



## Water-loss reduction program in Vietnam

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VIETNAM IS SITUATED in South-East Asia with area is about 329,566 km<sup>2</sup>. The estimated population is about 72.5 million (1994). The annual population growth rate is currently 2.2 per cent. About fifteen million Vietnamese (22 per cent of the population) live in urban area and up to 50 per cent urban population are concentrated in the three largest cities- Hanoi, Hochiminh and Haiphong cities). Under recent economic reforms, urban growth rate is expected to accelerate from 4 per cent presently to 7 per cent by the year 2000 with total urban population will be 21 to 24 million. Gross Domestic Production increased at an average annual rate in excess 9 per cent.

Most cities of Vietnam have piped water system, but as in many developing countries, these systems are old, frequently in poor conditions and inefficient: unaccounted for water average 50 per cent of water production due to leaks in distribution systems, wastage and illegal connections, furthermore, the service of systems is unreliable. As a result, many households do not have access to them. The remain (about 60 per cent) rely on shallow well, many of which are contaminated by poorly functioning septic systems or on rainwater which is scarce during dry reason.

Except for some water treatment plants in Hanoi, Hochiminh and Haiphong cities improved with foreign technical assistance recently, most are inefficient and produce poor quality water. To keep pace with rapid urbanisation and population growth, heavy investments will need to rehabilitate and expand the municipal water supply systems. At present, Vietnam does not have the capacity to implement all of them simultaneously, however, the private sector might be willing to invest in some of these areas if the conditions are favourable.

### Problems encountered in Haiphong water supply company (HPWSCo)

Haiphong is the third largest city in Vietnam with population of about 1 500 000. The designed capacity of water treatment plants is 140 000 m<sup>3</sup>/d which supplies to about 500 000 urban population. Water consumption per capita is about 325 lpd which is high if compared to any city in the world. In spite of maximum pumping from overload water treatment plants, the produced water quantity did not meet the water demand because unaccounted for water in distribution network was very high (70 per cent).

The supply system was based mostly on open public tanks and taps, flat rate only a part of the households had house connections. The places where close to the water treatment plants or pumping stations, water use was very

wasteful, resulting a very scarce water came to population live in the remote areas of water distribution network.

Operation and management of distribution system were very poor and pressure level is very low. The company didn't have enough capital to operate and maintain well system and people did illegal connections to get water.

### Reviews of water-loss reduction program in Haiphong city

The HPWSCo had carried out extensive investigations and studies since 1990, and several actions were implemented as follows: Since 1991, with assistant of Finnish experts, the program started with investigating on water use to estimate unaccounted for water and then a leak detection group have been established to define roughly and develop a suitable leak detection method and equipment for the water company. Follow up, a wastage control program was developed to identify major points of wastage and assess economic and financial implications of wastage. The results were found out that non-physical loss is higher than physical loss, and the main leakage is essentially in distribution network rather than in trunk mains. These are matters of administration and customer relation management, therefore the company should reform its organisation if they want to reduce water production loss and improve the level of service.

The main objectives in the program were aimed at rehabilitation of distribution networks system, in fact it was reconstructed and unbundled to "phuong" network for controlling of water flow to the areas and water losses. A program divided into two steps. The first step was piloting in one "phuong" in 1993. The lessons learned in the first phuong has been expended in the remain phuongs since 1994 and will complete with 38 phuongs by the year 2000.

In parallel with these actions, a program to reduce the number of people used water at one water connection was implemented by phasing out flat rate, disconnecting public tanks and taps. The result described in table 1 below, consequently, the population depending on collective taps or tanks has decreased from 332 000 to 135 000.

### A model of unbundling water supply network in HPWSCo

Unbundling was carried out for both technical (physical division of the distribution network into phuong networks, according to the administration areas of the phuongs) and

Table 1. Reduction of number used per one water connection

institutional aspects. In each phuong, a working group consist of 5-8 people has been established. This group has an office in the local authority premise (phuong's people committee office) and they have full responsibilities of operation and maintenance of phuong network, including making connection/disconnection; meter reading e.g. As results of these arrangements, the relation between water supply company and consumers have been radically improved. Through the model, the problems in administrative management were solved.

### The main challenges facing implementation of "phuong" management model

#### A. Water company site

##### *Technical*

The pipe network was very old and damaged heavily by many illegal connections. In order to avoid illegal connection, the mains and "phuong" network should implement at the same time meanwhile the company have not enough qualified technicians.

##### *Institutional*

The work morale in the company was low because of low salary level, therefore many workers had to concentrate on private businesses and other ways to make extra money for their family. It was hard to push them working in new regulation. A big bar in developing "phuong" model was in company itself because many people don't want to change their mind and especially the situation which they might have got the benefits from its inefficiency. The behaviour of company staffs to consumers was authoritarian and bureaucratic, resulting the prestige of company was very low in city. They lost the supports and cooperation from consumers.

##### *Financial*

The main problem was to find out capital for implementing the model in such situation of company that the financial performance was very poor. The company was often not adequate capital for operating and maintaining the system in good condition.

##### *The customer site*

The people who had habit to use water freely from flat rate, public tanks and/or taps was very negative to accept this management model, event persons working in people's committee. Many households had illegal connection which they had to pay a lot of money now didn't want to pay anymore. In addition, how encourage the people who did

connection with company's permission which they often had to pay extra money, to support this solution. Finally, what is a solution for the poor people.

### Achievements of "phuong" model

- The most considerable development result of this model is that unaccounted for water in rehabilitated phuongs is down 20 to 30 percent and revenue collection up nearly 100 percent, The comparison between rehabilitated areas and others is shown in table 2. The wastage in the areas near to water sources has been reduced so the HPWSCo could supply adequate water for remote areas in the network without increasing production of water.
- Operation and management of network are in good condition and the water level has been controlled in main network at 1.5 bar and in distribution network at 1.0 bar
- Through the "phuong" model, WSCo has come close to the customers and won their support. The responsibilities of the company and local people's committee increased in protection of water works.
- The customers have had a chance to introduce their opinions and thus influence to the implementation. Their awareness of water value improved and so people is willing to organize their voluntary participation, because they know that the company has provided service level which is considered worth of the contribution by population.
- The significant result in financial aspect is that from not adequate capital for operation and maintenance of system, the financial performance of HPWSCo now is good. The total revenues 1997 are estimated to be VND 29.7 billion ( approximate USD 2.3 million )and the profit after the operational cost and depreciation VND 3.7 billion ( approximate USD 0.3 million )

### Limitation of the "phuong" model

The "phuong" model has worked well in HOWSCo so far as the number of phuongs has been limited. However, some problems occurred in the process of developing and they can be described as follows:

- There are too many phuongs 38 in urban Haiphong city and more in Kienan and in the future supply areas. When all phuongs are rehabilitated in 2000, the personnel in "phuong" offices of company would increase to 200-250 people. Too many phuong offices to be managed means that company need a lot of qualified managers and also are too difficult for the head of the

Table 2. Water-loss in July, 1997 at five areas in HPWSCO

company to manage system. The tasks set as responsibility of phuong office are not simple, but the phuong does not have ability by personnel resources and by other resources given to fulfil all these responsibilities.

- Therefore, the management model in Haiphong is under change. Several phuongs rehabilitated several years ago are now unified as a bigger administrative unit.

### Conclusions

- The lessons, therefore, that the South East Asian countries and, in particular, Vietnam water companies facing situation of high unaccounted-for water are that the non-physical water loss is often higher than physical loss, and even in physical loss, the leakage is essentially in distribution network, therefore more water production means more water loss.
- Awareness and participation of consumers, especially the support and cooperation of people's committee with activities of water company are the key to success of unbundling distribution network model
- The real lesson introducing to other cities is that through this model, water will be considered as a valuable commodity rather than one to be wasted.
- A good management model is a favourable environment to attract investments from private sector.

### References

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\* A " phuong" is a lowest administrative unit (quarter) with approximately 15, 000 people inside city.

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