MARUO	Leader of JICA Advisory Team	JICA Development Specialist

* From IC Net

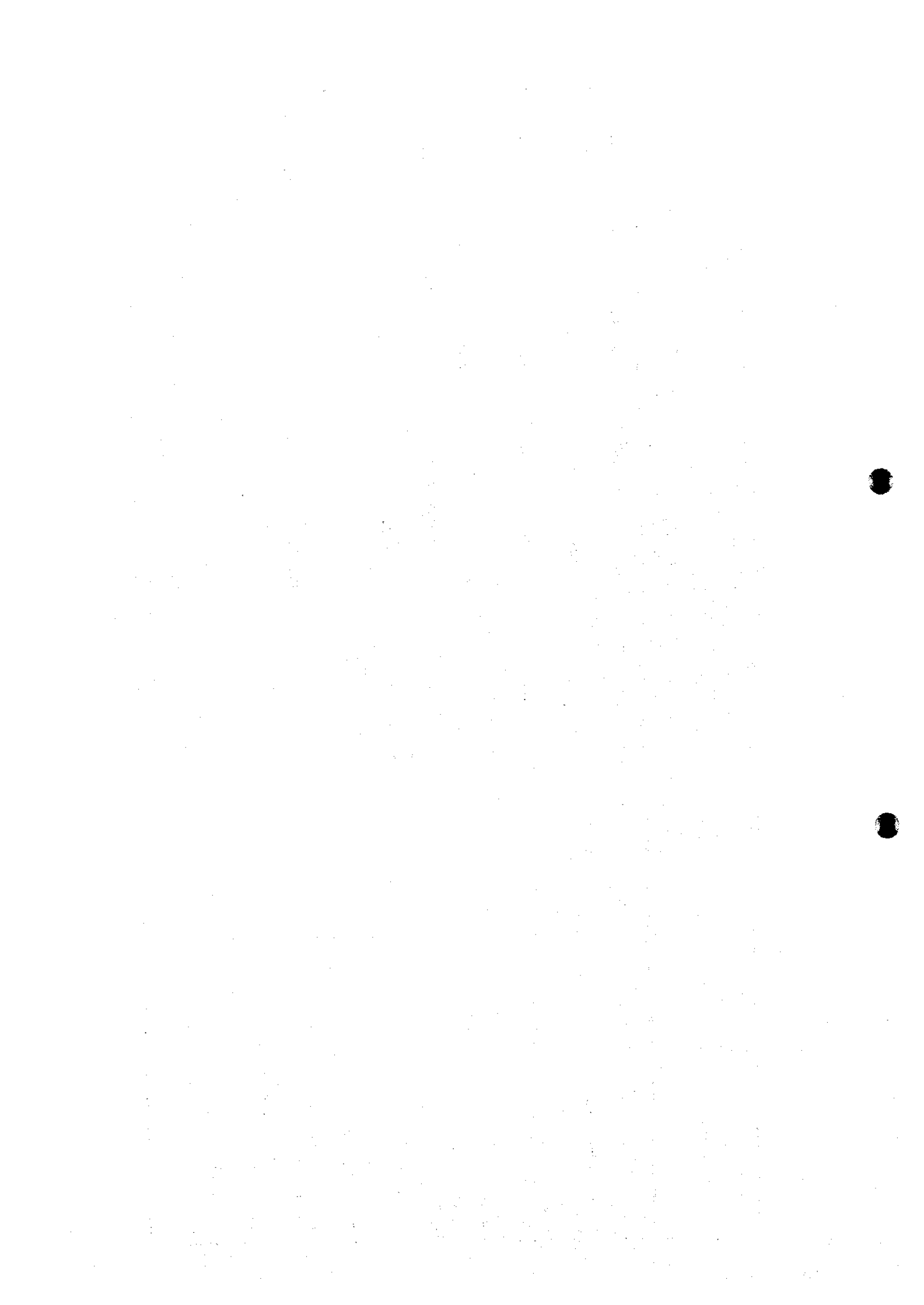
** From Lao Consulting Group (Formerly Lao Montgomery Watson)

*** From Pro Act International

Figure 1-8 Study Team Assignment Schedule

Function	Name	Affiliation	Phase I : Baseline Study									Phase II : Pilot Study						Phase III : Pilot Study Monitoring and Evaluation											
			JFY1998			JFY1999						JPY2000						2001											
			1999									2000						2001											
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27			
Team Leader/Rural Water Supply Operation and Maintenance	Shoji FUJII	Japan Techno		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
Hydrogeology/Environmental Analysis	Shigeyoshi KAGAWA	Japan Techno	□	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
Social Survey/WID/Community Participation I	Neriyo AOKI	Japan Techno	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
Social Survey/WID/Community Participation II	Khamtanh CHANTY Sybounheung PHANDANOUVONG	Japan Techno	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
Sanitation Education/Public Hygiene	Izumi ATSUTA	Japan Techno	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
Facilities Design I	Nobuyuki ISHII	Japan Techno	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
Geophysics/Drilling Advice	Toshimichi NAGANUMA	Japan Techno	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
Facilities Design II/Supervision I/Procurement II	Kiyoko TAKAMIZAWA	Japan Techno	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
Cost Estimation/Procurement I/Financial Analysis	Akihiko UCHIYAMA	Japan Techno	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
Construction Supervision II	Akinori MIYOSHI	Japan Techno	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
			▲						▲							▲									▲	▲			
			IC/R						P/R(1)							P/R(2)									P/R(3)	DF/R	F/R		
			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
			□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□		
			Work in Laos Work in Japan																										

1-19



CHAPTER 2 SOCIO-ECONOMIC SITUATION

2.1 National Socio-economic Conditions

2.1.1 Socio-economic Conditions

With an estimated per capita GNP of US\$400, Lao PDR is one of the least developed countries in the East Asia region (World Development Indicators). Agriculture remains the major sector of the economy, contributing 52 percent of GDP and employing over 80 percent of the labor force. The structural reforms and macroeconomic management since the introduction of reforms under the New Economic Mechanism (NEM) fostered a steady movement towards macroeconomic stability, production growth, small private sector, and increased foreign direct investment and trade flows, particularly with neighboring countries. The average GDP growth rate is 7 percent between 1992 and 1997, which made Government hope that it would reach the goal of graduating from the ranks of the Least Developed Countries by the year 2020.

Table 2-1 Lao Socio-Economic Profile, Comparison with Neighboring Countries

Item	Total Population	Land Area	Population Density	GNP per Capita*	GNP PPP**
Unit	million	thousand km ²	persons/m ²	US\$	%
Year	1996	1995	1995	1996	1995
Ref.	S-1	S-1	S-1	S-1	S-1
Lao PDR	5	231	20	400	1,250
China	1,215	9,326	130	750	3,330
Cambodia	10	231	60	300	-
Myanmar	46	658	70	-	-
Thailand	60	511	120	2,960	6,700
Vietnam	75	325	230	290	1,570

Ref. S-1: World Bank, World Development Indicators, 1998

* Calculated using the World Bank Atlas method

** Purchasing power parity

However, the reform effort has slowed significantly and the macroeconomic environment has worsened considerably, with serious inflation and exchange rate depreciation in these years. As of the middle of June in 1999, the Lao currency Kips was devaluated down to more than 100% of its value from the beginning of Phase I of this Study (February, 1999), which caused serious inflation to the Lao economy.

As the majority of the population is engaged in subsistence activities, the impact of the Kip crisis on them is initially shielded. The actual effects of the economic crisis vary. It depends on the level of involvement of groups in the cash economy, their ability to produce sufficient food and other commodities for their own use, the degree of dependence on imported goods or inputs, and their ability to adjust their patterns of consumption or employment.

The rural sector accounts for 52 percent of GDP and 80 percent of employment and continues to be important to the Lao economy. However, there are major constraints to rural development such as insufficient rural infrastructures, inaccessibility to markets and the limited network of all-weather feeder roads.

2.1.2 Population Growth

The population projection in accordance with the results from the population census shows decline in fertility and improvement in mortality in the next few decades.

Table 2-2 Population Projection at National Level

Parameter	1995-2000	2001-2005	2006-2010	2011-2015	2016-2020
Annual Population Growth	2.4%	2.3%	2.1%	1.9%	1.7%
Crude Birth Rate	37	35	32	29	25
Crude Death Rate	14	12	11	9	8

Source: Results from the Population Census 1995, Lao Census 1995

2.2 Regional Socio-economic Conditions

2.2.1 Location and Zoning

Luang Namtha Province, which is one of the Study target areas, has a total land area of 9,325 km². The Province is bordered by China and Myanmar and it is located north-west of Oudomxai Province, and north of Bokeo Province. Long District is bordered by Myanmar to the west. Viengphoukha District is a landlocked area and located in the southern part of Luang Namtha Province. Bokeo Province, the other Study target area, has a total land area of 6,196 km². This Province is bordered by Thailand and located southwest of Luang Namtha Province.

The zone system was set up for the EPI program in the early 1990's and the zones are adapted for the measurement of the extent of remoteness, which is related to the time-distance or distance from the District Nam Sat Office. Each District Office has their own definition. For example, in Houayxai, District Zone 0 villages are located from 0 to 3 km from the District Office; Zone 1, 3 to 10 km; Zone 2, 10 to 15 km; Zone 3, more than 15 km. The zoning distribution of the 81 target villages for both Provinces is as: 49 % in Zone 3, 25% in Zone 2, 19% in Zone 1 and 7% in Zone 0. This reveals that most of the target villages are located in remote areas of each District.

2.2.2 Infrastructure

1) Road

According to the Integrated Rural Accessibility Planning Survey in 1997, roads in Long District were accessible to only 18% of the total villages in the dry season. The rainy season allowed only a few accessibility in Long District. However, since 1998, 80% of the main road in Long District has been improved by the Rural Infrastructure Development Programme, and even in the rainy season, accessibility has been greatly upgraded. The roads in Viengphoukha District are accessible to 43 % of the total villages in the dry season. Since there are many streams along National Route No. 3, most of the villages are isolated from markets and roads during the rainy season. National Route No. 3 extends from Luang Namtha Province to Houayxai in Bokeo Province. 44 % of the villages in Houayxai District of Bokeo Province can be reached by road even in the rainy season. Most villages in Pha Odom District have few accessibility by road in the rainy season. Normally villagers have to walk or travel by boat for their transportation.

2) Electricity

In Luang Namtha District, the electricity coverage rate is 24%, and electricity can be used only 3 hours per day. Long District and Viengphoukha District are not yet receiving electricity. Some of the villages use their own generators. In Bokeo Province, especially Houayxai town has been receiving electricity since 1996 through powerline connections from Thailand. Since some villages in Houayxai and Pha Oudom Districts as well as Long District have generators of their own, villagers of those villages have become accustomed to using electrical goods such as the television. The demand survey in Bokeo Province shows that

electricity is the highest priority. According to the Bokeo provincial plan, electrification will be expanded from Houayxai town to Ban Pong village, which is one of the target villages in Houayxai District, within the next few years.

3) Regional Planning

According to the urban water supply planning of the Ministry of Communication, Transport, Post and Construction (MCTPC), Nam Papa (Lao Water Supply Authority)¹ will be expanded by the year 2020. According to the ADB Small Town Development Programme, Pha Oudom District among the Districts in Bokeo Province is given higher priority for transferring to Nam Papa, but this transfer is unlikely to be realized in the few years. Furthermore, the Mekong basin regional development plan has recently reached the target area, where the Lao and Chinese governments are preparing a plan to cross a bridge through the border at Xiengkok Mai. This large infrastructure development plan would bring a significant change in the livelihood to the community of the target villages.

2.2.3 Population Growth

In Luang Namtha, a family planning programme has been conducted only for Luang Namtha city, and other areas in Long District and Viengphoukha District have little contraceptive prevalence. The TFR (Total Fertility Rate) of Luang Namtha is higher (5.7) than that of national average (5.4). In Bokeo Province, the Department of Health took the initiative to conduct a family planning programme in Houayxai District, and then the TFR in Bokeo began to decrease down to 5.5.

Table 2-3 Population Profile of Study Target Provinces

Item	Total Population	Population Density	TFR (1)	Population Growth Rate	Infant Mortality Rate (2)
Unit	1000 persons	persons/km ²	persons	%	‰
Year	mid-year 1997	1997	1995	1995	1995
Ref.*	S-1	S-1	S-2	S-2	S-2
Luang Namtha	121.5	13	5.7	2.8	119
Bokeo	120.3	19	5.5	2.6	82
National Average	-	20	5.4	2.5	104

Ref* S-1: National Statistical Center, State Planning Committee, Basic Statistics, 1997

S-2: National Statistical Center, Data from the Lao Population Census, 1995

(1) Total fertility rate: average number of children whom a woman delivers in her lifetime

(2) Infant mortality rate: number of infant mortality of those under one-year old per 1000 births

¹ Nam Papa or Lao Water Supply Authority is the organization under MCTPC responsible for management and operation of water supply and sanitation systems of urban and other areas not served by Nam Saat. Provincial Nam Papas are autonomous bodies.

2.2.4 Regional Economy

The regional economies of Luang Namtha and Bokeo Provinces are influenced by countries located next to these Provinces. Most of the commodities in Luang Namtha Province are imported from China. Long District near the Myanmar border has trade with Myanmar. Economy of Viengphoukha District, which is isolated both geographically and economically, is affected by weather conditions and insect damages. Goods and commodities in Bokeo Province come from Thailand which gives rise to using Thai Baht as the currency in daily trade. Some areas close to the Mekong River in Long District in Luang Namtha Province also use Thai Baht.

Table 2-4 Economic Profile of Study Target Provinces

Item	Land Area	Lowland Rice		Upland Rice	Vegetable and Beans
		ton/ha (non-irrigated)	ton/ha (irrigated)	ton/ha	tons
Unit	km ²	1997		1997	1997
Year	1997	1997		1997	1997
Luang Namtha	9,325	3.11	3.13	1.80	1,050
Bokeo	6,196	4.00	na	1.96	1,100
Vientiane	15,927	3.59	4.38	1.30	14,500

Source: National Statistical Center, State Planning Committee, Basic Statistics, 1997

2.2.5 Educational Development

Most of the Targeted villages in Long and Viengphoukha District in Luang Namtha Province do not have schools inside the village and the enrollment ratio of primary schools is estimated at less than 15% according to the survey results. The enrollment ratio of primary schools in Houayxai District is estimated to be more than 50%, much higher than Long and Viengphoukha Districts. Literacy rate for the population aged 5 years and above is 27.75% in Viengphoukha and 10.65% in Long, 54.5% in Houayxai and 31.2% in Pha Oudom.

Table 2-5 Educational Statistics in Luang Namtha Province by District

Item	Adult Literacy Rate		Completion Rate (Primary)	Shortage of Schools
	male	female	%	%
Unit	1995		1997-98	1997
Year	1995		1997-98	1997
Ref*	S-1		S-2	S-3
Luang Namtha	69.6	41.4	34.7	29.0
Viengphoukha	46.0	9.5	10.9	72.0
Long	16.6	4.7	3.8	85.0
Sing	35.4	15.8	7.9	44.0
Nale	52.9	13.7	12.5	47.0
Average	44.1	17.0	14.0	55.4

Ref* S-1: National Statistical Center, Census 1995-Luang Namtha Province (in Laos)

S-2: Ministry of Education, Annual Bulletin 1997-98, Results of Interviewing Education Officers in Vientiane

S-3: Ministry of Communications, Transport, Post and Construction, IRAP, 1997

Table 2-6 Educational Statistics in Bokeo Province by District

Item	Adult Literacy Rate		Completion Rate (Primary)
	male	female	%
Unit	1995		1997-98
Year	S-1		S-2
Ref*			
Bokeo			
Houayxai	70.0	39.0	57.3
Pha Oudom	48.7	13.7	10.4

Ref* S-1: National Statistical Center, Census 1995-Bokeo Province (in Laos)
 S-2: Ministry of Education, Annual Bulletin 1997-98, Results of
 Interviewing Education Officers in Vientiane

The ability for Lao language is not the same by region and gender. In most of the villages, the male is a good Lao speaker, although female speak less fluently. In some regions, for example the remote rural minority villages (Mousir, Qui, Hmong villages) in Luang Namtha Province, women cannot speak Lao. Most of the Lao Lum², such as Leu women, are proficient in speaking, reading and writing.

Table 2-7 Literacy Rates* by Sex at National Level
 (Unit:%)

Ethnic Group	Classification	Male	Female	Total
Leu	Lao Lum	60.8	22.7	40.9
Khmu	Lao Theung	73.9	46.6	59.7
Lamae	Lao Theung	49.0	10.2	28.0
Mousir	Lao Sung	2.9	0.4	1.6
Hmong	Lao Sung	45.7	8.1	26.5
Akha	Lao Sung	7.0	0.7	3.8

Source: Lao Census 1995
 *for the population aged 15 years and above

The educational levels of the villagers are mostly up to the fifth grade. More boys tend to go to school rather than girls. Educational problems that the villagers mentioned are, insufficient number of schools in and near the villages, limited number of qualified teacher, and high illiteracy, especially for women.

2.2.6 Religion and Beliefs

The majority of Lao Lum such as Leu tribes believes in Theravada Buddhism, in which most of them have a temple inside their village. The villagers of Lao Theung believe in Animism. Lao Sung also believe in different types of Animism. They believe that spirits reside in various places in and outside the village such as houses, trees, rivers and the land. Religious practices are maintained mainly by

² Ethnic minorities of Lao PDR are classified into three main categories: Lao Lum (inhabitants of lowlands, valleys and plateaus of altitudes between 200 and 400 m), Lao Theung (inhabitants of slopes, valleys and watersheds between 300 and 900 m) and Lao Sung (inhabitants of mountain tops between 800 and 1,600 m).

elder men, and are less influential to the decision making process in the village. Some of the villages, especially minority groups such as Khmu and Lamae in Bokeo, as well as some villages in Long District, have come to believe in Christianity after their resettlement.

2.3 Village Level Socio-economic Conditions of Study Target Villages

2.3.1 Village Survey Methodology

Survey objectives were set for investigation of possibilities of improvement of water supply through community dialogue and situation analysis of the villages from socio-economic aspects. The socio-economic aspects were surveyed by the non-technical team consisting of participants from Provincial and District Nam Saat as well as personnel from the Lao Youth Union, Lao Women's Union and other local representatives. They received training in March 1999 on the basics of participatory survey including the basic understanding of the Sector Strategy, the community dialogue and informed choice, PRA method and gender analysis. The actual survey in four Districts continued up until the end of May 1999 and data collection was completed at the end of June 1999 (detailed survey information are included in the Supporting Report).

2.3.2 Water Usage and Collecting Time

According to the results of the Phase I village survey, 74% of the target villages replied that the distance from their village to their water points is less than 200 m. In 24 villages out of the 81 target villages, the distance to their existing water source is more than 200 m. Five villages are having difficulties in fetching water due to the long distance of more than 300 m to their water sources. The water sources of two villages, H-32 Hat Phouan and H-38 Done Xavanh, are located 500 m away from their villages. The water sources for these villages were the river located down from their dwellings. The distances to water sources are shown in the basic socio-economic profile table in the next page.

The water collecting time varies from village to village as well as among households in the same village. The villagers whose water points are located farther away tend to spend less time for daily fetching of water. The dry season requires a longer collection time than the rainy season. The main water fetchers are women, but in some villages, men are also collectors.

Water related issues and problems that villagers addressed are summarized in the table below. This shows that 22 villages out of the total of 81 or about 27% answered that their existing water is either dirty or turbid. Furthermore, 25 out of the 81 villages or about 31% addressed the need for water, of which 17 villages or about 21% specifically replied the need for drinking water.

Table 2-9 Water related Problems Addressed by Villagers

Are there any problems related to water?	Villages	% /81 villages
<input type="checkbox"/> drinking water needed	17	21.0%
<input type="checkbox"/> water needed	8	9.9%
<input type="checkbox"/> water is highly turbid	6	7.4%
-turbid in rainy season	(5)	(6.2%)
<input type="checkbox"/> water is dirty	16	19.8%
-water is enough but not clean	(2)	(2.5%)
<input type="checkbox"/> water is insufficient	18	22.2%
<input type="checkbox"/> tap water needed	1	1.2%
<input type="checkbox"/> water collection point is very far	4	4.9%
<input type="checkbox"/> no water source	1	1.2%

Source: Result of Phase I Village Survey in 1999

2.3.3 Village Economy and Income Disparity

In general, villages situated in the Mekong River Basin in Houayxai and Long Districts enjoy a relatively affluent economy through income from non-farming activities. Some of the villages in Houayxai have gem mining concessions and also provide labor to the mining firm, which bring in extra income. Xiengkok Mai is becoming a trendy border spot for foreign tourists, of which villagers have boats for crossing the border between Laos and Myanmar to the area of the so called "Golden Triangle". The income itself varies from village to village where the economic disparity among villages in Houayxai began to widen owing to the impact of the Mekong Basin development, its urbanization and increasing income from non-farming work. Long district economy is becoming improved thanks to the recent infrastructure development. The socio-economic profile of the 81 target villages was presented in the previous page, and details of socio-economic survey results for the four Districts are summarized in the Supporting Report and Data Book.

The average cultivation areas of paddy fields and upland fields by district are shown below. Houayxai, Pha Oudom and Long Districts are carrying out both upland and lowland rice cultivation. However, Viengphoukha is cultivating mainly upland rice, where the average paddy field of the target villages in Viengphoukha is only 2.6 ha.

Table 2-10
Average Cultivation Area of Target Villages by District

District	Paddy Field(ha)	Upland Field(ha)
Houayxai	28.1	23.0
Pha Oudom	23.1	25.2
Viengphoukha	2.6	63.8
Long	21.5	10.6
Average	18.8	30.7

Source: Results of Field Survey, March-May 1999

The range of paddy field possession of the 81 target villages is presented below. H-15 Ban Namtoi and H-34 Ban Nampoukang own paddy fields of more than 100 ha. They have a large number of livestock and enjoy relatively affluent economies. However, more than half of the target villages have small paddy fields that are less than 10 ha.

Table 2-11
Range of Paddy Field Possession of Target Villages

Range of Paddy Field	No. of Villages
More than 100 ha	2
Below 100 ha - more than 50 ha	11
Below 50 ha - more than 20 ha	20
Below 10 ha	48
Total	81

Source: Results of Field Survey, March-May 1999

Farmers raise livestock such as buffaloes, cattle, goats, pigs, ducks and chickens. Livestock also become property in case of villagers' financial needs. The price range of livestock in both Provinces is buffalo 2,000,000 to 2,200,000 kip; cow 675,000 to 990,000; pig 270,000 to 360,000; and chicken 18,000 to 22,000 kip for prices during March to May 1999. The average number of livestock of the villages in Houayxai shows their wealthy economic condition. In contrast, most of the farmers in Viengphoukha raise more pigs than cows or buffaloes.

Table 2-12
Average Number of Livestock of Villages by District

District	Cows	Buffaloes	Pigs
Houayxai	72.2	36.5	81.3
Pha Oudom	2.3	42.8	53.0
Viengphoukha	8.4	19.8	111.1
Long	29.4	49.8	69.4

Source: Result of Field Survey, 1999 March-May

2.3.4 Household Economy and Willingness to Contribute

The household incomes and willingness to contribute by District are shown in the next page. The average number of household members is 6 or 7 persons. It is noted that the affluent economy of Houayxai does not reflect upon the overall willingness to contribute in comparison to other districts.

Table 2-13
Household Economy and Willingness to Contribute for Construction by District

Parameter	Houayxai	Pha Oudom	Viengphoukha	Long
Average Number of Household Members (persons)	6	7	6	6
Household Income				
• Average Annual Household Income (kip)	2,639,168	1,135,944	1,186,412	3,010,956
• Median Annual Household Income (kip)	1,560,000	622,600	590,000	1,680,000
• Maximum Annual Household Income (kip)*	3,290,000	8,930,400	4,714,000	9,620,000
• Minimum Annual Household Income (kip)*	186,000	172,250	70,000	412,000
Willingness to Contribute				
• Average Construction Contribution (kip/HH)	20,469	20,556	26,206	82,701
• Median Construction Contribution (kip/HH)	5,000	15,000	20,000	50,000

Source: Results of Phase I Village Survey and Household Survey held in 1999

*Excluding statistical error and adjusting the income to balance of expenses of each household

Although Viengphoukha villages depend heavily on subsistence economy rather than cash economy, the willingness to contribute is higher than Houayxai. Long District, whose average willingness to contribute for construction is 82,701 kip and its median is 50,000 kip, shows the highest willingness to contribute.

2.4 Village Level Socio-Economic Conditions of Pilot Study Villages

2.4.1 General Village Profile

The basic socio-economic information of the pilot villages obtained by the village survey is summarized in the next page. The total numbers of beneficiaries of the pilot villages are shown below. The total number of households is 1,936 households and the total population for the four Districts is 10,595 persons.

Table 2-14 Population Data of Pilot Villages by District

District	No. of Households	Population	No. of Males	No. of Females
Houayxai	915	5,083	2,502	2,581
Pha Oudom	583	3,365	1,655	1,710
Viengphoukha	117	543	263	280
Long	321	1,604	811	793
Total	1,936	10,595	5,231	5,364

Source: Results of Phase I Village Survey in 1999

Table 2-15 Basic Socio-Economic Profile and Water Related Issues of Pilot Villages

No.	Name	Water Scheme	Latrine	Zone	No. of HH	Pop.	Male	Female	Official	Major Ethnic Category	Major Ethnic Grp	Religion*	Paddy Field (ha)	Upland Field (ha)	Existing Water Source				Distance to Water Source	Period of Water Shortage	Water Related Problems	No. of Cows	No. of Buffaloes	No. of Pigs	Major Cash Income	Average Income** (kip/cap/yr)		
															Stream	Trad. Well	Dug Well	Trad. GFS										
□ Houayxai District																												
H-1	Poung	GFS	Pour Flush	3	90	543	269	278	7	Lum	Leu	B	96	na	1	19	3	-	5-110m	May-Nov	drinking water needed	858	276	na	Rice, cabbage, coriander,	833,000		
H-8	Nam Ngao	Dug Well		3	66	377	184	193	-	Theung	Doi	B.A	11.8	37.4	1	-	-	-	40-300m	Mar-Apr	drinking water not clean	49	88	133	Livestock	100,000		
H-7	Namza	GFS	Pour Flush	3	61	362	180	182	4	Theung	Doi	B	85	55	-	5	-	-	10-110m	-	drinking water needed	72	51	66	Rice, resin, palm	187,000		
H-9	May Phattana	Borehole		3	29	185	78	55	-	Theung	Lamsoe	A	na	na	-	1	1	-	30-100m	-	drinking water needed	85	23	100	Rice, palm fruit, resin	25,200		
H-17	Maynigrom	GFS/ SVillages	Pour Flush	2	18	98	47	51	1	Lum	Leu	B	4	2.5	1	3	-	-	10m	2 months	insufficient water	24	-	7	Selling labour	117,000		
H-18	Thongsenghan			2	132	686	319	367	5	Theung	Lamsoe	A	22	47	4	11	3	-	5-70m	-	high turbidity	210	10	85	Rice, livestock	338,000		
H-19	Xiangnam			2	81	207	109	98	2	Lum	Leu	B	36	-	1	1	2	-	100m	-	drinking water needed	100	7	30	-	338,000		
H-20	Nongneun			2	42	224	114	110	5	Lum	Leu	B	18.2	0.1	-	18	-	-	5-10m	-	water is dirty	21	6	14	Rice, selling labour	250,000		
H-21	Nale			Pour Flush	2	55	264	148	121	-	Lum	Leu	B	83.6	6	1	3	3	-	100m	-	na	120	40	150	Selling labour	308,000	
H-22	Chomchouk			3	40	335	179	165	-	Sung	Hmong	A	-	-	-	2	-	-	150-200m	Apr-Jun	no water source	-	-	-	Rice, livestock	1,000,000		
H-23	Paksang			Pour Flush	3	39	209	106	103	7	Lum	Leu	B	10.2	18	-	4	1	-	60-80m	-	water is not clean	18	-	150	Rice, peanut	250,000	
H-24	Mayphoukha			Pour Flush	2	74	426	206	220	30	Lum	Leu	B	66.3	1	-	8	6	-	50m	-	na	450	50	15	Rice	500,000	
H-25	Namhotay			Pour Flush	2	117	658	328	335	6	Lum	Leu	B	20.1	30.8	-	15	6	-	10m	-	drinking water needed	12	18	75	Livestock, selling labour	333,000	
H-31	Dons Kao		GFS	Pour Flush	3	45	220	104	116	1	Theung	Doi	B.A	5	36	-	3	2	-	50-100m	May-Jun	not enough water	40	20	2	Salt, vegetable garden	50,000	
H-32	Hat Phouan	GFS		3	29	182	87	75	-	Theung	Yuan	A,B	8.5	11	2	-	-	-	50-500m	-	collection point is far down	-	31	17	Rice, corn, flower	100,000		
H-37	Leang	Borehole		3	45	220	104	116	2	Theung	Doi	B	32	37	1	1	3	-	5-40m	May-Jun	lack of water	85	15	45	Rice, resin, palm fruit	33,000		
□ Pha Oudom District																												
P-1	Phiangkham	GFS/ SVillages		1	84	445	209	236	23	Theung	Khmu	A	9.3	36.8	1	2	1	-	150m	Mar-Jun	drinking water needed	6	71	135	Rice	357,142		
P-2	Thinkeruan			0	59	307	158	154	5	Theung	Khmu	A	23.5	11	1	4	3	-	10-200m	Mar-May	drinking water needed	1	48	25	Rice	285,000		
P-3	Thienkokang			0	55	310	148	162	18	Lum	Leu	B	26.5	7	1	1	3	-	100-150m	Apr-Jun	drinking water needed	-	17	23	Rice, vegetable	357,142		
P-4	Thinkotay			0	46	262	138	124	16	Theung	Lamsoe	A	12	16.5	1	4	2	-	25-150m	Mar-May	not enough drinking water	-	30	20	Rice, palm fruit	667,000		
P-5	Phououdom			0	130	607	293	314	19	Theung	Lamsoe	B	77.3	38.4	1	5	3	-	150m	3-5months	not enough drinking water	-	126	193	Rice	833,000		
P-6	Nathong			0	34	175	89	86	5	Theung	Yuan	A	80.8	10.4	1	4	2	-	200m	-	not enough drinking water	-	4	16	Rice, rattan	200,000		
P-7	Phonsay			Pour Flush	1	77	369	171	198	11	Theung	Khmu	A	19.9	91.5	-	5	2	-	10-1,000m	Mar-May	drinking water needed	-	37	30	Rice	418,000	
P-8	Somsavang			1	61	327	155	172	23	Theung	Thaidam	B,P	10	15	-	19	1	-	25-30m	Mar-Jul	bad water quality, lack of water	14	46	32	Rice	1,167,000		
P-9	Somsay			1	37	363	199	164	3	Theung	Khmu	A	-	-	-	-	1	-	20-25m	Feb-Jul	not enough water	-	6	10	Rice	50,000		
□ Viengphouka District																												
V-6	Pangnai	GFS	Pour Flush	3	34	175	90	85	-	Theung	Yuan	A	-	80	1	-	-	-	25-70m	-	enough but not clean	-	20	60	Livestock	58,000		
V-8	Namsoou	GFS		3	83	368	173	195	1	Theung	Yuan	A	-	48	-	-	-	2	50-100m	-	not enough water	-	40	100	Rice, kaen, palm fruits	83,000		
□ Long District																												
L-1	Xiangkok May	GFS/ SVillages	Pour Flush	2	51	239	113	126	-	Lum	Leu	B	4	12	2	5	-	-	20-100m	Mar-May	inadequate water	20	17	21	Rice, kaen, palm fruits	250,000		
L-3	Xiangkok Kao		Pour Flush	2	67	317	173	144	3	Lum	Leu	B	2	10	2	8	-	-	5-1,000m	8months	quality bad, lack of water	117	-	80	Palm fruit	167,000		
L-4	Luang	GFS		0	53	304	129	175	5	Lum	Leu	B	10	-	2	1	-	-	25-300m	-	dirty water	25	200	100	Cows, buffaloes	167,000		
L-13	Chalkhamping	GFS		2	27	107	54	53	-	Sung	Akha	A	13.2	68.5	1	-	-	-	50-150m	Feb-May	not enough water and dirty	18	24	30	Livestock	167,000		
L-15	Tinthat	GFS		2	49	253	131	122	4	Lum	Leu	B	5.3	8	1	6	-	-	5-200m	-	enough but not clean	20	152	50	Rice, livestock, cardamom	250,000		
L-12	Hoi Mo	GFS/ SVillages		2	24	68	37	31	-	Sung	Akha	A	3	40	-	2	-	-	80-200m	-	collecting point is far	11	19	78	green vegetable	58,000		
L-21	Dean Kang			2	50	316	174	142	-	Sung	Hmong	A	27	44	1	1	-	-	150-200m	-	enough but not clean	38	12	88	Vegetable, livestock, rattan	191,000		

HH: households

* Religion: A = Animism, B = Buddhism, C = Christianity

**using the results of first monitoring income survey and excluding statistical errors

The ethnic groups of the pilot villages and their distribution in the two Provinces are described in the table below. Lao Lum villages number 13 which include Leu, Thaidam, and Doi; Lao Theung, 17 villages such as Khmu, Lamae and Yuan; and Lao Sung, 4 villages such as Hmong and Akha. Among the pilot villages, Lao Theung shares 50%, whereas Lao Lum is 38.2% and Lao Sung, 11.8%.

Table 2-16 Ethnic¹ Composition of Pilot Villages

Classification	No. of Villages	Ratio(%)	Main Ethnic Group
Lao Lum	13	38.2	Leu, Thaidam, Doi
Lao Theung	17	50.0	Khmu, Lamae, Yuan
Lao Sung	4	11.8	Hmong, Akha
Total	34	100.0	

The most predominant ethnic group, not only in terms of the numbers sharing but socio-economical conditions among the pilot villages, is the Leu which enjoys an affluent sedentary lifestyle with Theravada Buddhism belief by cultivating paddy fields and making commercial trades. Thaidam known for its traditional features seems to be assimilated into other tribes in the pilot villages. Thaidam can be found in P-8 village, some households of H-25 and H-23 villages, four households of L-4, and one household of L-2. Khmu, noted as historical predecessors in Laos, account for 4 villages in the pilot villages which believe in various spirits with ritual ceremonies. Most of the Yuan situating in Viengphoukha have characters of swidden agriculture and hunting lifestyle.

Table 2-17 Minority Tribe Distribution of Pilot Villages by District

District	Leu	Thaidam	Khmu	Lamae	Doi	Yuan	Hmong	Akha
Houayxai	8	0	0	2	4	0	1	0
Pha Oudom	1	1	4	2	0	1	0	0
Viengphoukha	0	0	0	0	0	2	0	0
Long	4	0	0	0	0	0	1	2
Total	13	1	4	4	4	3	2	2

¹ In many cases of the pilot villages, one village consists of several tribes. For instance, in H-1 Pong village, Lamae is the dominant tribe, however it includes Samtao and Phounoi. Here, only the main tribe groups are described for simplicity.