

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MINISTRY OF HEALTH
NATIONAL CENTER FOR ENVIRONMENTAL HEALTH AND WATER SUPPLY

**The Case Study of
Rural Water Supply and Sanitation
Improvement in
North - West Region
in
The Lao People's Democratic
Republics**

SUMMARY REPORT

Water and Poverty Session

THE 3RD WORLD WATER FORUM
KYOTO, JAPAN

March 2003

The views expressed in this paper are the views of the authors and do not necessarily reflect the views or policies of the Asian Development Bank (ADB), or its Board of Directors or the governments they represent. ADB makes no representation concerning and does not guarantee the source, originality, accuracy, completeness or reliability of any statement, information, data, finding, interpretation, advice, opinion, or view presented.

Presenters:

Dr. Keooudom Namsena

Chief, Management and Administration Division
The National Centre for Environmental Health and Water Supply (Nam Saat Central)
Ministry of Health, Lao PDR
Tel: +856-21-413-310
Fax: +856-21-450-834

Ms. Keodokmay Phouipaseuth

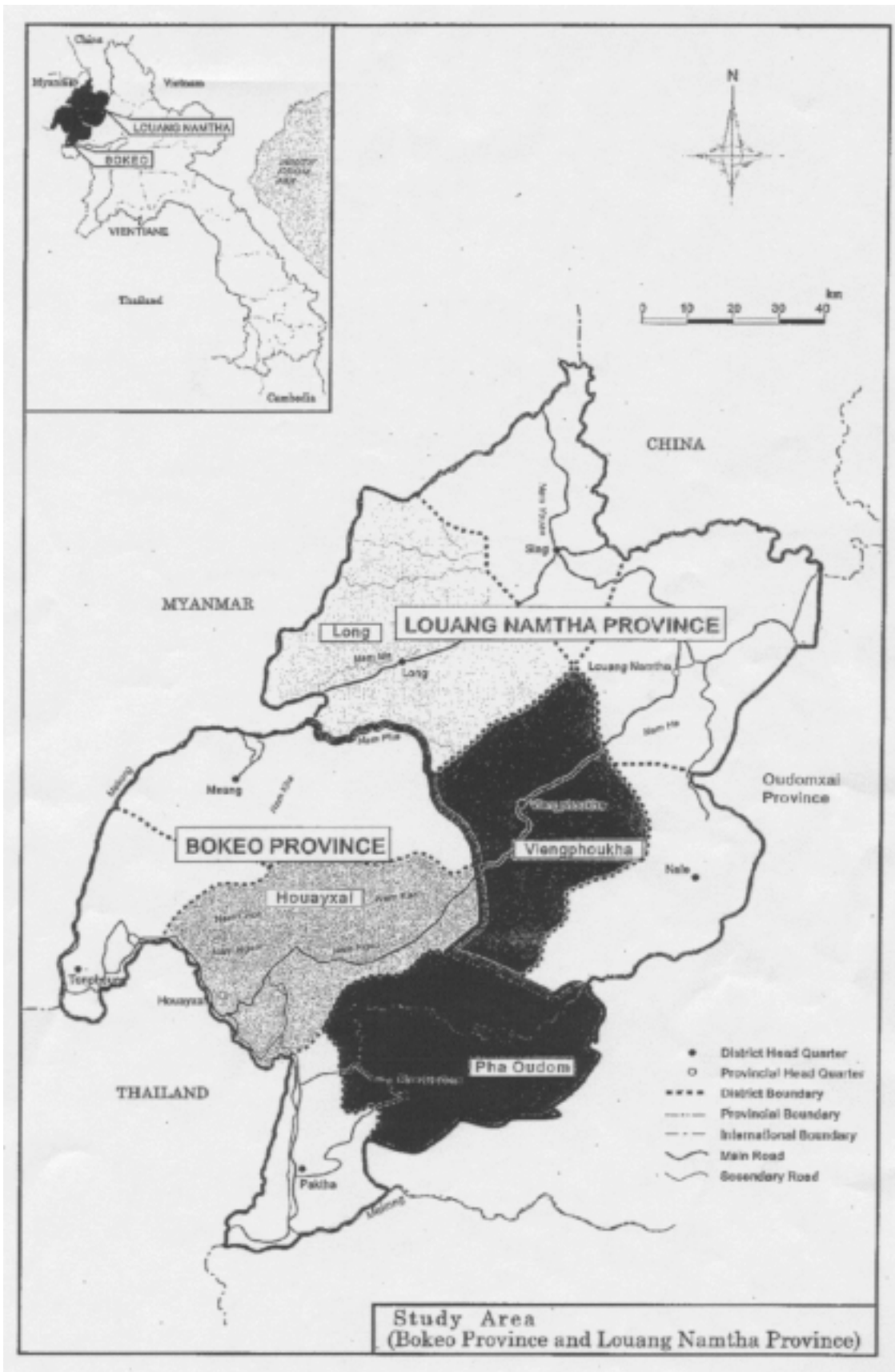
Chief of Gender Unit
The National Centre for Environmental Health and Water Supply (Nam Saat Central)
Ministry of Health, Lao PDR
Tel: +856-21-413-310
Fax: +856-21-450-834

Ms. Harumi Okawa

Deputy Director
Global Issues Division
Planning and Evaluation Department
Japan International Cooperation Agency (JICA)
URL: <http://www.jica.go.jp>
Email: Okawa.Harumi@jica.go.jp
Tel: +81-3-5352-5322
Fax: +81-3-5352-5490

Ms. Emi Yamamoto

Associate Expert on Gender
Global Issues Division
Planning and Evaluation Department
Japan International Cooperation Agency (JICA)
URL: <http://www.jica.go.jp>
Email: Yamamoto.Emi@jica.go.jp
Tel: +81-3-5352-5322
Fax: +81-3-5352-5490



Contents

	Page
LOCATION MAP	3
Chapter 1 Introduction	
1.1 Project Background	6
1.2 Project Objectives	6
1.3 Project Area and Target Villages	7
1.4 Project Description	7
Chapter 2 Socio-Economic Situation	
2.1 Village Level Socio-Economic Conditions	11
2.2 Gender and Ethnic Minority Issues	12
Chapter 3 Sanitation and Health Conditions	
3.1 Epidemiology	14
Chapter 4 Water Resources Situation	
4.1 Available Water Sources	15
4.2 Water Use Situation	16
4.3 Water Quality	16
Chapter 5 Project Evaluation	
5.1 Economic Benefits	17
5.2 Social Evaluation	17
5.3 Technical Evaluation	19

Chapter 6 Conclusion and Recommendations

6.1 Conclusion	22
6.2 Lessons Learned	22
6.3 Recommendations	23

Chapter 1 INTRODUCTION

This report was compiled for the Project on Rural Water Supply and Sanitation Improvement in North-West Region in Lao People's Democratic Republic (hereinafter referred to as "the Project") 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 Project commenced in February 1999 and terminated upon submission of the Final Report in March 2001. The Project was divided into three phases as follows.

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

During the course of the Project, the JICA Project Team 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. Throughout the three phases of the project, especially women were encouraged to participate in the project.

The main objective of this Project was **capacity building** and **institutional strengthening** of Provincial and District level of Nam Saat using lectures and on-the-job training.

Furthermore, **community participation and dialogue** were another important component in this Project. **Gender perspectives and ethnic minority consideration** was emphasized through community participation and dialogue. As a result, gender sensitive participatory survey methods were applied in this Project as much as possible from the planning stage.

With the slogan, "Training on Participatory Socio-Economic Survey, Community Dialogue and Technical Basics to Improve Rural Water Supply and Sanitation for Bokeo and Luang Namtha Provinces," a training in the classroom (lecture) was held in the project sites with the aim to teach the participants the basics of gender sensitive participatory survey through lectures, discussions and a preparatory OJT. The participants of the training were considered to be gender balanced and included Provincial and District members of Nam Saat, Lao Women's Union, Lao Youth Organization and Rural Development.

This report covers the outline of the Project, the activities, the outputs obtained, and lessons learned, from gender perspectives, during the period from Phase I through Phase III.

1.1 Project Background

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%.

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 project for improvement of rural water supply and sanitation. In response to this request, JICA dispatched a Preparatory Project Team in October 1998 and formulated the Scope of Work for this Project.

1.2 Project Area and Target Villages

The Project area covers two Provinces of Luang Namtha and Bokeo, which are located in the north-west region of the country bordering with Thailand, Myanmar and China. 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 is the least developed area in the country.

The road distances 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. The Project targeted 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.

1.3 Project Objectives

The objectives of the Project 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 Project in pursuit of capacity building.
- 4) to hold workshops during the course of the Project in order to share project results with concerned personnel and exchange views.

1.4 Project Description

This Project was a participatory development project predominantly characterized by its application of the engendered community participation approach. During the pilot activities of the Project, the both of male and female villagers are directly involved in the community dialogue at the target villages. These local villagers, comprehending all the relevant factors (i.e., functions of the facilities, methods of operation and maintenance, and the meaning of the village contributions as labor, local materials and required expenditures), chose by themselves the water and sanitation facilities such as gravity-fed water supply system and pour flush latrines that they are actually willing to construct and continue using.

The JICA Project Team executed the Project 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.
- 2) The Pilot Project 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 Project shall be executed in cooperation with counterpart personnel and target area villagers in order to complete the Project 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 Project and necessary elaboration will be made. This Project can contribute to the promotion of the Sector Strategy.

Through the implementation of the pilot studies, it was planned and implemented that both of male and female 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.

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

The Project was divided into the following three phases which began in February 1999 and completed in March 2001. Throughout the three phases of the project, women were encouraged to participate in the project.

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

In Phase I, participatory training sessions including on-the-job training at the villages were held to build capacity of Provincial and District level Nam Saat staff as well as other local representatives considering gender balance. A lecture on gender considerations was provided by the JICA team member during the training in Phase I. The results of the village survey were used as baseline data to formulate the pilot projects and development plans.

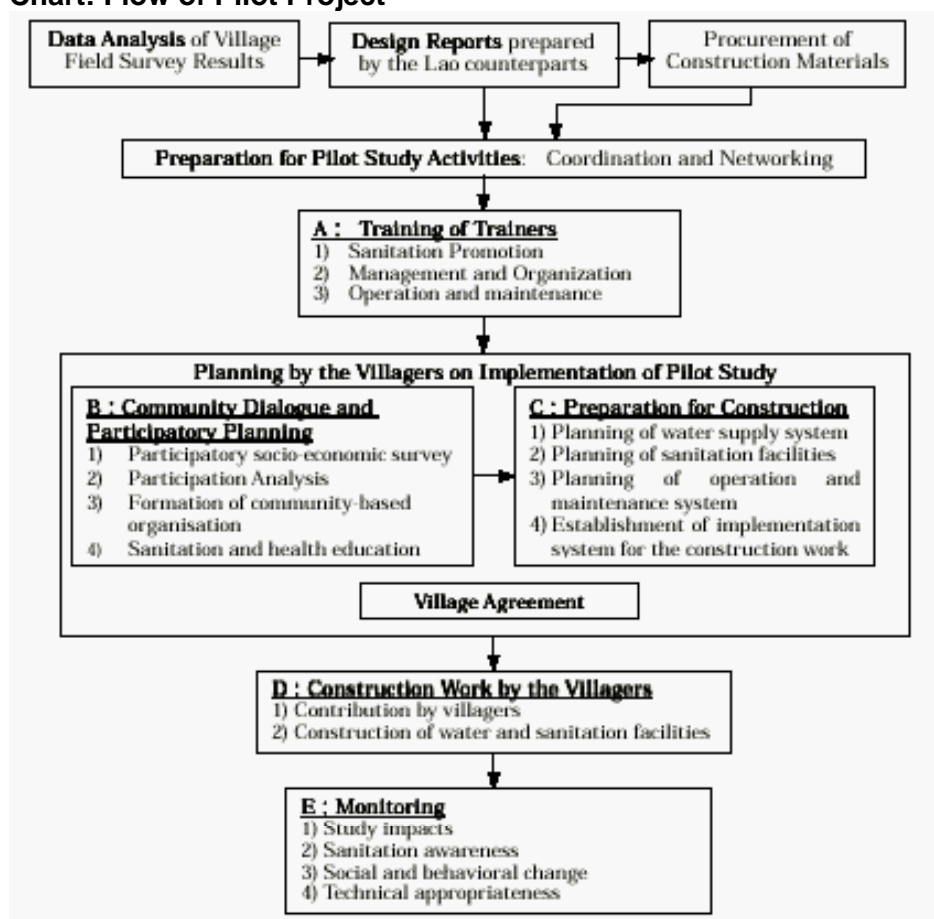
As for needs identification of the baseline survey, 32% of the participants in the training and those who joined the non-technical survey were female. During the community dialogue, they were the major promoters who also encouraged village women to participate in the survey and articulate their needs. As a result, women in the villages

became aware of the necessity for participation in this project. However, female are still shy in public to express their opinions and feelings.

A pilot project was implemented in Phase II at 34 villages selected out of the 81 project target villages through an elaborate selection process. The pilot project was conducted in the five stages (Stage A to E) as follows (see the detail at the chart below). At the every stage, gender consideration was emphasized.

- Stage A: Training of trainers (TOT) on community management, sanitation education and hygiene promotion, and operation and maintenance
- Stage B: Participatory village activities including community dialogue, committee organization, hygiene promotion, village contribution confirmation, community management and village agreement
- Stage C: Preparation for construction on participatory planning, construction scheduling, guidance on operation and maintenance and plan of action
- Stage D: Construction works for water supply and latrines construction through the participation of the villagers
- Stage E: Monitoring of behavioral changes and village awareness on social and sanitary improvements

Chart: Flow of Pilot Project



In Phase II, 23% of the participants in TOT on organization management and operation

and maintenance were female from Lao Women's Union. In the training course, a gender approach lecture was included as part of community management and organization that was conducted by Central Nam Saat officers. During the planning and construction preparation at the village level, 41% of the total attendants were female (average percentage of 34 pilot villages). During the actual preparation for construction, 53% of total participants were women. During stage D, that is the construction period, although local construction supervisors were all men, village women were well mobilized and in accordance with their capability, actively participated in digging trenches for the pipeline, and carrying sand and gravel in harmony with men.

Phase III continued the monitoring survey for evaluation. Also in this final phase, a pilot project extension was implemented at 17 villages to further build capacity and extend coverage of water supply and sanitation as a result of the favorable response of the previous pilot project. In order to reflect upon users' reactions, various women as the major users of the scheme were interviewed. Consequently, 24% of the monitoring team members were female in the first monitoring survey, and one female in three monitoring staff was from Lao Women's Union and health department for the second monitoring survey.

Then, development plans were formulated for improvement of water supply and sanitation of the target area.

Chapter 2

SOCIO - ECONOMIC SITUATION

2.1 Village Level Socio-economic Conditions

(1) Water Fetching Distance and Time

According to the results of the Phase 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 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.

(2) Water Related Problems

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.

(3) 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. Xiengkong 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.

(4) Household Economy and Willingness to Contribute

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. 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.

(5) Beneficiaries

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 (men: 5,231/ women: 5,364 as of 1999 from Result of

Phase I Village Survey) .

(6) RRA and In-depth Survey

The RRA (Rapid Rural Appraisal) enables to rapidly and intensively assess the features of the living conditions of the rural population for diagnosis of issues and problems. RRA is designed as an on-going learning process for both local as well as external team members in a more cross-sectional way. They evaluate local know-how and relevant technology transfer with the communities. When it is applied in a more participatory way involving the community, it is called PRA (Participatory Rural Appraisal) which was conducted in the baseline survey of Phase I. In Phase I, physical layout mapping including infrastructure, water resources and land utilization mapping has been drawn by the villagers and survey team members, and other basic village socio-economic data were identified. In Phase II, social assessment was conducted in Daen Kang and Hoai Mo villages on 7 December 1999 and Chakhamping village on 15 December 1999 as preparation for monitoring. The reason for selecting these villages is that these villages are regarded as the most difficult pilot villages due to the features of their ethnic affiliation and their perception on water and sanitation related issues. The survey was carried out for more precise items such as time line village development history, religious and festival calendar including beliefs and taboos on water related practice, information on historical background of water-related rights, life time survey including water fetching time, examination of payment capability, and willingness and their understanding of cost of effectiveness as well as other items.

2.3 Gender and Ethnic Minority Issues

(1) Gender Considerations

In order to incorporate gender considerations into the program, the survey was conducted through interviews regarding women's situation and social gender roles. Lao Lum women are better off in the access to resources such as land and capital.

In accordance with matrilineal tradition, Lao Lum women inherit their parents' land and property, especially the youngest daughter of the family. Lao Lum men will marry and go out to live with their wives and the wives' parents, and work for the wives' families. Unlike Lao Lum women, Lao Theung and Lao Sung women have fewer rights and little control of their resources according to their patriarchal tradition.

However, men of Lao Theung and Lao Sung have control over most of the resources such as land and in the decision making process. Participation of women in meetings or political events is limited. The number of women's participation is always less than that of men. Without special considerations, men speak more than women, especially in public occasions. In most places, women and children, especially girl children are responsible for collection of water for domestic use. However, women have less opportunity to make decisions related to the fetching and usage of water than male.

Therefore, women have been encouraged to participate in each workshop so they can address their situation and requirements in the project cycling.

(2) Ethnic Minorities Issues

In Lao PDR, 68 ethnic minority groups are recognized and officially classified into three categories, that is, Lao Lum, Lao Theung and Lao Sung. In Long District, 86% of the total number of villages are Lao Sung, in contrast to 12% Lao Lum and 2% Lao Theung. Akha (Ikor) is the major minority tribe under the Lao Sung minority group in Long District. In Viengphoukha District, 40 % is Lao Sung, whereas 53% is Lao Theung and Lao Lum shares only 7%. 32% of the total target villages is Lao Lum (Leu, Thaidam, Phoutai, Phounoi), 47% is Lao Theung (Khmu, Lamae, Yuan, Doi) and 21% is Lao Sung (Hmong, Akha, Yao, Qui, Mouser).

Ethnic minorities in the target villages mostly live in the mountainous area and preserve their own cultural heritage with a long history. They are independent and have pride in their skills for their own way of life such as farming, hunting and handcrafting. They have their own traditional water supply schemes using bamboo to transport water from the source.

Chapter 3

SANITATION AND HEALTH CONDITIONS

3.1 Epidemiology

Among the 356 households surveyed at the four target districts, interviewees have responded to the question “What are the most common diseases experienced by members of your family?” with 61 kinds of disease or symptoms. The most frequent answer is Malaria (31%), followed by Diarrhea 2 (23%) and Fever (9%). The others category includes: Cough, Headache, Measles, Stomachache, and so on.

Those interviewees also responded to the specific cause of the diseases they believe. For Malaria, the majority could not identify its specific cause. In Bokeo and Louang-Namtha, where they are rich in natural forests and small streams, countermeasures against mosquitoes breeding seems not practically feasible. Under such circumstances, protection of individuals might be the only choice for disease prevention. Mosquito nets are commonly used in some villages but they are not perfect. Commonly employed tactics to reduce Malaria are: to distribute impregnated mosquito nets; to impregnate existing mosquito nets in the village; and to promote awareness of Malaria and the need for protection.

For Diarrhea, one third of the respondents refer to some risk of contamination from drinking water or food, while still more than half could not identify the causes. Infection routes of those diseases have not been clearly identified yet, mostly due to the lack of epidemiological investigation capability at the local level. A part of this project result shows a significantly high rate of bacillary contamination in sampled dug wells. While people commonly prepare boiled water for drinking in the form of tea or some traditionally prepared herbal plant, “pakdomn” or “la” in it, some people in some ethnicity believe “raw” water is better for their health.

According to the KAP project done by UNICEF in 1996, people see benefits of having latrine as a convenience of not having to go far from the house, prevention of diseases, keeping area clean, and for privacy. Those reasons explain well the result of another village survey conducted by the Bokeo provincial health department and MSF, an NGO, in Houayxai district in 1998. That survey revealed that the population density and the length of stay at the current place are the major parameters to affect latrine demand, and this coincides with the observation of HASWAS as well.

Chapter 4 WATER RESOURCES AND WATER USE SITUATION

4.1 Available Water Sources

The Mekong River which originates in the Himalaya mountains is the main river course of Laos, and most of the rivers flowing inside the country are tributaries of the Mekong River. The main river in the project area is the Nam Tha River originating from Luang Namtha Province flows from northeast to southwest into the Mekong River passing through Bokeo Province. Other rivers in the project area are Nam Ma river, Nam Ngam river, Nam Hoo river and Nam Tin river which flow from northeast to southwest all terminating into the Mekong River.

The water sources expected to be used as sources for the project target villages are further tributaries of the above rivers or springs related to the above sources. In the past, the rivers had stable base flow with abundant quantity and good quality owing to abundant rainfall and protected by deep forests. The recent deforestation activities in upstream areas and slash and burn farming have contributed to the decrease in flow rates of water resources. The decrease in river base flow in the dry season and increase of turbidity due to topsoil outflow in the rainy season are causing environmental problems in water quality and quantity.

On the other hand, abundant groundwater can be found as unconfined and confined aquifers in the riverbank terraces of Viengphoukha and Long Districts where villages have settled along the river; the inland basins of Luang Namtha, Sing and Pha Oudom Districts; and the Alluvial fan of lowlands of Houayxai District.

However, it is reported that the confined groundwater in both Luang Namtha and Bokeo Provinces has a problem with water quality and cannot be used as drinking water in some areas. Groundwater surveys are not carried out scientifically in this area. In Houayxai District, only a few groundwater development projects using boreholes were implemented in the past, which were mostly by EU.

Also, a groundwater development project to develop confined water was implemented in Luang Namtha Province through the support of the World Bank in 1994, where 18 boreholes were drilled, and due to dry wells and water quality problems, only 8 wells were successful (success rate of about 44%). Then, 3 boreholes were drilled in the river terrace zone found in the central part of the District capital of Viengphoukha, and these were successful. The depths of these boreholes are about 30 m and the water quality is acceptable. Tara pumps were installed and are still functioning without any major problems even after more than 3 years of operation and supplying precious drinking water to the villagers.

As for unconfined groundwater, it is being drawn from traditional hand dug wells and concrete lined shallow wells, and is supplying drinking and domestic water to the villagers in many areas. These wells have depths of a few meters to 10 m or so with static water levels of a few meters, and water is fetched by hand using buckets. While the water quality of unconfined groundwater is good and water can be fetched easily,

quantity can become a problem in the dry season and also these type of wells are easily contaminated by human sources, and therefore proper construction techniques, sanitary control and careful maintenance are necessary.

4.2 Water Use Situation

Presently, the existing water sources and water intake facilities for villagers are mainly river water and groundwater as follows.

- (1) Traditional hand dug well
- (2) Concrete lined shallow well with cover
- (3) River and stream water
- (4) Spring water
- (5) Borehole

According to the annual calendar of water use, which was surveyed at a few villages in Long District, the shortages in water become prevalent at the end of the dry season and the villagers tend to use less water, whereas in the rainy season when water is abundant, more water is used, but problems with turbidity, odor and bad taste become apparent. The daily water use pattern reveals that water is used the most in the evening from about 5 p.m. to 9 p.m. for cooking, cleaning and bathing; the second most used period is in the morning from around 5 a.m. to 9 a.m. where water is used for cooking breakfast and cleaning; the tertiary water use period comes around noon to 3 p.m. when water is needed to cook lunch and other minor uses; and at other hours of the day, water is hardly used at all.

4.3 Water Quality

Water samples from existing and available water sources were carefully analyzed in the laboratory. The water quality analysis results for the project sites indicate water contamination in ammonium, nitrate, nitrite and coliform count. However, some of these contaminations could have originated from poor sampling practices at the sampling sites. Therefore, during the Pilot Project, the selected future water sources were properly sampled and carefully examined.

Chapter 5

PROJECT EVALUATION

5.1 Economic Benefits

(1) Improvements in Conditions of Sanitation and Hygiene

- About 70% of the pilot village population reported a noticeable decrease in the number of water related diseases such as diarrhea after access to clean water and sanitation. Similar improvements are conceivable for the project.
- The days of absence from school of the pilot village children have decreased after receiving the conveniences.

(2) Effects on Time Saved in Water Collection

- About 91% of the pilot villages responded to reduction in water fetching time by using the improved water supply facilities, with an average time reduction of more than 20 minutes. Therefore, similar effects can be expected from the project.
- The reduced fetching time is used, especially by women, for caring their children, tending gardens and raising livestock with possibilities for increased income from these extraneous activities.

(3) Contribution to Guiding Orientation and Capacity Building

- The Project can contribute to guiding orientation of counterpart staff towards participatory methods and learning-through-sharing to apply demand-driven approaches.
- Capacity building of all level concerns can be effected through training sessions, OJT and actual applications in line with learning-by-doing.

5.2 Social Evaluation

(1) Social Impact and Social Considerations

Evaluation on social impacts brought by the project and other social considerations are summarized below.

Needs Satisfaction

- GFS schemes of one source to supply one village brought higher satisfaction to the villagers.
- Boreholes did not bring needs satisfaction to the villagers because water has undesirable odor.
- The GFS scheme supplying 9 villages in Houayxai as one scheme did not bring high satisfaction to the villagers as somewhat predicted due to the already sufficient number of existing dug wells, giving rise to low willingness to participate and contribute.

Ownership and Potential for Sustainability

- Even though participation in community dialogue and contribution to construction were equally shared, actual benefits were not necessarily equal among villagers, such as differences in distance to tapstands and water flow.

- Overall ownership through participation is excellent in GFS schemes, which induces responsibility of the facilities, which is especially true for villages of single-village GFS schemes.
- The level of ownership of the borehole scheme was not considered as satisfactory, because outside contractors have done most of the construction work.
- If the project did not bring any improvement to villagers, ownership had not developed.
- Most of the village committees reported that they were not trained enough on basic repair and management of their water schemes.

Empowerment

- Through the three phases of the project, women tried to be encouraged to participate. Men were enthusiastic to participating in decision-making, whereas female contributed to labor more than men.
- Female participation must be promoted through the whole process including maintenance activities.
- Villages having self-help efforts, high self-sufficiency and urgent demand for water are more cooperative and participatory.

Relationship with Government and Donor

- Only the villages that are benefiting from the project are happy and grateful to the government and donor.
- A more needs oriented project formulation has to be promoted by donors and government.

(2) Community Participation

- Overall participation is excellent in GFS schemes and in most of the villages, labor and local construction materials have been sufficiently provided to the project.
- The level of participation of the villagers receiving boreholes and dug wells were not considered as satisfactory, because most of the construction work has been done by outside contractors who did not clearly understand the importance of community participation in this project. Therefore, sufficient explanation and education are required for both the contractors and villagers.
- The existence of co-ownership between nine villages in Houayxai being supplied by one scheme is causing friction between villages with consequent insufficient development in sense of ownership. The important lesson to be learned from this is that demand orientated project formulation is a key to nurture preferable ownership and substantial sustainability.

(3) WID/Gender Project Cycling

- Whereas most of the users of the water supply schemes are women, the water supply scheme tend to be implemented without women's involvement to create difficulty on reflecting the actual needs on the overall project.
- The major purposes of female participation are not only the sustainability of the project and maximization of the benefits to the beneficiaries, but the

enhancement of awareness on gender in daily life through the participation of the project.

- Gender/WID evaluation on their participation and contribution was quite high from a project cycle management perspective.

5.3 Technical Evaluation

(1) Gender Considerations in Water Supply due to Biological Differences

- Although both men and women have similar capabilities and potentials, the biological differences between them due to their reproductive differences have to be carefully considered in water supply issues. GFS communal taps are welcomed by all types of population in the pilot villages. However, the differences in hand pump type have different reactions from different users as shown in the table below.

Hand Pump Type	Village Name(Well Type)	Appropriateness to Different Users
Rope Pump Lao-99	H-3 Nam Ngao (Dug Well)	All village population such as men, children, pregnant women, middle-aged women are able to use the pump.
Tara	H-3 Nam Ngao (Dug Well) H-9 May Phatthana (Borehole)	For pregnant women, middle-aged women as well as aged women who had experienced delivery many times, the pump handle should be installed at a higher position to relieve strain on lower belly muscles. But for others, this position is comfortable.
Afridev	H-37 Leang (Borehole)	All village population such as men, children, pregnant women, middle age women are able to use the pump.

(2) System Function for Dug Well and Borehole

- For villages using groundwater with dug well or borehole, the problems with system functioning were limited to hand pump operation and drainage.
- Since the drainage situation is similar to that for GFS, the same can be mentioned as was listed above for GFS.
- Even though different types of hand pumps involved different operation techniques, the villagers are not having big problems with their use. Only specific women were having difficulties due to the height of the handle of Tara type pumps.
- The Rope Pump Lao-99 was favored the most for reasons of comfortable turning of the handle and damages are easily repaired using locally available materials.

(3) System Function for Latrines

- The functioning of pour flush type latrines is very simple involving no mechanical parts, and the villagers were not yet faced with any problems.
- The only conceivable problems to be encountered are cracks or breakage of the bowl and fully filled underground pits. After about 5 years, when the underground pit becomes completely filled, this pit has to be desludged or cleaned out so that it can be used continuously.

(4) Water Quality

- The groundwater in the boreholes of pilot villages contains an undesirable odor to cause the villagers to avoid using the water for drinking. This is believed to be caused by biological phenomena of organic substances in the geology of this area.
- The problem related to water quality of GFS is turbidity, especially during the rainy season.
- Another water quality problem worth mentioning is the number of coliform bacteria. This does not imply absolute fear, but probable indications of fecal contamination. The most positive solution is to boil the water before drinking and many of the rural villagers are already accustomed to this practice.

(5) Water Flow

- Since the source for GFS is a stream on top of the mountain, the flow can diminish during the dry season.
- For villages using groundwater sources from dug wells or boreholes, the groundwater potential of the aquifer will influence the pumping rate.
- Another important consideration for preserving the water sources is conservation of the environment around the water source. Slash-and-burn of forests around streams can have adverse effects on their flow rate.

(6) Maintenance

- One of the easiest and most important task for GFS villages is regular cleaning of the system, but these operations are not always being conducted at all villages.
- Collecting maintenance fees on a periodic basis is very effect to sustain the system and foster a stronger sense of ownership. Many of the pilot villages have set a rate of about 100 kip/person/month on the average as the maintenance fee, but only about half of the villages are actually collecting these fees.
- Some villagers complained that they do not want to pay the fee because their house is farther away from the tapstand than others, which creates unfairness in the quantity of water use. This situation can be alleviated by collecting fees on a volumetric basis instead of a fixed price. For proper volumetric levying of fees, the flow meters installed in each of the tapstands should be used for this purpose.
- Other problems communicated by the villagers related to maintenance as well as solutions to them are listed below

Problem	Situation	Solution
Lack of basic tools	The villagers cannot make appropriate repairs because they do not have any basic hand tools.	Province and District should hand out some of the tools used during the construction to the villages.
Delays in response upon informing of damages	Upon informing the District and Province, repairs are not conducted immediately.	Province and District should make periodic interventions to handle these emergencies. And District and Province need means of transportation for this purpose.
Low knowledge of caretakers	Village caretakers cannot properly handle maintenance tasks and repairs because they were not trained.	A training program should be prepared and District and Province should make frequent interventions to advice on water use and sanitation, and support on operation and maintenance.
Maintenance fees not collected	Village misunderstands that the contribution in cash that they made for the construction is to be used for maintenance. Also, some villagers are unwilling to pay because of irregular supply or they are situated far away from tapstand.	The villagers should be trained on operation and maintenance, and given an education to foster a sense of ownership.
Unfairness of maintenance fee	Some villagers complaint that they cannot pay the same amount as others because they are using less than others due to distance from the tapstand or irregular supply.	Fees should be collected on a volumetric basis instead of a fixed amount. For this, the water meter is useful to determine the exact amount consumed by each user.

(7) Evaluation of Technologies

- In spite of the high initial cost and skill requirements for construction, the GFS scheme is technically sustainable and therefore can be considered as the most feasible scheme, and this conforms to the preference of the target villages.
- All types of latrines are technically feasible, but if sufficient water is available, the pour flush and septic tank type latrines are the most acceptable, but the pour flush type latrine is more preferable in consideration of costs.

Chapter 6

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The conclusions made through the implementation of this Project are as follows.

- (1) This Project has significantly achieved the set objectives of capacity building and improved conditions in water supply and sanitation.
- (2) This Project has fully applied a demand-oriented approach wherever possible. However, due to the fact that the main objective of this Project is improvement of water supply and sanitation facilities, this nature itself excused supply-oriented concepts to be partially kept, but to the benefit of appropriately applying the merits of both approaches.
- (3) The Project has involved target villagers, both men and women, in participatory planning which encouraged a greater sense of ownership to sustain the system.
- (4) Good cooperation and support from concerned personnel from different levels of agencies are a few of the contributing factors to the success of this project.
- (5) GFS water schemes and latrines are easier for communities to realize participatory activities because they require high level contributions. Whereas, boreholes receive low participation due to low requirements for community involvement.
- (6) Confined groundwater in the target area is difficult for development due to problems with water quality and quantity.
- (7) After completion of the water supply and sanitation facilities, social and economic impacts from the project on the livelihood of the communities were noticeably observed even during the short period of about three months. Sanitation awareness improved and their behavior changed as a result of the newly acquired conveniences.
- (8) There is concern regarding sustainability upon withdrawal of JICA support.
- (9) In most of the pilot villages, the WATSAN (water and sanitation) committees need further training in operation and maintenance and management of the facilities.
- (10) District and Provincial Nam Saat still need capacity building to provide effective services and technical support in order to motivate the villagers to develop healthier lifestyles.
- (11) Village contributions should not be a forced effort, but rather a motivation effort in consideration of a balance between willingness-to-pay (in relation to the benefits conceived) and ability-to-pay.
- (12) For the villages that were cultivating poppy, and agreed to abandon the poppy field to discontinue taking opium in favor of receiving a water supply, they have proven that water is a basic human need of the villagers and is more in demand than narcotics.

6.2 Lessons Learned

This Project has conducted Phase I through Phase III, including the Pilot Project with a Pilot Project extension. As a result of these implementations, the following lessons and experiences were identified for enhancing future development studies and projects.

- (1) The more needy the people are, the more motivated they are. The communities having self-help efforts, high self-sufficiency and pressing water needs were more participatory and cooperative with high ownership.
- (2) Participatory approaches and techniques, such as community dialogue, PRA and PCM were proven effective for sustainable development of water supply and sanitation.
- (3) Cultural and gender needs at all levels must be taken into consideration and incorporated during all stages of the project.
- (4) Good coordination and cooperation among different sectors at all levels involved directly or indirectly in the project can contribute to its success.
- (5) Counterpart staff should apply the concept of learning-through-sharing to identify actual needs of the villagers and to formulate an effective solution to sustainable development.
- (6) An appropriate team combination of multidisciplinary members is one of the key approaches when working with rural communities.
- (7) Start a future project with a smaller scale that is controllable and conforming to the capacity of Nam Saat and concerned departments.
- (8) Promotion of sanitation through the construction of latrines in a village can serve as model case for neighboring villages in motivating them to want their own latrines to heighten their awareness towards sanitation.
- (9) Experiences learned through on-the-job training are considered to be most effective for capacity building of Provincial and District level personnel.
- (10) One method of restraining the use of narcotics may be to provide an alternative that is much more in demand for human life, such as water.

6.3 Recommendations

In consideration of the above topics, the following recommendations and suggestions can be made.

- (1) The procedures used in this project as well as the lessons learned can be applied as model for other Provinces having similar socio-economic and environmental conditions.
- (2) During the baseline survey and selection of target villages, more time should be spent for in-depth assessment by using participatory techniques such as community dialogue, RRA and PRA. Also, various sources of information should be collected by interviewing different groups of people and avoid interviews with only village headmen or one group of people who may not tell the real story but only for their own interests.
- (3) Secondary key sources such as Rural Development, the State Planning Committee, the Committee for International Economic and Cooperation, and the Department of Industry and Commerce, should be collaborated with in addition to the concerned sectors to collect and analyze information more comprehensively.
- (4) Actual local demands need to be fully understood by the Provincial and District level concerns applying a learning-through-sharing concept to be incorporated into future development plans.

- (5) Support and cooperation should be continued with Nam Saat at all levels through networking with gender and ethnic minority programs in order to respond to cultural and gender needs among Provincial and District Nam Saat in accordance with the Sector Strategy.
- (6) The level of village contribution should consider an appropriate balance between willingness-to-pay (resulting from the extent of benefits anticipated) and ability-to-pay. Subsidies in consideration of the poorer, more remote and ethnic minority villages are quite significant for future development.
- (7) A follow-up plan for sanitation improvement needs to be developed by concerned sectors. This should be followed by regular visits by District Nam Saat in collaboration with the concerned sectors at District level to promote behavioral change among people in the pilot project villages.
- (8) Concurrent implementation of both water schemes and sanitation facilities can give multiple effects to improve the sanitary conditions and raise satisfaction of the villagers.
- (9) Central Nam Saat in collaboration with Provincial level staff must follow up on the Sector Strategy and its dissemination with the District level offices. Practical breakdown guidelines which are easier to read and understand should be formulated to match the local situation.
- (10) Some culturally and gender sensitive personnel are required to join Nam Saat at all levels in order to work effectively in addressing gender and cultural needs with the ethnic minorities and isolated rural communities in accordance with the fundamental concept of the Sector Strategy.
- (11) Technology should be promoted keeping the following key points in mind.
 - Affordability: Payable by rural people
 - Appropriateness: Technically easy to operate and maintain
 - Accessibility: Easily reached and serviceable
 - Adaptability: Responsive to local culture and gender
 - Appreciativeness: Satisfied by all beneficiaries
- (12) Assistance is needed to Provincial and District Nam Saat in developing an operation and maintenance follow-up program to ensure sustainability of the implemented villages.
- (13) In pursuit of long-term capacity building, a long-term advisor is required to provide technical and managerial assistance to Nam Saat offices at Provincial level.
- (14) Financial support and resources should be provided to District level Nam Saat to implement operation and maintenance as well as advisory interventions.
- (15) Exchange and coordination activities should be carried out with other international donors and NGOs implementing similar activities to share information and experiences, and to avoid possible overlapping or repeated negative experiences.