Water and Sanitation Program

An international partnership to help the poor to gain sustainable access to improved water supply and sanitation services

GLOBAL SMALL TOWNS WATER AND SANITATION INITIATIVE

Comparative study of water supply and sanitation services management models in small towns of developing countries

Vietnam Case study

Preliminary findings

Introduction

In 1999, the World Bank Rural Water Supply and Sanitation Thematic Group and the Water and Sanitation Program (WSP) launched a joint Global Initiative to develop a work program to continue research on the theme: Management Models of Simplified Water Supply Systems in Small Towns. Development agencies have yet to address small town water supply and sanitation, instead focusing on rural and urban water scenarios.

The Global Initiative on Small Town Water Supply and Sanitation (WSS) includes electronic conferences, workshops, study tours and 4 country case studies—Vietnam, Mauritania, Colombia and Benin. The case studies aim to identify different management models and evaluate aspects of their implementation: institutions, financing, social factors, technological factors, environmental factors and customer satisfaction. It will identify promising approaches, problems and bottlenecks to improve services management.

WSP-EAP (East Asia Pacific) began the Vietnam case study in December, 2000. In Vietnam, the interest shown by government agencies and donors for small town water supply and sanitation is quite new. Many public stakeholders, private stakeholders and community organisations are developing models independently of one another. It is therefore important to analyse these approaches to improve new policies.

This paper summarises the preliminary findings of the case study for 5 provinces in the Mekong River and Red River Delta regions. The final report for the whole case study (4 regions) will be completed by September 2001.

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National context

Small Towns and Townlets

The Vietnamese government defines small towns (thi tran) as urban administrative units, and communes (xa) as rural administrative units. An executive People's Committee (Uy Ban Nhan Dan) and an elected People's Council (Hoi Dong Nhan Dan) are responsible for town and commune affairs. The People's Council is an elected body that chooses a chairperson of the People's Committee. The chairperson then appoints his committee and conducts town or commune affairs with the Council's approval. Small towns and communes operate in the jurisdiction of a district (huyen) with its own elected council and committee [see figure below]. In most cases, the town People's Committee (TPC) and the district People's Committee (DPC) are located in the same community. Some districts have a second small town with only a TPC.

According to Decision No. 132 HDBT May 5, 1990, the criteria for a small town include:

- population from 4,000 to 30,000 persons (2,000 in mountainous areas)
- density averaging 60 persons/hectare (30 in mountainous areas)
- over 60% of a town's population involved in non-agricultural activities
- significant public facilities and services

The population of the 490 district towns (thi tran huyen li) and 40 other small towns (thi tran) totals 5,198,000 inhabitants (7% of the total population).

Besides these small towns, there are areas of increasingly dense settlement called townlets (thi tu). Townlets are unincorporated settlements that may cross several commune boundaries. They often have a population of more than 2,000 inhabitants and may be bigger than the district towns. Townlets have no central administrative unit and may be administered by one or more commune People's Committees (CPC).

The Ministry of Construction (Circular 3 BXD-KTQH June 4, 1997) defines a townlet as an area with a population greater than 2,000 persons (1,000 in mountainous areas) and a density greater than 30 persons/hectare (10 persons/hectare in mountainous areas). A townlet must have at least 40% of the labor force engaged in non-agricultural activities. Some public services and facilities may exist. Townlets have no formal autonomy in decision-making about investment or management. Communes with the townlet in their boundaries are responsible for administration of that part of the townlet. As townlets are not an official administrative unit, no census data is available on the their exact number or population. A rough estimate would place the number of townlets at 3,000 with an estimated total population of more than 10 million persons (15% of the national population).

Viet Nam at a glance

Population	77.7 millions
Urban/Rural	24 / 76%
growth rate	1.6%
GDP per capita	US$370
PPP GDP 1999	US$144,179,000
PPP GDP per capita	US$1,860
Exchange rate	US$1=VND 14,585
UNDP HDI Rank:	108 / 174
Life Expectancy:	68.3 years
Female / Male:	70.1 / 66.6 years
Literacy:	92.9%
Percent of Population with	
Access to Safe Water:	45%
Urban / Rural	61 / 39%
Access to Sanitation	29%
Urban / Rural	55 / 18%

Sources: National census (1999), world bank annual report (1999), UNDP Devel[t] report (1999), UNICEF…

Vietnamese administrative levels

National
|
61 provinces (includes 4 cities)
|
500 districts
|
490 district towns, 40 small towns, and 8,850 Communes
|
(3000 Townlets)

Source: Statistical Pub. House. *Socio-Economic Statistical Data of 61 Provinces and Cities in Viet Nam (1999)*

National strategy, institutions and stakeholders involved

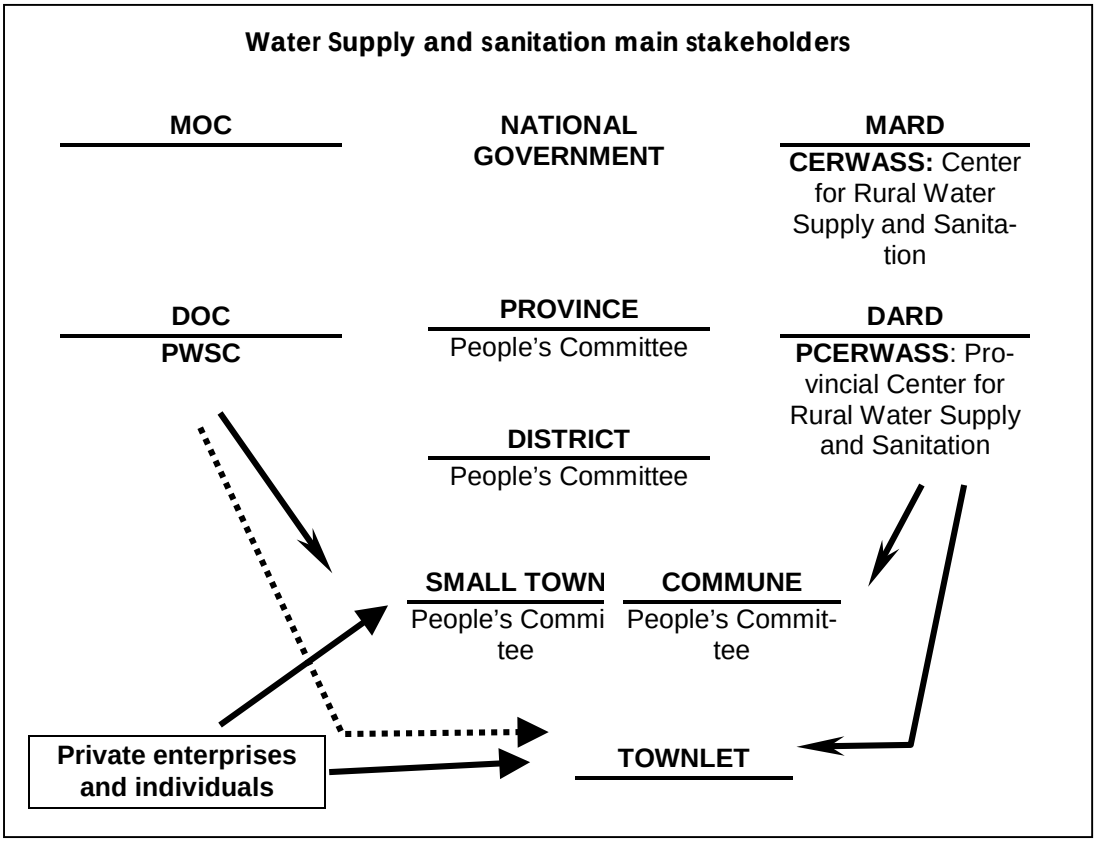
Small town water supply is described both in terms of an national directive on urban water supply (PM Decision May 3, 1998) and a national strategy for rural water supply (PM Decision August 25, 2000). By the year 2020, it is hoped that 100% of the population will be provided with clean water. However, the standards for daily water consumption differ in these urban and rural policy directives. In the urban case, it is proposed to be 120-150 liters per capita/day. In the rural strategy, it is 60 liters per capita/day.

Both policy statements recognize the Ministry of Construction (MOC) as the responsible agency for planning and development of water supply and sanitation facilities in small towns. The Ministry of Agriculture and Rural Development (MARD) is recognized as the agency responsible for development of rural water supply facilities including those in townlets. The rural strategy also emphasizes the use of piped water systems in rural areas and townlets in particular.

The main stakeholder in small town and townlet piped water systems is the government. The Provincial People's Committee (PPC) is responsible for the planning and approval of water supply projects in small towns. They establish and supervise the province water supply company (PWSC) for province city services. Now, with the new strategy, they are expected to extend their services to all small towns. Some districts have already established their own district service company (DSC). The government is now encouraging private sector and community involvement as well. In the case of private investment and community involvement, the Town People's Committee (TPC) and Commune People's Committee (CPC) play an important role in organization, supervision, and operation.

Small towns water supply situation

Vietnam is a water-rich country with many rivers and plentiful rainfall. Ecologically, Vietnam can be divided into eight regions that correspond to general water conditions. In the mountainous areas, use of gravity-fed schemes and rainwater collection are common. The majority of the population lives in the northern Red River Delta and the southern Mekong River Delta. Surface and ground water resources are plentiful in these regions, but in many areas surface water is contaminated by saltwater, chemical runoff, or acid sulfate (H_2SO_4). Wells up to 400 meters deep must be drilled to supply potable water in the Mekong delta region. Small towns without piped water systems generally use a combined scheme of rainwater and shallow wells. The Ministry of Construction estimates approximately 45% of official small towns have piped water systems. Because there are not yet any official statistics on townlets, an estimated percentage of townlets with piped water systems would approach 10%.



People in small towns frequently combine various types of water supply sources. Even in towns with piped water systems, people use rainwater for drinking and surface water for washing. This is an important reason why daily use of piped water may not accurately reflect total daily per capita water consumption in these areas.

Management models

Management models encountered in Vietnam can be summarised in the following table. The proposed classification is done according to the relationship between the owner (responsible for ensuring that service is provided and generally also owner of the facility) and the operator (responsible for providing the service) and their respective status:

- Direct management: the owner provides the service (through their own staff or board or any non-autonomous body) and is then both owner and operator. The local authority is usually the owner, through their District, Town or Commune People's Committees. In the case of private investment, at the investor's initiative, the owner is the investor.
- Delegation: the owner establishes, appoints or selects an operator, to deal with the operation of the service, with more or less responsibilities and tasks in investment, maintenance, and renewal. In some cases, the owner can hand over ownership of the facilities. The main operators are:
  - PWSC (SOE owned by the PPC, with full financial autonomy). In some provinces, the PWSC makes a significant part of the investment, and assumes most of the owner responsibilities and tasks (the facilities are accounted in its assets)
  - Districts Services Companies (SOE owned by districts, with full financial autonomy). Their autonomy in decision making is often less than the PWSC.

The case of agriculture co-operatives is special. They often intervene to provide public services (transportation, water supply schemes, and kindergartens) in their area for their members, even if it is not their main purpose. Water supply service is then often managed with other activities, with some cross-subsidies (in both directions according to local situations) for investment and operation.

The choice of a management arrangement often relates to the mode of financing.

No official statistics are available on the importance of these various models, but the information shared with participants during a recent presentation workshop gives some trends. A new national policy includes the following aims:

The various management models for Water supply service in small towns

Ownership	Financing	Operator	Importance and trends	
Commune and /Town PC	Public + users	**CPC's staff** or **workers hired-out** (direct management) or **Individuals** (Self-interested	Quite frequent for townlets (related with National Rural WS Pro-	↘ ↗
Commune PC (formal & support), delegated **Community** (effective)	Users + public	**Workers** hired-out/elected or **Individuals** (Self-interested management)	Mainly in rural areas (related with National Rural WS Program)	→ ↗
Commune PC (formal), delegated to **Agriculture Co-op** (effective)	Agric. Co-op + Public + Users	**Agric. Co-op's staff** (with possibly profit sharing)	Not frequent, according specific situations and members' demands	→
Delegated by **Province PC** to **Prov. WS. Corp.** (PPC owned)	Public + PWSC	**Prov. WS. Corp.** staff or +/- autonomous branches (self interested management)	For cities and some district small towns (Level V), new strategy	↗
Prov. or Town PC	Public + users	**District WS. Corp.** (District PC owned). Delegation "leasing or self-interested"	Some district small town	→
Town PC (supervision), delegated to **WS Co-operative** (+/- private)	WS Co-operative + Public + Users	**Water and Sanit. Co-operative**	New (very few cases), in experimentation	↗
Private investor (at its initiative) (often informal)	The private investor (+ possibly Public)	Ownership and management by the **private investor**, (generally individual)	Generally small scale scheme in townlets (sometime several in the same townlets)	↗

- District small towns should delegate operation of water supply schemes to PWSCs. In Tien Giang Province, the PPC has established a Province Rural Water Supply Company to service townlets in the same fashion as the PWSC model.

- The private sector is expected to be more deeply involved in financing and operation. The Water Supply Co-operative is an intermediate model of a private water service enterprise.

Recently, some CPC and communities have selected individuals to fully operate mini-schemes as "concessions". At this time, it is not used in bigger systems, but in some cases there is interest in encouraging PWSCs to become full owners and to delegate operation to the private sector.

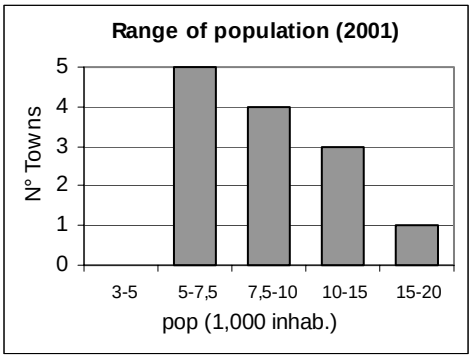
Provinces and small towns studied

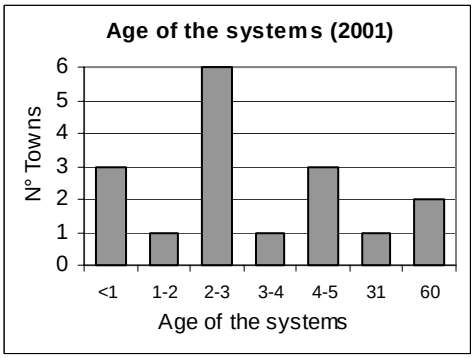
At present, survey teams have conducted case studies in five provinces, three in the Red River Delta and two in the Mekong River Delta. The sampling for these provinces and small towns was designed using the following criteria: diversity of management models, varying sizes of towns, ages of the systems (more than two years old), technical options, and stakeholder's willingness to respond. The five provinces (for this first part of the case study) are:

- **Nam Dinh (North)**
  - 18 towns and townlets with piped systems. Age: 1 to 5 years. Surface water.
  - Different types of management: community, cooperatives, PWSC
- **Thai Binh (North)**
  - 5 of 7 small towns and 10 townlets with piped systems. Age: 1 to 5 years. Surface water.
  - Private piped systems also exist
- **Ha Nam (North)**
  - 4 of 8 small towns and 18 townlets with piped systems. Age: 1 to 4 years. Surface water.
- **Long An (South)**
  - 12 of 13 small towns and hundreds of townlets with piped systems (mini-scheme for smaller ones). Age: 1 to 60 years. Mainly groundwater.
  - Diversity in management: DSC at district level, direct O&M by local PC, Private, PWSC, and community self-operated.
- **Tien Giang (south)**
  - 7 small towns and hundreds of townlets with piped systems. Mainly groundwater.
  - Dynamic support policy from PPC.
  - Diversity in management: Private, PWSC, community self-operated. Age: 1 to 60 years.
  - In some small towns or townlets, several systems (often private) coexist.

Small towns sampled (described in detail in the appendix):

- 8 small towns in the North, 7 in the South, representing 17 studied systems
- Population range from 5,200 to 17,750
- Systems from 6 months to 60 years old. The 3 younger systems coexist in the same commune (Le Loi). 2 of the 3 oldest systems were fully rehabilitated in 1995 and 1996.
- 7 identified management models are represented
- 9 systems (North) use surface water: 5 with full treatment, 4 with simple filtration
- 6 systems (South) use ground water: 2 with full treatment, 2 with aeration (iron)
- 1 system (South) uses ground and surface water





Management models	No.
Direct Town PC	2
Community	3
Agr HTX	2
PWSC	4
State owned firms	3
Water HTX	1
Private	2

Construction, financing and management

Institutional arrangements for construction phase						
Management model (operator)	**Investor**	**Financing**	**Design**	**Appraisal**	**Construction**	**Supervision**
Community	C-PC / PCERWASS (formal) Community (effective)	Users + public	PCERWASS	Department of Construction DOC	PCERWASS Community	Community Contract out
Commune People Committee	PCERWASS + D/C-PC	Public + users	PCERWASS or CERWASS or MARD	DOC PCERWASS	PCERWASS and public engineering firms Contract out for construction works CPC for earth works	C-PC
Agriculture co-operatives	PCERWASS (formal), Operator (partial)	Operator / owner + Public + Users	PCERWASS	DOC CERWASS of MARD	PCERWASS and public engineering firms Contract out for construction works CPC for earth works	Operator + Community
PWSC	P-PC/PWSC	Public + PWSC	Self design, or contracted out: consultant co. of MOC	(DOC)	Contracted out for equipment installation Self constructed by construction team of the PWSC	Sefl PWSC
State owned Public Enterprise (& multi-service public firms)	D-PC	Public + users + owner (little)	Contract out: consultant companies	DOC	Contract out to private or state owned company Self constructed for small items	D-PC Contracted out Owner/Operator
WS Co-operative (private)	PCERWASS (formal), Operator (partial)	Co-operative + Public + Users	PCERWASS	DOC DPC	PCERWASS Self construction	Owner (cooperative)
private investor	The private investor (often informal)	The private investor (+ public)	PCERWASS DOSTE	DOSTE	PCERWASS Self construction	Onwer (private)

Comments

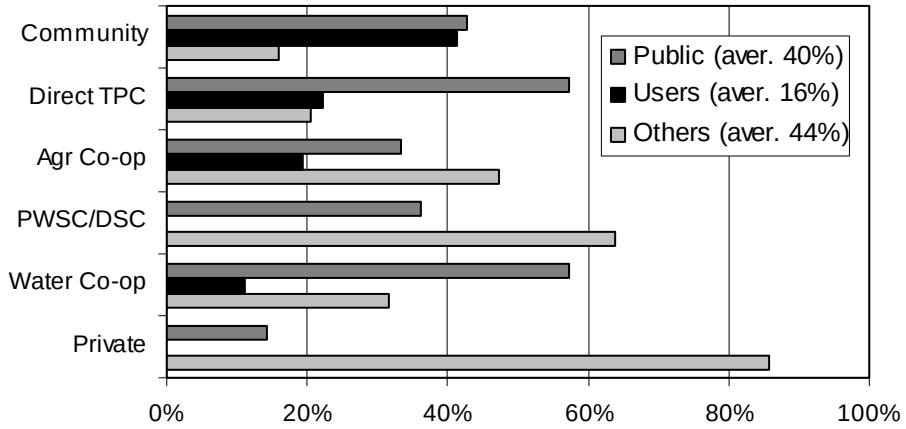
The *investor* or *project owner* makes key decisions, signs the various contracts (according to regulations), and manages funds and their disbursement. Formally, it should be a public body—Province, District or Commune People's Committee—or PCERWASS or PWSC. In practice, this is is clear in the case of single (public) financing by PPC or TPC directly and/or through a SOE. It is also clear in the case of a facility funded by the contribution of users. But when several stakeholders contribute to the financing (Water Supply Co-operatives, Agriculture co-operatives, private

operators), it can lead to conflicts. At least, there are problems in task sharing according to respective contributions, especially for all tasks related to funds and disbursements. The same issues remain after construction for ownership of facilities and service management.

The financing of capital costs: In the diagram below (for 15 of the studied systems) the actual sharing of capital costs between the various stakeholders is very diverse. On average, public sources (including donors) fund 40 %, users 16% and others 44%. It mainly depends on the type of management model and/or project arrangements:

- Public sources (mainly through the PPC budget, occasionally through DPC/TPC/CPC budgets and occasionally through donors) are present in almost all of the systems including sometimes private ones. In most townlet schemes, PCERWASS is the funding implementation agency. The People's Committee, as the agency responsible for supplying water service, actually contributes to the cost of construction (at least partially).
- User contributions are particularly significant in the case of community systems funded through the National Rural Water Supply Program or in pilot projects dependent on user contributions (in theory, investment is 40% public and 60% user for the National Rural Water Supply Program). These programs usually involve direct local management (CPC, TPC). Sometimes, the user contributions are partially born by local organizations such as agricultural cooperatives or water supply cooperatives. In the case of private investors and public firms (operating on a commercial, profit-making basis), users normally do not contribute. It is particularly clear in Tien Giang province, where the PPC now prohibits user contributions to capital costs.
- The others are generally owners/operators: PWSC, water supply cooperative, agriculture cooperative, other public firms, and private investors. In the case of PWSC's and other SOE, the sharing between formal public and PWSC/SOE funding varies from 0 - 100%.

Average contributions to capital costs (excluding House Connections works) for the various management models



The user contributions to capital costs

The user contributes to capital costs through "connection fees" that also include the cost of material (pipes, valves, meter) and installation (done by the operator). Inhabitants that do not want a house connection then do not pay for the capital costs.

The construction is launched, based on more or less formal household commitments. The investor or the community sometimes borrows money to pay contractors.

After completion, new household connection fees are used to repay loans for construction if needed, or to fund extensions and renewal. The revenue from new connections is not always accounted for clearly.

Design: In theory, design of systems should be based on Government specifications and contracted out to a licensed professional firm. In the case of small systems, rehabilitation or extensions, PCERWASS or PWSC can design, according to PPC approval.

Construction: The main works are often carried out directly by PCERWASS and PWSC. Construction by private enterprises is only sometimes carried out under contract. In most cases, the PPC or investor appoints contractors. Among the 17 systems studied, only one owner decided to call for tenders.

Supervision: In practice the arrangement for supervision is not clear, especially for small systems. It is often done by the owner or future operator.

Institutional arrangements for operation phase						
Owner	**Operator / service provider**	**Remuneration of operator (& workers)**	**Main mainten. & & renewal operations**	**Financing of renewal**	**Tariffs choice / revision**	**Contract operator/user, invoice**
Commune/Town-PC	**CPC/DPC** (employees or hired out individuals)	Fixed wages or % of revenues / bonus	Contracted out	C/T-PC (rarely with P-PC subsidies)	T/C-PC (owner and operator)	Contract: Y/N invoice : Y/N (break-down consump.)
C-PC (formal) Community (Supervision board)	**Community** Executive Board (2-3 elected / appointed peoples)			Community (with possibly C or P-PC subsidies)	Propos: community (+CERWASS) Approv: C-PC	Contract: N invoice : N (break-down consump.)
C-PC (formal) Agr. Co-operative (effective)	**Agr. Co-operative** (employees)		Operator (Co-op. employees)	Agr. Co-op (with possibly C/T-PC subsidies)	Propos: operator Approv: C-PC	Contract: Y Invoice: Y
PWSC	**PWSC** (direct or through local branches)	Company: Full revenues – expenditures – taxes (and possibly P-PC fees) Workers: fixed wages or % of revenues/bonus	Operator	PWSC (with possibly P-PC subsidies / more and more loans)	Propos: PWSC, Approv & dec: P-PC	Contract: Y Invoice: Y
D-PC	**District Service Company**		Operator or contract out	SOE (with possibly P-PC subsidies / more and more loans)	Propos: operator Approv: P/D-PC	Contract: Y Invoice: Y
T/C-PC + Water Co-operative	**Water Co-operative** (shareholders or employees)	Operator: Full revenues – expenditures – taxes Workers: fixed wages or % of revenues/bonus	Shareholders or contract out	WS Co-op (with probable P-PC subsidies)	Propos: operator Approv: T-PC	Contract: N invoice : N
Private	**Private investor** + hired employees		Self or contract out	Private	Private approve by P-PC	Contract: Y /N invoice : Y/N (listing consumption)

Comments

Ownership: As stated above, ownership is not clear, especially when non-public stakeholders contribute towards financing the system and are generally the operator. In many cases, the PPC, TPC or CPC hand over the facilities (by letter) to the operator who then also becomes the effective "owner" without limit of duration. Actually, the operator assumes most of the owner's tasks, including decision-making and financing of renewals and extensions (sometimes with user contributions). But, in case of conflict (significant profits…), operator default, etc., establishing formal ownership might be important.

License: in the case of full private investment, ownership cannot be contested, but the private owner/operator must obtain a license to operate. What might happen in the case of competition between a private system and a public one (i.e. the extension of a "public" network into a private one before the expiration of the private license)? In Ben Luc, this situation hap-

pened without much conflict. The private owner extended the network toward remote areas.

Institutionalisation should be mentioned in all stages, from project preparation to construction and management. Provincial level institutions play a very important role in issuing instructions/decisions on mobilizing financial resources, tariffs, savings, renewals and getting loans from banks. One of the main issues is the user contribution and connection fee. Tien Giang Province is unique among provinces visited for developing their own decisions on water supply tariffs and investment, water catchments, etc.

Decision-making on design and technical issues is mainly based at the level of PCERWASS (in the case of the National RWS Program) and the PWSC. User participation in this area is limited. Users and communities are only involved in extension of piped systems. Users can complain or recommend improvements mainly through the PC or other community groups.

Tariffs setting: According to national regulations issued by MOC, tariffs must be set by PPC (or TPC/CPC). In practice, in most cases, the operator proposes a tariff to be approved by PPC/TPC/CPC. The national strategy also states that tariffs must be "affordable". Tariffs are calculated in different ways. PWSC and State Owned Enterprises follow MOC regulations on cost estimates. Community-based systems and small private systems calculate costs based on materials and labor. For many systems of the sample, tariffs are not sufficient to bear all the costs, including depreciation.

Financing of Renewal: In most cases, the operator/owner is responsible for renewal (but the majority of the systems studied are quite young and few replacements have actually occurred). In some cases there is a Province Water Supply Fund, funded by a "tax" on the water tariff to finance new systems and/or renewal and rehabilitation. But the systems are too young to be assessed in detail at this time. The users always fund their house connection, and sometimes contribute for extensions. In very few cases, the DPC financed or facilitated loans.

Management model**:** The choice of management model and operator is made during construction

- PWSC: Private Models are showing positive effects through effectiveness in management, water quality, O&M, and renewal. Technical support and financial management, professional staff and skilled workers are strong issues to ensure the sustainability of the system. Under the supervision of the PPC, user's interests can also be addressed.
- Community-based and State Owned Enterprises: Under the TPC these entities have had some problems, especially on renewal and maintenance. Capacity building should be mentioned.
- In cases where the owner allowed remunerations for the operator or worker according to revenues or performance of services (including informal delegation), quantity and quality of water service increased. In contrast, operators with fixed salaries are not encouraged to raise profits through improved service. Today there is an increasing trend towards delegation of operations or specific work. Mini-schemes are also using delegation for individual labor arrangements.

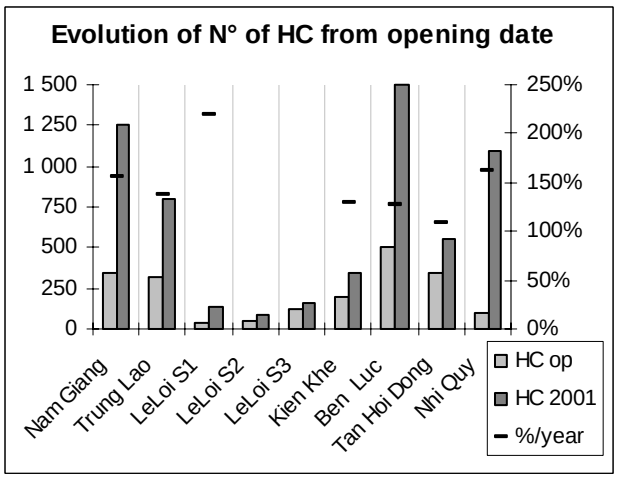
Coverage, level of service and user satisfaction

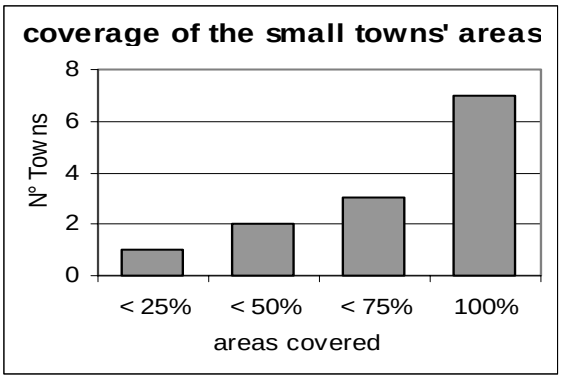
Geographic coverage: sometimes multiple systems per small town

- In more than half of the small towns studied, all of the areas were served by a pipe network (one was covered by 3 significant systems, 2 others with several small systems in addition to the main one)
- In the others, coverage ranged from 20 to 70% of the total area. In many cases, the owner or the TPC/CPC had tried to extend the system to remote areas, but the water pressure was then insufficient.
- This is why, in some small towns, the TPC, community organizations, or private individuals built and operated several small systems to meet demand.
- Sometimes, these systems are more or less in competition when they serve the same areas. Users connect to a system according to several criteria: connection costs (fees, materials and distance), tariffs and quality of service.

Service delivery only through house connections

- In the 14 small towns studied (and probably in most of the small towns), water is provided through house connections, and there are no stand-posts.
- The current connection rate ranges from 4 (for one of the very new systems in Le Loi) to 15 house-connections per 100 inhabitants, and 1.2 to 7.8 house connections per 10 households. However, these ratios do not exactly define a coverage rate, nor do they allow comparison in detail in the various small towns: according to each town's situation, a variable number of households (generally of the same family) may share the same house and one connection.

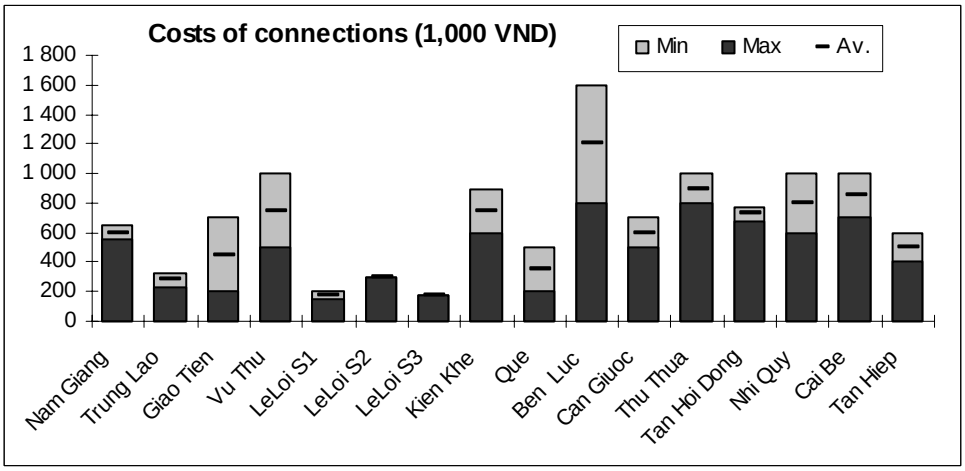




- In general, the connection rate increases with the age of the system. In particular, a comparison of opening date and current number of house-connections also shows an important increase during the first three years of operation. Actually, it was common that most inhabitants waited a few months before connecting (even if they were involved in the design and construction phases). This is particularly evident for the 2 more recent systems (Le Loi 1 and Le Loi 2) that show higher rates of increase, but are only calculated for 6 and 9 months respectively.
- There are also a lot of alternative water resources for a user. Further analyse should investigate the importance of rain, shallow wells, and rivers on user behaviour and the level of consumption for piped water.

Connection costs are a bottleneck for the poor

- The household surveys carried out in the small towns indicate that the connection fee is not affordable for the poorest inhabitants.
- In average, the connection rates are lower in the North than in the South (even if the highest rate is in Nam Giang). Among the possible explanations (not exclusive) to be deeply analysed later are:
  - **Affordability:** The opposite diagram shows a significant link between the connection rate in a small town and the average GDP per inhabitant (but the connection cost–fees, materials and installation– itself seems to have no determinant influence). The average GDP per inhabitant is



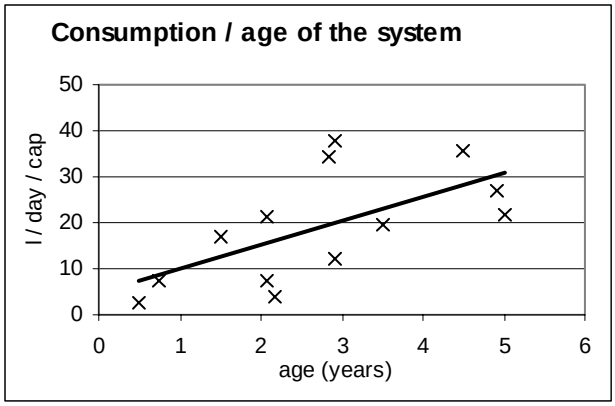
lower in the North (except Nam Giang, that shows a higher connection rate).

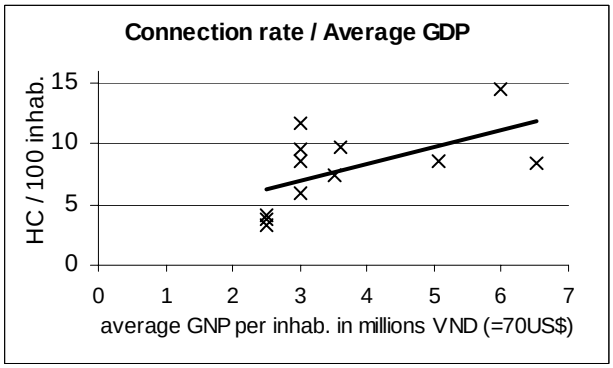
- **Age of the systems** (younger in the North): as stated above, the number of house connections markedly increased during the first years of operation.
- **Existence of alternative sources:** there are many surface and shallow water sources in the North and few easily accessible in the South (often salted).
- **Importance of neighbourhood resale.** It is forbidden in some cases, but quite frequent (especially in the South). It does not become a real economic activity—the number of house connections is important (volumes provided are probably little). The users may pay for water in money or in kind. Occasionally water is provided for free (to relatives).

- Some operators assist applicants from lower income levels by allowing them to pay connection costs in two or three instalments.

Consumption

- The levels of consumption range from 2 to 80 litres per day per capita. As for connection rates, they are higher in the South (average 38 l/d/cap) than in the North (average 18 l/d/cap). Further analysis will have to highlight the importance of the age of the systems, average GDP, and availability of alternative sources including neighbourhood resale.
- On average, consumption steadily increases with the age of the system. Higher consumption was observed in Cai Bé and Tan Hiep—very old systems (61 and 31 years old but rehabilitated and expanded between 1994 and 1997). Lower consumption was observed for younger systems.





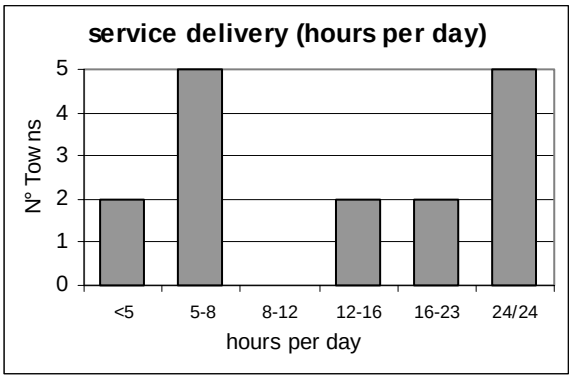
Tariffs and expenses

- Tariffs varied from 800 to 3,000 VND/m^3 (.05 to .20 USD/m^3) and there was no standing charge (users own their meters and there is no rental charge). Prices were higher in the South than the North.
- The related expenses per capita range from 2,000 to 50,000 VND/cap/year (0.12 to 3.40 USD/cap/year). It represents 0.1% to 1% of the average GDP per capita in small towns. The level is quite low, and this correlates with findings of the household surveys: most users are not unhappy with the price. It also means that the tariff could probably be increased (to allow for depreciation funds).

The quality of water, continuity of service and pressure can be grounds for dissatisfaction of the users

- In half of some small towns, the quality of water was a subject of user dissatisfaction. Often this was a consequence of inadequate treatment operations: turbidity, iron, strong chlorine smell or traces of aluminium.

- In 5 small towns, the users complained about service delivery hours: for 9 systems, the water was provided less than 16 hours per day (in two cases, for only 2 or 3 hours per day per area, and in one case, only 2 or 3 times per week). The main reasons are technical (systems are without water towers). Sometimes, operators are not "encouraged" to improve the hours of service.
- But actually, it is not always the case that users complain. Limited hours of service do not bother users with low levels of consumption too much.
- In addition, in many towns, users stored water at home in small tanks and adapted to these breaks in service (it should be noted that such storage can lead to quality problems, especially where these tanks are also used for gathering rain water).
- The continuity of electricity (clearly improved in the past 2-3 years) is also important as only one system is fitted with a spare generator.
- Maintenance work and repairs usually last just a few hours, at the most one or two days, and they are sufficiently rare to not cause user complaints.

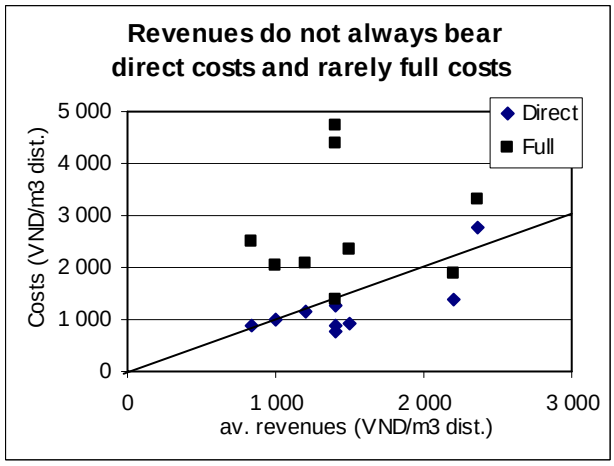


- The lack of pressure in the network was mentioned in 5 of the 14 small towns. It was attributed to the networks (too many extensions with an insufficient pipe diameter causing low water pressure in remote areas). In other cases, the pumping and treatment capacity was insufficient (and lower than expected from the design phase).
- User satisfaction with operator service was generally high. There was only one complaint about delays in servicing. In another small town, poor households complained about the low frequency of meter reading and invoicing (resulting in a large amount to be paid at one time).

Financial viability

Revenues and costs

- As described in the paragraph on management arrangements, tariffs are usually proposed by the operator and then appraised and approved by a local authority (province, district or commune PC).
- For most of the system, there is not a significant problem of defaults or delays in payment. In most cases, the operator demands to be fully paid (except for instance in Thu Thua where the collection rate was under 80%. Following the floods in 2000, many people could not pay their bills on time).
- In most cases, the operator accepted late payments (for a maximum of 3 months).
- From preliminary financial analysis (of 9 systems), the revenues from water sold generally bear all the direct costs of service (energy, chemicals, wages, maintenance, administrative and miscellaneous—excluding depreciation and profit). The only system showing a debt for direct costs was Thu Thua where they encountered serious floods.



- If theoretical depreciation were taken into account, in most cases, the revenues would be insufficient (see graph).
- In many cases, the operator or owner did not consider depreciation and did not make any formal savings for it.
- Household surveys suggest that a tariff increase to allow for depreciation costs would be acceptable to users.

Funding of renewal and extensions

Sustainability of the water supply system was not insured a priori through planned funding for renewals and extensions.

Direct saving:

- Not frequent (see above)
- Individual private operators/owners did not distinguish savings from profit. They put all revenues into the same account.

Cross subsidies between systems or activities:

- The PWSC makes depreciation payments with necessary cross-subsidies from all of its various systems including those managed by branch operators.
- In Tien Giang province, the PPC established a Provincial Water Development Fund in 1998 generated by a fee of 200VND/m^3 of water sold by the PWSC and its branches. In Nam Dinh province, systems built through the EAST Project (a French NGO) must contribute 10% of their revenue to the Fund for Consolidation and Development of the Water Sector. This fund has been established since 2000.
- Agriculture co-operatives and other economic development organisations can also make cross subsidies (or reallocate resources) among their various activities when they need budget for renewal or expansion of the water supply system.
- Use of cross-subsidies is common to reimburse loans to get rid of debts as soon as possible

Loans

- It is not difficult for a commercial operator (PWSC, district service company) to get favourable loans from the Provincial Investment and Development Fund (esp. in the South).
- Community-based operators cannot easily obtain bank loans because ownership is not clear and they are not considered legal entities.

Subsidies

- Most systems received some government and donor support for the construction phase. The owner/operator must then take responsibility for renewals and extensions.

Brief description of small towns studied

Province	Town Name (Pop)	Reason of Choice for Water Supply System (management, age specific hypothesis,…)
Namh Dinh (North)	Hanh Thien	Agr. Cooperative. Operated from 2000.
	Nam Giang (8,597)	WS Cooperative. Operated from 3/1998. New type of management.
	Trung Lao (6,811)	Agr. Cooperative. Operated from 1998.
	Giao Tien (17,877)	Commune PC. Operated from 1/1999. Stimulated the contribution.
Thai Binh (North)	Vu Thu (6,585)	Operated from 2/1999. State-Owned Public WSC at district level.
	Le Loi, (8,011)	3 systems (2 community, 1 private)
Ha Nam (North)	Kien Khe (8,977)	Community self-managed. Operated from 1999.
	Que (5,252)	T-PC direct management. Operated from 1997
Long An (South)	Ben Luc (8,688)	State Public WSC at district level. Operated from 1996.
	Can Giuoc (10,670)	Provincial WSC. Operated from 1998.
	Thu Thua (14,196)	*(Almost Rehabilitated In 1997.* State Public WSC at district level. Operated from 1940.
Tien Giang (south)	Tan Hoi Dong *(*7,234)	Provincial Rural WSC. Operated from 1998.
	Nhi Quy (11,290)	Private. Operated from 1996.
	Cai Be ( )	PWSC. Operated from 1940. Partially rehab and expanded in 1994 and 1997.
	Tan Hiep (5,747)	PWSC. Operated from 1970. Fully Rehabilitated In 1994

Small towns and main piped systems description						
Small Towns (Province)		Population (Growth rate), N° Households	Main systems description	Investor	Capital costs (US$) public / users / oper.	Other piped systems
Nam Giang (Namh Dinh)		8,597 Inh. (1.1%) 1,841 HH	Surface water, full treatment station, chlorination, no High level tank, coverage: 3 areas on 7, open: May 98	PCERWASS	90,000 57% / 11% / 32%	0
Trung Lao (Namh Dinh)		6,811 Inh. (1.3%) 1,524 HH	Surface water, full treatment station, chlorination, no High level tank, coverage: 10 areas on 10, open: Apr. 98	PCERWASS	77,000 23% / 7% / 70%	0
Giao Tien (Namh Dinh)		17,930 Inh. (1.0%) 4,403 HH	Surface water, full treatment, chlorination, no High level tank, coverage: 28 areas on 28, open: Apr. 98	PCERWASS	140,000 70% / 30% / 0%	0
Vu Thu (Namh Dinh)		6,585 Inh. (1.3%) 1,100 HH	Surface water, full treatment, chlorination, no High level tank	DPC	290,000 100% / 0% / 0%	0
LE LOI - Thai Binh 7,900 in.(1,4%) 2,130 HH	**Syst1**	1,316 Inh. (1.4%) 350 HH	Surface water, simple treatment, water tower coverage: 3 areas on 3, open: 99	PCER-WASS/Community	8,300 50% / 40% / 10%	***Total 3 Piped systems***
	Sys2	2,745 Inh. (1.4%) 730 HH	Surface water, simple treatment, water tower, coverage: 3.5 on 3.5, open: Oct 00	PCER-WASS/Community	9,150 39% / 23% / 38%	
	Syst3	3,949 Inh. (1.4%) 1,050 HH	Surface water, full treatment, chlorination, water tower, coverage: 3.5 areas on 3.5, open: June 00	Private	28,000 29% / 0% / 71%	
Kien Khe Thai Binh		8,977 Inh. (1.2%) 2,065 HH	Surface water, simple treatment, no water tower, coverage: 2 areas on 7, open: Feb 99	ST PC	36,500 39% / 61% / 0%	0
Que Ha Nam		5,252 Inh. (1.0%) 1,800 HH	Surface water, simple treatment, no water tower, coverage: 5 areas on 7, open: Aug 97	PCERWASS	65,000 44% / 15% / 41%	0
Ben Luc Ha Nam		17,450 Inh. (1.6%) 3,671 HH	Ground water, aeration, chlorination, water tower, coverage: 5 areas on 5, open: 96	Multy Service Co.(MSCo)		8 (small)
Can Giuoc Long An		10,670 Inh. (1.0%) 2,204 HH	Ground water, full treatment, aeration, chlorination, no water tower, coverage: 3 areas on 3, open: Apr 98	Provincial WSC	183,000 45% / 0% / 55%	0
Thu Thua Long An		14,614 Inh. (1.4%) 3,182 HH	Ground water, full treatment, aeration, water tower, coverage: 2 areas on 7, open: 1940, fully rehab 95	DPC	144,000 0% / 0% / 100%	3
Tan Hoi Dong Long An		7,367 Inh. (1.6%) 1,598 HH	Ground water, water tower, coverage: 3 areas on 5, open: Apr 96	PCERWASS	31,000 36% / 0% / 64%	2
Nhi Quy Tien Giang		11,290 Inh. (1.6%) 2,359 HH	Ground water, water tower, open: Mar 96	Private	100,000 0% / 0% / 100%	
Cai Be Tien Giang		15,019 Inh. (1.3%) 3,133 HH	Ground water, full treatment, desinfection, water tower+ pumping, coverage: 3.5 areas on 3.5, open: 1940, last rehab. 94-97	PWSC		
Tan Hiep Tien Giang		5,747 Inh. (1.7%) 1,103HH	Ground water, open: 1970, rehab 1970	PWSC	74,500 0% / 0% / 100%	

Institutional arrangement						
Small Towns		**Models/operator**	**Owner**	**daily O&M & commercial**	**Financing Re-newal**	**Tariff setting**
Nam Giang		Water Co-op	C/PC (to became T-PC) and W.Co-op	W-Co-op shareholder and em-ployees	W.Co-op	W. Coop with T-PC approval
Trung Lao		Agr. Co-op	C-PC (formal) Agr. Co-op (effective)	Agr. Co-op employee	Agr. Co-op	Agr. Coop with C-PC approval
Giao Tien		Direct Town PC	C-PC	worker nominated by Agr. HTXs	C-PC	C-PC
Vu Thu		DSC	D-PC	DSC selected workers	will by DSC	D-PC
LE LOI	**Syst1**	Community	Community (informal but effec-tive), through Supervision Board	*Appointed mechanic worker*	*Community (supervision board)*	*Community (+ PCERWASS), approved C-PC*
	Syst2					
	syst3	Private	Private	*Owner*	*Owner*	*Owner based on other systems in the commune*
Kien Khe		Community	Community (informal but effec-tive)	Electrician for elect. service, double job	Comm (supervision board)	T-PC based on village propose
Que		Town PC	Town PC	Hired workers	T PC	District ST PC
Ben Luc		DSC	D-PC	DSC employees	DSC	P-PC
Can Giuoc		PWSC	PWSC	PWSC staff	PWSC	P-PC
Thu Thua		DSC	D-PC	DSC experienced workers	DSC	D-PC
Tan Hoi Dong		PRWSC	PRWSC	PRWSC employees	PRWSC	P-PC
Nhi Quy		Private	Private	Private	Private	P-PC
Cai Be		PWSC	PWSC	PWSC staff contracted	PWSC	P-PC
Tan Hiep		PWSC	PWSC	PWSC staff contracted	PWSC	P-PC

Coverage, rates and consumption								
Small Towns		**Average GDP per capita**	**N° HC (HC/100 inhab.)**	**Distribution (m3/d)**	**Consumption (l/d/inh.)**	**Tariff (VND/m^3)**	**Yearly exp (VND) (%GNP/cap)**	**HC costs (VND) (%GNP/cap)**
Nam Giang		6 000 000	1 250 (14.5)	292	34	2.200	27 318 (0.5%)	550,000 - 650,000 (10%)
Trung Lao		3 000 000	800 (11.7)	83	12	1.500	6 634 (0.2%)	230,000 - 330,000 (9%)
Giao Tien		3 000 000	1 050 (5.9)	66	4	1.400	1 874 (0.1%)	200,000 - 700,000 (15%)
Vu Thu		3 000 000	629 (9.6)	138	21	1.400	10 718 (0.4%)	500,000 - 1,000,000 (25%)
LE LOI	**Syst1**	2 500 000	130 (9.9)	22	17	*800*	8 585 (0.3%)	150,000 – 200,000 (7%)
	Syst2	2 500 000	90 (3.3)	7	2	*800*	715 (0.0%)	300,000 – 300,000 (12%)
	Syst3	2 500 000	160 (4.1)	30	7	*800*	2 310 (0.1%)	180,000 – 180,000 (7%)
Kien Khe			340 (3.8)	65	7	1.200	3 190	600,000 – 900,000
Que		3 000 000	559 (10.6)	102	19	1.000	7 083 (0.2%)	200,000 - 500,000 (12%)
Ben Luc		6 525 000	1 500 (8.6)	612	35	3.000	38 415 (0.6%)	800,000 - 1,600,000 (18%)
Can Giuoc		5 075 000	900 (8.4)	402	38	3.000	41 239 (0.8%)	500,000 - 700,000 (12%)
Thu Thua		3 500 000	1 254 (8.6)	365	25	2.500	21 491 (0.6%)	800,000 - 1,000,000 (26%)
Tan Hoi Dong		3 600 000	550 (7.5)	195	27	2.000	17 782 (0.5%)	680,000 - 770,000 (20%)
Nhi Quy		4 500 000	1 100 (9.7)	241	21	1.000 - 2.000	8 721 (0.2%)	600,000 - 1,000,000 (18%)
Cai Be			1 804 (12.0)	1,178	78	2.000	49 222 (1.0%)	700,000 - 1,000,000
Tan Hiep			529 (9.2)	284	49	2.000 - 3.000	29 528 (0.6%)	400,000 – 600,000

User satisfaction (rough finding)					
Small Towns		**Connection costs**	**Tariff**	**Continuity of service**	**Quality of water**
Nam Giang		OK	OK	OK	No
Trung Lao		OK	OK	OK	OK
Giao Tien		OK	OK	OK	No, suspect surface source polluted
Vu Thu		No, high price	OK	OK	
LE LOI	**Syst1**	OK	OK		No, suspect surface source polluted
	Syst2	OK	OK		
	Syst3	OK	OK		
Kien Khe		OK (except poor, too expensive)	OK	Power cut off	OK
Que		OK (except poor, too expensive)	OK	shortage in dry season (within 1 week)	OK
Ben Luc		No, high price (3 times more than some alternative piped systems	No, high price (2 times more than some alternative piped systems	interruption during road repair (5-7 days)	OK (but not used for drinking)
Can Giuoc		OK (except poor, too expensive)	No, high price (2 times more than some alternative piped systems	No	No, not used for drinking, bad taste, little iron
Thu Thua		OK		OK but some interruption for repairing pipes (happens 5-7 days) and during road repair	No: unclearness, strong chlorine smell, not used for drinking,
Tan Hoi Dong		OK		power cut off. Some pipe broken	OK
Nhi Quy		OK (except poor, too expensive)		No	OK, but consideration about hardness
Cai Be		OK		Power cut of	No: chlorine smell, iron, not used for drinking,
Tan Hiep		No: Too expensive for the poor, and network insuffient (long connections = expenseives)		Pipe reparation (5h to 1 day)	No, iron, not used for drinking.