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1. TOR, S/W, M/M



TERMS OF REFERENCE  
TECHNICAL ASSISTANCE FOR DEVELOPMENT STUDY  
RURAL WATER SUPPLY & SANITATION IMPROVEMENT PROJECT IN  
FIVE PROVINCES OF NORTH - WEST REGION  
IN  
THE LAO PEOPLE'S DEMOCRATIC REPUBLIC

JULY 1995

MINISTRY OF PUBLIC HEALTH (MOPH)  
LAO PEOPLE'S DEMOCRATIC REPUBLIC

## REQUEST FOR TECHNICAL ASSISTANCE FOR DEVELOPMENT STUDY

### 1. PROJECT DIGEST

#### (1) PROJECT TITLE :

RURAL WATER SUPPLY & SANITATION IMPROVEMENT PROJECT IN 5 PROVINCES OF NORTH - WEST REGION.

#### (2) LOCATION ( LOCATION MAP ) :

- as attached -

#### (3) IMPLEMENTING AGENCY :

a. Responsible Agency Ministry of Public Health ( MOPH )

b. Executing Agency Department of Water Supply and Environmental Health, MOPH.

#### (4) PROPOSED DATE OF COMMENCE OF THE PROJECT :

- as soon as possible -

#### (5) PROSPECTIVE FUNDING SOURCE :

- expecting Japanese ODA -

### 2. JUSTIFICATION OF THE PROJECT

#### (1) BACKGROUND

##### a. *Present condition of the Sector :*

The Lao People's Democratic Republic ( Lao PDR ) had a population of 4.248.000 in 1991, and more than 88% of which were rural inhabitants. The birth rate, of the country is as much as 46 per 1.000, however the population increase rate in 1985 - 1991 was about 2.9% because of high mortality rate, especially the infant mortality rate was as much as 117 per 1.000. Consequently the average life expectancy is only 46 years.

The country's average distribution of disease occurrence is reported that 11% of Diarrhoea, 12% of Malaria, 7% of Chest tube, 3% of Dengue fever, etc., which means that 33% of diseases are related to the environmental health.

The government of Lao PDR is, there fore, endeavoring to improve sanitation and hygiene standard in the country, especially in the rural area.

##### b. *Problems to be solved in the Sector*

*3 main problems are to be solved in the Sector to achieve social goal of the country as below:*

b.1 Supply safe potable water.

b.2 To provide latrines and garbage disposal, especially in the rural area, and.

b.3 To reinforce sanitary education and training to the rural inhabitant.

##### c. *Sectorial Development Policy of the National / Local Government*

The government of Lao PDR has prepared the 3rd 5 years plan for national development starting from 1991, and the infrastructure program, including potable water supply, is one of emphasized subjects in the Plan.

*The general guiding policies for water supply are as follows :*

- c.1 To provide pipe borne water to all the provincial capital, and.
- c.2 To provide all communities with access to safe potable water at a reasonable cost.

The quality of water is a main problem because most of existing water resources do not meet WHO standard of potable water.

## (2) PROJECT DESCRIPTION

### a. *Project Objections*

*Long - term objectives :*

As long - term objectives, the Government of Lao PDR is willing to provide safe potable water and sufficient sanitary facilities of acceptable standard to all peoples living in the country, however the details of scheme is not yet provided.

*Short - term objectives :*

As short - term objectives, the supply of safe potable water to both of urban and rural inhabitants are first priority because many peoples are suffering for water borne diseases, At the same time, the Government is aiming to level up sanitation and hygiene condition in, especially, the rural area.

### b. *Project Area :*

The study area covers 64.155 sq.km or 27.1% of whole area of the country and located at the north - western region of the country. The provinces of Luang Namtha, Oudomsai, Luang Prabang, Sayaboury and Bokeo are included in the study area.

The project area will be selected from the above study area taking the priority of development into account.

### c. *Project Components :*

*The project consists of following components :*

- c.1 Water resources development for potable water. The ground water, river flow and rainfall are considered as available water resources in the project area.
- c.2 Preparation of public latrines at the center of communities, which include simple sewerage system and house level excreta disposal facilities, etc.
- c.3 Preparation of garbage disposal system at the center of communities.
- c.4 Preparation of education and training facilities for diffusion of sanitation and hygiene know-hows in the rural area.

### d. *Prospective Beneficiaries :*

The population of the study area was 858.154 or 23.8% of total population of the country in 1991. Most of this population are considered as prospective beneficiaries of the project.

### e. *Project Priority in the National Development Plan/Public Investment Program :*

As explained in the above para. 2 ( 1-c ), the project is a part of main subjects of the 5 years plan, as services sector, and expected to keep an annual growth rate of 7.8%, as whole services sector, in 3rd 5 years plan.

## (3) OTHER RELEVANT PROJECT

The government of Lao PDR has been implementing water supply projects to the urban area, center town of provinces as well as potable water supply projects to different rural areas in the country.

(4) IMPLEMENTING AGENCY

a. *Authorities and Duties of the Agency*

The agency, Department of Water Supply and Environmental Health (DWSEH), is responsible for the development of water supply and the improvement of environmental health in rural area, and also responsible of the training of the staff in charge of advising local personnel in the exploitation and maintenance of water supply and sanitation projects.

b. *Number of Staff of the Agency*

The MOPH has staff of 1.733 persons, and the National Institute of Hygiene and Epidemiology, see para ( d ) below, has 64 of which. Presently, the MOPH allocated following personnel to the DWSEH :

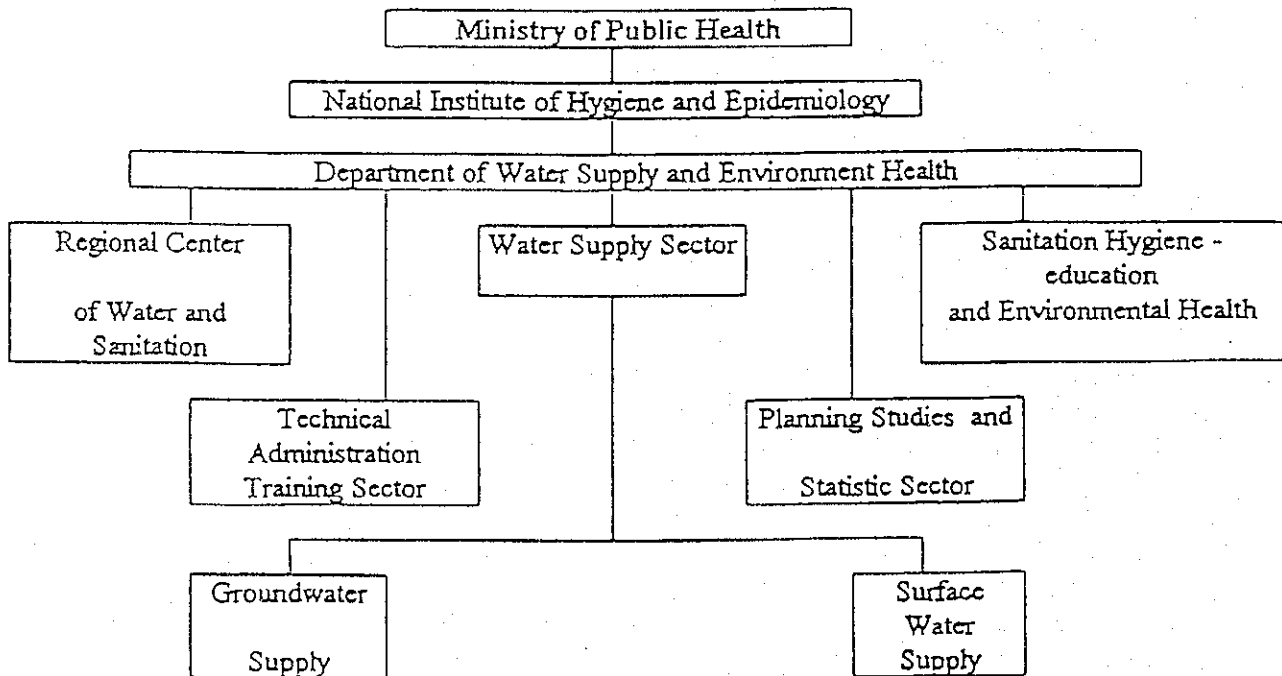
Hygienist	1
Medical Doctors	5
Drilling Engineer	1
Senior Engineers	3
Hygiene Engineers	2
Driver	1
Typist	1
Others	4
<b>TOTAL</b>	<b>18</b>

c. *Budget allocated to the Agency*

The government of Lao PDR allocated US\$ 3.570.000 to the DWSEH as budget in 1991.

d. *Organization Chart*

The Organization of the DWSEH is shown as below :





### 3. TERM OF REFERENCE OF THE PROPOSED STUDY

#### (1) *Objectives / Necessity of the Study*

The objectives of the study are to clarify the scale and dimension of the project providing sub - projects and their priority of implementation. The study is, therefore, to be implemented in the following 2 phases :

Phase - 1 : Master plan or pre - feasibility level study to clarify the physical and socio - economical standings of the study area. The demand of inhabitants and constraint in the development are also examined simultaneously.

Phase - 2 : Feasibility study of priority sub - project/5 applying project evaluation based on socio - economical factors.

#### (2) *Necessity / Justification of the Japanese Technical Cooperation.*

As shown in the para. 2 ( 4-b ), the DWSEH has not sufficient staff for implementing the project, therefore the alien donation in technical and financial aspects are unavoidably necessary. Amongst such alien donation, the government of Lao PDR is greatly expecting that of Japanese ODA.

#### (3) *Study Area*

The study area is north - western region of the country and covering 64.155 sq.km as explained in the above para 2 ( 2 - a ).

#### (4) *Scope of the Study*

*The scope of the study includes following items :*

- a. To collect and analyses the physical data of the study area such as topography, geology, meteorology, hydrology, hydro - geology, etc.
- b. To collect and analyses the socio - economical data of the study area such as demography, rural sociology, production and consumption, institution, etc.
- c. To collect the supplemental data by means of observation, measuring, testing, interviewing, etc. for different fields as required.
- d. To clarify the demand and custom of rural inhabitant in relation with potable water supply, sanitation and hygiene.
- e. To clarify the constraint in the project development.
- f. To provide series of sub - projects based on the above studies.
- g. To evaluate the sub - projects based on the socio - economical factors.
- h. To decide the priority of implementation of sub - projects as well as implementation program of each sub - project.
- i. Cost estimation of each sub - project.
- j. To provide relevant reports.

(5) *Study Schedule*

The phase - 1 study will need 4 months, 2 months of which are the field survey, and the phase - 2 study will need 5 months, 2 months of field survey and 3 months of home office works.

*The required expertise for the above study will be as below :*

- 1 Regional development planner
- 1 Meteorological and hydrological expert
- 1 Geological and hydro - geological expert
- 1 Sanitation / hygiene expert
- 1 Socio - economist
- 1 Structure design engineer

(6) *Expected Major Output of the Study*

*The government of Lao PDR expected to receive the following output of the study at the end of study period :*

- a. Master plan report for implementing rural water supply and sanitation improvement project in 5 provinces of north - west region of the Lao PDR. The report is to include the details of relevant sub - projects and priority of the implementation of those sub - projects.
- b. Feasibility study report of selected sub - project / s, which include the preliminary design drawings of facilities, breakdown of construction cost and other relevant data and informations.

(7) *Request of the Study to Other Donor Agencies.*

The government of Lao PDR has been receiving technical and financial aid for improvement of rural water supply and sanitation from many alien ODA as well as NGO. The international institutes such as UNDP, UNICEF, IBRD, etc. are also rendering the technical and financing assistance for this sector.

(8) *Other relevant Information*

- as attached list -

Number of population in five Provinces	:	188.008
Number of house in five Provinces	:	30.766
Number of families in five Provinces	:	32.284

4. FACILITIES AND INFORMATION FOR THE STUDY TEAM. ETC.

(1) *Assignment of counterpart personnel of the implementing agency for the Study :*

The MOPH will assign adequate and proper number of the counterpart personnel.

(2) Available data, information, documents, maps, etc. related to the Study ( as attached list )

(3) *Information on the security conditions in the Study Area :*

The study area has no security problem in the recent years.

5. GLOBAL ISSUES ( ENVIRONMENT, WOMEN IN DEVELOPMENT, POVERTY, ETC.

(1) *Environmental components ( such as pollution control, water supply, sewage, environmental management, forestry, biodiversity ) of the project :*

The project include water supply, sewage of village level, environmental health, etc.

(2) *Anticipated environmental impacts :*

The environmental health will be improved greatly at the implementation of the project, viz, the life pollution such as excreta, garbage, etc. will be disposed properly, and the peoples will receive more hygienic living quarters. Simultaneously the peoples will have safe potable water. These factors will doubtlessly give a favorable environmental impact.

(3) *Women as main beneficiaries or not :*

The fetching of water for domestic use is one of hard duties of women at present. The project aims, at the final stage, to release women from the fetching of water. Therefore the women are main beneficiaries of the project.

(4) *Project components which requires special considerations for women ( such as gender difference, women specific role, women's participation )*

- not clear -

(5) *Anticipated impacts on women caused by the Project :*

- not clear -

(6) *Poverty reduction components of the Project :*

- not clear -

(7) *Any constraint against the low income people caused by the Project :*

- not clear -

6. UNDERTAKINGS OF THE GOVERNMENT OF LAO PEOPLE'S DEMOCRATIC REPUBLIC.

In order to facilitate a smooth and efficient conduct of the Study, the Government of Lao People's Democratic Republic shall take necessary measures :

(1) To secure the safety of the Study Team.

(2) To permit the members of the Study Team to enter, leave and sojourn in the Lao People's Democratic Republic in connection with their assignment therein, and exempt them from alien registration requirement and consular fees.

(3) To exempt the Study Team from taxes, duties and any other charges on equipment, machinery and other materials brought into and out of the Lao People's Democratic Republic for the conduct of the Study.

(4) To exempt the Study Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Study Team for their services in connection with the implementation of the Study.

(5) To provide necessary facilities to the Study Team for remittance as well as utilization of the funds introduced in the Lao People's Democratic Republic from Japan in connection with the implementation of the Study.

(6) To secure permission for the entry into private properties or restricted area for the conduct of the Study.

- (7) To secure permission for the Study to take all data, documents and necessary materials related to the Study out of the Lao People's Democratic Republic to Japan.
  - (8) To provide medical services as needed. Its expenses will be chargeable to members of the Study Team.
7. The Department of Water Supply and Environmental Health shall act as counterpart agency to the Japanese Study Team and also as coordinating body in relation with other governmental and non - governmental organization concerned for the smooth implementation of the Study.

The Government of the Lao People's Democratic Republic assured that the matters referred in this form will be ensured for the smooth conduct of the Development Study by the Japanese Study Team.

Signed : \_\_\_\_\_

Title : \_\_\_\_\_

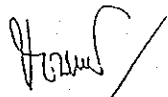
on behalf of the Government of  
Lao People's Democratic Republic

Date : \_\_\_\_\_

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

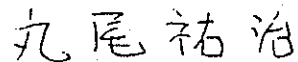
AGREED UPON BETWEEN  
THE MINISTRY OF HEALTH  
AND  
THE JAPAN INTERNATIONAL COOPERATION AGENCY

Luang Prabang, October 21, 1998



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Mrs. Chanthanome MANOTHAM  
Director of Cabinet,  
Ministry of Health



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Dr. Yuji MARUO  
Leader of the Preparatory Study Team,  
Japan International Cooperation  
Agency (JICA)

## I. INTRODUCTION

In response to the official request of the Lao People's Democratic Republic (hereinafter referred to as "the Government of Lao"), the Government of Japan decided to conduct a Study on Rural Water Supply and Sanitation Improvement in North-West Region in the Lao People's Democratic Republic (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

The Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of the Government of Lao.

The present document sets forth the Scope of Work for the Study.

## II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

- (1) to identify the existing issues on rural water supply and sanitation through the investigation of the present rural water supply and sanitation situation,
- (2) to formulate rural water supply and sanitation improvement plan for the selected target villages, and
- (3) to transfer skills and technology of water resources development and management for potable water to counterpart personnel in the course of the Study.

## III. STUDY AREA

The Study will cover about eighty (80) villages in Luang Namtha and Bokeo provinces in North-West Region.

## IV. SCOPE OF THE STUDY

Phase I Baseline Study and Analysis

1. Collection, review and analysis of related data and information
  - a. social and economic conditions
  - b. topographical and hydrogeological maps
  - c. meteorological, hydrological, geological data
  - d. existing well data and existing water supply facilities
  - e. data on rural living conditions
  - f. on-going and planned projects relevant to the Study
  - g. laws, regulations and policies on water resource development and water supply services
  - h. other relevant data and information
2. Field reconnaissance
  - a. hydrological and hydrogeological investigation
  - b. topographical and geological investigation
3. Inventory and assessment on possible water sources and existing water supply facilities

4. Study on actual condition and people's aspiration of target villages
  - a. economic conditions
  - b. sociological configuration
  - c. sanitation and hygiene
  - d. gender issues
  - e. villager's will on water supply development
5. Initial Environmental Evaluation (IEE)

#### Phase II : Water Resources Potential Study for Potable Water and Pilot Study

1. Field study
  - a. topographical and geological investigation
  - b. rivers and springs
  - c. hydrogeological investigation
2. Preparation and selection of villages for pilot study
3. Geophysical exploration
4. Test well construction, well logging, pumping test and water quality analysis
3. Observation of groundwater level, spring water, river flow and their water quality analysis
4. Evaluation of water resources potential for potable water
5. Model water supply facility construction for pilot study (gravity system, spring protection, rain water harvesting, tube well, etc.)
6. Implementation of pilot study for people's participation in planning, construction, operation and maintenance of water supply facilities and sanitary education

#### Phase III: Formulation of Development Plan on Rural Water Supply and Sanitation Improvement

1. Formulation of basic strategy
2. Formulation of water supply plan and preliminary design of appropriate facilities for various water sources
3. Formulation of operation and maintenance plan
4. Formulation of institution and organization plan
5. Formulation of sanitary education plan
6. Cost estimation
7. Monitoring of the Pilot Study

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- a. observation of changes in custom and behavior related to water use and sanitation
  - b. monitoring of operation and maintenance condition
  - c. observation of groundwater level, spring water flow and water quality analysis
  - d. evaluation of the pilot study and feedback for the development plan
8. Evaluation of the development plan
    - a. financial plan and evaluation
    - b. institutional and technical evaluation
    - c. socio-economic evaluation
    - d. environmental impact assessment
    - e. WID evaluation
  9. Formulation of implementation program and prioritization

## V. SCHEDULE OF THE STUDY

The Study will be carried out in accordance with the tentative schedule as attached in the appendix. The schedule is tentative and subject to be modified when both parties agree upon any necessity that will arise during the course of the Study.

## VI. REPORTS

JICA shall prepare and submit the following reports in English to the Government of Lao.

1. Inception Report:

Thirty (30) copies at the commencement of the first work in Lao.

2. Progress Report (1):

Thirty (30) copies at the end of the first work in Lao.

3. Phase I Report:

Thirty (30) copies at the commencement of the second work in Lao. This report will contain the results of the Phase I and the schedule and methodology of the Phase II and Phase III study program.

4. Progress Report (2):

Thirty (30) copies at the end of the second work in Lao.

5. Phase II Report :

Thirty (30) copies at the commencement of the third work in Lao.

6. Progress Report (3):

Thirty (30) copies at the end of the third work in Lao.



7. Draft Final Report:

Thirty (30) copies at the end of the forth work in Lao. The Government of Lao shall submit its comments within one (1) month after the receipt of the Draft Final Report.

8. Final Report:

Final Report will consist of Main Report, Supporting Report, Data Book and Summary. Fifty (50) copies will be submitted within one (1) month after the receipt of the comments on the Draft Final Report.

**VII. UNDERTAKINGS OF THE GOVERNMENT OF LAO**

1. To facilitate the smooth conduct of the Study, the Government of Lao will take the following necessary measures:

- (1) To secure the safety of the Japanese study team (hereinafter referred to as "the Team")
- (2) To permit the members of the Team to enter, leave and sojourn in Lao for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees
- (3) To exempt the members of the Team from taxes, duties, fees and any other charges on equipment, machinery and other materials brought into Lao for the conduct of the Study
- (4) To exempt the members of the Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Team for their services in connection with the implementation of the Study
- (5) To provide necessary facilities to the Team for remittance as well as utilization of the funds introduced into Lao from Japan in connection with the implementation of the Study
- (6) To secure permission for the Team to enter into private properties or restricted areas for the implementation of the Study
- (7) To secure permission for the Team to take all data and documents ( including photographs and maps ) related to the Study out of Lao to Japan
- (8) To provide medical services as needed, expenses for which will be chargeable to the members of the Team.

2. The Government of Lao shall bear claims, if any arises, against the members of the Team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the member of the Team.

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*Handwritten signature*

3. The Ministry of Health shall act as a counterpart agency to the Japanese Study Team and also as a coordinating body in relation with other governmental and non-governmental organizations for the smooth implementation of the Study. The Ministry of Health shall, at its own expense, provide the Team with the followings, in cooperation with other organizations concerned:

- (1) available data and information related to the Study
- (2) counterpart personnel
- (3) suitable office space with necessary equipment
- (4) credentials or identification cards
- (5) an appropriate number of vehicles with drivers.

#### VIII. UNDERTAKINGS OF JICA

For the implementation of the Study, JICA shall take the following measures:

1. to dispatch, at its own expense, study teams to Lao
2. to pursue technology transfer to counterpart personnel in the course of the Study.

#### IX. CONSULTATION

JICA and the Ministry of Health shall consult with each other in respect of any matter that may arise from or in connection with the Study.

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APPENDIX

TENTATIVE SCHEDULE

MONTH \ DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
WORK IN LAO																								
WORK IN JAPAN																								
PHASE OF THE STUDY				PHASE I																PHASE II				
REPORT PRESENTATION	▲ IC/R							▲ P/R(1)		▲ P I/R							▲ P/R(2)		▲ P II/R		▲ P/R(3)		▲ D/F/R	▲ F/R

- IC/R : Inception Report
- P/R : Progress Report
- P I/R : Phase I Report
- P II/R : Phase II Report
- D/F/R : Draft Final Report
- F/R : Final Report

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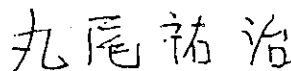
MINUTES OF MEETINGS  
ON  
SCOPE OF WORK  
FOR  
THE STUDY  
ON  
RURAL WATER SUPPLY AND SANITATION IMPROVEMENT  
IN  
NORTH-WEST REGION  
IN  
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Luang Prabang, October 21, 1998



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Mrs. Chanthanome MANOTHAM  
Director of Cabinet,  
Ministry of Health



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Dr. Yuji MARUO  
Leader of the Preparatory Study Team,  
Japan International Cooperation  
Agency (JICA)

## 1. Introduction

In response to the request of the Government of the Lao People's Democratic Republic (hereinafter referred to as "the Government of Lao"), the Preparatory Study Team (hereinafter referred to as "the Team") of the Japan International Cooperation Agency (hereinafter referred to as "JICA") visited Lao from October 5 to 30, 1998 to discuss the Scope of Work (hereinafter referred to as "S/W") for the Study on Rural Water Supply and Sanitation Improvement in North-West Region in the Lao People's Democratic Republic (hereinafter referred to as "the Study").

The Team carried out field surveys of the study area and held a series of discussions with the authorities concerned of the Ministry of Health (hereinafter referred to as "the MOH"), and other organizations.

The list of attendants is shown in Appendix.

The Minutes of Meetings has been prepared for the better understanding of the S/W agreed upon between the MOH and the Team on October 21, 1998, summarizing main points of the discussions made in the course of the preparation of the S/W.

## 2. Study Title

Both sides agreed that the title of the Study would be "the Study on Rural Water Supply and Sanitation Improvement in North-West Region in the Lao People's Democratic Republic" as described in the S/W.

## 3. Study Area

The Team explained that the five provinces with four hundred forty eight (448) target villages in them which were originally requested by the Government of Lao would be too many to study in detail at a time, and that one or two provinces would be selected for the study. The Team also explained that total number of target villages should be not more than eighty (80) when those are taken into consideration that usual rainy season starts from late May and the field study of the phase I should be completed by that time.

In accordance with the national policy of the sector strategy and recommendation of the MOH, the Team selected Luang Namtha and Bokeo which are located more remote than other three (3) provinces. The Team will choose forty two (42) villages from Luang Namtha and thirty eight (38) villages from Bokeo provinces as the target villages for the study. Those target villages must be located not far from any mortarable roads.

The MOH agreed with the selection.

## 4. Demand Projection

It is a general practice of this area that demand projection of fifteen (15) years is applied to the designing of rural water supply facilities using the fixed rate of population growth. The Study will follow the way of the general practice, although the Study will introduce most realistic rate of population growth.

## 5. Counterpart Personnel

It was confirmed that the MOH would assign some counterpart personnel to the specialists of the Study with Director of Nam Saat (Water Supply and Environmental Health Programme) as a chief counterpart. It was also confirmed that at least one (1) staff from

the provincial or the district Nam Saat Office would accompany with a field research group when the groups visit the target villages.

#### **6. Office Space and Vehicles**

The Team requested that the MOH would provide the suitable office space with necessary equipment in Luang Namtha and Bokeo provinces, sufficient numbers of vehicles with drivers for the Study. The MOH, however, expressed concern that, due to the budgetary constraints and remoteness of the locations, such a request could not be fulfilled. The Team recognized the situation and promised to convey the message to JICA H.Q. for consideration.

#### **7. Counterpart Training in Japan**

The MOH requested that JICA conduct counterpart training for one (1) month in Japan for the purpose of the smooth transfer of technology during the Study. The Team agreed to convey this request to JICA H.Q. for consideration.

#### **8. Reports**

In order to clarify the status and nature of the respective reports, title of some reports in the original Scope of Work were changed as follows, Progress Report (2) to Phase I Report, Interim Report to Progress Report (2), Progress Report (3) to Phase II Report, Monitoring Progress Report to Progress Report (3).

The MOH requested that main report and summary of Draft Final and Final Reports would be translated into Lao Language for wider dissemination of the outcome to the provincial and district levels. The Team will convey this request to JICA H.Q. for consideration.

The MOH agreed to make all the reports open to public in order to achieve maximum use of the Study results.

#### **9. Work Shops**

Both the MOH and the Team recognized the necessity to hold work shops at least three (3) times when the study team submits the Phase I Report, Phase II Report and Draft Final Report for sharing the learnings and for exchanging views with related officials and other donors and NGOs which have been operating similar projects.

The Team will convey the information to JICA H.Q. for positive consideration.

#### **10. Type of Water Supply**

According to the information from provincial Nam Saat and after their own field visit, both the MOH and the Team recognized that the most popular type of rural water supply in the north-west region is the gravity piped scheme, and that although there are quite a few tube wells in the region, water quality of those wells are usually not favorable for drinking. Taking these information into consideration, the Team suggested that geophysical exploration and test well drilling works may not be necessary to be included in the phase II study. If in case it is recommended by the study team to conduct the geophysical exploration and test well drilling as a result of phase I study, JICA will consider again to carry out these works.

The MOH understood the situation.

## APPENDIX

## LIST OF ATTENDANTS

(Lao Side)

## Ministry of Health

Dr. Bounkouang PHICHIT  
 Mrs. Chanthanome MANOTHAM  
 Mr. Phoukhong CHOMMALA  
 Dr. Nouanta MANIPHOUSAY

Vice-Minister of Health  
 Director of Cabinet  
 Director, Foreign Relations Division  
 Program Manager of Water Supply and  
 Environmental Health Programme  
 (Nam Saat)  
 Deputy Manager of Water Supply and  
 Environmental Health Programme  
 (Nam Saat)

## Prime Minister's Office Committee for Investment and Cooperation

Mr. Soulasith OUPRAVANH

Deputy General Director, Bilateral  
 Cooperation, Dept. of International  
 Economic Cooperation

## Luang Prabang Province

Mr. Chansy PHOSIKHAM  
 Ms. Amone SIRIVONG  
 Mr. Khampheua PHALYVANH

Governor  
 Deputy Director, Department of Health  
 Deputy Director, Water supply and  
 Environment Health Section (Nam Saat),  
 Dept. of Health

## Bokeo Province

Mr. Mai Bunchan WANNACHOOMCHAN

Director, Water Supply and Environment  
 Health Section (Nam Saat), Dept. of  
 Health

## UNDP-World Bank Water and Sanitation Program

Mr. Michael SEAGER

Country Program Manager, Lao P.D.R.  
and Cambodia

Mr. Johan ARVLING

Country officer, Lao P.D.R.

## UNICEF

Mr. Rafael Diaz Diaz

Project Officer, Water and Environmental  
Sanitation

Dr. K. S. MUNG  
 Mr. Malipom VIRACHITH

Project Officer, Health and Nutrition  
 Assistant Project Officer, Water and  
 Environmental Sanitation

Mr. Nadarajah S. MOORTHY

Assistant Project Officer, Water and  
 Environmental Sanitation

## Food For The Hungry International (NGO)

Mr. John R. Gowdy

Country Director, Lao P.D.R.

Southeast Asia Regional Representative

Action Contre la Faim (NGO)  
Mr. Onekham Keokanong

Hydrological Technical Assistant

(Japanese Side)

Embassy of Japan  
Mr. Shigeki KOBAYASHI  
Mr. Seiji NAGANO

First Secretary  
Second Secretary

JICA Lao Office  
Mr. Tsuneo TAKAHATA  
Mr. Nobuhiro KUMAGAI  
Mr. Yusuke TADA  
Mr. Mikio MASAKI  
Dr. Hiroyuki AMANO  
  
Dr. Sophonh KOUSONSAVATH

President Representative  
Assistant President Representative  
Project Formulation Advisor  
Project Formulation Advisor  
Expert, Health and Medical Cooperation  
Planning Adviser  
Programme Officer

The Preparatory Study Team  
Dr. Yuji MARUO  
Mr. Yasumichi ARAKI  
Mr. Shogo SHIBATA  
Mr. Makoto YASUDA  
Ms. Kimiko ABE  
Mr. Akio MURAYAMA

Leader  
Member  
Member  
Member  
Member  
Interpreter

*mm*

*Doisan*



## 2. 主要面会者リスト



- 1 保健省、給水・環境衛生計画 (NWSEHP = Nam Saat)  
National Water Supply and Environmental Health Programme,  
Ministry of Health
  1. Program Manager  
- Dr. Nuanta MANIPHOUSAY
  2. Deputy Manager  
- Dr. Khamvieng VILAPHAN  
- Dr. Souksakhone CHANTHAPHONE
  3. Chief of Planning Section  
- Dr. Tayphasavanh FENGTHONG
  4. Assistance of Planning Section  
- Dr. Khonthip PHOUNGPHEP
  5. Environmental Health Section  
- Mr. Bouakeo SUVANTHONG
  
- 2 ウドンサイ県
  1. Chief of Lao Women's Union Provincial  
- Mrs. Simua
  
- 3 ウドンサイ県保健部、給水・衛生課 (Provincial Nam Saat)  
Provincial Department of Health, Water Supply and Hygiene Section,  
Oudomxay Province
  1. Chief of the Section  
- Mr. Bunthag THAVISAY
  
- 4 ルアンナムタ県  
Governor of Luangnamtha Province
  1. Vice Governor  
- Mr. Singkham  
- Mr. Thongwansai MANPADIT
  2. Chief of Provincial Cabinet  
- Ms. Khamngan SIVANXAY
  3. Deputy Chief, Department of Planning and Cooperation  
- Mr. Bounhing BOUTSAVONG
  4. Deputy Chief of Lao Women's Union Provincial  
- Ms. Thanma
  
- 5 ルアンナムタ県保健部、給水・衛生課 (Provincial Nam Saat)  
Provincial Department of Health, Water Supply and Hygiene Section,  
Luangnamtha Province
  1. Director, Department of Health  
- Dr. Intha WANSAVAT
  2. Chief of the Section  
- Mr. Somlith SENVANPAN
  3. Deputy Chief of the Section

- Mr. Sisouphanh CHANTAPASEUTH
- Dr. Bovane

6 ルアンプラバン県

Governor of Luangprabang Province

1. Governor
  - Mr. Chansy PHOSIKHAM
2. Chief of Provincial Cabinet, Relation of Foreign Affairs
  - Mr. Kamtanh
3. Vice Chairperson, Lao Women's Union Provincial
  - Ms. Douangchanch LONEKHAM

7 ルアンプラバン県保健部、給水・衛生課 (Provincial Nam Saat)  
Provincial Department of Health, Water Supply and Hygiene Section,  
Luangprabang Province

1. Deputy Director, Provincial Department of Health
  - Dr. Amone SIRIPHONG
2. Deputy Chief of the Section
  - Mr. Thong VANH

8 サヤブリー県

Governor of Sayaboury Province

1. Governor
  - Mr. Sombath YIARYHEU
2. Deputy Governor
  - Mr. Meck PHANLACK
3. Project Manager of SESMAC, Department of Planning and Cooperation
  - Mr. Sisamouth D'OUANGPHACHANH
4. Cooperation Division, Department of Planning and Cooperation
  - Sisouphoy KONGSANITH
5. Deputy Director, Department of Planning and Cooperation
  - Mr. Khamsing SORASOUK
6. Deputy Director, Department of Health
  - Dr. Khamla PHOUTHONESY
7. Deputy Director, Lao Women's Union Provincial
  - Ms. Itmany
8. Chief of Cabinet, Lao Women's Union Provincial
  - Ms. Bouthsaba DOUANGMALY

9 サヤブリー県保健部、給水・衛生課 (Provincial Nam Saat)

Provincial Department of Health, Water Supply and Hygiene Section,  
Sayaboury Province

1. Deputy Director, Department of Health
  - Dr. Khamla PHOUTHONESY
2. Chief of the Section

- Mr. Sitha SAYSAATH

- 10 ヱィエンチャン県保健部、給水・衛生課 (Provincial Nam Saat)  
Provincial Department of Health, Water Supply and Hygiene Section,  
Vientiane Province
  1. Chief of the Section
    - Mr. Khamphiane UANMANY
  2. Deputy Chief of the Section
    - Mr. Bouthang PHETRAUANH
  
- 11 Integrated Rural Accessibility Planning (IRAP)
  1. Deputy Director of Committee for Rural Development  
and Director of Transport Planning Unit and IRAP
    - Mr. Ouneheuane SIRIAMPHONE
  2. Rural Development Planner
    - Dr. Laura A. LINTAO (UNV)
  3. Chief of Technical Assistant in Luang Phrabang Province
    - Ms. Corinne PETIT (UNV)
  4. Counterpart in Oudomxay Province
    - Mr. Bounta PHETDARA
  5. Counterpart in Luangnamtha Province
    - Mr. Khampao
  6. Counterpart in Sayaboury Province
    - Mr. Bounthay KHAMPHOUMY
  
- 12 国連開発計画 (UNDP)
  1. Assistant Resident Representative, Rural Community Development
    - Ms. SASAKI (TANAKA) Mikiko
  
- 13 世界銀行
  1. Chief, Liaison Officer
    - Ms. Linda SHNEIDER
  
- 14 NGO
  1. Action for the Hungry International
    - Mr. John R. GOWDY (Country Director, Southeast Asia Regional )
  2. World Vision
    - Mr. Steve RAY (Operation Coordinator)
    - Ms. Alison WILLIAMS (Project Officer)
  3. Action Contra la Faim
    - Mr. Tim SUTTON (Hydraulicien)
    - Ms. Daniel DE KNOCKE (Chief de Mission)
    - Mr. Onekham KEOKAVONG (Hydro-technical Assistant)
  4. CONCERN WORLDWIDE
    - Mr. Mark CAPALDI (Country Representative)

5. Japan International Volunteer Center  
 - Mr. TSUKAMOTO Izumi (Project Coordinator)
- 15 ラオス女性連盟 (Lao Women's Union)  
 1. Deputy Chief of Dept. for Right of Women Development, Foreign Affairs  
 - Ms. Kham LAXAYSOMBATH
- 16 ラオス水道公社、チナイモ浄水場  
 Lao Water Supply Company, Chinaimo Water Treatment Plant  
 1. Water Analyst  
 - Ms. MARUYAMA Harumi (JOCV)  
 2. Chief of laboratory  
 - Mr. Phom KEOKANRAYA
- 17 首相府、国立地図局  
 National Geographic Department, Prime Minister's Council  
 1. Chief of Aerial Photography and Photogrammetry  
 - Mr. Bouasoth SOUVANNAKOUUMANE
- 18 農林省、水文・気象部  
 Hydro and Meteorology Department, Ministry of Agriculture and Forestry  
 1. Deputy Chief of Data Collection Center  
 - Mr. Keosavang NIKHOM
- 19 民間業者  
 Private Company  
 1. Phoudoi Geo-mining Co., Ltd.  
 - Mr. Dhetsone CHANTHAVONG (Director)  
 2. Hydropower Engineering Co., Ltd.  
 - Mr. Thongsamouth LUNAMMACHAK (General Manager)  
 Consultanting Company  
 3. Bruapha Group  
 - Mr. Sumphorn MANODHAM ( Director, Economist)  
 - Ms. Geraldine ZWACK (Assistant Director)  
 Consultant  
 4. - Ms. Ny (Nee) LUANGKHOT  
 5. - Ms. Manivone VIRAVONG
- 20 JICA PHC プロジェクト  
 1. プロジェクト長期専門家  
 - Ms. HARADA Etsuko
- 21 JICA ラオス事務所  
 1. Resident Representative  
 - Mr. TAKAHATA Tetsuo  
 2. Assistant Resident Representative

- Mr. KUMAGAI Nobuhiro
  - Mr. IKEDA Norihiro
  - 3. Project Formulation Advisor
    - Mr. MASAKI Mikio
  - 4. Health and Medical Cooperation Planning Advisor
    - Dr. AMANO Hiroyuki
  - 5. Consultant
    - Ms. MORIKAWA Naomi
  - 6. Programme Officer
- Mr. Sophonh KOUSONSAVATH





### 3. 質問票と回答



Answer of the Questionnaire to National Water Supply and Environmental Health Programme, Ministry of Health

Part - 01: General		
No.	Items	Remarks
1 - 1	Population Density Map	National Geographic Department (PM'sc)
1 - 2	Administration Map	National Geographic Department (PM'sc)
1 - 3	Occupational Population	Committee for International Economic Cooperation
1 - 4	Long Term National Development Plan	Committee for International Economic Cooperation
1 - 5	Five(5) Year National Development Plan (on & after 1996 - 2000)	Committee for International Economic Cooperation
1 - 6	Organization of Government	Science, Technology and Environmental Organization (PM'sc)
1 - 7	Law, Regulation and Local Rule relating to Water Resources Development	Science, Technology and Environmental Organization (PM'sc)
1 - 8	National Budget in past five years	Committee for Planning and Cooperation
1 - 9	National Plan of Transportation	
a)	Existing Road Network	Ministry of Communication, Post, Transport and Construction
b)	Future Plan under city plan	Urban Planning Institute (MOCPTC)
1 - 10	List of Government & Private Company & Required Job Cost	
a)	Drilling & Pumping Test	Ministry of Industry-Handicrafts
b)	Survey Population Density Map	Ministry of Communication, Post, Transport and Construction
c)	Geophysical Sounding	Geology and Mines Department (MOIH)
d)	Water Quality Analysis	Hygiene and Prevention Department (MOH), Drug and Food Department (MOH), Lao Water Supply Company (MOCPTC)
e)	Engineering Consulting	Ministry of Communication, Post, Transport and Construction
f)	Construction	Ministry of Communication, Post, Transport and Construction
1 - 11	Local Cost of Main Construction Materials	Ministry of Commerce
1 - 12	Labor Cost	Ministry of labor and Social Welfare
1 - 13	Other Related Data	-

Part - 02: Map (Scale, Covered Area, Published Year, etc.)

No.	Items	Obtainability	Remarks
2 - 1	Topographical Maps	Yes	National Geographic Department (PM'sC)
2 - 2	Aerial Photographs	Yes	National Geographic Department (PM'sC)
2 - 3	Geological & Hydrogeological Data		
a)	Geological & Hydrogeological Maps	Yes	Geology and Mines Department (MOIH), Hydro and Meteorology Department (MOAF)
b)	Geological & Hydrogeological Study Reports	Yes	Geology and Mines Department (MOIH), Hydro and Meteorology Department (MOAF)
2 - 4	Remote Sensing Data	-	No suggestion
2 - 5	Land Use Map	-	No suggestion
2 - 6	Soil Classification Map	Yes	Geology and Mines Department (MOIH), Hydro and Meteorology Department (MOAF)
2 - 7	Road Map	Yes	Ministry of Communication, Post, Transport and Construction

Part - 03: Meteorology and Hydrology

No.	Items	Obtainability	Remarks
3 - 1	Meteorological Data		
a)	List & Location Map of Observation Stations	Yes	Hydro and Meteorology Department (MOAF)
b)	Year Book	Yes	Hydro and Meteorology Department (MOAF)
c)	Study Report of Climatic Conditions	Yes	Hydro and Meteorology Department (MOAF)
3 - 2	Rainfall(Precipitation) Data		
a)	List & Location Map of Observation Stations	Yes	Hydro and Meteorology Department (MOAF)
b)	Isohyet Map	Yes	Hydro and Meteorology Department (MOAF)
c)	Year Book	Yes	Hydro and Meteorology Department (MOAF)
d)	Study Report of Rainfall Characteristics	Yes	Hydro and Meteorology Department (MOAF)
3 - 3	Discharge Data		
a)	List & Location Map of Gauging Stations	Yes	Mekong River Commission, Hydro and Meteorology Department (MOAF)
b)	Hydrological Year Book	Yes	Mekong River Commission, Hydro and Meteorology Department (MOAF)
3 - 4	Data Bank System of Meteorology and Hydrology	Yes	Mekong River Commission, Hydro and Meteorology Department (MOAF)
3 - 5	Other Related Data	-	

Part - 04: Surface Water

No.	Items	Obtainability	Remarks
4 - 1	River		
a)	Map of Catchment Area & Tributaries	Yes	Mekong River Commission, Hydro and Meteorology Department (MOAF)
b)	Profiles & Typical Cross Sections	Yes	Mekong River Commission, Hydro and Meteorology Department (MOAF)
c)	Characteristics of Main Rivers	Yes	Mekong River Commission, Hydro and Meteorology Department (MOAF)
d)	Discharge Records	Yes	Mekong River Commission, Hydro and Meteorology Department (MOAF)
4 - 2	Main River Structures(Dam, Intake Facility, etc.)		
a)	List & Location Map of Structures (Existing, Under Construction, Planning)	Yes	Irritations and Small size Hydropower Department (MOAF), Ministry of Industry and Handicraft
4 - 3	Present Water Consumption and Future Demand in 2000/2005(Sector and Area)	Yes	Mekong River Commission, National Statistical Center (SPC)
4 - 4	Potential of Water Resources	Yes	Science, Technology and Environmental Organization (PM'sC)
4 - 5	Water Right		
a)	List & Location Map of Registered Water Rights	Yes	Science, Technology and Environmental Organization (PM'sC), Mekong River Commission
b)	Registration Form of Water Right	Yes	Science, Technology and Environmental Organization (PM'sC), Mekong River Commission
4 - 6	International Law or Custom related to Mekong River Water Use	Yes	Mekong River Commission,
4 - 7	Law & Custom on River Maintenance Flow	Yes	Mekong River Commission,
4 - 8	Previous Study Report on Surface Water Development	Yes	Science, Technology and Environmental Organization (PM'sC), Mekong River Commission
4 - 9	Other Related Data		

Part - 05: Groundwater

No.	Items	Obtainability	Remarks
5 - 1	Hydrogeology		
a)	Hydrogeological Map & Profile (Scale, Area, Year, etc.)	Yes	Geology and Mines Department (MOIH)
b)	Isopiezometric Contour Map	Yes	Geology and Mines Department (MOIH)
c)	Groundwater Quality Data	Yes	Irritations and Small size Hydropower Department (MOAF)
d)	Hydrogeological Parameters (Transmissivity, Startivity, Specific Capacity, etc.)	Yes	Science, Technology and Environmental Organization (PM'sc)
e)	Groundwater Table Contour Map	Yes	Geology and Mines Department (MOIH)
5 - 2	Well Data		
a)	Type of Well & its Definition(Deep, Shallow, Dug, etc.)	Yes	National Water Supply and Environmental Health Programme (MOH)
b)	List & Location Map of Existing Wells and Springs	Yes	National Water Supply and Environmental Health Programme (MOH), Water Supply and Hygiene Section (Provincial Health Department)
c)	Well(each type) Inventory including	Yes	National Water Supply and Environmental Health Programme (MOH), Water Supply and Hygiene Section (Provincial Health Department)
	- No. or Name	Yes	Water Supply and Hygiene Section (Provincial Health Department)
	- Location, Purpose, Construction Date	Yes	Water Supply and Hygiene Section (Provincial Health Department)
	- Well Logging, Well Design, Discharge	Yes	Water Supply and Hygiene Section (Provincial Health Department)
	- Observation Records of Water Level, etc.	Yes	Water Supply and Hygiene Section (Provincial Health Department)
5 - 3	Location and Development Potential of Main Groundwater Basin	No	
5 - 4	Present Use & Future Demand in 2000/2005 by Sector & Area	Yes	National Water Supply and Environmental Health Programme (MOH)
5 - 5	Previous Groundwater Development Projects or Previous Study Reports on Hydrogeology & Groundwater Development	Yes	National Water Supply and Environmental Health Programme (MOH)
5 - 6	Law & Regulation for Groundwater Development Data	No	on going Preparation by MOH and MOAF
5 - 7	Data Bank System for Groundwater	No	
5 - 8	Other Related Data	-	

Part - 06: Urban and Rural Water

No.	Items	Obtainability	Remarks
6 - 1	Urban & Rural Water Supply System (Existing, Under Construction, Planning)		
a)	List & Location of Water Supply System	Yes	Lao Water Supply Company (MOCPTC), National Water Supply and Environmental Health Programme (MOH)
6 - 2	Previous Study Report on Water Supply Development	Yes	Lao Water Supply Company (MOCPTC), National Water Supply and Environmental Health Programme (MOH)
6 - 3	Other Related Data	Yes	Lao Water Supply Company (MOCPTC), National Water Supply and Environmental Health Programme (MOH)

Part - 07: Ecology & Environment

No.	Items relating to Environment	Obtainability	Remarks
7 - 1	Law and Regulation relating to Environment Impact Assessment	Yes	Science, Technology and Environmental Organization (PM'sC)
7 - 2	Environmental Quality Standards (Values, Penalties)	Yes	Science, Technology and Environmental Organization (PM'sC)
7 - 3	Name of NGOs related to Proposed Project Environment	Yes	Science, Technology and Environmental Organization (PM'sC), Committee for International Economic Cooperation
7 - 4	List & Location Map of following Items		
a)	Historical Remains, Cultural Assets, Aesthetic Sites	No	
b)	Habitat of Fauna & Flora listed in CITES (CITES: Convention on International Trade in Endangered Species of Wild Fauna & Flora.... Washington Treaty)	No	
c)	Heritage Designated under Conservation for the Protection of the World Cultural & Natural Heritage	Yes	Ministry of Information and Culture
d)	National Park, Nature Reserve, etc.	Yes	Ministry of Information and Culture
e)	Important or Indigenous Fauna & Flora	No	
f)	International Protected Animals listed on the Red Data Books by IUCN (IUCN: International Union for Conservation of Nature & National Resources)	Yes	Ministry of Agriculture and Forestry
g)	Wetland, Peaty	Yes	Ministry of Agriculture and Forestry
h)	Tropical Forest	Yes	Ministry of Agriculture and Forestry
i)	Arid & Semi-arid Lands (Savanna, Rangeland, etc.)	Yes	Ministry of Agriculture and Forestry
7 - 5	National Forestry Plan	Yes	Ministry of Agriculture and Forestry
7 - 6	Other Related Data	-	

Answer of the Questionnaire to drilling company, PHOUDOI GEO-MINING Co., Ltd.

Part - 01 : General

No.	Items	Answers	Remarks
1 - 1	Name of your company	B.P.K.P. Group PHOUDOI GEO-MINING Co., Ltd.	
1 - 2	Address, telephone & fax	Nong bone Road Bane Phonexay, Vientiane, Lao PDR, Tel:416836, Fax:413439	
1 - 3	Past well drilling works (experience)	9 years	
1 - 4	Company strength in drilling work engineering	-	
1 - 5	Engineering for drilling works :	Number of engineers & years of experience 4 engineers, 12 years experience	
1 - 6	Engineering for pumping test :	Number of engineers & years of experience 3 engineers, 5 years experience	
1 - 7	Water quality analysis : (for drinking water)	Number of engineers & years of experience We use laboratory of Irrigation Department (MOAF)	
1 - 8	Engineering for geophysical exploration :	Number of engineers & years of experience We can do with Thai company (SAHABARDAL Co., Ltd.) and with Mineral Department (MOIH)	
1 - 9	Interest in participating as a contractor for JICA's project	Yes	



Part - 02 : Material & equipment

No.	Items	Answer	Remarks
2 - 1	Drilling work equipment	-	
	Drilling machines :	Number & specifications	2: Russian, we can rent from Thai company (SAHABARDAL Co., Ltd.)
	Mud pumps :	Number & specifications	1: Japanese, we can rent from Thai company (SAHABARDAL Co., Ltd.)
	Bits :	Number & specifications	We can rent from Thai company (SAHABARDAL Co., Ltd.)
2 - 2	Finishing materials	-	
	Casing pipe	(type & diameter)	-
	Screen	(type & diameter)	-
	Gravel filter	(specifications)	-
2 - 3	Pumping test equipment	-	
	Test pump	Number & specifications	-
	Test riser pipe	Number & specifications	-
	Device for measure water volume	Number & specifications	-
	Device for measure water level	Number & specifications	-
2 - 4	Device for pumping water :	-	
	Motor Pump	Number & specifications	-
	Hand pumps	Number & specifications	-
	Riser water pipes	Number & specifications	-
2 - 5	Equipment for geophysical exploration	-	
	Electrical prospecting	specifications	We can rent from Thai company (SAHABARDAL Co., Ltd.)
	Elastic wave prospecting	specifications	We can rent from Thai company (SAHABARDAL Co., Ltd.)
	Electrical logging	specifications	We can rent from Thai company (SAHABARDAL Co., Ltd.)
2 - 6	Equipment for water quality analysis (for drinking water)	specifications	-
2 - 7	Equipment for transportation	Tracks (specifications)	4: Tracks
2 - 8	Equipment for loading & unloading	Cranes (specifications)	1: Hand crane

## Part - 03 : Cost estimation

No.	Items	Answer	Remarks
3-1	Well drilling	-	
	Transportation of equip.	one team, per 100 km	100 US\$ / 100 km
	Installation & removal	per well	50 US\$ / well
	Drilling costs	per 1m & by diameter	72 US\$ / m / 150 mm diameter, 72 US\$ / m / 200 mm diameter
3-2	Finishing well work	per 1 m	2 US\$ / m / well
	Casing pipe	by type, by diameter	50 US\$ / m / PVC 100 mm diameter
	Screen pipe	by type, by diameter	60 US\$ / m / PVC 100 mm diameter
	Gravel filter	per m3	50 US\$ / m3
	Apron & barrier	per well	-
3-3	Pumping test itself	per well	55 US\$ / well
	Transportation of equipment	per team, per 100 km	50 US\$ / 100 km
	Installation & removal	Test pump & rising pipe	200 US\$ / well
3-4	Water quality analysis; (for drinking water)	per 1 sample	60 US\$ / sample
3-5	Electric prospecting	one team, per 100 km	We can estimate the cost from Thai company (SAHABARDAL Co., Ltd.)
	Transportation of equipment	one team, per 100 km	-
	1 sample site	100 m depth	-
3-6	Elastic prospecting	by 1 km survey line	We can estimate the cost from Thai company (SAHABARDAL Co., Ltd.)
	Transportation of equipment	one team, per 100 km	-
3-7	Electric logging	by 1 m depth	We can estimate the cost from Thai company (SAHABARDAL Co., Ltd.)
	Transportation of equipment	one team, per 100 km	-
3-8	Equipment		-
	Riser pipes	by type, by diameter	-
	Motor pumps	specifications	-
	Hand pumps	specifications	250 - 400 US\$ / set

Answer of the Questionnaire to drilling company, Hydropower Engineering Co., Ltd.

Part - 01 : General

No.	Items	Answers	Remarks
1 - 1	Name of your company	Hydropower Engineering Co., Ltd.	
1 - 2	Address, telephone & fax	P.O. Box 2352, Vientiane, Lao PDR, Tel:217201, Fax:217203	
1 - 3	Past well drilling works (experience)	6 years	
1 - 4	Company strength in drilling work engineering	-	
1 - 5	Engineering for drilling works :	Number of engineers & years of experience : 5 engineers more than 10 years experience	
1 - 6	Engineering for pumping test :	Number of engineers & years of experience : 4 engineers more than 10 years experience	
1 - 7	Water quality analysis : (for drinking water)	Number of engineers & years of experience : 2 engineers more than 10 years experience	
1 - 8	Engineering for geophysical exploration :	Number of engineers & years of experience : 1 engineer more than 10 years experience	
1 - 9	Interest in participating as a contractor for JICA's project	Yes	

Part - 02 : Material & equipment

No.	Items	Answer	Remarks
2 - 1	Drilling work equipment	-	
	Drilling machines :	1: KOKEN, 1: CLELIUS, 2: CHINESE (XY100, XY150)	
	Mud pumps :	1: KOKEN, 1: CLELIUS	
	Bits :	Metal bits ( φ 100, φ 200, φ 250)	
2 - 2	Finishing materials	-	
	Casing pipe (type & diameter)	PVC and metal (can be purchase depend on required)	
	Screen (type & diameter)	PVC and metal (can be purchase depend on required)	
	Gravel filter (specifications)	Can be purchase depend on required	
2 - 3	Pumping test equipment	-	
	Test pump	3: Monopump	
	Test riser pipe	-	
	Device for measure water volume	-	
	Device for measure water level	2: Japanese type	
2 - 4	Device for pumping water :	-	
	Motor Pump	We have	
	Hand pumps	We have	
	Riser water pipes	-	
2 - 5	Equipment for geophysical exploration	-	
	Electrical prospecting	specifications	Not Available
	Elastic wave prospecting	specifications	Not Available
	Electrical logging	specifications	We can do
2 - 6	Equipment for water quality analysis (for drinking water)	specifications	Conductivity and pH
2 - 7	Equipment for transportation	Tracks (specifications)	2: Tracks
2 - 8	Equipment for loading & unloading	Cranes (specifications)	1: Hand crane

Part - 03 : Cost estimation

No.	Items	Answer	Remarks
3-1	Well drilling		
	Transportation of equip.	one team, per 100 km	500 US\$ / 100 km
	Installation & removal	per well	400 US\$ / well
	Drilling costs	per 1m & by diameter	100 US\$ / m / 100 mm diameter, 100 US\$ / m / 200 mm diameter
3-2	Finishing well work	per 1 m	-
	Casing pipe	by type, by diameter	30 US\$ / m / PVC 100 / 200 mm diameter
	Screen pipe	by type, by diameter	40 US\$ / m / PVC 100 / 200 mm diameter
	Gravel filter	per m <sup>3</sup>	100 US\$ / m <sup>3</sup>
	Apron & barrier	per well	150 US\$ / well
3-3	Pumping test itself	per well	20 US\$ / hour / well
	Transportation of equipment	per team, per 100 km	200 US\$ / 100 km
	Installation & removal	Test pump & rising pipe	100 US\$ / well
3-4	Water quality analysis; (for drinking water)	per 1 sample	50 US\$ / sample
3-5	Electric prospecting		Not Available
	Transportation of equipment	one team, per 100 km	-
	1 sample site	100 m depth	-
3-6	Elastic prospecting	by 1 km survey line	Not Available
	Transportation of equipment	one team, per 100 km	-
3-7	Electric logging	by 1 m depth	100 US\$ / day
	Transportation of equipment	one team, per 100 km	100 US\$ / 100 km
3-8	Equipment		-
	Riser pipes	by type, by diameter	-
	Motor pumps	specifications	-
	Hand pumps	specifications	-
3-9	Topographic survey		-
	Transportation of equipment	one team, per 100 km	350 US\$ / 100 km
	GPS		1,200 US\$ / point
	Traverse survey	by 1 km survey line	380 US\$ / km survey line
	Longitudinal profile survey	by 1 km survey line	350 US\$ / km survey line
	Leveling survey	by 1 km survey line	250 US\$ / km survey line
	Topographical mapping survey	by 1 ha survey area	320 US\$ / ha survey area
	Drawing by CAD		80 US\$ / sheet

Answer of the Questionnaire to drilling company, Siam Tone Co., Ltd. (Thailand)

Part - 01 : General

No.	Items	Answers	Remarks
1 - 1	Name of your company	Siam Tone Co., Ltd.	
1 - 2	Address, telephone & fax	5/15 Moo 6, Bangna-Trad Road (km 15) Bangchalong, Bangple, Samutprakarn 10540, Tel:312-5281, Fax:312-5304	
1 - 3	Past well drilling works (experience)	7 years	
1 - 4	Company strength in drilling work engineering	-	
1 - 5	Engineering for drilling works : Number of engineers & years of experience	7 engineers, 5 - 10 years experience	
1 - 6	Engineering for pumping test : Number of engineers & years of experience	2 engineers, 7 years experience	
1 - 7	Water quality analysis : (for drinking water) Number of engineers & years of experience	1 Chemist, 15 years experience	
1 - 8	Engineering for geophysical exploration : Number of engineers & years of experience	2 engineers, 5 years experience	
1 - 9	Interest in participating as a contractor for JICA's project	Yes (high)	

Part - 02 : Material & equipment			Remarks
No.	Items	Answer	
2 - 1	Drilling work equipment	-	
	Drilling machines :	Number & specifications	5: Japanese (max. well diameter 12 inches, depth 500 m), 5: Japanese (max well diameter 6 inches, depth 300 m), 10: Japanese (max well diameter 4 inches, depth 100 m)
	Mud pumps :	Number & specifications	10: Japanese (max 700 l / m, 25 bar), 5: Japanese (max 400 l / m, 40 bar), 5: Japanese (max 60 l / m, 60 bar)
	Bits :	Number & specifications	All size (standard and improved local made)
2 - 2	Finishing materials	Number & specifications	All size steel (ASTM, API and BSM standard and improved local made)
	Casing pipe	(type & diameter)	All size steel and PVC (ASTM, API and BSM standard and improved local made)
	Screen	(type & diameter)	All size steel and PVC (imported and improved local made)
	Gravel filter	(specifications)	All size Thailand made
2 - 3	Pumping test equipment	-	
	Test pump	Number & specifications	Test capacity 1- 300 m <sup>3</sup> / hour
	Test riser pipe	Number & specifications	All size (1 - 4 inches) x (3 m - 6 m) x (100 m /each)
	Device for measure water volume	Number & specifications	Water meter gauge, wire tank orifice
	Device for measure water level	Number & specifications	Electric tape, 100 m x 10 set
2 - 4	Device for pumping water :	-	
	Motor Pump	Number & specifications	Turbine and submersible pump, 1- 300 m <sup>3</sup> / hour
	Hand pumps	Number & specifications	Local and imported 2 - 4 inches cylinder, depth max 50 m, capacity max 15 l / min.
	Riser water pipes	Number & specifications	All size standard
2 - 5	Equipment for geophysical exploration	-	
	Electrical prospecting	specifications	VSF electrical surveying 500 m cable, 3: OYO model MCOHM 300
	Elastic wave prospecting	specifications	Geomagnetic instrument, 1 :Geonic EM-34
	Electrical logging	specifications	3: Bore hole E-log, resist Gamma, SP, caliper short and normal resistivity
2 - 6	Equipment for water quality analysis (for drinking water)	specifications	1: Horiba U-10
2 - 7	Equipment for transportation	Tracks (specifications)	10: Tracks
2 - 8	Equipment for loading & unloading	Cranes (specifications)	4: 100 ton truck crane, 150 ton truck crane

Part - 03 : Cost estimation

No.	Items	Answer			Remarks
		4 inches well	6 inches well	6 inches well	
3-1	Well drilling				
	Transportation of equip.	one team, per 100 km	5,105 US\$/100 km	5,105 US\$/100 km	Asphalt road without mobilization and demobilization
	Installation & removal	per well	625 US\$ / well	625 US\$ / well	
	Drilling costs	per 1m & by diameter	210 US\$ / m	317 US\$ / m	
3-2	Finishing well work	per 1 m	1,667 US\$ / well	2,084 US\$ / m	
	Casing pipe	by type, by diameter	13 US\$ / m / PVC	67 US\$ / m / steel	
	Screen pipe	by type, by diameter	17 US\$ / m / PVC	250 US\$ / m / steel	
	Gravel filter	per m3	125 US\$ / m3	125 US\$ / m3	size 4 m/m
	Apron & barrier	per well	667 US\$ / well	667 US\$ / well	
3-3	Pumping test itself	per well	1,200US\$/24 hour	1,667US\$/24 hour	
	Transportation of equipment	per team, per 100 km	250 US\$ / 100 km	250 US\$ / 100 km	Asphalt road
	Installation & removal	Test pump & rising pipe	250 US\$ / well	250 US\$ / well	
3-4	Water quality analysis; (for drinking water)	per 1 sample	150 US\$ / sample	150 US\$ / sample	
3-5	Electric prospecting		-	-	
	Transportation of equipment	one team, per 100 km	125 US\$ / 100 km	125 US\$ / 100 km	Asphalt road
	1 sample site	100 m depth	834 US\$ / 100 m	834 US\$ / 100 m	Clean land
3-6	Elastic prospecting	by 1 km survey line	10,834 US\$ / km	10,834 US\$ / km	
	Transportation of equipment	one team, per 100 km	417 US\$ / 100 km	417 US\$ / 100 km	Asphalt road
3-7	Electric logging	by 1 m depth	3 US\$ / m	3 US\$ / m	
	Transportation of equipment	one team, per 100 km	125 US\$ / 100 km	125 US\$ / 100 km	Asphalt road
3-8	Equipment		-	-	
	Riser pipes	by type, by diameter	16,460¥en/ 2"	30,750¥en/ 4"	40,420¥en/ 6"
	Motor pumps	specifications	2,480,000 ¥en /170 l/min.	3,625,000 ¥en /500 l/min.	4,667,000 ¥en /1,000 l/min.
	Hand pumps	specifications	1,250 US\$	-	-



#### 4. 北西部三県における給水施設現況数量

- 1) ルアンナムタ県
- 2) ウドンサイ県
- 3) サヤブリ県



## 1) ルアンナムタ県

Facilities Numbers of Water Supply Systems in Luangnamtha Province

Districts	Donor	Water Supply Systems			
		Spring Protection	Gravity System	Bore Hole	Dug Well
Namtha	Total	0	8	2	68
	EC	0	4	0	2
	NCA	0	0	0	0
	UNICEF	0	2	0	11
	ACF	0	2	0	22
	ADRA	0	0	0	33
	GTZ	0	0	0	0
	World Bank	0	0	2	0
	EED	0	0	0	0
Sing	Total	0	2	3	23
	EC	0	0	0	0
	NCA	0	0	0	0
	UNICEF	0	1	0	2
	ACF	0	1	0	15
	ADRA	0	0	0	0
	GTZ	0	0	0	3
	World Bank	0	0	3	0
	EED	0	0	0	3
Long	Total	0	4	0	0
	EC	0	0	0	0
	NCA	0	3	0	0
	UNICEF	0	1	0	0
	ACF	0	0	0	0
	ADRA	0	0	0	0
	GTZ	0	0	0	0
	World Bank	0	0	0	0
	EED	0	0	0	0
Vienphokha	Total	0	3	4	3
	EC	0	1	0	0
	NCA	0	0	0	0
	UNICEF	0	1	0	0
	ACF	0	0	0	0
	ADRA	0	1	0	3
	GTZ	0	0	0	0
	World Bank	0	0	4	0
	EED	0	0	0	0
Nalea	Total	5	15	0	7
	EC	0	0	0	0
	NCA	0	0	0	0
	UNICEF	0	0	0	0
	ACF	5	15	0	7
	ADRA	0	0	0	0
	GTZ	0	0	0	0
	World Bank	0	0	0	0
	EED	0	0	0	0
Provincial total		5	32	9	101

Facilities Numbers of Water Supply Systems in Luangnamtha Province

Districts	Water Supply Systems			
	Spring Protection	Gravity System	Bore Hole	Dug Well
Namtha	0	8	2	68
Sing	0	2	3	23
Long	0	4	0	0
Vienphokha	0	3	4	3
Nalea	5	15	0	7
Provincial Total	5	32	9	101

## 2) ウドンサイ県

Facilities Numbers of Water Supply Systems in Oudomxay Province

Districts	Donor	Water Supply Systems		
		Gravity System	Bore Hole	Dug Well
Xay	Total	9	0	2
	UNICEF	4	0	0
	IRAP	0	0	0
	ADB	0	0	0
	Enfants & Development	0	0	0
	Quaker Service	1	0	0
	Extra Education System	4	0	2
Namo	Total	5	0	20
	UNICEF	0	0	20
	IRAP	0	0	0
	ADB	0	0	0
	Enfants & Development	1	0	0
	Quaker Service	4	0	0
	Extra Education System	0	0	0
La	Total	7	10	18
	UNICEF	2	10	18
	IRAP	0	0	0
	ADB	0	0	0
	Enfants & Development	1	0	0
	Quaker Service	4	0	0
	Extra Education System	0	0	0
Bang	Total	6	15	28
	UNICEF	2	15	28
	IRAP	0	0	0
	ADB	0	0	0
	Enfants & Development	4	0	0
	Quaker Service	0	0	0
	Extra Education System	0	0	0
Nga	Total	9	0	0
	UNICEF	9	0	0
	IRAP	0	0	0
	ADB	0	0	0
	Enfants & Development	0	0	0
	Quaker Service	0	0	0
	Extra Education System	0	0	0
Hoon	Total	3	34	60
	UNICEF	3	34	40
	IRAP	0	0	0
	ADB	0	0	0
	Enfants & Development	0	0	0
	Quaker Service	0	0	0
	Extra Education System	0	0	20
Pakbeng	Total	9	0	0
	UNICEF	2	0	0
	IRAP	4	0	0
	ADB	3	0	0
	Enfants & Development	0	0	0
	Quaker Service	0	0	0
	Extra Education System	0	0	0
Provincial Total		18	0	0

Facilities Numbers of Water Supply Systems in Oudomxay Province

Districts	Water Supply Systems		
	Gravity System	Bore Hole	Dug Well
Xay	9	0	2
Namo	5	0	20
La	7	10	18
Bang	6	15	28
Nga	9	0	0
Hoon	3	34	60
Pakbeng	9	0	0
Provincial Total	48	59	128

## 3) サヤブリ県

Facilities Numbers of Water Supply Systems in Sayaboury Province

Districts	Year	Water Supply Sysytems		
		Gravity System	Bore Hole	Dug Well
Sayaboury	Total	18	41	321
	1992	7	0	42
	1993	0	0	8
	1994	3	0	221
	1995	2	0	17
	1996	4	30	8
	1997	2	0	25
	1998	0	11	0
Phiang	Total	3	7	112
	1992	1	0	15
	1993	0	0	25
	1994	1	0	53
	1995	0	3	3
	1996	1	4	14
	1997	0	0	2
	1998	0	0	0
Parklai	Total	3	8	127
	1992	3	0	30
	1993	0	0	9
	1994	0	0	64
	1995	0	0	0
	1996	0	0	10
	1997	0	8	14
	1998	0	0	0
Kenethao	Total	8	46	242
	1992	1	0	60
	1993	2	0	2
	1994	1	22	173
	1995	0	0	0
	1996	3	0	5
	1997	1	19	2
	1998	0	5	0
Botene	Total	13	0	131
	1992	7	0	18
	1993	1	0	25
	1994	1	0	37
	1995	0	0	46
	1996	3	0	5
	1997	0	0	0
	1998	1	0	0
Thongmyxay	Total	0	4	35
	1992	0	0	0
	1993	0	0	25
	1994	0	0	0
	1995	0	0	0
	1996	0	0	0
	1997	0	4	5
	1998	0	0	5

Districts	Year	Water Supply Sysytems		
		Gravity System	Bore Hole	Dug Well
Hongsa	Total	3	0	43
	1992	0	0	0
	1993	0	0	0
	1994	1	0	0
	1995	1	0	43
	1996	0	0	0
	1997	1	0	0
	1998	0	0	0
Ngeun	Total	0	0	25
	1992	0	0	0
	1993	0	0	0
	1994	0	0	0
	1995	0	0	15
	1996	0	0	0
	1997	0	0	5
	1998	0	0	5
Xienghone	Total	1	0	15
	1992	0	0	0
	1993	0	0	0
	1994	0	0	0
	1995	0	0	0
	1996	0	0	0
	1997	1	0	10
	1998	0	0	5
Khop	Total	2	0	0
	1992	0	0	0
	1993	0	0	0
	1994	0	0	0
	1995	0	0	0
	1996	1	0	0
	1997	1	0	0
	1998	0	0	0
Provincial Total		51	106	1,051

Facilities Numbers of Water Supply Systems in Sayaboury Province

Districts	Water Supply Sysytems			
	Gravity System	Bore Hole	Dug Well	
Sayaboury	18	41	321	
Phiang	3	7	112	
Parklai	3	8	127	
Kenethao	8	46	242	
Botene	13	0	131	
Thongmyxay	0	4	35	
Hongsa	3	0	43	
Ngeun	0	0	25	
Xienghone	1	0	15	
Khop	2	0	0	
Provincial Total		51	106	1,051



## 5. 全国における給水施設建設数量 (1992~1998)



Construction Numbers of Water Supply Systems  
related National Water Supply and Environmental Health Programme

Water Supply Systems	Years							Total
	1992	1993	1994	1995	1996	1997	1998	
Gravity System	11	17	23	30	67	107	96	351
Bore Hole	44	366	710	1,443	1,160	1,154	1,087	5,964
Dug Well					531	107	37	675
Rain Water Jar					251	187	25	463

The source: National Water Supply and Environmental Health Programme



## 6. 各県 Nam Saat における削井機械所有数量



Numbers of Drilling Machine in Provincial Department  
of National Water Supply and Environmental Health

No.	Provinces	Type	Quantities	Year	Donor	Remark
1	Vientiane Minucipality	PAT 201	1		UNICEF	Working
2	Oudomxay	PAT 301	1	1995	UNICEF	Working
3	Bokeo	PAT 201	1	1994	CONCERN	Not working
4	Luangprabang	PAT 301	1	1994	EU	Not working
5	Sayaboury	PAT 201	2	1996	UNICEF	Working
		PAT 301	1	1997	UNICEF	Working
6	Xiengkhuang	PAT 201	1	1993	UNICEF	Working
		PAT 301	1	1995	UNICEF	Working
7	Huaphanh	PAT 101	1		FIH	Not working
8	Vientiane Province	PAT 201	2	1993	UNICEF	Working
9	Borikhamxay	PAT 201	1	1992	UNICEF	Not working
		PAT 201	1	1995	UNICEF	Working
		PAT 301	1	1996	UNICEF	Working
10	Khammuane	PAT 201	2		UNICEF	Working
		PAT 301	1		JICA	Working
11	Savannakhet	PAT 101	3		MCC, CIDSE, NCA	-
		PAT 201	1		JICA	-
		PAT 201	1	1992	UNICEF	Not working
		PAT 201	1	1994	UNICEF	Working
		PAT 301	1	1996	UNICEF	Working
12	Saravane	PAT 201	2		UNICEF, WCONCERN	-
		PAT 401	1		WCONCERN	-
13	Champasack	PAT 201	1	1994	UNICEF	Working
		PAT 201	1	1995	UNICEF	Working
		PAT 201	1	1996	ADRA	-
		PAT 301	1	1995	UNICEF	Not working
		TH 5	1	1995	UNICEF	Working
14	Attapeu	PAT 201	1	1997	-	Not working
15	Phongsary	-	-	-	-	-
16	Luangnamtha	-	-	-	-	-
17	Sekong	-	-	-	-	-
18	Xaysomboon Special Region	-	-	-	-	-
19	Namsaat Central	PAT 101	1		CIDSE	Not working
		PAT 201	1		UNICEF	Not working
Total			36			Working Not working

The source: National Water Supply and Environmental Health Programme





7. ルアンナムタ・ボケオ両県から提出された調査  
対象候補村落リスト



Requested target villages from Luangnamtha and Bokeo Province

**I. Louangnamtha Province**

No.	Districts	Target Villages
<b>I-1</b>	<b>Namtha District</b>	
1		Sineoudom
2		Namtalane
3		Sopsine
4		Namkhong
5		Nongbua
6		Sida
7		Pakha
8		Ponsa
9		Namleunmay
10		Hongleuai
<b>I-2</b>	<b>Viengphoukha District</b>	
11		Phouyai
12		Tachoum
13		May
14		Taleu
15		Dongvieng
16		Palang
17		Talong
18		Namloune
19		Chava
20		Talith
<b>I-3</b>	<b>Long District</b>	
21		Mokko
22		Phayaluang
23		Namma
24		Xiengkokkao
25		Sompanekao
26		Xiengkokmay
27		Donesavang
28		Long
29		Donemay
30		Sivilay
31		Houaimo
32		Donechay
<b>I-4</b>	<b>Sing District</b>	
33		Thongmay
34		Yangphiang
35		Nongkham
36		Khovane
37		Langpha
38		Nanoi
39		Chavangmay
40		Longmeu
41		Pahouai
42		Houaikem

**II. Bokeo Province**

No.	Districts	Target Villages
<b>II-1</b>	<b>Huoixai District</b>	
1		Poung
2		Cheingngam
3		Phokham
4		Nalacr
5		Paxang
6		Parkhaoneua
7		Pasak
8		Maiyang
9		Thongbear
10		Hongleay
11		Namngao
12		Donyeng
13		Donephao
14		Pangpot
15		Phousand
16		Namnhounnai
17		Banlaeng
18		Namhorkai
19		Nokkachor
20		Nongngeun
21		Namhor
22		Sinoudom
23		Phibouthong
24		Thongnamai
25		Huana
26		Chomchouk
27		Namtoysaichaleun
28		Nampu
29		Maihear
30		Namma
31		Namduea
32		Teanthard
33		Phrakham
34		Nampukkang
35		Nampuktai
36		Houakhoua
37		Bolek
38		Nampuknuea

80	Grand Total	
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The source:  
Provincial Department of National Water  
Supply and Environmental Health  
dated 28 October 1998



8. ルアンナムタ・ボケオ両県から提出された現地  
踏査同行候補者リスト



Nominated member for cooperating with JICA study team  
from Provincial Department of National Water Supply and Environmental Health

I. Luangnamtha Province

Name	Age	Sex	Responsibility	Working Place	Work from
Dr. Sengthip	36	Female	Chief of technical section	Provincial Health Department	1998
Mrs. Thamma Ladvangsy	41	Female	Women Development	Provincial Lao Women's Union	1998
Mr. Bounsy	36	Male	Water Supply Section	Provincial Health Department	1990
Mrs. Khampheng Luangleuxay	42	Female	Women and Children Rights	Namtha District of Lao Women's Union	1996
Mr. Pheth	27	Male	Rural Water Supply	Sing District of Water Supply and Hygiene section	1998
Mrs. Sengchoui	39	Female	Women and Children Rights	Sing District of Lao Women's Union	1996
Mr. Feua	35	Male	Rural Water Supply	Long District of Water Supply and Hygiene section	1991
Mrs. Sengkham	44	Female	Women and Children Rights	Long District of Lao Women's Union	1996
Mr. Bounsy	33	Male	Rural Water Supply	Vienphoukha District of Water Supply and Hygiene section	1992
Mrs. Mangchanh	42	Female	Women and Children Rights	Vienphoukha District of Lao Women's Union	1996

II. Bokeo Province

Name	Age	Sex	Responsibility	Working Place	Work from
Mr. Bouchanh Vanenachoumchanh	40	Male	Section Chief	Provincial Water Supply and Hygiene Section	
Mr. Somsouk Sithong	35	Male	Gravity System Unit	Provincial Water Supply and Hygiene Section	
Mr. Phonekeo Kamnanipahanh	34	Male	Dug Well & Bore Hole Unit	Provincial Water Supply and Hygiene Section	
Mr. Intha Kithisack	45	Male	Sanitation Unit	Provincial Water Supply and Hygiene Section	
Mrs. Khankeo	22	Female	-	Provincial Community and Development	
Mrs. Sivilay	22	Female	-	Provincial Community and Development	
Mrs. Khamping Luanglusey	38	Female	Chief	District Lao Women's Union	
Mrs. Manivone Silipanya	29	Female	-	District Financial Unit	

The source: Provincial Department of National Water Supply and Environmental Health dated 28 October 1998





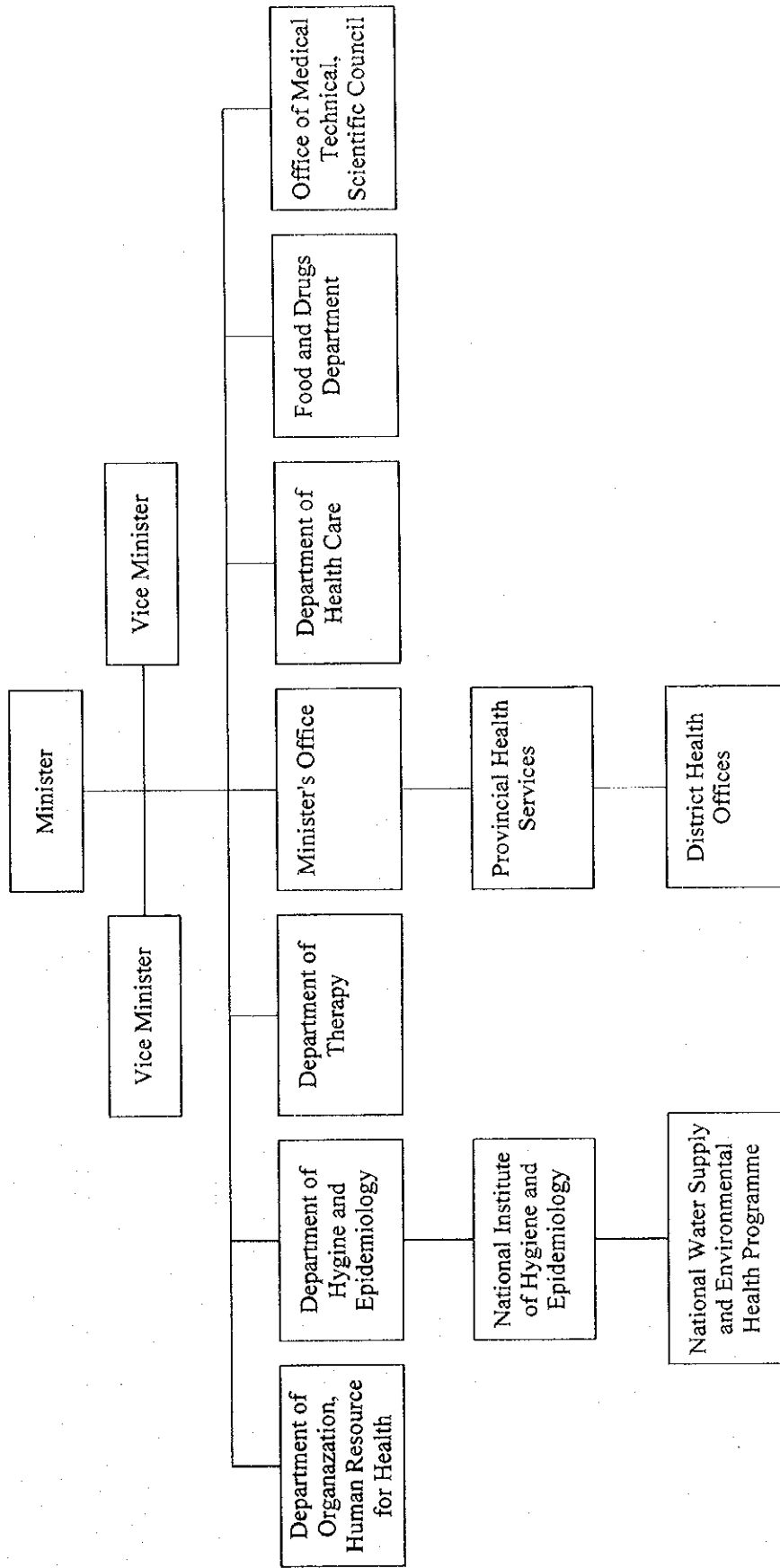
## 9. 組織図

- 1) ラオス国保健省
- 2) 保健省、衛生・免疫部
- 3) 県保健部

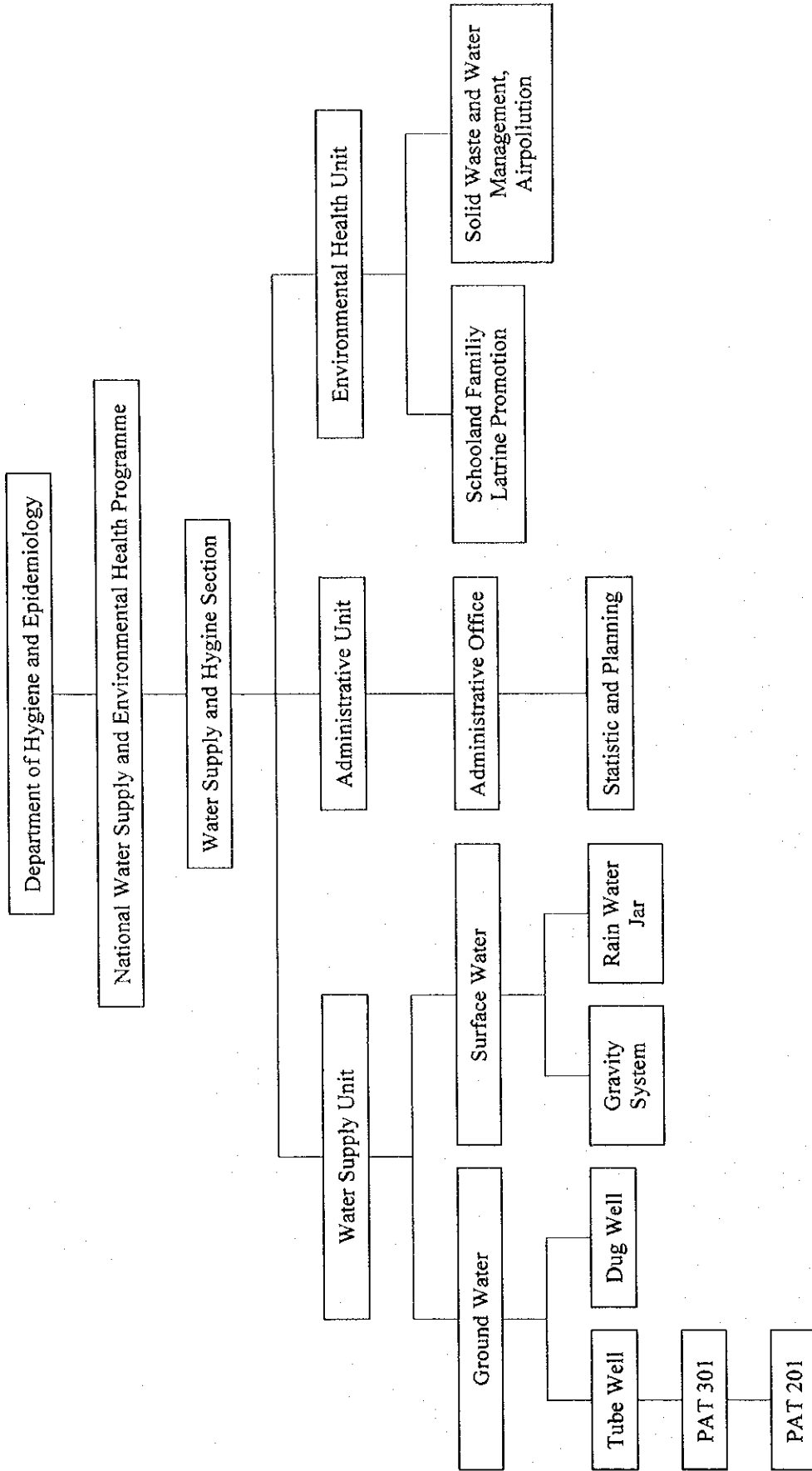


1) ラオス国保健省

Organization Chart  
Ministry of Health

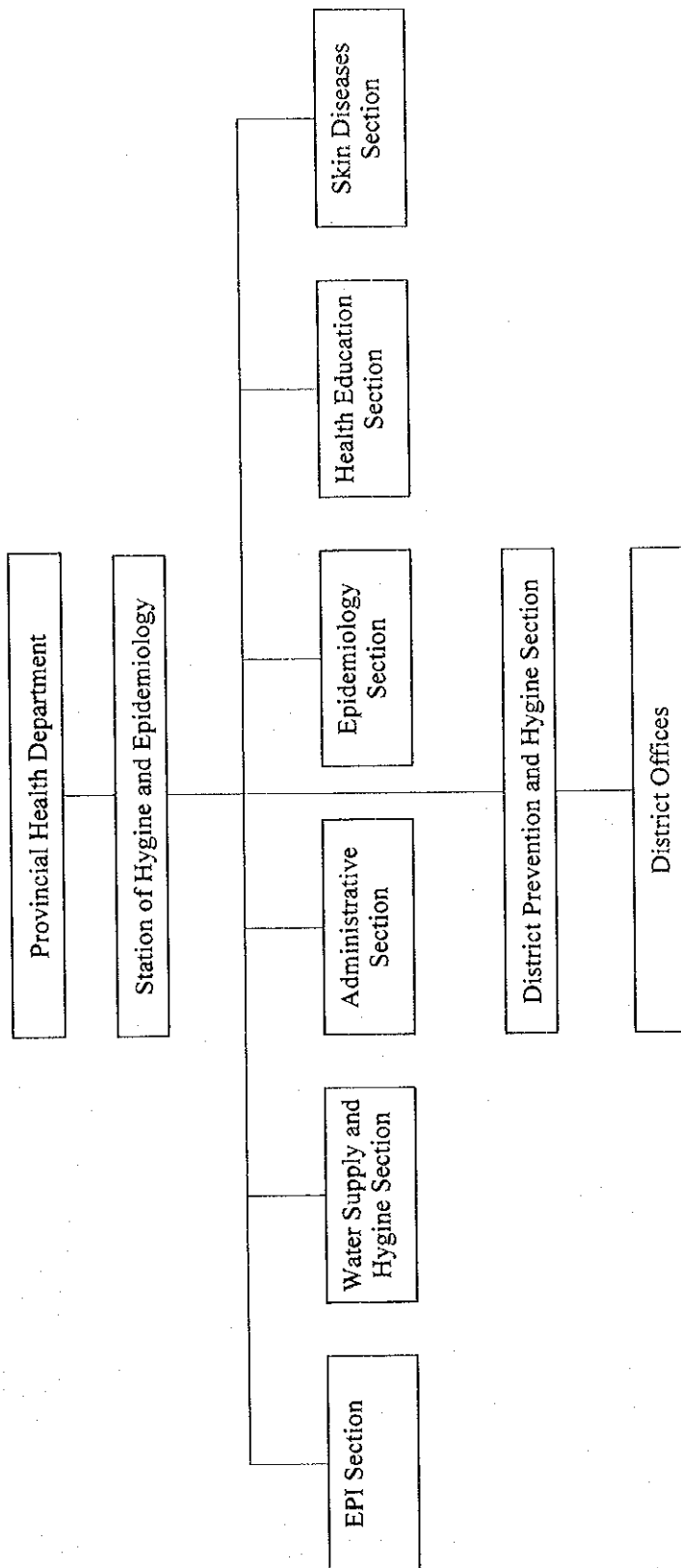


Organization Chart  
Department of Hygiene and Epidemiology



3) 県保健部

Organization Chart  
Provincial Health Department





10. Nam Saat プログレスレポート (1998) からの  
抜粋資料





Table 1: Staffing number of Nam Saat at central level, 1998 information

	Unit	Staff No	Permanent	men	W	Master	Specialist	High degree	Middle	nurse	Internship	Remark
1	Boreholes	5	5	5				2	3			
2	DW and RWJ	2	2	2				1	1			
3	GFS and SWP	4	4	4				4				
4	Procurement	11	8	9	2		1	4	1	2	3	3 ពិបាក ដំណើរ ការងារ
5	Statistic, Planning, Budget	3	3	1	2	1		1	1			
6	Family latrine	2	2	2					2			
7	School sanitation	2	2	2				1	1			
8	Water quality control and Hygiene sanitation	3	3	1	2			1	2			
9	Solid waste and waste water	1	1	1				1				
10	Total	33	30	27	6			16	11	2	3	

Table 2: Staff number of Nam Saat at provincial and district levels, 1998 information

	Province	Staff No	Permanent	men	W	provincial staff	district staff	high degree	middle	nurse	internship	Remark
1	Vientiane municipality	16	16	13	3	8	8	1	7	8	0	
2	Phongsali	18	12	18	0	9	9	2	5	6	1	
3	Luangnamtha	14	12	12	2	9	5	1	1	10	2	
4	Oudomxai	15	15	15	0	10	5	0	2	13	0	
5	Bokeo	15	14	14	1	8	7	0	1	14	0	
6	Luangprabang	33	27	30	3	20	13	1	6	20	6	
7	Houaphanh	23	22	22	1	23		0	7	8		
8	Sayaboury	23	23	22	1		23	0	6	17		
9	Xiengkhouang	19	17	16	3	12	7	1	5	11	2	
10	Vientiane Province	21	21	19	2	10	11	1	10	10		
11	Borikhamxay	26	21	25	1	11	15	1	7	13	5	
12	Khammouane	26	26	25	1	14	12	2	5	19	0	
13	Savannakhet	45	43	42	3	20	25	0	13	31	1	
14	Saravane	19	18	16	3	13	11	0	7	12	1	
15	Sekong	15	14	14	1	6	9	0	3	3	1	
16	Champasack	46	36	40	6	34	12	1	9	26	10	
17	Attapeua	17	16	16	1	7	10	0	8	8	1	
18	Saysomboune	5	5	5	0	1	4	0	2	3		
	Total	396	354	355	32	215	186	11	104	232	30	

Table 3: Number of training, workshop for Nam Saat staff at all level in the country  
in 1997-1998(10/97-9/98)

	Venue and Activities	Provinces	Districts	Participants	Budget (Kip)	Supporter	Remark
<i>A</i>	<i>In Country</i>						
1	Management training	2	9	25	1 899 544	Ministry of Health	
2	Planning workshop for Luangnamtha, Oudomxai and Phongsali	1	3	17	1 738 800	World Bank IDA and UNDP World Bank	
3	Training on Boreholes maintenance and data collection form	3		30	5 833 000	UNICEF+ AICF,WC	
4	Training on GFS construction	2	10	30	1 200 000	Luangnamtha Rural Dev.	
5	Training on RWJ construction	1	1	20	2 000 000	CAA	
6	Training on family and school latrine construction	2		10	2 535 000	UNICEF+G TZ	
7	Training on solid waste management, nutrition, using IEC material at primary school	1		27	41 500	WHO-UNDP/AV B	
8	Training on surveying and designing of GFS in Sayaboury	1	10	21		SCF Australian	
9	Training on sanitation in Attapeua province	1		15			
<i>B</i>	<i>Abroad</i>	Country					
1	Management and Hygiene promotion training	Sri Lanka		3	39 000 000	UNICEF	
	Total	16	33	198	54 247 844		

*Table 4:* The agencies supported for the Gravity fed system investment in 1997- 98

	Organisation Name	Number of GFS	Remark
1	UNICEF	6	
2	Gov., Comm., International agencies	14	
3	Rural Development II	13	
4	World Vision, MCC, Australia	5	
5	Consortium	7	
6	CCL	7	
7	ACF	7	
8	EED and UNICEF	6	
9	Community and International agencies	2	
10	Japanese Government	3	
11	Save Children Fund Austrian	3	
12	Rural Development, Lao Red Cross	3	
13	Consortium, Lao Red Cross	2	
14	Lao Red Cross	2	
15	UNICEF, SCF Austrian	2	
16	Australia, Lao Government	2	
17	World Vision	1	
18	Rural Development Committee	1	
19	Community and Government	1	
20	IRAP	3	
21	UNC and Lao Government	5	
22	Community and UNICEF	1	
	Total	96	

*Table 5:* The agencies supported for Boreholes with handpump investment in 1997-1998 (10/97-9/98)

	Organisations Name	Number of Boreholes	Remark
1	UNICEF	733	
2	UNICEF, ADRA	137	
3	World Concern	70	
4	Community and Government	39	
5	Community	23	
6	UNICEF, ACF	13	
7	Care	12	
8	UNICEF, ADB	11	
9	GTZ	8	
10	Lao Red Cross	7	
11	UNHCR	7	
12	CAA	6	
13	SEDEB	5	
14	JICA	4	
15	Health Unlimited	3	
16	Concern	2	
17	Rural Development Committee	2	
18	Private Sector	3	
19	Lao Government	2	
	Total	1087	

*Table 6* : Achievement summary for the new construction and rehabilitation of old schemes for WSS in 1997-1998 (10/97-9/98) by comparison with the annual workplan

	Descriptions	Plan ning	Imple menting	Benefi ciaries	Percenta ge coverage	Re mark
	<i>A. Hard Ware</i>					
1	GFS	70	96	40 100	4.91	
2	SWP	15	4	1 232	0.02	
3	BH	1050	1087	160 610	3.84	
4	DW	600	37	3 453	0.08	
5	RWJ	400	25	150	0.003	
	<i>Total</i>			207 605	4.91	
1	Family latrines	18000	9998	63 601	1.27	
2	School latrine	200	86	22 929	1.22	
	<i>B. Rehabilitation</i>					
1	GFS	30	14	7 025	0.16	
2	BH	50	146	13525	0.32	
3	DW	NA	10	835	0.1	

Table 7 : Summary for field monitoring, field reconnaissance survey, supervision on construction and rehabilitation in 1997-1998 (10/97-9/98)

	Descriptions	Provinc es	District s	Number of field mission	Resour ces person	Budget (Kip)	Supporters
<i>A</i>	<i>In Country</i>						
<i>I</i>	<u>Central level</u>						
1	Monitoring on latrine construction	2		5	3	3 150 000	UNDP/WB+ UNICEF
2	Monitoring on drilling BH	7		6	9	3 650 000	JICA, UNICEF, GOV
3	Monitoring and Evaluation for WSS	12		6	8	3 474 000	UNICEF, SIDA, WORLD CONCERN, WB, GOV
4	Supervision for water schemes construction	6		5	4	3 337 400	UNICEF, UNHR LAO AMERICAN GOV
5	Field monitoring for financial reporting	15		1	3	841 000	UNICEF
7	Field study for solid waste management	5		1	3	1 999 960	GOV
<i>B</i>	<i>Abroad</i>	Country					
1	Study tour on WSS	Thailan d		1	2	400 000	FHI
//	<u>Province</u>						
1	Field monitoring for water schemes	10		95			GOV
2	Study tour on WSS	Thailan d		1	3	800 000	FHI
	Total			121		17 652 360	

Table 8: Summary of field survey activities for water supply in  
1997-1998(10/97-9/98)

	Description	Province s	Districts	Staff No	Budget (Kip)	Supporte r	Rem ark
<i>I</i>	<u>From central</u>						
1	Field survey for odl GFS for rehabilitation	2	2	3	677 000	UNICEF	
2	Field survey for new GFS	1	1	1	216 400	Lao Red Cross	
3	Field survey for drilling BH	1	1	2	632 600	FAR	
4	HRD field studies	2	1	1	300 000	UNDP/W B	
<i>II</i>	<u>Provincial level</u>						
1	Water sources survey in Longpot and Pakum development areas	1	1				
2	GFS survey for supplying through health center		3		2 000 000	ADB	
	Total				3 826 000		



*Table 9:* Summary of Meeting, Conferences and Workshops in 1997-1998

	Description	Province/ Abroad	District	Participants	Budget (Kip)	Supporter	Remark
<i>A</i>	<i>In country</i>						
1	Meeting in Phongsali for Rural Development	1			60 000	Rural Development	
2	Training in Phongsali, Oudomxai and Luangnamtha (World Bank)	3		53	5 347 850	UNDP/WB, WB	
3	Annual Review Meeting 1996-1997	18		65	9 305 920	UNICEF, MoH, UNDP/WB	
4	Annual Workplan Meeting			6	0	Facilitator	
5	Meeting in STENO			2		Staff time	
6	Gender Issues Meeting			1	20 000	MRC	
7	1998/1999 Workplan Meeting			25	1 596 700	UNDP/WB	
8	PIP preparation Meeting for Oudomxai and Phongsali			1	150 000	UNDP/WB	
9	Procurement Meeting			1	10 500	MoH	
<i>B</i>	<i>Abroad</i>	<i>Country</i>					
1	WSS Conference	USA		2	16 000 000	UNDP/WB	
2	Meeting for contractor	Japan		3	14 000 000	JICA	
3	Sustainable WSS Meeting	Thailand		1	3 128 000	Sida	
4	Gender Issues Meeting	Thailand		1	56 000	MRC	
5	South East Asia Core Group Meeting on WSS	Thailand		1	2 000 000	WSSCC	
6	Global Water Partnership Meeting	Denmark		1	6 000 000	Sida	
7	WSSCC and PAC Meeting	Manila		1	4 000 000	WSSCC/WB	
	<b>Total</b>			162	61 674 970		

Table 10 : Water quality analysis at Nam Saat Laboratory 1997-1998(10/97-9/98)

	Province	District	Village	water sampling	Results	Remark
1	<i>Champasack</i>		Paksone	BH	High Fe	
1		Bachiang	Sensaat	BH	High Fe and Cu	School
2		Paksong		BH	High Fe, TDS, CDT	
3			Saphane	Bh	Low PH and Streptococies	
4			Houaten	Spring	Low PH and Streptococies	
5			Km 20	GFS	Low PH and Coliform	
2	<i>Luangphabang</i>					
1		Xiengngeun	Moud	GFS	CND,TDS,Total Hardness increased and E.coli	
2			Phadeng	DW	E.coli	
3		LPB	Donedeng	DW		No record
4.			Donekang	DW		
5		Xiengngeun	Keunga	Spring		
3	<i>Vientiane</i>					
1		Sanakham	SanaK. Tay	BH		
2			Simoune	rain water		
3			Dongkha	DW		
4			Napa	DW		
5			Nasou	BH	High minerals	
4	<i>Houaphan</i>					
1				Hot water	high dissolved solid and mineral	
5	<i>Viantiane mun.</i>					
1	Chane Co.	Purustique		BH	Total Hardness high	
2		Xauthani	Phaykham	Nam Papa	High dissolved solid, minerals	
3			Donkhamsan	BH	High dissolved solid, mineral	
6	<i>Borikhamsay</i>					
1			Nahay	river	Low PH	
2			Nahay	BH	High Fe and Low PH	
3			Vangko	BH	High Fe and low PH	
4			Bouchian	Bh	High Fe	

### Achievement on School latrines construction in 1997/1998

	Province	New latrines constructed	Pupils benefit	School percentage	Remark
1	Sayaboury	5	2,207		Total primary school
2	Vientiane Muni.	2	400		in country about
3	Savannakhet	55	15,428		7000 schools
4	Champasack	22	4,856		
5	Houaphan	2	38		
	Total	86	22,929	1.22	

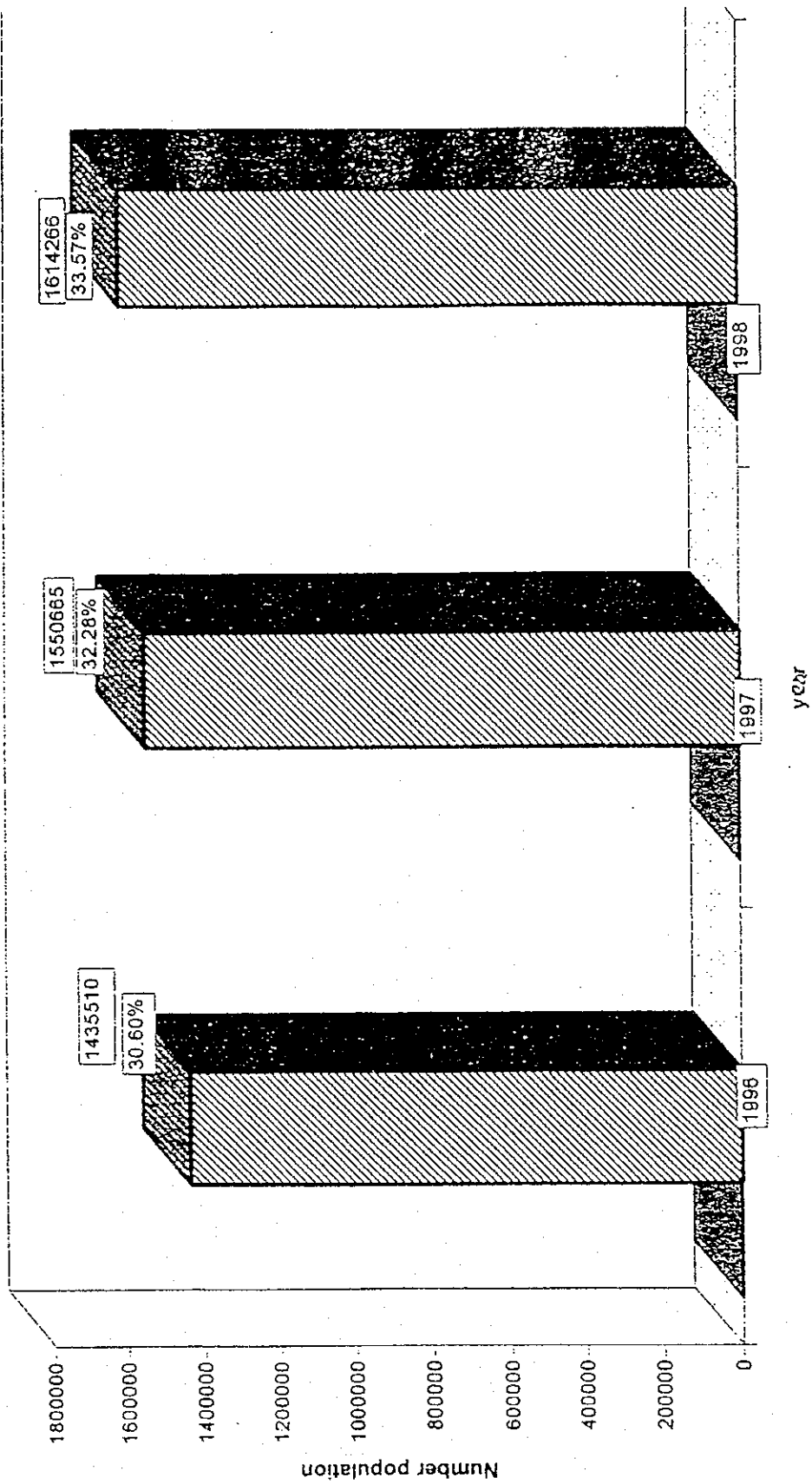
### Achievement on latrines construction in 1997/1998

	Provinces	Population in 1998	New latrines constructed	Beneficiaries	%
1	Vientiane muni.	567,051	1,014	6,054	1.06
2	Phongsali	164,087	255	2,395	1.45
3	Luangnamtha	122,962	611	3,666	2.98
4	Oudomxai	226,365	300	1,800	0.79
5	Bokeo	128,861	437	2,391	1.96
6	Luangphabang	397,271	361	2,239	0.57
7	Houaphan	264,583	247	1,438	0.54
8	Sayaboury	313,213	980	5,880	1.87
9	Xlengkhouang	214,828	292	1,752	0.81
10	Vientiane prov.	307,184	21	162	0.05
11	Borikhamxay	175,928	279	1,674	0.95
12	Khammouane	293,966	1,476	8,865	3.01
13	Savannkhet	721,102	965	6,755	0.93
14	Saravane	275,467	287	1,722	0.62
15	Champasack	537,936	2,214	15,495	2.88
16	Sekong	68,542	95	602	0.87
17	Attapeua	93,609	84	420	0.44
18	Saysomboun	58,100	80	291	0.5
	Total	4,919,087	9,998	63,601	1.29

Achievement of water supply in 1997/1998

	Provinces	Rural population in 1998	BH	BH rehab.	GFS	GFS rehab.	SWP	DW	DW rehab.	RWJ	Beneficiaries	
											Beneficiaries	%
1	Vientiane muni.	481,995	61	36							3,713	0.77
2	Phongsali	139,475			14	2			1		4,913	3.52
3	Luangnamtha	104,518			7		4				2,541	2.4
4	Oudomxai	192,416	31		9			2			8,298	4.31
5	Bokeo	103,582	5		14	1					8,062	7.78
6	Luangphabang	333,431			28	4					11,847	3.55
7	Houraphanh	224,897	13		12	3		15			9,013	4
8	Sayaboury	266,233	33		1				2		2,020	0.75
9	Xiengkhouang	182,604	17	7	2	1			7		2,496	1.36
10	Vientiane Prov.	261,107	34	23	4			11			5,652	2.16
11	Borikhamsay	149,539	40	34	4			3		25	6,207	4.15
12	Khammouane	249,872	44								4,471	1.78
13	Savannakhet	612,938	219			2					39,716	6.47
14	Saravane	234,147	104	3		1		6			40,598	17.33
15	Champasack	457,247	457	27							48,207	10.54
16	Sekong	58,261	27								6,501	11.1
17	Attapeua	79,568	2	16	1						1,288	1.61
18	Saysomboun	49,387										0
	Total	4,181,217	1,087	146	96	14	4	37	10	25	205,545	4.91

Nationwide coverage on sanitation from 1996-1998 in PDR



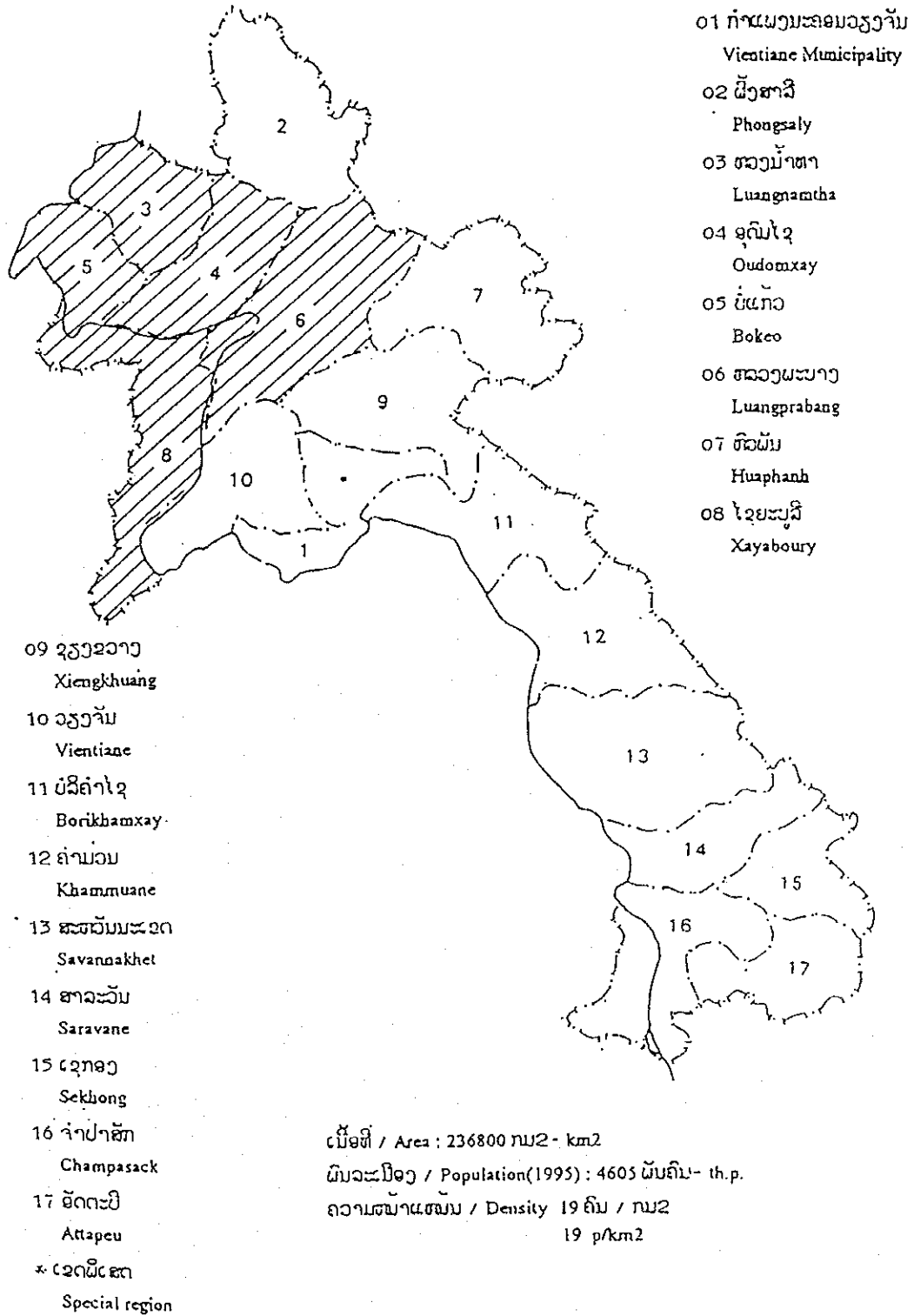


## 11. 全国県区分図





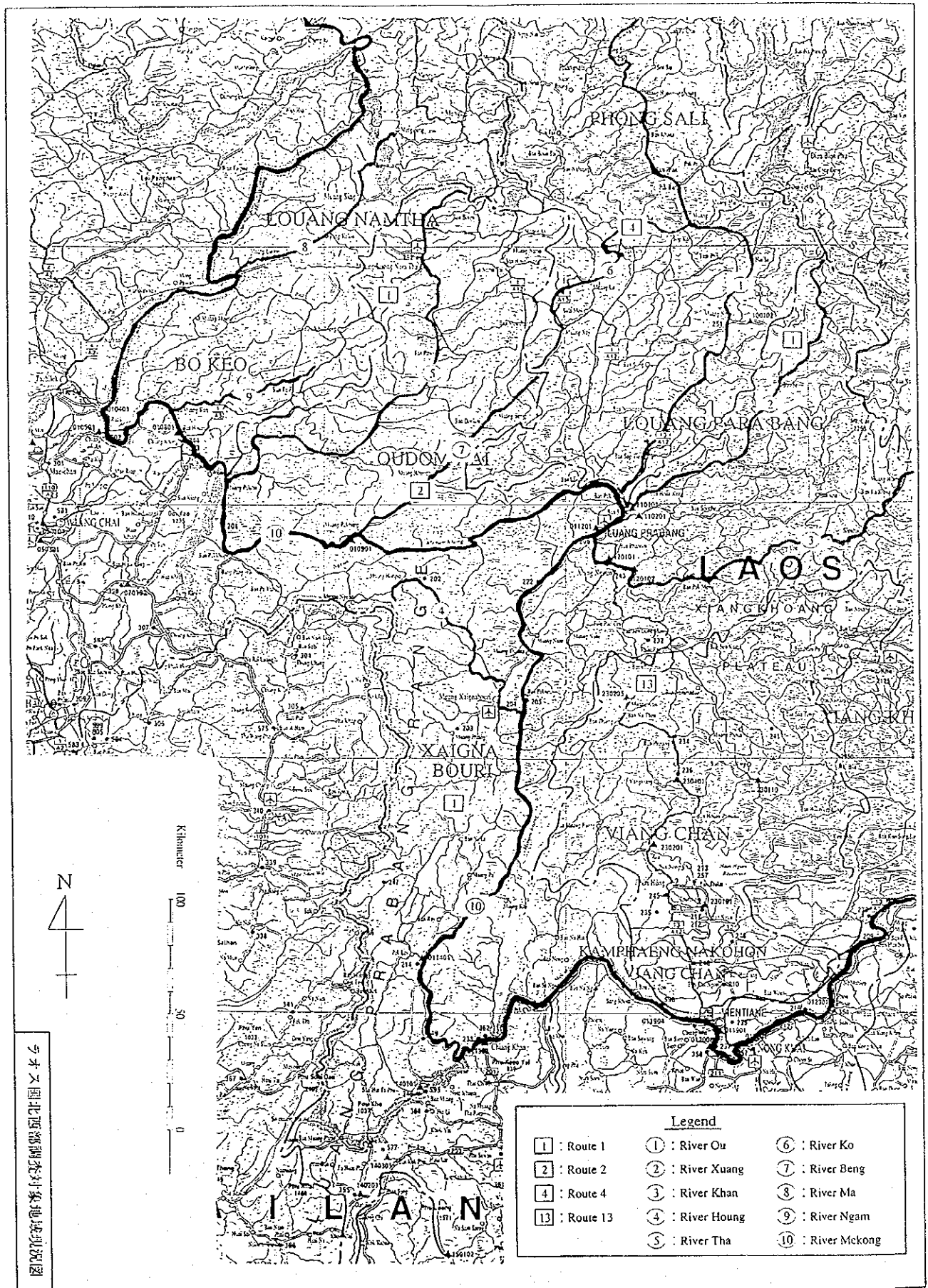
ラオス県区分図





## 12. 北西部对象地域地形图





老挝及泰国西北部河流分布图

