CHAPTER 2

FORMULATION OF THE MASTER PLAN

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2.1 Rural Water Supply Program

The rural water supply plan in this master plan will cover 20 of the communes in the 5 northern provinces of Vietnam. The implementation will be in accordance with the framework of the current rural water supply system detailed in *Chapter 6 of Part 1*.

2.1.1 Outline of the Plan

(1) Target year: 2010
(2) Service commune: 20 communes in the 5 northern provinces of Vietnam
(3) System: Household connections (Level III)
(4) Target service population, design water supply amount and service coverage rate

Year	Service Population	Supply Amount	Service Coverage Rate (%)
2002	74,800	9,170 m^3/day (124 ℓ/c/d)	50
2005	124,000	16,350 m^3/day (132 ℓ/c/d)	80
2010	149,700	23,030 m^3/day (154 ℓ/c/d)	90

Note: ℓ/c/d = amount of water supplied in liter per capita per day

2.1.2 Target Operation

This plan will be implemented by CERWASS. The central and regional CERWASS offices will generally supervise the planning, implementation design, construction and supervision of the works. The communes, which become the owners of the facilities, will be responsible for the operation, maintenance and management of the facilities after completion and the turn over.

The planning, design, and construction of many of the existing water supply facilities in Vietnam were carried out mainly with emphasis on the demands of the party providing the services. Many aspects of the system were seen not to reflect the opinions of the beneficiaries. The consensus supposedly of the commune with regard to operation and maintenance is also deemed unsatisfactory.

The key to the success of the master plan is measured by the sustainability of the water supply facilities to be constructed, which is reliant on the commune resident's understanding and acceptance of issues related to facility O&M and payment of the costs. Prior to the construction of the facilities, CERWASS, the province and relevant district agencies should, therefore, hold discussions with the communes to gain understanding through acceptance and public commitment.

While the CPC tends to focus on the policy making aspect regarding the construction and operation of the water supply facilities, the beneficiaries or the residents tend to focus on the financial aspect, e.g. ability to pay the water charge. It is very important, therefore, to gain the residents' complete understanding regarding their financial obligations in facility O&M, as well as the convenience of receiving clean water and how this would improve health and sanitary conditions.

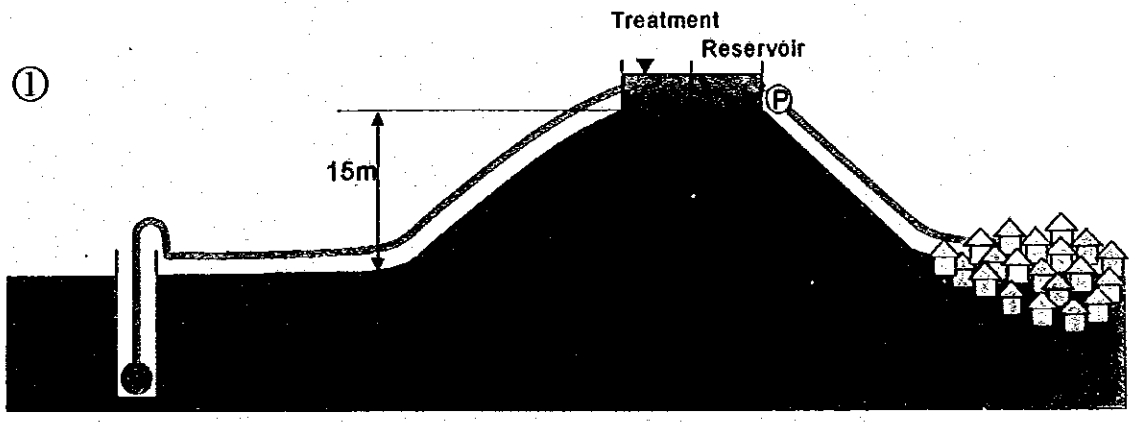
With these considerations, the study will promote from the planning stage close cooperation between the service providers and the beneficiaries, and establish mutual understanding between the two parties. Accordingly, the CPC should make the following fully known to the residents: the objectives and contents of the plan, the facilities to be constructed, funding required, operation, maintenance and management methods, water charge, and the positive impacts on health and sanitation. The committee should also gain the consensus of the residents regarding their full and direct involvement in facility operation and maintenance. The providers, including CERWASS, should also provide the required technical assistance, information relevant to facility operation, maintenance and management, hold training programs, and supervise administrative activities.

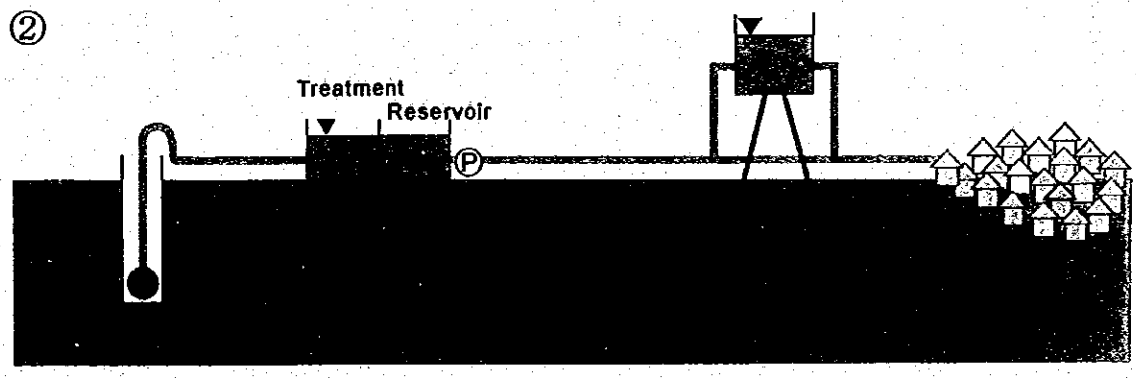
2.1.3 Facility Plan

The water supply system will be made up of the following facilities in accordance with the facility design standards mentioned in the preceding chapter.

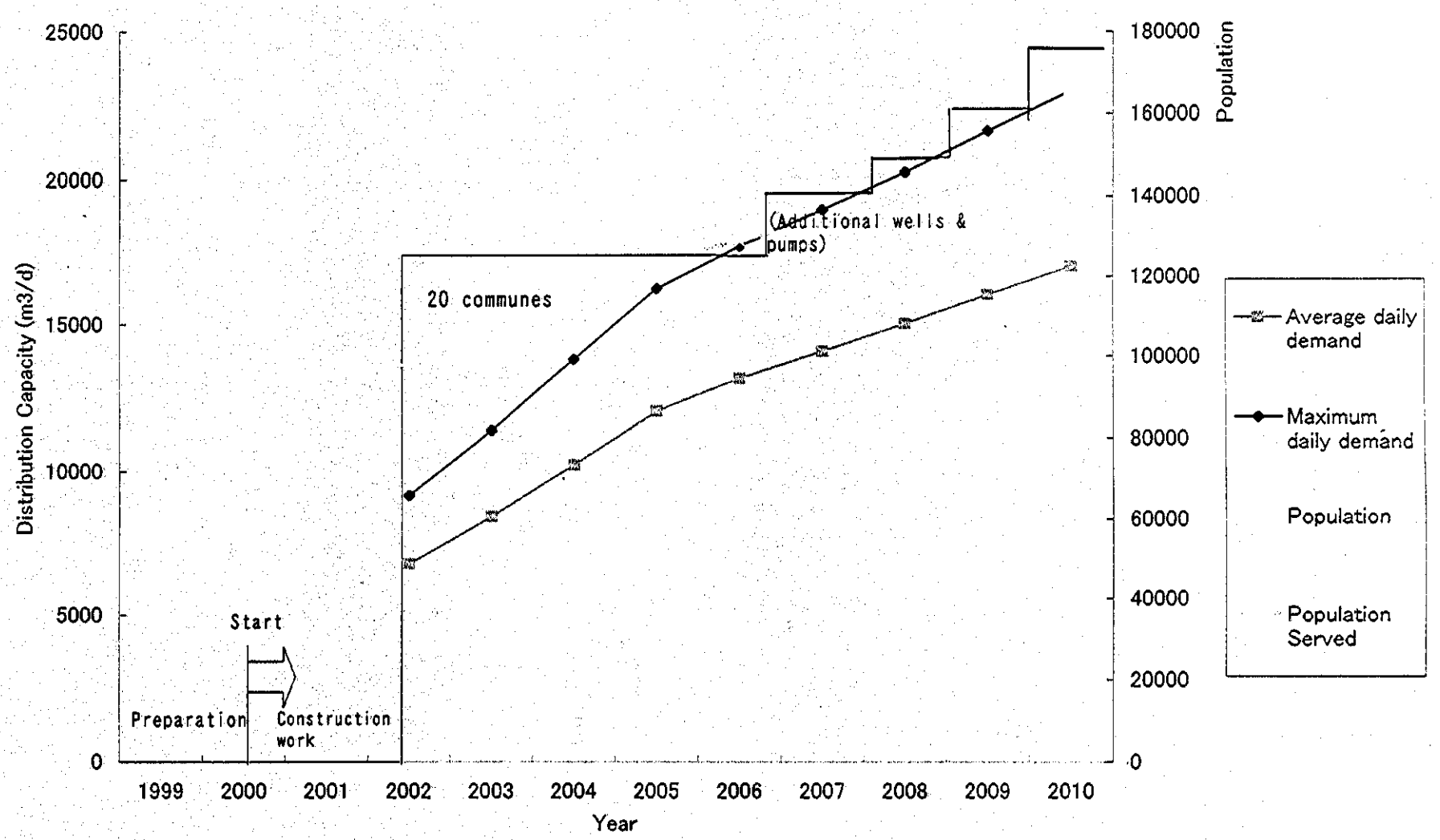
(1) Source facilities:	deep well (15 communes except for 4 in Ha Tinh, and Nong Cong Town in Thanh Hoa) river water intake facilities (5 communes: 4 in Ha Tinh and Nong Cong Town in Thanh Hoa)
(2) Purifying facilities	filtering pond, sedimentation pond
(3) Distribution facilities	distribution pond, distribution tower, distribution pump, distribution pipeline, water supply pipeline

The system flow chart is as shown below.





Proposed Implementation Schedule



2.1.4 Funding & Construction Schedule

The investment amount required to implement the master plan is estimated at US$ 16.2 million (225.3 billion VND). The water supply facilities will be constructed within a period of 1.5 years in Ha Noi, Ninh Binh, Thai Nguyen, Thanh Hoa, and Ha Tinh simultaneously.. The figure below shows the construction schedule and the financial investment plan.

2.2 Institutional Framework and Management Plan

2.2.1 Institutional Framework for Program Implementation

The project is implemented within the present institutional framework of the RWSS sector outlined in Part I Chapter 5. The following components of the project organization will be established[1]:

- **Project Management Unit** (PMU) responsible for completing the detailed planning of the project, perform project management, liaison with national stakeholders, provide support to project implementation units, and monitor and evaluate project progress and report to the National Steering Committee;

- **National Program Steering Committee** (NPSC) responsible for national coordination of resources and project monitoring.

- **National Training Team** (NTT) responsible for developing and implementing the capacity building program[2].

- **Provincial Program Coordination Committee** (PPCC) in each province responsible for planning and co-ordination of project implementation.

- **Provincial Program Coordinators** are international consultant appointed by the CERWASS, responsible for technical assistance to the PPCC and PTT as well as

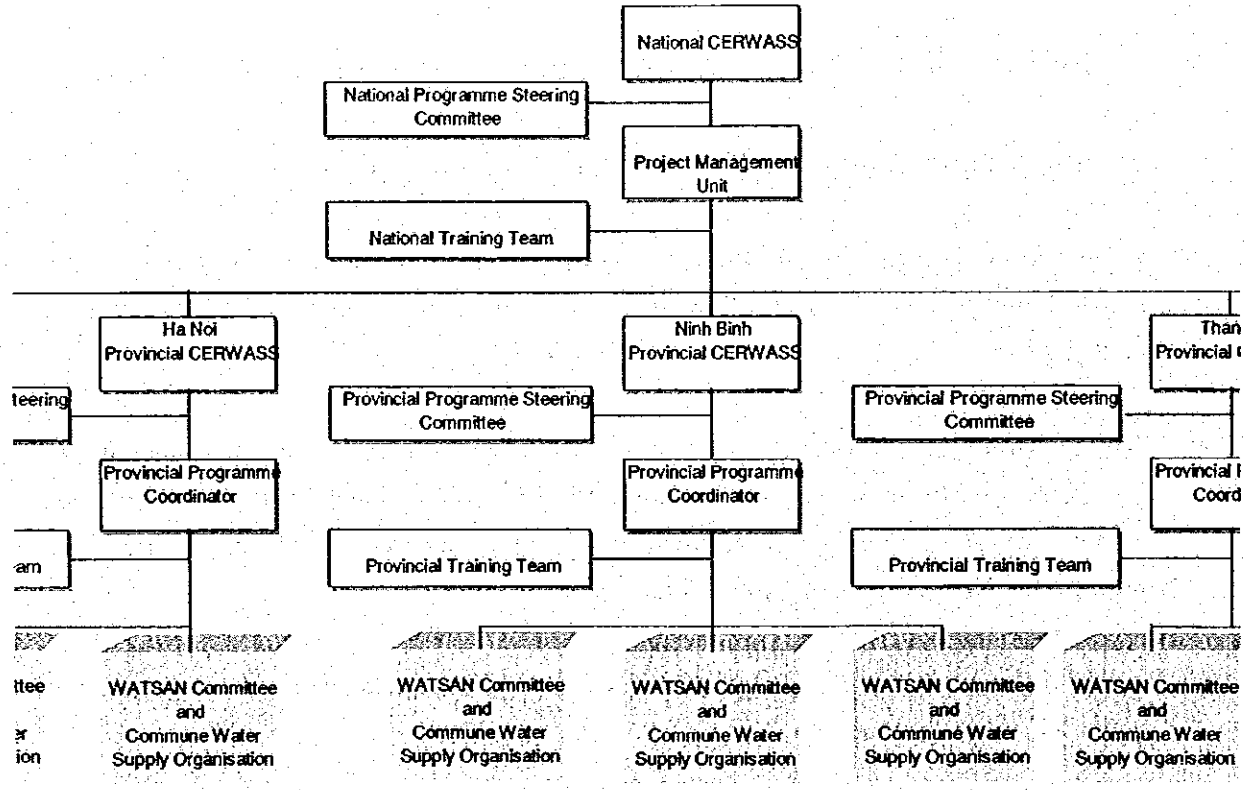
[1] It is expected that the project organization has been adapted to the existing institutional set-up of the rural water and sanitation sector e.g. within the framework of MARD and using CERWASS as the implementing agency.

[2] The NTT should consist of international and Vietnamese training providers. National training providers will most probably include among others Vietnam Women's Union, the Asian Institute of Technology, and selected CERWASS staff. Additional training provider will be selected among the pool of short-term experts available to the PMU according to needs.

providing capacity building measures at commune level.

- **Provincial Training Teams** (PTT) responsible for training the **Village Mobilizers.**

An organogram outlining the organization is presented overleaf.



(1) Organization at National Level

The Central CERWASS will be the national executing agency as they have been granted the responsibility for rural water and sanitation. Accordingly, at national level a Project Management Unit (PMU) will be established under the Central CERWASS.

The PMU is responsible for overall project planning, coordination, monitoring and evaluation of implementation. The PMU will be guided by the National Program Steering Committee (NPSC).

The NPSC will include representatives from MARD, MOH, Vietnam Women's Union, and Central CERWASS.

The National Training Team (NTT) will be attached to the PMU and responsible for the

detailed design and implementation of the capacity building component. The implementation of the capacity building component will be applied as a training-of-trainers exercise meaning that the NTT will train the Provincial Training Teams (PTT) in becoming project related trainers and the Provincial Program Coordination Committee (PPCC) to become efficient and effective provincial resource mobilizers and coordinators.

The PTT will then act as community development agent responsible for facilitating community mobilization, establish and train the WATSAN committee and the Community Water Supply Organization (CWSO) to operate and maintain the water supply facilities.

The PPCC will receive training in project management tools and be responsible for provincial co-ordination and monitoring/evaluation of project activities under close guidance by the Provincial Project Coordinator.

(2) Organization at District/Province Level

A PPCC will be established in each province responsible for co-ordination and monitoring of provincial resources to facilitate project implementation. Provincial Steering Committees for Water and Sanitation (PSCWS) are in the process of being established in most provinces as part of the NRWSS[3]. The PPCC will liaison with PSCWS in order to co-ordinate and utilize resources in the most effective and efficient way.

The members of the PPCC should include:

- A Provincial Peoples Committee representative;
- Provincial Department of Agriculture and Rural Development represented by Provincial CERWASS
- Provincial Department of Health representative/District Health Centers
- Mass-organizations representatives (Women's Union)
- A representative from each District Peoples Committee where target communes are included;
- Provincial Project Coordinator.

It is expected that some of the members of PPCC also will be members of the PSCWS.

[3] National Water Supply and Sanitation Strategy

This will benefit the utilization of local human resource and strengthen project implementation.

A Provincial Training Team (PTT) should be established responsible for training community mobilization agents and provide capacity of selected Commune People's Committee members. The PTT will also train the WATSAN committees in managing the different stages of project implementation as well as O&M of the water supply facilities. The PTT will be headed by the Provincial Coordinator and should have assigned staff from:

- Mass-organizations (Women's Union) responsible for community mobilization, health education[4] and WATSAN training;
- Provincial CERWASS staff responsible for construction supervision and training of O&M staff of the water supply systems.

Private- or state construction companies selected through a tendering process will do construction. It is expected that Provincial CERWASS will be responsible managing the construction with support from the Provincial Coordinator.

Capacity building/training of trainers program will be provided to the members of the PTT by the National Training Team (NTT). The NTT will also apply capacity building measures to PPCC.

(3) Organization at Commune Level

Effective information, communication, and education (ICE) programs will start before detailed planning and construction of the water supply facilities is initiated. This will initially be done by the Provincial CERWASS mobilizing the community and facilitate a participatory approach to decision-making. It is expected that selected key persons at Commune Peoples' Committee (CPC) and village level will act as initial mobilisers ([5]).

- A WATSAN Committee should be established and participate in the community mobilization as part of the community development process. The members should be elected from the villages expected to receive water, and include CPC representatives, Commune Health Center, union members, head of hamlets/villages,

[4] With support from provincial/district health staff .

[5] Vietnam Women's Union (VWU) is expected to play a central role in community development activities using village VWU as mobilises.

and other elected community members.

The PTT trains the WATSAN committee in community mobilization and health education as well as the explain the main conditions for sustainable O&M of water supply systems.

During mobilization WATSAN committee will act as mediator between the commune people and the implementing agency eg. the CERWASS. The committee will be responsible for sharing information with the commune people about the project and at the same time provide through the Provincial Program Coordinator with information that can facilitate appropriate project planning and implementation.

At the same time the WATSAN committee will select the members of the O&M organization of the water supply facilities eg. the Community Water Supply Organization (CWSO).

- The CWSO will participate in the construction work as part of O&M training. Additional O&M training will be provided by the PTT prior to the hand-over period. Intensive O&M training will be applied as part of the running-in period. Post-training will also be provided after hand-over based on an evaluation of O&M at that time.

Prior to the completion of the construction, the WATSAN committee would have received training in water supply facility management including accounting and financial management. At the time of take-over and the CWSO is in place ready to operate the water supply facilities, the WATSAN committee will have the capacity of managing the water supply system in a sustainable manner as well as provide continuing information on water and sanitation issues to the commune people. Training will be provided by the PTT.

2.2.2 Management Plan

(1) WATSAN Committee

The role of the WATSAN Committee is to represent the water users and secure that sufficient quantity and quality of potable water is provided to the households. At the same time it is responsible for facilitating information and campaigns about health issues related to the use of clean water. As such the WATSAN committee will be

acting as an advisory body to CPC and at the same time direct the O&M of water supply system according to the rules and regulations of the water supply utility.

A WATSAN Constitution (by-laws) should be made by the CPC to guide the work of the WATSAN committee. The PTT should guide the CPC in this work. The WATSAN Committee can, if possible, be established as a sub-committee under the PC.

Based on this, users will be able to feel consulted and having a more say on service level, technology and operational arrangements. This will facilitate more commitment towards O&M of facilities and at the same time a better understanding of the need for clean water in terms of improving health conditions.

(2) The Commune Water Supply Organization (CWSO)

The day-to-day management of the CWSO will be done by an Administrator who will oversee the O&M functions performed by the Plant Operators. The Administrator will also take on accounting responsibilities as well as the management of water bills, and customer relations.

Other related CWSO staff will be:

- Pump Operators/Pipeline Inspectors;
- Meter Readers/Fee Collectors[6] and
- Accountant/Treasurer

People to fill these posts should be selected by the WATSAN committee and approved by the CPC. The selection should be completed before construction starts in order for their participation in the construction of the system. Combined with training in O&M procedures this will facilitate enhanced knowledge about O&M requirements and the layout of the piping system.

[6] It should be discussed and decided by the commune how selection of money should be arranged. One option is for the individual households to pay the water bill to the Administrator at the CWSO office. An other option is for the Meter Readers to collect the amount and hand the money over to the Administrator. In both cases receipts will be provided. Either way, the households should have confidence in the arrangement.

2.3 Financial Plan

2.3.1 Capital Investment and House Connections

Contributions by local Governments are quite difficult to discuss at this stage of the Project, since investments in water supply systems are covered by a special budget which can be obtained through negotiations among authorities.

The cost for the house connection must be borne by the users in order to establish ownership of this common property, which is critical to maintain the facility for the long term. The connection charge for the past projects in the rural area in Viet Nam ranges from VND 300,000 to 1,000,000, which is equivalent to half to one month's income of Study Area households.

As was discussed in Chapter 5, Part I, most of villagers have invested a significant amount of money in the construction of a dug well or a bore-hole (VND 500,000 to 2,000,000). However, according to the results of the household questionnaire survey, the quality of water from these wells is mostly poor and their quantity is quite limited. As a result, few of the villagers are satisfied with their wells. Although cash would not be promptly at their disposal, it is expected that a significant number of villagers would shift from well water to piped water over time, if the connection charge is reasonable.

When the prospective water users or the service area is determined, the village must hold a meeting with prospective water users to decide whether they are going to pay the connection charge to receive the service. At the same time, how to apply the connection fee should also be discussed among the users. Variable fees could be levied on each household, depending on their distance to the water pipeline, or a uniform charge could be applied for all households.

There would be some (or many) households that wish for piped water but cannot afford to pay the connection charge. Since the proposed project uses public funds, its benefit should not be limited to only those who can afford the house connection. There are several approaches to solve this problem: (a) the community introduces a cross-subsidy by levying a variable connection fee based on household income; (b) poor households contribute labor to the construction work and trench digging for main pipelines, and in return they receive a free connection; or (c) public taps are installed so that poor households can access clean water without paying the connection charge. The community itself has to decide which approach it takes. If option (c) is chosen, the management method of public taps must be thoroughly discussed and agreed upon by the users.

There are very few cases of successful public tap management in Viet Nam, apparently because of a generally weak sense of common property. It is strongly recommended that a proper procedure for the introduction of a public tap be established through a pilot program in one of the hamlets, prior to the overall introduction of public taps in the service area.

Although capital amortization fees must be, in principle, included in the water tariff to enable the future replacement of the facility, it would be quite difficult considering the communes' low income level. However, part of the capital costs could be recovered in communes with higher income levels, such as the two communes in Ha Noi Suburbs. The amount of capital amortization fees should be discussed and determined by the commune itself.

2.3.2 Determination of Tariff

(1) Tariff level

As was discussed in Chapter 5, Part I, the electricity charge can be used as a proxy for the maximum water price that users can pay.

When the water consumption is assumed at 80 ℓ/day/capita and the size of household is assumed to be 4.5 members, the monthly water consumption per household is calculated to be 11 m^3. Assuming that rural households can afford to pay the same amount of money for water as electricity, the affordable prices of water in Ha Noi and in the other four Provinces are calculated as follows:

Table 2.3.1 Maximally Affordable Water Price (per month)

Province	Income (VND)	Electricity Charge (VND)	Electricity Charge as a Proportion of Income (VND)	Maximum Affordable Water Price (VND/m^3)
	(a)	(b)	(c) = (b) / (a)	(d) = (b) / 11*
Ha Noi	800,000	50,000	6 %	4,500
Four Provinces	600,000	20,000	3 %	1,800

*A household is assumed to consume 11 m^3 per month

(Source: JICA Study Team)

There are several factors that determine a household's willingness to pay for piped water: the quality and price of substitutes, water tariffs applied in other areas, the expected service level, and the distance to the water tap. According to the household interview survey conducted by the Study Team, the needs for piped water are very high

since the quality and quantity of the well water is very low. On the other hand, households know that the standard water tariff applied in urban areas is VND 1,500 to 2,000 per m^3. In order for these tariffs to be accepted by local users, the value of clean water must be emphasized through an information campaign on public health and sanitation.

(2) Procedures for the Determination of Tariff

Ensuring the collection of water tariffs is crucial for the sustainable operation of water supply facilities. Past experiences in the UNICEF-WATSAN Program show that involvement of users or the community in the planning stage is key to the successful introduction and sustainable use of piped water supply facilities.

There are several matters that must be discussed by the users prior to the construction of water supply facilities.

(a) Before deciding on the construction of the water supply system, thorough explanation should be given to prospective water users on each item of operation, maintenance costs and user's share of maintenance costs. Transparency in the determination of costs and prices must be assured through these discussions; this step is critical to making users aware of the importance of payment.

(b) Subsequently, discussions should be held among users on whether they can afford the O/M costs and to what extent the amortization fees should be included in the tariff. The tariff structure must also be determined. For instance, the tariff for public taps could be set lower than that of a house connection since maintenance costs for the former are lower. A per capita rate instead of meter reading could be applied for public taps if the meter reading for public taps is proved to be inefficient. Maintenance and operation of public taps could be entrusted on a contract basis to the households located close to the taps. Finally, a progressive rate could be applied to the house connection so that a higher rate could apply to the users who consume a relatively large amount of water.

(c) A proper billing and book recording system, capable of being reviewed by a third party must be developed by the WATSAN committee so that the transparency in financial management is guaranteed. The collected tariff must not be used for other purposes than operation and maintenance of water supply facilities.

2.4 Capacity Building Measures

2.4.1 Project Stages

The main objectives of the capacity building measures to be applied is to secure sufficient skills, knowledge and attitude exists at commune level in order to sustain the supply of safe water after project termination. The following organizational arrangements and main capacity building activities should be applied to the different stages of the project:

Stage 1 - Preparation and Capacity Building at National Level:

① The Project Management Unit (PMU) establishes the National Training Team (NTT) as part of the organisational set-up of the program.
② NTT address capacity building needs at national, provincial and local level in detail;
③ NTT establish a net of training providers and develop capacity building programs, and monitoring and evaluation systems;

Stage 2 - Capacity Building at Provincial Level

① PMU establish Provincial Program Co-ordination Committee (PPCC)
② NTT establishes a net of training providers and consolidate Provincial Training Teams (PTT)
③ NTT apply training of trainers program for PTT
④ NTT apply capacity building for PPCC.

Stage 3 - Capacity Building at Commune Level

① PTT liaison with Commune People's Committee (CPC) followed by capacity activities to enhance CPC facilitating role.
② Together with Vietnam Women's Union (VWU) and the CPC, PTT facilitate the organization of Village Mobilizers;
③ PTT train Village Mobilizers to mobilize the commune;
④ PTT support CPC to establish WATSAN committee;
⑤ PTT train WATSAN committee;
⑥ PTT training Commune Water Supply Organization (CWSO) staff;
⑦ PTT supports CWSO staff in the running-in of water supply system and apply on-the-job training of CWSO staff and WATSAN;

Stage 4 - Monitoring and Evaluation

① NTT train PTT and PPCC in monitoring and evaluation techniques;
② NTT evaluate monitoring and evaluation by PTT (and NPSC and PPCC).

It is expected that construction of the water supply facilities will be adapted to the implementation of the organizational arrangements and different capacity building activities are in place before construction takes place.

As capacity building is a process where the activities are applied in sequences over a longer period, several activities might be applied in parallel. The stages are therefore not to be regarded as strict sequencing.

2.4.2 Stage 1-Capacity Building at National Level

<Central CERWASS>

Several initiatives related to capacity building of Central CERWASS have been provided by other donor organization including UNICEF. Selected staff from Central CERWASS has also participated in this study and has received training in Project Cycle Management/Logical Framework Approach and acted as project facilitator at province/district level.

The Danida will provide considerable capacity building measures to Central CERWASS through its sector program. As selected staff from Central CERWASS will form part of the NTT, enhanced capacity building measures will be provided more indirectly through on-the-job experience and working with international and national experts at province and district level.

2.4.3 Stage 2-Capacity Building at Provincial Level

(1) Provincial Program Coordination Committees (PPCC)

The PPCC will be responsible for coordination of provincial resources and stakeholder inputs as well as overseeing project implementation within the province. The responsibilities of the PPCC will be very much in line with those of the NPSC, but while the national committee will take national view and thus coordination of national resources, the PPCC will concentrate on coordinating issues within the province.

In order to facilitate full and active collaboration of the different stakeholders involved in the project at province level, technical assistance will be provided to the PPCC. This

will also be done in the form of a seminar.

(2) Provincial Training Teams (PTT)

The NTT establishes a net of training providers and consolidates PTT. A training-of-trainers approach will be applied emphasizing a participatory approach to community mobilization and development.

Given the wide range of skills required, training cannot be accomplished in just a on-time workshop. It is therefore recommended that basic training of trainers courses are provided to the PTTs before any project activities are started at commune level. Training of trainers e.g. the Village Mobilizers are then applied as a two step sequence. The first sequence includes training of the PTT by the NTT in project specific subjects prior to their implementation (TRT). The second sequence constitutes the training of Village Mobilizers and later CPC and CWSO.

The training of PTT can be done in a combination of national training courses and seminars supported by provincial training courses arranged by NTT. It is recommended that a pilot commune is selected in each province to be used as a training ground before full-fledge implementation is applied. This does not mean that the pilot project has to be completed before projects are implemented in other communes, only that experience has been gained from one project under close supervision by the NTT.

2.4.4 Stage 3-Capacity Building at Commune Level

(1) Training of Commune Peoples' Committee Members

After construction of the water supply facilities has been completed, the CPC will be the sole owner of the facilities. To secure sustainable project implementation and O&M of the water supply facilities it is essential that the CPC are involved right from the start of the mobilization period.

The PTT should conduct a workshop with (selected) CPC members to explain about the different steps of the project and how it is going to be implemented. This should be followed by the provision of training courses within subjects like:

- Project cycle management;
- The role of the Village Mobilizers, community participation and mobilization techniques;
- Hygiene education and environmental sanitation;

- Financial management and tariff calculation;
- Monitoring/evaluation of operation and management of water supply facilities;
- Conflict resolution

(2) Training of Village Mobilizers

Most of the member of the Village Mobilizers will be selected from the Vietnamese Women's Union (VWU) or other mass organizations at village level. The PTT facilitates the organization of Village Mobilizers together with VWU and the CPC. The Village Mobilizers will be trained before they perform any major IEC as they are not professional community workers, but fellow villagers.

The training activities will be provided by the PTT before any major new project activity will take place. The IEC period and curricula of each IEC component will be decided during the detailed planning of the IEC component. This will be done by the NTT in collaboration with the PTT. A step-by-step training approach will be applied correspond to the different sequences of the project implementation plan.

The Village Mobilizers will do the mobilization and training of commune people with support from the PTT. A combination of household visits and group meetings should be applied as the main IEC tools supported by visual aids.

(3) Training of WATSAN Committees

The objective of the training is to prepare the members of the WATSAN committee to manage the water supply system. The training of WATSAN committee members should be done by the PTT and occur at regular appointed time once a week. A participatory approach should be applied with emphasis on learning by doing, role-playing, demonstration, and if possible, visits to communes where projects are more advanced. Through out the training, references will be made to the Community Handbook and how to apply the different tops in practical terms.

The training should include the following topics:

Mobilization and community development

- The role and functions of a WATSAN committee;
- Water borne decease and health risks —basic health training;
- The cost of water;
- Participatory approaches to community management;
- Gender issues and the role of women in connection with water and sanitation;

- Conflict resolution and problem solving
- How to make bylaws and rules for O&M of water supply systems
- Protection of water source;

Overall O&M management:

- General management procedures of water supply systems;
- Cost and financing of O&M;
- How to calculate correct tariffs;
- Accounting principles and annual reporting
- Fee collection systems and payment recording;
- Consumer relations;
- How to make job descriptions for O&M staff;
- How to monitor O&M of water supply system;
- Record keeping and reporting.

(4) Training of the Commune Water Supply Organization

<Training of Plant Operators>

The training of Plant Operators should be confined to the equipment and machinery installed in the plant as well as the plant technology itself eg. treatment system and appropriate use of system. As the operators will participate in the construction work of the plant they will experience how the raw water will be processed to drinking water. This will be combined with water treatment theory and visits to other operating treatment plant.

The operators should also get a basic understanding of how electrical motors operate and their maintenance requirements. The same occurs for the pumps and related monitoring equipment. While the plant operators should perform (preventive) maintenance, it is recommended that repairs and overhaul be done by trained mechanics located in the commune or the nearest town. When calculating the water fee it is important that these costs are included.

<Training of Booster Pump Operators/Pipeline Inspectors>

In those cases the system requires booster pump stations, caretakers should be applied and provided training in pump maintenance and proper operation of the pumps and electrical motors. It is expected that the they also will be responsible for inspecting the pipelines regularly to detect any leakage and illegal connections. If there is no requirements for booster pumping, the inspection of the pipeline should be performed

by the Meter Reader/Fee Collectors.

All training related to operation and maintenance procedures should be provided by the provincial CERWASS participating in the PTT.

<Training of Meter Readers>

The Meter Readers/Fee Collectors must be trustworthy members of the commune and each village should select their own Meter reader/Fee Collector. This should be facilitated during the mobilisation phase in order to have sufficient time for training. The selected persons must be literate and able to do simple arithmetic. Water meters will be used to measure water use and customers' logbook will be introduced where consumption is calculated and recorded whereby a bill is issued.

It is recommended that the consumers make the payment at the Administrator's office. A receipt will be provided upon payment.

<Training of Administrator>

The Administrator will have the overall managerial and administrative responsibility for O&M. He/she will also be responsible for financial management and accounting. Perform banking functions, pay bills and arrange staff salary payments. The Administrator should make monthly reports to the WATSAN committee addressing financial status and any other business that influence on the O&M of the water supply system.

It is recommended that the Administrator take part in the training of the WATSAN committee, as he/she will be the communication link between the public, the plant and the WATSAN committee. The selected candidate should preferably have some administrative background including basic accounting skills. During construction, specialised training will be offered the Administrator to compensate for any skill gaps that might occur after WATSAN committee training.

A manual should be developed by the NTT to guide the daily work of the Administrator. The training program should be developed and correspond to the manual. It is expected that some of the tops to be trained in will include:

- Tariff calculation;
- Budgeting, financial management and control;
- Accounting and financial reporting;

- Banking;
- Consumer relations;
- Procurement and stock keeping;

The training will be applied as a combination of lecturing and on-the-job training/coaching.

2.5 Water and Sanitation Campaign

2.5.1 PCM Workshops for Improvement of Water and Sanitation

From May to July of 1999, workshops using Project Cycle Management (PCM) method were conducted in five provinces of the study area. There were three main objectives for PCM workshops.

- To analyse participants, problems, objectives and approaches of the future water supply and sanitation project with a participatory approach.
- Training of commune representatives, district planning staff, and provincial and central CERWASS staff for social mobilization.
- To inform about concept and program of the Study for M/P and Feasibility Study.

Participants of this workshop are expected to be the members of the Village Mobilizers in their commune to manage social mobilization using workshops during planning and implementation of the future project. Detail of the workshop is included in the Supporting Report.

In all workshops, necessity of disseminating appropriate knowledge on hygiene and mobilization of community are highly focused and actively discussed. Dissemination of appropriate awareness on hygiene is a base to increase demand for safe water, so that the future project comes to be sustainable or not is, in some part, depends on the effect of campaign. Another important issue discussed in every workshop is training of commune staff for Operation and Maintenance (O&M). It also takes a lot of time and necessary to achieve before the water supply system starts its operation. As well as hygiene campaign, precise preparation is necessary for training of O&M staff. So hygiene campaign and training of O&M staff is strongly recommended to be conducted at the same time during the construction stage, to reduce burden for the commune. Logistics for propaganda, communal meetings, workshops and invitation of experts from outside of commune can be conducted both for

campaign and training.

Thus, in this section, design of water and sanitation campaign is presented based on the results of the workshops described above, particularly, on dissemination of hygienic awareness and mobilisation of habitants to community participation.

2.5.2 Objectives Analysis and Approaches for Water and Sanitation Campaign

(1) Objective Analysis

Based on the workshops, a standard objective tree for dissemination of appropriate awareness on hygiene is shown in Figure 2.5.1.

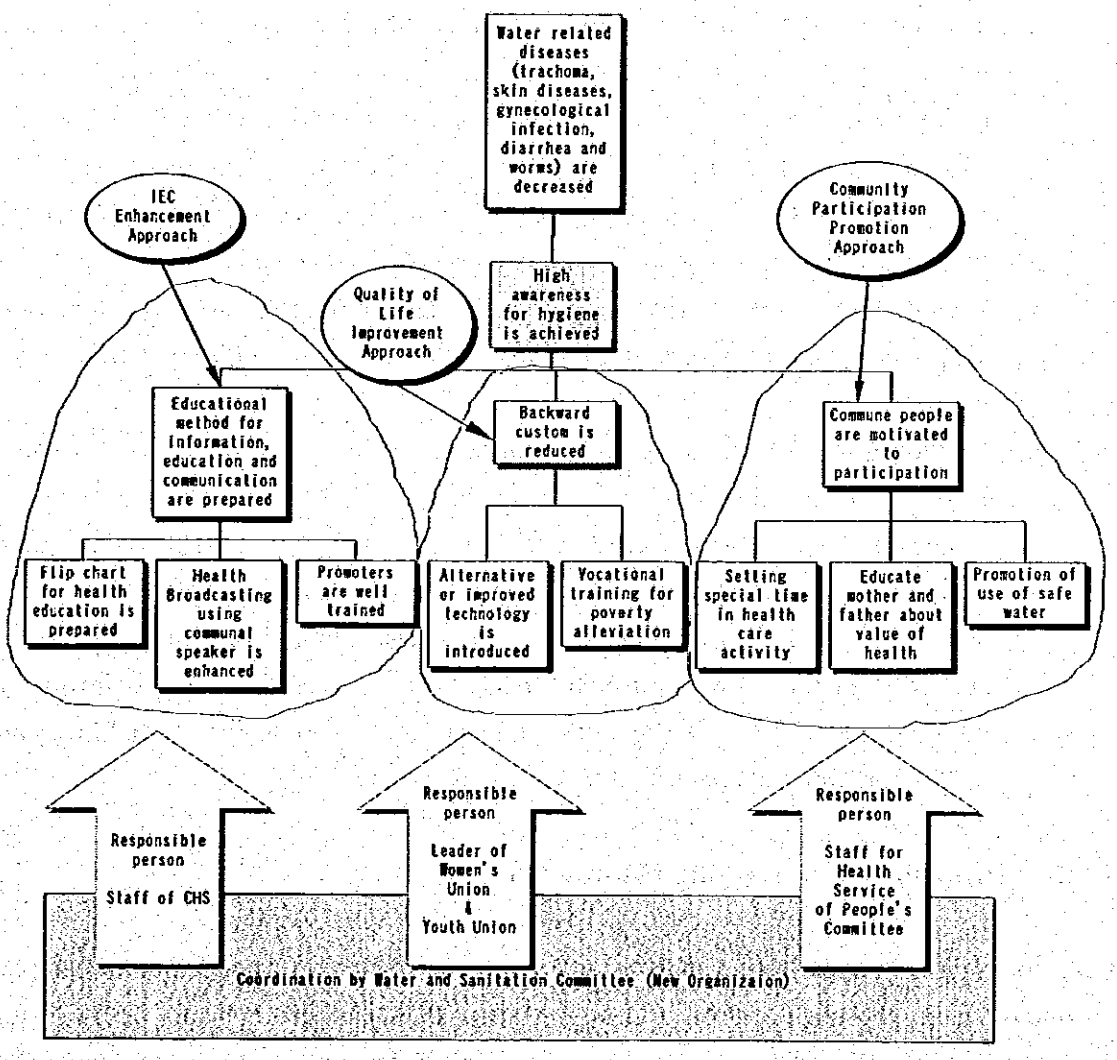


Figure 2.5.1 Model of objective tree for dissemination of hygienic awareness

(2) Main Objectives and Approaches

Mainly three important objectives will be included in the campaign, development of means of communication, introduction of hygienic behavior and promotion of community participation.

- Educational method for Information, Education and Communication (IEC) should be developed within financial limitation. Flip chart and other low-cost materials will be prepared to give hygienic education in schools, Commune Health Station (CHS) and communal meetings. Communes with laud-speaker system can make public announcement of communal meeting and health slogan. It is highly recommended to have skilled promoters in each commune. Thus possibilities to invite external support from the provincial authority, CERWASS and other technical cooperation from NGOs or Donors are recommended to be considered.
- Traditionally developed customs such as use of human excreta as fertiliser, bathing with dirty water and drinking raw water are commonly observed in all target communes. They are traditionally developed and stabilised custom in the communes. So it is difficult to introduce any alternative methods of these activities in a short term. Thus introduction of some improved method to alleviate anti-hygienic effect is necessary, such as use of excreta conserved several months, keeping boiled water always in accessible place in schools and home, fabrication of soap using local resources and bathing with clean water with soap after playing in pumps.
- Promotion of community participation is necessary and it is a basis of campaign itself. Not only this, most primary health care depends on attitude of father and mother at home. So hygienic education for father and mother is indispensable. However, most fathers and mothers are too busy to participate communal meetings and health activities. Thus setting a special time, determined by communal authority, to focus on health activities is recommended to make easier to prepare interdependent system, such as nursery for small children, taking care of neighbours' animals in turn, etc.

2.5.3 Program Design of the Campaign

Based on the result of objective analysis and selection of approaches, a design of campaign is formulated using the form of Project Design Matrix (PDM) as seen in Table 2.5.1. Naturally, this is no more than an example of one project, every commune need to modify depend on the individual conditions of each commune.

Table 2.5.1 Model of Project Design Matrix of Water and Sanitation Campaign

Title: Water and Sanitation Campaign			
Target group: Habitants of the Commune			
Duration: from January 2000 to December 2000		**Project area:** (Name of the commune)	
Narrative Summary	**Objectively Verifiable Indicators**	**Means of Verification**	**Important Assumptions**
Overall Goal Decline of water related diseases	10 % of decrease of water related diseases in habitants of the commune by the end of 2000.	Record in Community Health Station (RP: CHS director and Water and Sanitation Committee)	Government continues policies for health improvement
Project Purpose Achieving high awareness of hygiene	Until the end of 2000, 10 % of households have received certification of healthy family by active participation for health activities and hygienic behaviour.	Record of certification determined by PC and director of CHS	Water supply project continues to work well. No big natural disaster which influence human health
Outputs 1. IEC enhancement (RP: CHS director)	1.a Until the year 2001, 10 educational materials of various media are prepared.	1.a Number of material	Economic condition of the commune does not deteriorate drastically.
2. Quality of life improvement (RP: Women Union, Farmer's Union and Youth Union)	2.a 10 alternative / improved technologies are presented to the habitants every year. 2.b Until the year 2001, 20 % of habitants bigger than 15 years old, continue to use at least 1 alternative / improved technologies	2.a Number of introduced technologies 2.b Direct observation by Women's Union and Youth Union in each Hamlet	
3. Community participation promotion (RP: member in charge of PC)	3.a Until the year of 2001, 30 % of habitants bigger than 15 years old participate in the health programme minimum 5 times/ year.	3.a List of participants (RP: member in charge of PC and Water and Sanitation Committee)	

Activities	Inputs	
1.1 Improvement of material for hygiene education (RP: CHS and teachers) 1.2 Improvement of health broadcast (RP: CHS and PC) 1.3 Training of promoters (RP: CERWASS, PC) 1.4 Hygienic education by promoters by class and home visit (RP: CHS and teachers) 2.1 Introduction of alternative/ improved technologies (RP: Farmer's Union, Women's Union and Youth Union) 2.2 Vocational training for poverty alleviation (RP: Farmer's Union, Women's Union and Youth Union) 3.1 Setting special time for community participation (RP: PC, CHS) 3.2 Health education for father/mother (RP: PC, CHS) 3.3 Promotion of use of safe water (RP: PC, Water and Sanitation Committee)	**Human resources:** **(by commune)** ・ Water and sanitation committee; ・ Members of Women's Union, Youth Union and Farmers' Union and other Unions; ・ Announcer; ・ Nursery staff for children; **(from outside)** ・ District Officer of PC; ・ Provincial CERWASS; ・ Expert of social mobilisation from NGOs or other external expert (RP for coordination is Commune PC); ・ Expert of training NGOs or other external expert (RP for coordination is Commune PC); ・ Environmental sanitation engineers; ・ Medical specialist such as dentists and ophthalmologists; **Equipment** **(by commune)** ・ Teaching material; ・ Stationary; ・ Laud-speaker for announcement **(from outside)** ・ Equipment for improved technologies such as bio-gas system for wastewater; ・ Equipment for vocational training; ・ Documents of references; ・ Simple audio-visual equipment; ・ Copy machine / printer; **Facilities** **(by commune)** ・ Meeting place ・ Storing place of compost **Cost** **(by commune)** ・ (Running cost should be estimated when the project starts.)	The majority of commune people continue to dwell in the commune. **Preconditions** Support from upper authority

Notes: RP stands for responsible person.

(1) Overall Goal and Project Purpose

Overall goal of all these effort is to attain decline of water related diseases, such as trachoma, skin diseases, diarrhoea and gynaecological infection, that are prevalent in target communes.

Project purpose will be achievement of high awareness on hygiene for habitants of the commune.

(2) Outputs, Activities and Monitoring of the Campaign

Main outputs of hygienic education campaign will be development of means of

communication, introduction of hygienic behavior and promotion of community participation. These outputs will be under monitoring using Verifiable Indicators. Since the WATSAN Committee will be responsible of management of the campaign, they have to conduct monitoring. This committee also has to disseminate know-how of good experiences of some habitants to the rest of people. Workshops at the beginning, mid-term and final stage of the campaign are recommended to hold under responsibility of this committee.

(3) Inputs and others

Input is classified as human recourse, equipment, facilities and cost. If request from outside of the commune is required, it should be described concretely. However a project must not depend on uncertain thing from external organizations. In this project, elaboration of teaching material and introduction of improved technologies are considered to be particularly important. Thus technical cooperation from outside will be helpful for efficiency of the project. Commune leader should make liaison with external organizations, such as PTT. The WATSAN members are going to conduct home-visit for dissemination of information and indication for habitants.

If there is any important conditions to the success of a project, but which are beyond the control of the project and whose probability is uncertain, such conditions will be recorded in important assumptions, as seen in the model PDM.

CHAPTER 3

SELECTION OF THE PRIORITY PROJECT

CHAPTER 3 SELECTION OF THE PRIORITY PROJECT

3.1 Criteria for Priority Project

Among the M/P communes, priority projects were selected considering the following criteria.

3.1.1 Groundwater yield

The water demand for the target year-2010 must be secured by the groundwater development. The aquifer has an enough potential yield to meet the demand. The criteria is based on the pumping rate which were measured at the test well sites. In the communes where the test wells were not drilled, the pumping rate was estimated considering general hydrogeological conditions.

A: More than 1,000 m^3/day
B: 200~1,000 m^3/day
C: Less than 200 m^3/day

(1) Groundwater quality

The quality of the groundwater can be treated to meet the Vietnamese standard for drinking and domestic water by conventional treatment method. However, treatment of chloride contents is impossible because of its extremely high cost. Accordingly, the criteria for evaluation becomes as follows:

A: Good: Salinity, Fe and Mn contents are below WHO standard
B: Treatable: Fe and Mn contents are over WHO standard, however, they are treatable.
C: Saline: Salinity is over Vietnamese standard.

1) Necessity and urgency

This factor is divided into the following three sub-factors.

① Water quantity and quality of existing water source: (a) mixed water source (b) mixed water source with public well (c) dug well
② Environmental issue: (a) Serious: water pollution and groundwater depletion are occuring (b) water pollution recognized (c) water pollution not recognized
③ Relation between National Program on Hunger Reduction and Poverty Elimination Program: (a) Dong Bam, Thinh Duc, Quang Son, Yen Thanh and Dong Phong are

included in 1,715 commune list (b) not included

2) Affordability to pay water fee:

This factor is based on the household questionnaire survey.

A: More than 10 million VND
B: 5~10 million VND
C: Less than 5 million VND

3) Organization and management ability:

- Willingness to form O&M organization
- Willingness to establish WATSAN committee
- Overall support from the province and district

The following table summarizes the evaluation factors and their ranking.

Table 3.1 Evaluation Factors and Ranking

Evaluation Factor \Ranking	A	B	C
(1)Groundwater Yield	>1,000m³/day	200~1,000m³/day	<200m³/day
(2)Groundwater Quality	Good	Fe, Mn >WHO std.	Saline
(3)Necessity & Urgency			
-Existing water source	Mixed	Mixed with public	Dug well only
-Environmental issue	Serious	Recognized	Not recognized
-Hunger reduction program	Included	Not included	-
(4)Affordability to pay	Income <10 MVND*	Income 5~10 MVND*	Income >5 MVND*
(5)Organization and management			
-Willingness to pay	High	Average	Low
-Willingness to WATSAN	High	Average	Low
-Overall support	Possible	Unknown	Impossible

MVND: Million Vietnamese Dong

Ranking was converted to the score as follows.

A: 3 point
Ba: 2.5 point
B: 2 point
Bc: 1.5 point
C: 1 point

The following table shows the result of evaluation.

Table 3.2 Results of Evaluation and Score

Evaluation Factor \Province	Hanoi		Nih Binh			Thanh Hoa							Ha Tinh				Thai Nguyen			
(Commune Number)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(1)Groundwater Yield	(A)	(A)	B	B	A	(C)	B	A	B	A	(A)	A	B	(C)	C	(C)	(A)	A	C	C
(2)Groundwater Quality	(B)	(B)	B	C	A	(C)	C	B	A	A	(A)	B	C	(C)	C	(C)	(B)	B	A	A
(3)Necessity & Urgency	B	B	A	Ba	Ba	Ba	Ba	Ba	Ba	Bc	Ba	Ba	B	B	B	Ba	B	B	Bc	B
-Existing water source	c	c	a	b	b	a	a	a	a	c	a	a	b	b	b	a	c	b	c	c
-Environmental issue	a	a	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b
-Hunger reduction program	b	b	a	a	a	b	b	b	b	b	b	b	b	b	b	b	a	b	b	a
(4) Affordability to pay	A	B	C	B	B	B	B	A	A	A	B	B	B	B	B	B	A	C	C	A
(5)Organization & Management	Ba	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
-Willingness to pay	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b
-Willingness to WATSAN	a	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b
-Overall support	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b
Score (1) +(2)+(3)+(4)+(5)	12.5	11	10	9.5	12.5	7.5	9.5	12.5	12.5	12.5	12.5	11.5	9	8	8.5	8.5	12	10	8.5	11.0

1: Xuan Dinh 2:Dong Ngac 3:Quang Son 4: Yen Thang 5: Dong Phong 6: Nong Cong Town 7: Van Thang 8: Thie Hung 9:Thieu Do 10:Dinh Tuong

11: Vin Loc Town 12:Vinh Thanh 13 Duc Yen 14:Yen Ho 15: Trung Le 16: Duc Xa 17:Dong Bam 18: Hoa Thuong 19:Nam Tien 20:Thinh Duc

3.2 Selected Priority Projects

3.2.1 Policy of Selection

As shown in the table, total score is high in the communes of Hanoi and Thanh Hoa Provinces. On the other hand, the score is low in the communes of Ha Tinh Province and several communes in Ninh Binh and Thai Nguyen Provinces. The score is mainly affected by groundwater yield and quality. Since the water demand at the target year must be secured by the groundwater development and the groundwater quality must be treated to meet the Vietnamese water quality standard, quantity and quality of groundwater are essential key factors in selection of the priority project.

Therefore, the following 15 communes were finally selected for the priority projects mainly considering groundwater quantity and quality.

Table 3.3 Priority Project Communes

	Province	District	Commune	Population (thousand)
1	Hanoi	Tu Liem	Xuan Dinh	15.77
2			Dong Ngac	6.90
3	Ninh Binh	Tam Diep Town	Quang Son	7.50
4		Yen Mo	Yen Thang	8.53
5		Nho Quan	Dong Phong	10.00
6	Thanh Hoa	Nong Cong	Van Thang	6.66
7		Thieu Hoa	Thie Hung	6.75
8			Thieu Do	7.01
9		Yen Dinh	Dinh Tuong	6.52
10		Vin Loc	Vin Loc Town	5.08
11			Vinh Thanh	5.98
12	Thai Nguyen	Dong Hy	Dong Bam	5.28
13			Hoa Thuong	8.28
14		Pho Yen	Nam Tien	6.27
15		Thai Nguyen Town	Thinh Duc	6.24

3.2.2 Reason of exclusion

(1) 4 communes of Ha Tinh

4 communes of Ha Tinh were excluded from the priority projects. These 4 communes are located along the La River which is a tributary of the Ca River. Hydrogeologic

conditions are basically same in these communes. They are located in the alluvial lowland. Underground geology is composed of alluvial sand and gravel underlain by Neogene mudstone. The alluvial sediments constitute an aquifer, however, groundwater is salinized. The Neogene mudstone is basically impermeable. Although a small amount of water can be withdrawn it is not productive. Three deep test wells drilled at Trung Le and Duc Yen revealed that the groundwater is salinized. Therefore, these 4 communes are not included in the groundwater development based priority project in terms of groundwater quality.

(2) Nong Cong Town

Nong Cong Town of Thanh Hoa is excluded from the priority communes. The test drilling was not done at this commune. The commune is located in the south of Van Thanh along the Muc River. Since the drilling test result in Van Thanh shows a slightly salinized groundwater, groundwater might be more saline in Nong Cong Town. Existing wells also suggest high salinity of groundwater. The basement rock is composed of impermeable sandstone and silt-stone. Limestone does not exist. In addition, the commune area is small and located both banks of the river. Therefore, it is very difficult to find a promising drilling location in this commune.

3.2.3 Reason of Inclusion

Two communes were included in the priority project although the water quality of the test wells drilled at these communes showed high salinity.

(1) Yen Thang

Pumping test of the well drilled at the center of Yen Thang Commune showed high salinity. In the lowland where the most of the commune located, groundwater quality is thought to be salinized. However, existing tube wells drilled at the south-eastern mountain side suggest promising fresh groundwater resources in the limestone aquifer. It is worthwhile to conduct F/S in this commune.

(2) Van Thanh

Van Thang Commune was also selected for the F/S, although the test well data shows salinity of slightly more than 400 mg/ℓ. According to the MOH standard, permissible level of chloride content is 500 mg/ℓ in the coastal area for rural water supply. Van Thang is located about 30 km inland. However, it should be categorized to be the same as the coastal area since the area is affected by the tidal river.

3.3 Recommendation for the Excluded Communes

3.3.1 Recommendation for the communes in Ha Tinh

(1) On going water supply project

Four communes in Ha Tinh Provinces were not selected for the priority project. These communes belong to Duc Tho district. Construction of water supply system is currently being implemented in Duc Tho Town, center of the district, in order to supply clean water for the town people. According to the CERWASS, the total investment is VND 7.9 billion. Of which VND 4.1 billion was financed by OECF and VND 3.8 billion by Vietnamese government.

The water source is taken from the La River, which is a tributary of the Ca River. The water supply system will cover service population of 9,000 at the capacity of 1,500 m^3/day in the first stage of development (1999~2002). After year-2002, the system will be extended to cover service population of 12,000 at the capacity of 3,000 m^3/day. The system will be put into operation by the end of year-1999.

(2) Extension of the on-going project

Duc Yen Commune, one of the target communes in Ha Tinh Province, is located next to Duc Tho Town bounded by the railway. It is worthwhile to investigate the extension of the on-going water supply system to Duc Yen.

(3) Surface water development

Other three communes are also located in the lowland along the La River. Yen Ho commune is flooded every year. Since they are located on the natural levee, the flood is not so frequent in Trung Le and Bui Xa. However, these communes should also consider taking surface water from the La River for their water supply as well as Duc Tho Town water supply project. Possibility of extension of the Duc Tho Town project should also be investigated.

According to the statistics, discharge of the Ca River is as follows.

Table 3.4 Discharge of the Ca River (m^3/sec)

Station	1975~1995		1995	
	Maximum	Minimum	Maximum	Minimum
Anh Son	10,200	64	4,490	105
Thanh Chuong	9,140	48	5,300	81

Source: Statistical Year Book 1995

Although the discharge is smaller than the Ca River and saline water intrusion occurs at 20 km upper stream from the river mouth once or twice a year, there will be some possibility to take water from the La River at the upper stream.

Prior to the feasibility study, a preliminary investigation and survey of the La River are recommended.

- Continuous discharge measurement
- Water quality analysis
- Existing water use survey (Irrigation, factory and municipal water supply)
- Location of industry and waste water
- River profiling and saline water intrusion analysis

Based on the preliminary survey, a feasibility study should be conducted.

3.3.2 Recommendations for Nong Cong Town

Nong Cong Town is located along the Muc River which is independently constitutes a watershed apart from the Ma River basin in Thanh Hoa Province. The town area is only 1 km^2 and densely populated. Groundwater of the commune is not promising because of its high salinity and low yield judged from the existing shallow wells and hydrogeologic conditions.

The water source should be secured at the Muc River. It will be a possible solution and should further be discussed. Since the river water might be contaminated due to industrial and domestic waste, more attention should be paid to water quality. A preliminary study should be conducted prior to planning of the water supply system. The items of survey are same as mentioned in the previous section.