Water and Sanitation Program

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Vietnam

Evolving Management Models for Small Towns Water Supply in a Transitional Economy

Water and Sanitation Program for East Asia and the Pacific

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Vietnam:

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Executive Summary

Access to water supply services in Vietnam, not to mention sanitation services, is still rudimentary in small towns and even more so in townlets and communes. According to the Ministry of Construction only 30 percent of small towns have piped water systems. It is estimated that a mere 15 percent of the townlets have piped water systems. Most piped water systems cover only a fraction of the populations in small towns and townlets; it is estimated that the connection rate ranges from 20 to 80 percent, suggesting that only a very small part of the total population in small towns and townlets is covered by piped water systems.

It is not obvious from the research undertaken that any one of the small towns water supply management models is outperforming any of the others. Some management models do better in some aspects than others, but this is against the background of a sample that has flaws and with a dataset that suffers from inconsistencies, especially with regard to the financial data collected. What emerges from the data – with all these caveats – is a multidimensional picture – looking into different aspects of sustainability results in different conclusions.

The key discussion points are:

- ***Is there a 'best practice management model'?*** For Vietnam, due to varying geography and demographics, and a rapidly evolving economic policy and regulatory environment, the use of a variety of management models is optimal. The use of more customer-oriented approaches results in better overall performance, which supports evidence elsewhere in the world that demand-responsive approaches have a positive impact on systems' sustainability. Exclusive focus on technical and financial efficiency does not necessarily result in better service delivery. The performance within categories of management models varies widely. The conclusion thus seems justified that the more important aspect of management is not so much the organizational model, but what "rules of the game" are being applied. Some "rules of the games" like autonomy in managing the water supply business and proper tariff levels are better indicators for success than are the management models per se. Delivery of water supply services by companies that are not exclusively concerned with water supply may be less effective than those that are. In this review, systems managed by communities, cooperatives and private operators have much higher scores than systems managed under other models.

- ***Economies of scale.*** Water supply systems in small towns are not necessarily performing better than townlets. Level of demand measured in terms of water sold is consistently a better indicator and guideline than population size for determining success of a sustainable water supply system.

- ***Serving the poor.*** Connection costs are a major obstacle to achieving greater coverage of water supply services. Cross subsidies may be useful in some cases but more research is needed to understand how the poor can benefit from the different types of cross subsidies currently in place.

I. Introduction

In recent years, developing countries have focused most of their new water supply and sanitation investments on either urban or rural areas. Small towns often fall between these two settlement types in many ways - institutionally, financially, and legally. According to estimates from the Ministry of Construction 30 percent of small towns have piped water, and only 15 percent of townlets have access to that service. In most areas, the piped water service extends only to a fraction of the population living in small towns and townlets, making the actual access to services significantly lower than these data reflect. In contrast, access to safe water in urban areas is 61 percent. In rural communities an estimated 30 percent of residents have access to water that meets basic domestic requirements but only about 10 percent have access to water that meets national quality standards for drinking water. This tendency to orient investment toward large cities obviously has left the segment of small towns seriously neglected in terms of access to water supply services.

Small towns do not completely fit within either the urban or rural context. They are often considered too small to be managed institutionally, and too big for effective community management. The Vietnam Small Towns case study identified, analyzed and highlighted problems, trends and opportunities in evaluating the performance of different small towns water supply management models by looking into the institutional, financial, social, and technical performance of these systems.

In Vietnam, small towns are known as either small towns (*thi tran*) or townlets (*thi tu*). Urban areas are classified according to 5 categories[1] . The total urban population

1 *For more detailed description, see Annex 1.*

is estimated at about 19 million people (24 percent of the total population). Small towns are classified as "class 5 urban areas". They comprise more than 5 million inhabitants (or about 7 percent of the total population). These "class 5 urban areas" are defined as settlements with:

- Population size ranges from 4,000 to 30,000 inhabitants (2,000 inhabitants in mountainous areas);
- Sixty percent of the labor force is not engaged in agricultural activities;
- Construction of public facilities and technical infrastructure in early stages;
- Average population density of 6,000 inhabitants/km^2 (3,000 inhabitants/km^2 in mountainous areas).

A small town is an administrative unit that is equal to the commune level of administration and authority, the lowest level in the Vietnam administrative system. Small Towns are under the jurisdiction of the District People's Committee (DPC). Most of them are district administrative centers and have very limited autonomy for investment management[2]. The Small Town People's Committee (STPC) submits project proposals to the Provincial People's Committee (PPC) for approval and financial support. The STPC can be the water supply project owner and supervisor for the construction, operation, and maintenance of water systems in their town.

The Government does not classify townlets as administrative units, but considers them as residential areas under the management of the Commune People's Committees (CPC). The townlets are typically "commune centers", the largest settlement within a commune. There are an estimated 3,000 townlets nationwide. The total population residing in townlets is estimated at about 10 million (or 15 percent of the total population). Temporary standards for planning and approving construction in townlets are:

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 Vietnam (1999)

- Minimum population size of 2,000 inhabitants (1,000 inhabitants in mountainous areas);
- At least forty percent of the labor force is engaged in non-agricultural activities;
- Initial construction of main public services and technical infrastructure[3];
- Average population density of 3,000 inhabitants/km^2 (1,000 inhabitants/km^2 in mountainous areas).

No single organization is responsible for managing the implementation and coordination of water supply services in small towns and townlets. Small towns fall under the mandate or jurisdiction of the Ministry of Construction, as do water suplly services in all larger urban areas. Townlets fall under the Ministry of Agriculture and Rural Development, in which CERWASS is the lead agency.

2 *Investment management depends on each province's decentralization policy.*

3 *Examples of public services and technical infrastructure are transport, post office, water supply, sewerage and drainage, power supply and facilities for daily services such as markets, shops, health care centers, schools, small industrial production units, sports and entertainment services, and cultural and information facilities.*

II. Methodology

Vietnam is in a dynamic period of economic growth and liberalization. Regulations are changing, and new opportunities are opening (and others closing). That is one reason why there is what on the surface appears to be an odd mix of old and new management models. Most of the new water supply systems are in management arrangements that have only recently become possible with changes in regulations and decentralization. For example, the Enterprise Law made it possible for the private sector to enter the market and compete against state-owned enterprises (SOEs). That is one reason for the experimentation by the private sector in water supply, and SOEs attempting to become more competitive.

The research team investigated the water supply and sanitation situation in 22 small towns and townlets.

A variety of management models was looked into:

(i) direct management by Small Town People's Committee (STPC) in small towns and Commune People's Committee (CPC) in townlets;

(ii) community management;

(iii) cooperatives;

(iv) provincial water supply companies (PWSCs). This is a special form of state-owned enterprises. They are responsible for providing water supply services to provincial capitals (Class IV towns), but recently have seen their mandate extended to also provide their services to small towns (Class V towns);

(v) other state-owned enterprises. In the sample, they mainly consist of district water supply companies and/or environmental service companies; and

(vi) private water companies.

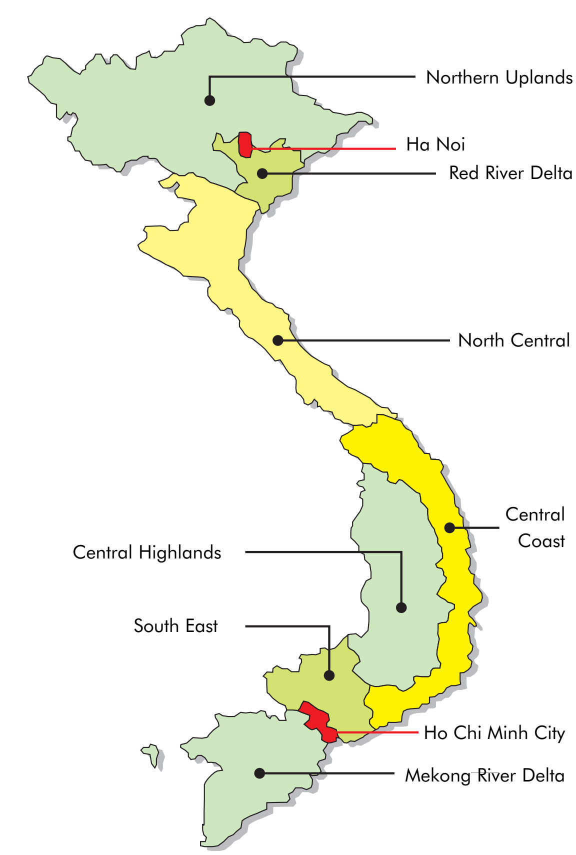
In addition to these models, the research team identified two other management models, which are much less common. The first is management by the Provincial Center for Rural Water Supply and Environment Sanitation (PCERWASS). PCERWASS coordinates the management of water supply systems in townlets and in all rural communes. Another model refers to the District People's Committee (DPC) coordinating water supply through district administrative units such as the District Economic Office, the Division of Public Works and Transport, or directly managing water management boards in the district.

Initially five provinces were selected for the study: three provinces in the Red River Delta (Nam Dinh, Thai Binh and Ha Nam) and two provinces in the Mekong River Delta (Long An and Tien Giang). The study was then extended to two more provinces to improve the regional representation of the sample of case studies: Thua Thien Hue in the North-Central region and Quang Ninh in the North-East. The selected small towns and townlets are described in Annex 1.

The following criteria were taken into account when evaluating the performance of the different management models:

1. *Variation in models between small towns and townlets*: In the sample, small towns mostly resorted to PWSCs, other SOEs or private water companies, while in the 7 townlets (one of which is served by 3 water supply systems[4]), the variation in management models is substantially larger – with cooperatives, communities, private operators and STPC/CPC managing water supply systems.

Figure 1 Selected provinces for Small Towns Study and their location within Vietnam



4 *In the Mekong River Delta, it is very common that more than one water supply systems exist in one small town or one commune; the district town Ben Luc in Tien Giang Province has 9 systems. Usually, a major public system was built in a populated center area and some small systems owned by individuals or communities were built in surrounding villages. In Le Loi, one of the townlets in the sample, the research team looked into three existing systems, two managed by communities and the third by a private operator.*

2. *Years of operation:* Different systems have been in existence for different time periods. The more "traditional" management models have been in operation much longer than the recently approved management models (such as cooperatives, private water operators and community managed systems). Age of the water supply system is likely to have an impact on performance indicators such as coverage and per capita consumption, and subsequently affect financial and technical performance.

3. *Geography*. The study was conducted in four regions which are economically and hydrologically diverse. Per capita income and access to alternative water supply sources (rain water, well water, etc.) vary widely among the towns examined. Moreover, cultural differences may be reflected in patterns of sharing water, which is quite common in the Mekong Delta but almost absent in the North East region.

4. *Exclusion of two small towns.* Data analysis excluded two small towns, Sia and Mao Khe due to their particular setups. Sia's water supply system is an extension of two other water supply systems. As it is not an independent water supply system, it provided insufficient information on how the system actually works, and as a result it gave few clues about its sustainability. The water supply system for Mao Khe was originally designed to supply a cement factory. Because of the importance of non-residential water use in overall water use, and the lack of information on actual non-residential consumption, it is difficult to judge the performance of this system in anyway comparable to that of the other small towns and townlets studied.

III. Performance of Management Models

The objective of the study was to determine how the different management models affected the performance of water supply systems. In this respect, performance is measured in terms of sustainability.

Sustainability has a number of different key aspects: social, financial, institutional, technical and environmental. Environmental aspects of sustainability were also studied but as these data were more qualitative than quantitative, they were not included in the final performance analysis. The research team compiled a set of ten indicators grouped under the categories of institutional, financial, operational and social sustainability. The ten variables were selected to, as a whole, represent a comprehensive picture of the sustainable performance of the water supply systems, taking into account the multi-faceted character of sustainability. Six of the indicators refer to on-going performance, the other four relate to the design of the system and financing rules (government subsidies, community contributions, investment per capita and design standards).

It is obvious that many of the indicators are interrelated. For example, per capita investments affect tariff levels, and hence profit margins, and hence the operations of the system, while they also affect the affordability of the services, especially to poor consumers. Design standards affect technical performance, and also environmental and financial performance. Influences to one aspect of performance may impact overall performance and therefore this indicator is not only a sum of individual features but provides an overall image of the system's performance.

For each indicator, the models were ranked relative to each other and scored based on this ranking. The rankings in each category were converted to a maximum score for each indicator. If the data were continuous, a maximum score of 22 could be achieved. In case of non-continuous data, the actual score was lower as several observations would share the same ranking. The maximum achievable score – in relation to the sample – was 202.

Table 1 Performance Indicators

Dimension of Performance	Indicator	Weighting	Ranking Procedure
I. Operational (66)	Per capita investment cost	10	The lower per capita investment costs, the higher the ranking
	Access rate: A measure of the number of households that have access to piped water (without necessarily owning the connection) as percentage of the total number of households in the settlement.	10	The higher the access rate, the higher the ranking
	Per capita billed consumption	10	The higher the per capita consumption, the higher the ranking
II. Financial[5] (59)	Profit margin:The difference between revenues and operating expenses plus depreciation per cubic meter of water distributed. The indicator is not adjusted for the payment of interest and capital repayments. As such, it may overestimate the actual profit margin.	10	The higher the profit margin, the higher the ranking
	Government contribution in investment funding	10	The lower the government subsidies, the higher the ranking
	Community/customer contributions in investment funding	10	The higher the contribution of customers and/or communities, the higher the ranking
III. Social – proxy for customer satisfaction (55)	Ability to Pay (i.e., water bill divided by household income)	10	The lower the ability to pay, the higher the ranking
	Maximum Connection Charges	10	The higher the connection charges, the lower the ranking
	Satisfaction with pressure as indicator for quality of services	10	The higher the satisfaction, the higher the ranking
IV. Institutional (22)	Adherence to technical standards set by Government: The maximum standard for supply is 50 lcd for townlets and 120 lcd for small towns. Hence, the difference is calculated as actual design capacity minus standard dependents on the type of settlement.	10	The wider the divergence between standards and actual design capacity, the higher the ranking if the divergence was negative (i.e. design was below government technical design standards), the ranking was lower than if the divergence was positive.

5 *In the case of community contributions, for example, there were a number of systems that registered a zero contribution. All these observations were given a similar rank, and hence instead of 22 being the highest ranking, the highest ranking would be lower, because of the shared ranking of a number of observations.*

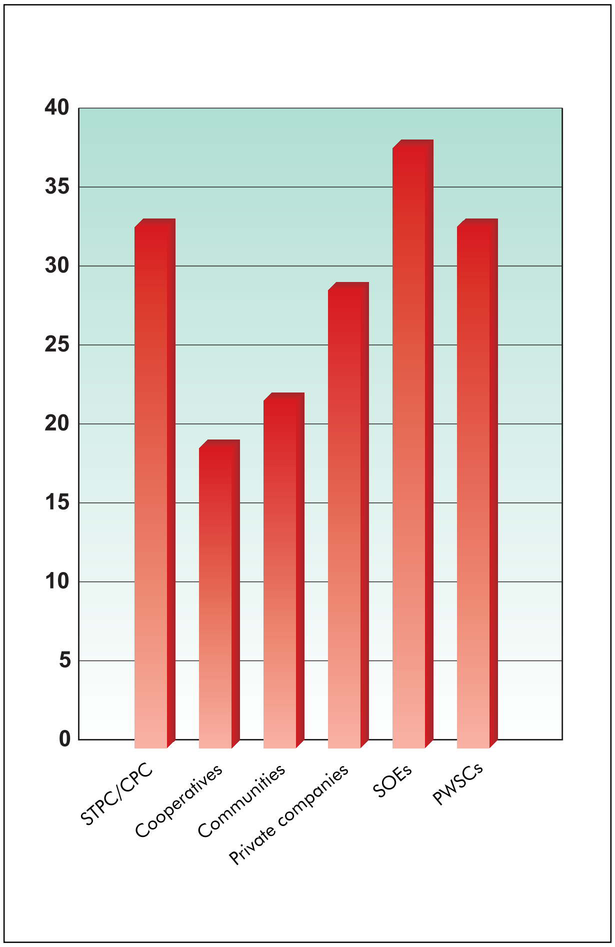
IV. Operational Performance

Operational performance was measured using three proxies: (i) per capita investment costs, (ii) coverage, and (iii) consumption rates.

Per Capita Investment Costs. Per capita investment cost varies widely over the different small towns and townlets, and between management models. The most obvious outlier in terms of per capita investment costs is Tu Ha, where they reached more than $1,000 per capita. The average per capita investment costs are substantially lower, and if corrections are made for the most obvious outliers, the average per capita investment cost is lower than $40. Figure 1 shows that cooperatives and community-managed systems show the lowest per capita investment costs, and SOEs the highest.

More interesting is the relationship between the investment cost per capita and the different regions – when major outliers are excluded. It is interesting to note that the outliers are concentrated in the North Central Region and to a lesser extent in the North East Region. Per capita investment costs are low in the Mekong Delta, slightly higher in the Red River Delta and, depending on the inclusion of outliers, substantially higher in the North East and North Central regions.

Figure 2 Investment per capita (US$)



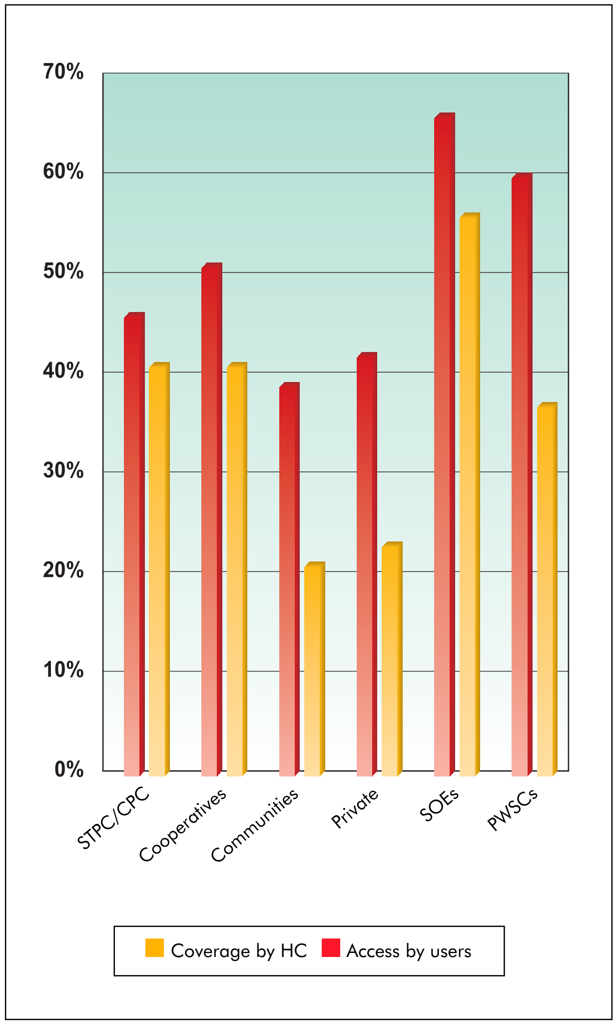
There are many explanations for these higher costs. The North Central and Northeast regions are characterized by (i) scarcity of water and hence no or few alternative sources of water supply; (ii) low per capita income; (iii) price of supplies may be higher due to the high transportation[6] cost as they are located less favorably than the provinces in the Red River and Mekong Deltas; and (iv) the source of water being used (In the Mekong Delta, almost all systems investigated used ground water, while the systems in the North almost all relied exclusively on surface water. In general, water supply systems using surface water tend to be more expensive due to the higher water treatment cost involved).

Coverage and Access to Water Supply Connections. Coverage and access have distinct meanings. Coverage refers to those households that are connected to a piped network, while access includes those households that not necessarily are connected, but nevertheless use piped water connections. In general, access exceeds coverage significantly in Vietnam due to the practice of sharing connections.

Coverage is relatively low in Vietnam. Only 38 percent of the population in the 22 small towns under review owns a piped water connection. Even in systems that have been in existence for many years, coverage is far from universal. Coverage differs substantially among the different management models – with SOEs having the highest coverage rates and community-managed systems showing the lowest coverage. However, access to piped water is significantly higher; on average 51 percent of the population has access to services. For PWSCs, for instance, sharing is very significant, with average coverage being 37 percent, while access is no less than 60 percent.

The tendency to share piped water connections is regionally very different. In the Mekong Delta and North Central Region, no less than 25 percent of the population shares connections, while the number is substantially less in the other regions. As a result in the Mekong Delta, access is set at 67 percent, which is much higher than that in the other regions (with the exception of the North East Region)[7] where access does not exceed 40 percent.

Figure 3 Coverage and Access by Management Model



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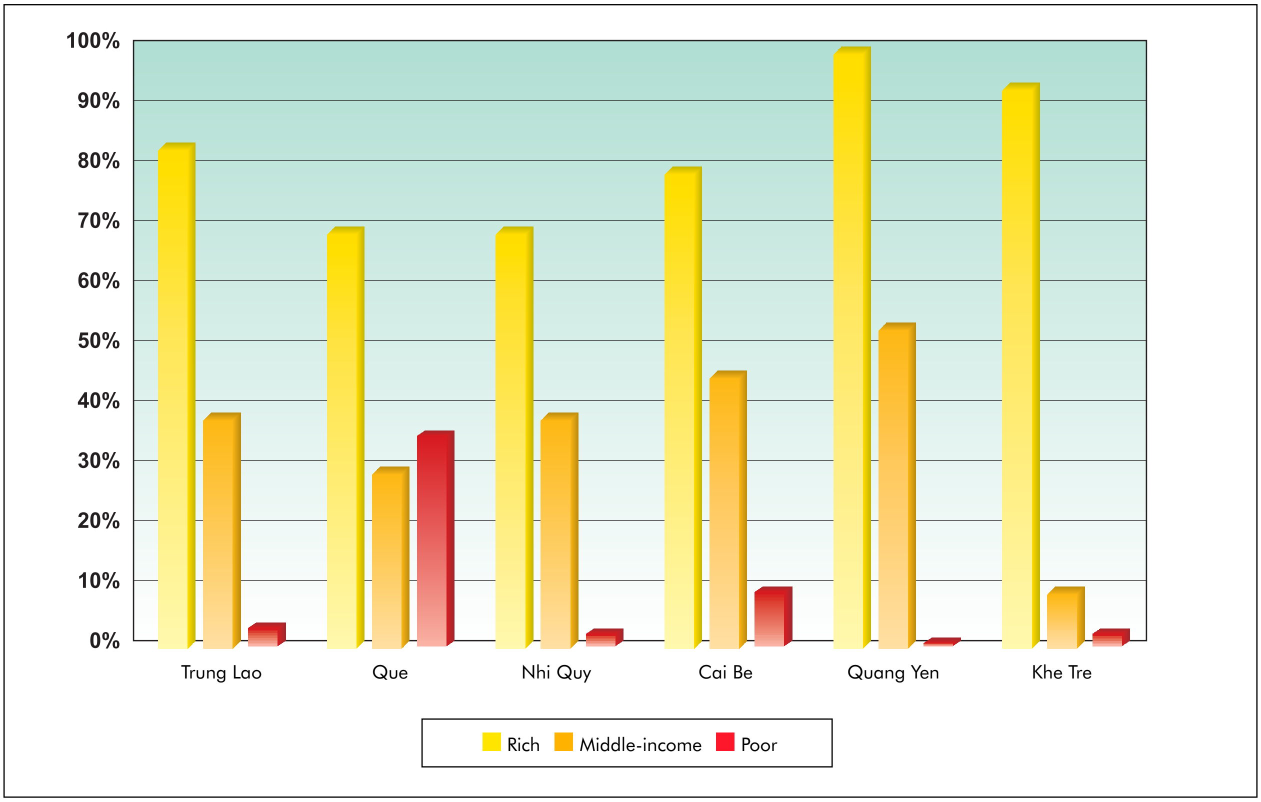
6 The latter could not be verified due to lack of data on the inputs and cost of the major cost items.

7 In the North East Region, coverage is high at 67 percent, which is not the result of sharing that is not a common practice here. However, this region is characterized by a relative lack of alternative water sources.

Figure 4 Coverage Rate by Income/Wealth Category



This phenomenon of sharing may be linked to the lack of alternative water supply sources, but it is not likely to be the only reason. Even though the North East region has less alternative sources, sharing seems to be a non-existent practice.

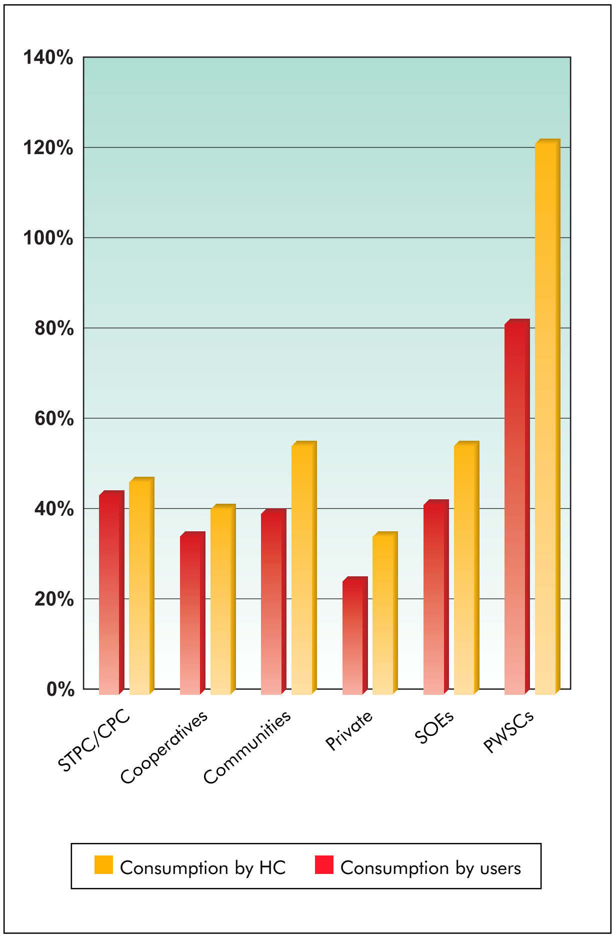
Most households that own a piped water connection are not poor. The households that are not connected are often poor, with no resources to pay for the connection cost. In addition, they may live far from the main trunk line, making the connection cost 2 to 3 times higher than for households that live near the trunk line.

With the exception of Que, poor households do not own piped water connections. The higher proportion of poor in Que owning water connections may be due to the lack of tradition of sharing connections (sharing connections is rather atypical in the small towns and townlets in the Red River Delta). It may also be due to a specific pro-poor pricing policy in place in this town, which exempts the very poor from paying connections fees thereby facilitating access to services.

In general, coverage is low but access is significantly higher – attributed largely to "sharing". The incidence of sharing connections varies regionally. High access rates are also related to wealth distribution and pricing policies favoring the poor.

Billed Water Consumption. Water consumption in the PWSCs is much higher than for any other types of management model. The higher consumption is mainly

Figure 5 Consumption Patterns by Management Model



related to the higher per capita income in the small towns served by PWSCs[8], the fact that most of these systems are operating for much longer than any of the other managed systems, and sharing is much more common under these management models than in any of the other management models, resulting in higher access. Also striking is the low level of consumption of the privately operated systems, which is mainly due to the very young age of these systems. Two of the three systems are less than 18 months in operation, while all private operators in the study work in townlets (instead of small towns).

Water consumption can be measured in different ways. Using the number of actual users of the connection, the figure is likely to be different than the figure that is related to the consumption of the households that are connected. In general, the numbers are affected by (i) *the years a system has been operating* – older systems have higher consumption mainly due to the maturation of the system, as people's water behavior changes only slowly even if more water is available; (ii) *coverage* – per capita consumption decreases as more households connect to the system. This confirms the usual pattern of connection, in which first rich, and then middle-income and only then poor households connect; (iii) *tariff structure* - block rates tend to have a more positive impact on per capita water consumption than flat rates[9]; (iv) *per capita income* - the higher per capita income, the higher water consumption; and (v) *type of settlement* - small town systems are designed for 80 to 120 liter per capita per day (lcd), compared to 25 to 50 lcd for townlets and rural areas. Analysis shows that there is a correlation between per capita income and type of settlement, with small towns having higher per capita incomes leading to higher consumption. The final factor affecting consumption is (vi) *supply factors* - the existence of alternative sources lowers piped water consumption.

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8 *Only one PWSC served a townlet, all others were providing services to small towns.*

9 *Block rates, even though often designed otherwise, tend to have a positive impact on consumption and hence sales, instead of resulting in a decline of consumption and therefore reduce the stress on water resources.*

V. Financial Performance

Financial performance was measured using three proxies: (i) profit margin, (ii) government funding and (iii) community contributions. Financial autonomy of water supply stations in townlets and small towns is still limited because water supply stations are not allowed to set the water tariff. It was found that while provinces control the water tariff in large urban areas; in small towns, townlets and rural areas the tariff is mainly set by the people's committees (STPC or CPC). The water tariff of community-managed systems is usually set by the community and endorsed by the People's Committee.

Tariff Structures. National Urban Water Supply policy states that tariffs overall should be adequate to cover the full cost of water supply operation and maintenance, but it is not enforced due to the political constraints. Some provinces (such as Tien Giang, Hue, Quang Ninh) have applied block rates, i.e. low tariff rates applied to a block of low consumption volume up to approximately 15 m^3/month to serve essential household consumption demand per month. The tariff for the subsequent blocks is then calculated progressively in accordance with increasing water consumption volumes. In addition to block rate tariffs, in some systems different tariff levels are applied to different categories of users, which allows for cross subsidies for different categories of users, e.g. residential users.

Block rates are usually promoted to help the poor gain access to services, yet as most poor customers do not have access to piped water supply, the actual benefits of a cross-subsidy system do not accrue to poor customers, but to customers with house connections, most likely relatively well-off customers. The most common tariff structure is a flat rate structure, in which the operator does not apply different rates for different blocks of consumption[10]. Tariff structures are distinct between different management models. Block rates are especially common in PWSCs, and less so in privately operated systems.

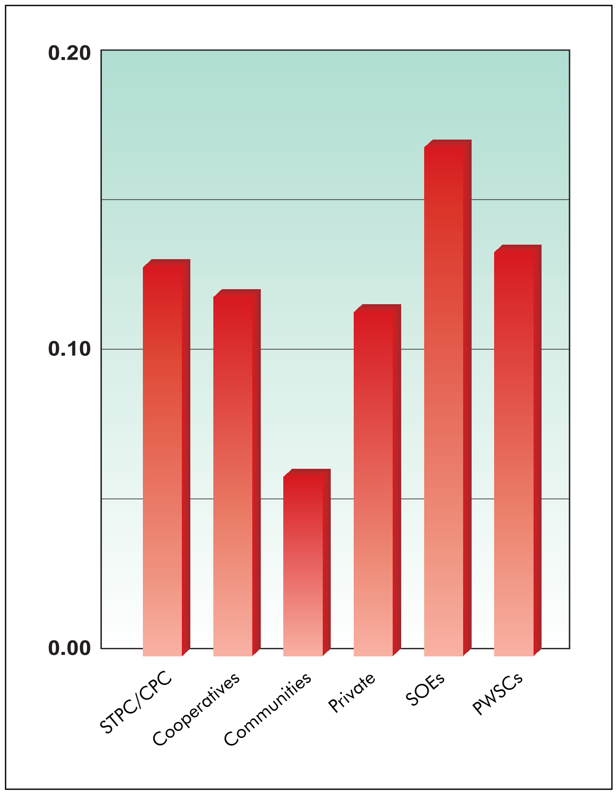
Figure 6 shows that the actual tariff levels vary between the different management models, with SOEs charging the highest and community managed systems charging the lowest rates, with the average at approximately $0.13/m^3. Additionally, significant differences in tariffs exist between the North and the South, most notably between the Red River Delta and the Mekong Delta. On average, water tariffs in the Mekong Delta are twice as high as those charged in the Red River Delta.

Profitability. Factors that influence the "profitability of water supply systems", whereby profit margin is defined as the difference between revenues and operating costs and depreciation, are:

- *Consumption:* The higher the water consumption per capita, the higher the "profits" assuming the tariff is adequate. It is likely that the size[11] of the system, in terms of how much water is consumed and subsequently paid for, explains a large part of the difference between a "profitable" and "non-profitable" water provider.
- *Tariffs:* The higher the water rates, the more likely it is that a positive return is generated.
- *Investment cost per capita:* The higher the investment per capita, the more unlikely that the profit margin is positive.

The profit margin data collected by the research team show some interesting features. The data show that there is a large discrepancy between water tariffs per m^3 and water revenues per m^3. In many cases, the actual tariff revenues per m^3 are much higher than the water tariffs per m^3 would suggest. This phenomenon occurs among all management models (except for community-managed systems). The explanation for this may be improper accounting that does not distinguish tariff income from connection fees, and other income. Another explanation may be insufficient "ringfencing", which is a specific form of imprecise accounting. Many PWSCs and/or SOEs are allowed to conduct multiple businesses to increase the viability of the enterprise. Revenues from these other activities, such as pipeline construction, or supplying water

Figure 6 Tariff levels (US$/m^3)



10 A flat rate is defined as a single rate per cubic meter regardless of how much water is being used. Block or progressive rates are using different rates for different consumption levels. Even though, many small towns and/or townlets use flat rates, they may have different rates for different types of consumers (for example, residential and commercial customers).

11 Although the average town population is higher for the group of "profitable" companies, correlations show that the link between population size and system size is tenuous.

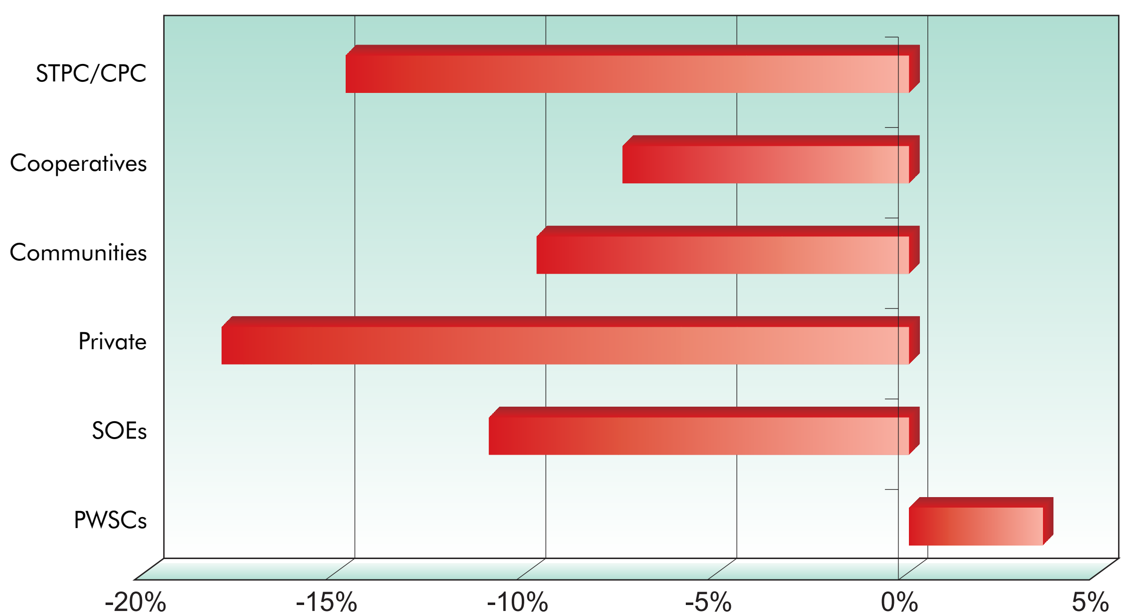
service materials, may end up as tariff revenues in the books of the water company. Hence, in many cases actual water supply revenues may be significantly over-estimated.

In the remaining systems, billing efficiency seems to be significantly lower than the survey data suggests. In Que, where a flat rate is in place, tariff revenues comprise less than 60 percent of the tariff. In the case of systems that use a block rate, for instance the PWSC of Tan Hoi Dong and Tan Hiep, tariff revenues are also far below the first block of the water rate, suggesting that billing efficiency is far from perfect.

A problem also occurs with the operation and maintenance costs. The reliability of the data is hard to check as underlying information is often missing (such as electricity use, or staff numbers). In several systems, no maintenance and/or treatment costs are registered. This is likely to have a positive impact on profitability in the short-run, but is in the long-run an unsustainable strategy. In general, operation and maintenance costs are underestimated.

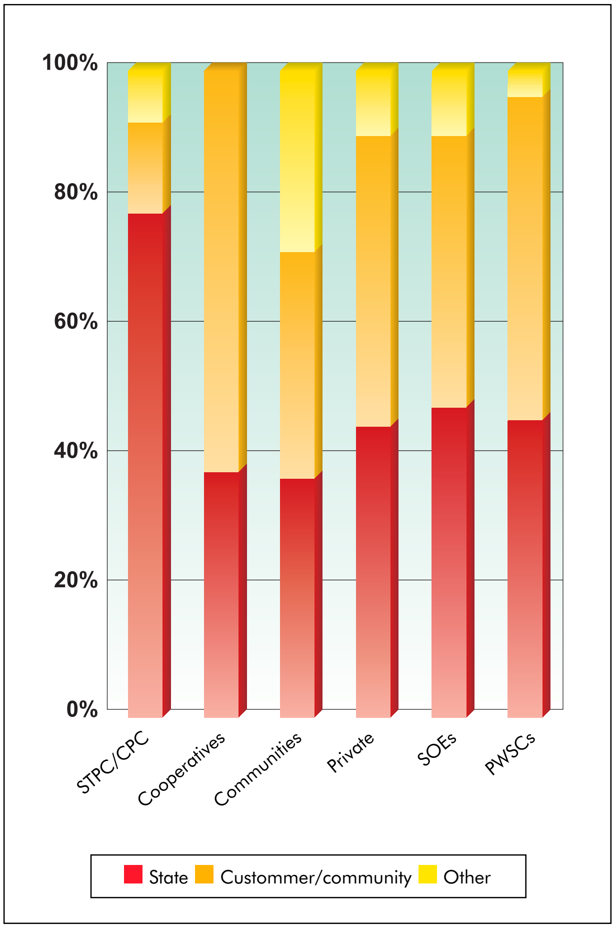
Assuming a depreciation rate of 5 percent per annum (using a 20 year lifetime of assets), almost all water systems register significant losses. The notable exceptions are the towns of Ben Luc and Thu Thua (under SOE management), Can Giouc, Cai Be, Tan Hoi Dong and Tan Hiep (under PWSC management) and Nam Giang (cooperative). If financing cost, operation and maintenance and treatment cost, taxes and overestimation of revenues are taken into account , it is possible that several of the “profitable” systems would turn unprofitable. Management models have only a marginal impact on the profit margin.

Figure 7 Profit Margin by Management Model



This Figure excludes the two major outliers :
Tu Ha, a PWSC managed system and Quang An, a privately managed water system

Figure 8 Funding Pattern by Management Model



PWSCs show the best performance if the major outliers are excluded. However, if the outliers are included, the results are dramatic - the PWSC management model with a small profit margin turns into the management model with the largest loss margin.

With one exception, all "profitable" companies are located in the Mekong Delta. The superior performance of the water supply systems in the Mekong Delta is due to the higher than average per capita consumption, lower than average per capita investment costs and relatively high tariffs.

Funding Patterns. There is quite a variety between management models and regions in terms of funding, with the exception of the STPC/CPC management model. On average, the state puts in about 40 percent of total investment costs. Customers pay most of the remainder, either through direct up-front contributions or through tariffs that provide the companies with the cash flow to pay for the investments. The remaining funds are provided through loans.

The funding pattern per region is substantially more diverse than that of the different management models, with large variations in government contributions and hence in the contributions of customers/communities. Most government subsidies are directed to the North East and North Central Regions. In the Red River Delta, the government on average contributes 50 percent of the investment costs, compared to only 12 percent in the Mekong Delta. From a poverty alleviation perspective, this distribution makes sense as the average per capita income in the North is much lower than that of the Mekong Delta.

The funding patterns of the PWSCs and other SOEs are intriguing. Some PWSCs and SOEs obtain investment funds from the parent company (Khe Tre, Can Giuoc and Thu Thua), others through preferential loans (Tan Hoi Dong, Thu Thua) and some others are funded through Provincial Water Supply Development Funds (Cai Be). The questions then arise:

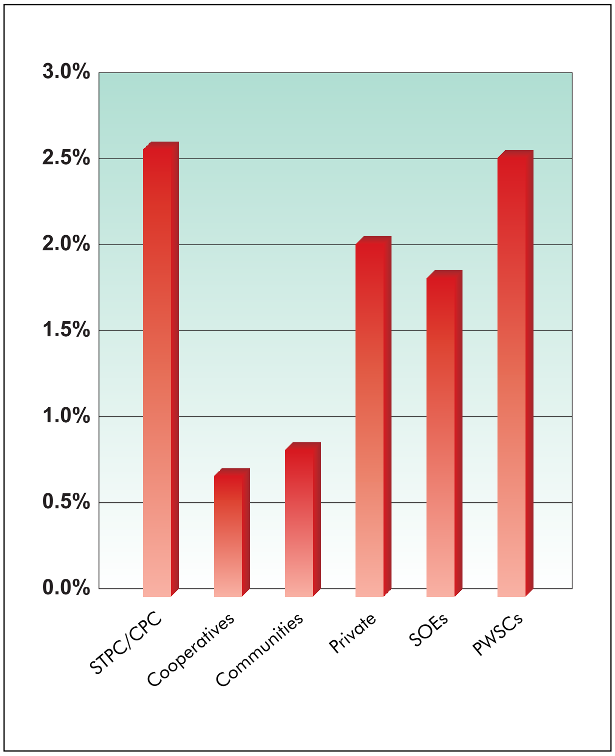
- What is the precise relationship between these water supply stations and the parent company?
- How important are cross-subsidies in PWSCs and SOEs – are small towns being cross-subsidized by larger towns or by other than water suplly business activities the companies engage in?

VI. Social Performance

Social performance was measured in terms of affordability of water tariffs and connection fees, and customer satisfaction with the quality of services.

Affordability of water supply services. Affordability or ability to pay is often measured as the sum households spend on water as a percentage of their household income. Because no separate surveys were being undertaken, the average per capita income was estimated for each small town/townlet investigated[12] multiplied by household size and used as a proxy for household income. Using that proxy, water tariff costs are rather affordable at an average 2 percent of household income.

Figure 9 Affordability of Tariff (% Household Income)



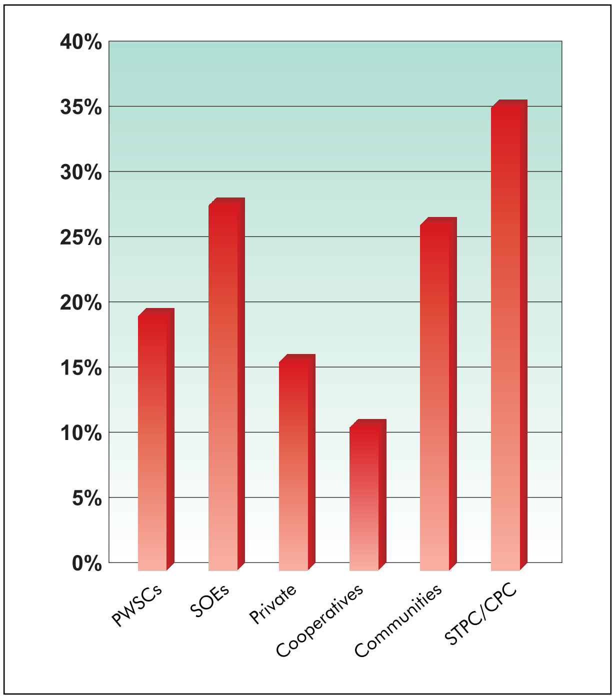
High connection charges are a major obstacle for poor households[13]. Payment ability and willingness to pay for connections are different in each studied area and dependent on the economic conditions of each family. In areas where people can easily access alternative good quality water sources, demand for piped water tends to be

12 *The average per capita income was determined by the district authority, which calculates this data annually using the methods as described in government regulations.*

13 *Poor households usually do not own fields. Their only livelihood is farming, or they do not have a stable job. Average monthly per capita income is low – normally below VND 60,000-100,000. They live in simple houses that lack basic facilities and convenience. They usually have more children than the average household, and their children are not properly educated because of the lack of means.*

lower. Vice versa, in areas where there are not many alternative water sources and/or water quality is inadequate, demand for piped water tends to be higher. In most of the studied areas, however, many households face difficulties in paying for the connection fee. The connection fee is one important and decisive factor for poor households in getting access to piped water.

Figure 10 Connection Costs as a Percentage of Household Income



The average total water connection cost in some small town water supply stations is relatively high, up to VND 3 million (US$197) against a minimum wage of about $1 per day. The reasons for the high connection fees are manifold: high construction costs; incomplete secondary network; choice of materials in project design (for instance, the use of galvanized steel pipes instead of PVC pipes,) and the use of indirect expenses and additional charges.

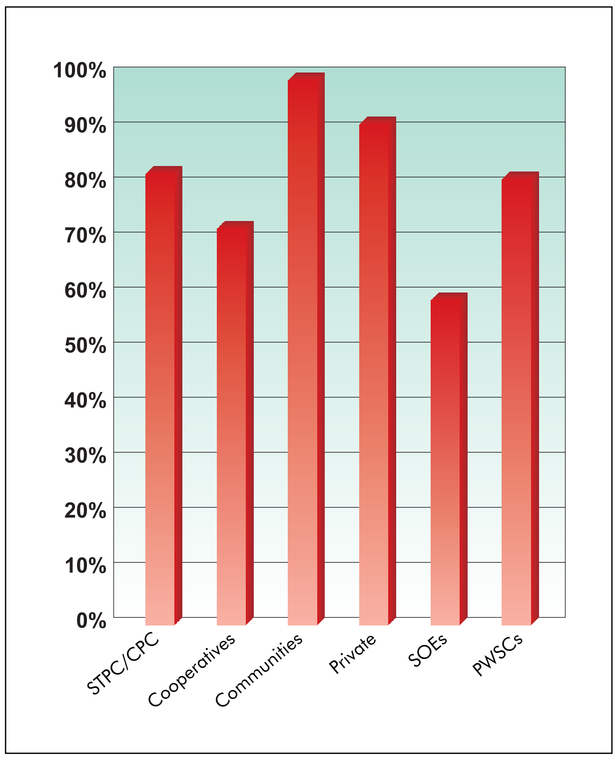
In order to provide incentives to ensure affordability, some water supply systems have applied the following supportive policies:

- Installment payments are allowed over a period of 1 to 2 years (such as in Que, Ben Luc, Thu Thua, Tan Hoi Dong, Nhi Quy).
- Subsidy policies for poor households by offering lower connection fees and construction contributions (for poor and so-called priority households).

Satisfaction with Water Pressure and Water Quality. In some towns, complaints focus on problems such as water clarity or odor. Customer satisfaction varies substantially among management models and with different technologies. Although many of these complaints result from differences in the water sources, operation and maintenance may also play a role.

Figure 11 shows that, in general, customer satisfaction with the pressure in the system is quite high. SOEs show much lower performance in delivering well pressurized systems than the other management models.

Figure 11 Customer Satisfaction with Pressure



VII. Institutional Performance

Ownership. One of the major issues still to be addressed in Vietnam's small town management of water supply systems is ownership. Generally, ownership of the water supply systems in small towns is fairly clear. The DPC or PWSC, state-owned enterprises, are assigned by PPCs to be investors in water supply projects and later to be the facility owners. In townlets, PCERWASS played the role of investor in almost all of the water supply systems investigated. Upon project completion, PCERWASS hands the facility over to local authorities – DPC, STPC, CPC or agricultural cooperatives. Local authorities formally are the facility owners – especially when projects were partially financed by the State. The PC decides on the management and operation model for the water supply system. For townlet water supply systems in which the investments were funded by private investors, or the community, the private sector and the community are the owners of the facility.

Ownership issues arise, however, in cases where multiple sources, such as private investors and community have contributed to the investment capital, as illustrated in Box 1.

Box 1 Ownership: Who is in Charge?

In Nam Giang, 1,250 households have connections for which they contributed 375 million VND. At the same time, all shareholders of the cooperative have drawn parts of their shares from the Cooperative, so the contribution of the users and the CPC (representing the state fund aid) have become disproportionately larger but these stakeholders are not considered as shareholders. Tien Giang Province has recognized this problem, and has promulgated a regulation that does not allow state-owned and private water supply enterprises to mobilize funds from customers/users for the construction of water supply facilities. In case funds have been mobilized, they must be refunded. The legality and the regulation on the contribution by water users to the expansion investments must be considered and guided more adequately, ensuring the customers' participation but also the legality in terms of the rights of the water users and the owners of the facilities.

Lack of clarity in ownership rights affects the process of mobilizing people to make contributions. Some water supply systems receive large contributions from their customers for construction and/or rehabilitation (such as Thu Thua, Ben Luc, Nam Giang). This may lead to confusion over ownership rights, causing disputes between different stakeholders. Clarifying property rights at the outset will help avoid later conflicts in management and operation.

For the purposes of this evaluation, since it was difficult to find a good indicator for ownership, this aspect is reflected in community and government contributions.

Adherence to Standards. The variable that was included as a proxy for institutional performance is the adherence to technical design standards as set by the Government. The Ministry of Construction has designated the standard per capita water consumption per day as follows:

Table 2 Design Standards for urban and rural domestic water consumption

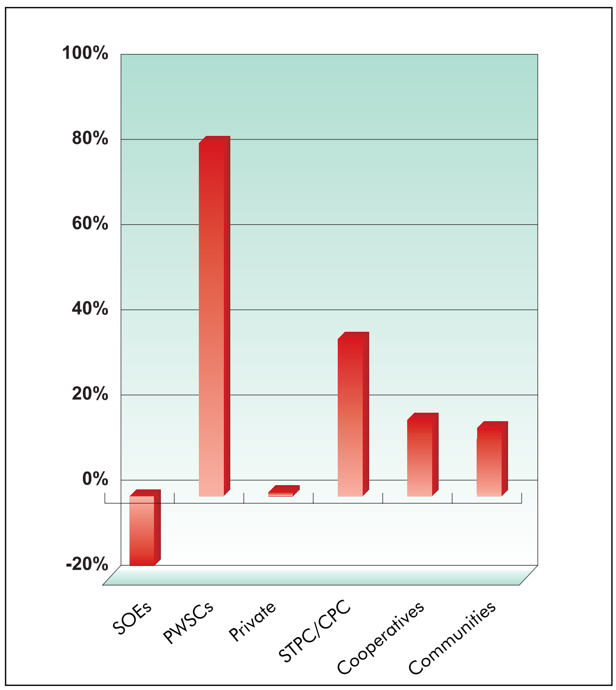
Categories	Consumption standards (liter/capita/day)
Towns category I and II	200-250
Towns category III and IV	150-200
Towns category V (Small Town)	80-120
Rural areas (including townlets)	25-50

Allowed Tolerance of 10 - 20% according to concrete situation

Even though these standards may have been set, they are hardly adhered too. There is a gap between actual standards and what is applied in the different systems, with many being over-designed. For all management models on average, only 36 percent of capacity is used for production. For very recently constructed systems such as the systems run by cooperatives, communities and private operators, the actual use of capacity is much lower. It is obvious that very new systems have lower production to capacity ratios than more mature systems, as systems are usually built with a long term time horizon (at least 10 years). The lowest production by capacity ratio is for STPC/CPC run systems, where only 21 percent of the capacity is used, although these systems have been operating for at least 9 years.

In small towns, two thirds of the systems do not comply with technical design standards. The PWSC and the STPC/CPC-run companies used technical designs far above the standard (up to 120 lcd). The deviation for townlets is much less stark; with most providers using design standards closer to those set by the Government. However, these are average deviations and they may reveal very different patterns within the same category. If the two major outliers are taken out of the comparison, PWSC's average deviation reduces to 19 lcd above the design standard, while the private companies are under-designing their systems.

Figure 12 Average deviation of design capacity from technical standards



Box 2   Technical Design Options and their Impact on Financial Viability

The capacity and service level of townlet water supply systems are usually determined on the basis of the funds which can be mobilized from the State, donors, community contributions or other sources. Because these funds are usually in short supply, investment in water supply systems is usually done gradually, closely following demand. Initially only a small well is drilled, a small pump is used. Once demand increases, additional investments are made (drilling more wells, purchasing more pumps, expanding the pipeline network, etc.). Good examples are : Tan Hoi Dong, Nhi Quy and Ben Luc which at present operate at around 70 to 80 percent of their design capacity. This investment model allows making full use of plant capacity, avoiding the construction of excessively large facilities, and reducing operation cost and depreciation, and thus helping to keep the cost of water down. However, in the design of the pipe network the need for expansion in the future should be taken into consideration: the main pipeline should be of sufficient diameter, the treatment station should be designed in modules which can be easily integrated when expansion is needed.

On the other hand, some water supply systems have invested large sums compared to the ability of its inhabitants to pay, so that the actual amount of water pumped is much lower than the capacity invested in. This case is common where the principal investor is not also the manager and operator of the system, such as in Tu Ha, where the DPC was the principal investor, constructing a water station with a capacity of 4,000 m3/day and a cost of 18 billion VND to provide water to the two small towns of Sia and Tu Ha. Tu Ha operates on only less than 5 percent of its design capacity, just like Quang An. Other small towns and townlets like Vu Thu, Kien Khe, Que, Trung Lao and Le Loi 1 also have systems which are seriously over-designed.

VIII. Conclusions and Recommendations

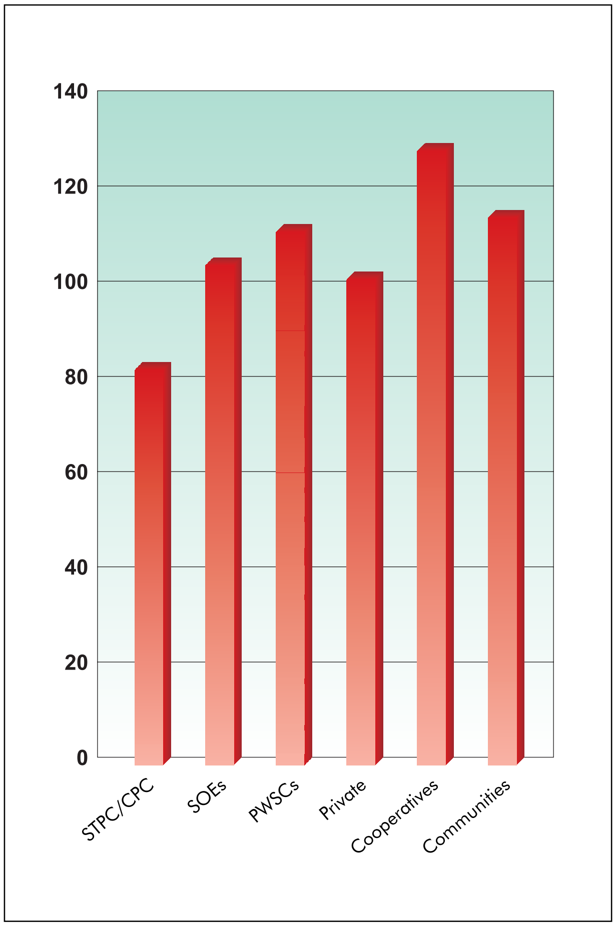
Access to water supply services, not to mention sanitation services, is still rudimentary in small towns and even more so in townlets and communes. In the study sample, about 38 percent of the population in these settlements owns house connections, while a slightly higher number representing 45 percent of the population has access to water supply services. However, these data are rather rosy as they reflect the situation in settlements that have a basic piped water network, which is only the case in a minority of these settlements nationwide.

Is there a "best practice" management model?

The ten selected indicators reflecting these dimensions were ranked – the best performance within the sample getting the highest number of points. The total values show that sustainability is rather marginal for all systems with an average value hovering around 110 out of a maximum score of 202. On the basis of this indicator, which sums all these dimensions of sustainability together, the performance by management model is shown in Figure 13.

There are no serious outliers in how management models perform. Cooperatives, communities, and PWSCs are doing

Figure 13 Overall performance by Management Model

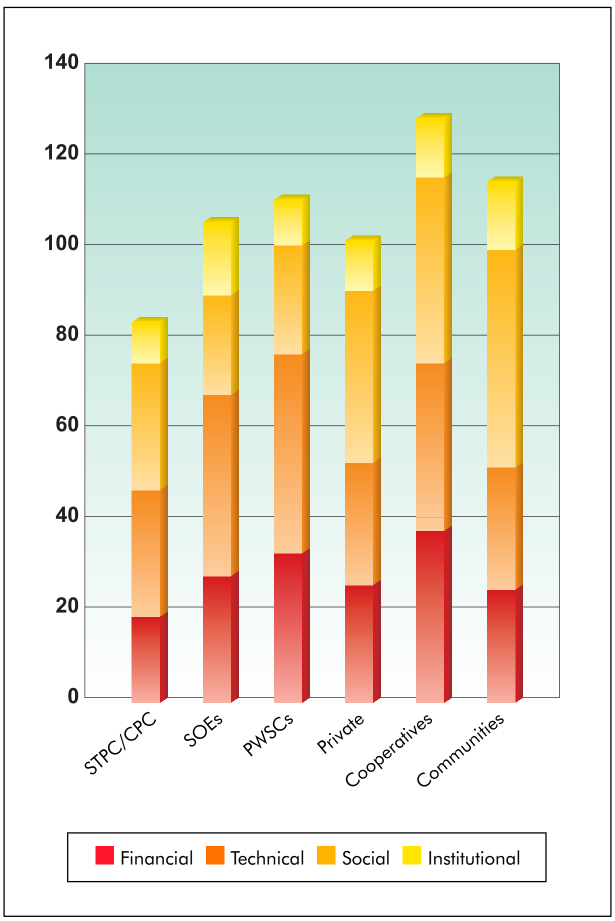


better than average, while STPC/CPC-managed systems are performing below average. The SOEs and privately operated systems are performing more or less average.

The implications are interesting, showing that:

- *The use of more focused customer-oriented approaches results in better overall performance, which supports evidence elsewhere in the world that demand-responsive approaches have a positive impact on systems' sustainability.* Cooperatives, communities and private operators show above-average social performance, while SOEs and STPCs/CPCs that are also engaged in outside business activities, may be less effective than companies that deliver water supply services exclusively.

Figure 14 Impact of different indicators on performance



- *Better technical and financial performance of a system's management does not necessarily result in overall more successfully performing systems* – customer satisfaction may still be low if tariffs or connection costs are high and the needs of the poor are not met.

Cooperatives, PWSCs, and SOEs have, on average, higher financial scores than the other management models. Technical performance is best by PWSCs, SOEs and cooperatives. Part of the better performance of PWSCs and to a lesser extent SOEs may be due to the higher age of the systems which influences the coverage and consumption levels in systems that are more mature than the systems that only recently came on stream. Age of a system is strongly correlated with the technical performance of the system, and hence adjusting for age is likely to make the differences in technical performance much less evident.

The largest differences between the various management models are shown in the social dimension of performance. Systems managed by communities, cooperatives and private operators have much higher scores than systems managed under other management models. SOEs score significantly below average in this dimension of performance. STPC/CPCs score below average on institutional performance.

The data presented here are average data, as such they do not reflect differences within the same management models. The PWSCs show very mixed results with companies in the Mekong Delta (in the province of Tien Giang) showing the water supply systems among the top performers in the sample, while PWSCs in other regions are scoring below average in overall performance. The question arises what makes the PWSC of Tien Giang so much more successful? The reasons for the success of Tien Giang province are manifold, but the most likely to have contributed are (i) clear institutional arrangements between the different agencies involved in the water supply sector, with Tien Giang having three different types of arrangements (PWSC, rural WSC, and private operator); (ii) entrepreneurial set-up, with PWSC also undertaking other business activities, including the design and construction of small towns and commune water schemes; (iii) additional financing arrangements, in which a water development fund has been set up for the rehabilitation and expansion of investments, funded by existing customers through a surcharge of VND200 per cubic meter.

Within these three systems in the same province, the oldest PWSC systems perform significantly better than the more recently established rural water supply company or the private operator, suggesting that age should not be overlooked as a factor explaining performance.

Yet, the large variety in performance between models also shows that the more important aspect of management is not so much the organizational model around which it is organized, but what "rules of the game" are being used and applied. Some "rules of the games" like autonomy in managing the water supply business, proper tariff levels, affordability of services are better indicators for success than are the management models per se.

What about "economies of scale"?

Correlation shows there is a weak, but inverse relationship between the size of settlement and performance: the higher the model's performance rating, the more likely it is located in a townlet. This is an intriguing result – and it seems to contradict the intuition that small towns can benefit more from "economies of scale" than townlets.

The difference in population size between small towns and townlets is smaller than one may expect. The average small town has 10,805 inhabitants compared to about 8,500 inhabitants for the average townlet. Correlations between coverage, population size and performance show inconclusive results suggesting that other factors besides size are more important in defining overall performance – either population, households with access to water supply services or the different set of standards that apply for small towns and townlets. However, "economies of scale" do exist when consumption is taken into account.

Government regulation, incentive structures and procedures (including technical standards, government subsidy policies, for instance) seem to have an overall adverse impact on the system's performance. Lack of government regulation in townlets has resulted in a sharp proliferation of different types of management models which are tailored to local needs. Technical standards in townlets are more in line with actual consumption patterns, resulting in a lower probability of over-designed systems. Also, the average townlet depends more on other sources of funding than that provided by the government. In general, townlets generate larger community contributions than small town-based systems, a feature linked to above average performance.

As the benefits of "economies of scale" are not straightforward, the issue regarding the value of aggregation or regionalization of systems needs to be addressed. Aggregation or regionalization has the advantage that systems within a province can pool scarce human and financial resources more efficiently. Aggregation also offers the possibility to use different forms of cross-subsidies, such as those between different locations and between different types of business activities.

Yet, this does not necessarily result in a better outcome for society than establishing a more competitive water market, characterized by an enabling environment for a variety of management systems. It is important that the cross-subsidy system is understood so as to arrive to a proper tariff design.

In the sample, PWSCs as regional or provincial entities, show a reasonable, above-average performance, but this performance is mainly due to the fact that the one provincial PWSC (represented with three systems) in the Mekong Delta is performing very well; other PWSCs in other provinces

Box 3 One poor family in Vu Thu town talked about its ability to pay:

"We have two children but we have only 4 "sao" of field. If we want to have piped water, we should pay at least 400,000 VND, equivalent to some tens of kilograms of rice. How we can find so much rice? At the beginning of the school year, we had to borrow money with a high interest rate to pay the school fees for our children. We have to wait for the crops or to sell chickens and ducks to pay for the debt. Hence, it will be difficult to get piped water to our home."

Tran Thi My - prioritized family in Cai Rong town, Quang Ninh

"Currently we are using well water, but we want to change to piped water because the water from the well is becoming increasingly polluted. In order to have piped water, we should have a service line from the other side of the road to our house— the line would be nearly 100m long, and the estimated cost ranges from 1.5 million VND to several million VND. But we have no savings and therefore we can't pay for the pipe in order to have a water connection."

perform below average. Moreover, factors such as age of the system, hydrological and socio-cultural factors, rather than the benefits of aggregation only, may influence performance significantly.

Serving the Poor

Water supply services are still not reaching the poor[14] in small towns and townlets. For the moment, the beneficiaries of pro-poor pricing schemes and policies are generally more well off residential customers. As elsewhere in the region, the poor tend to be excluded from access to piped networks, because of the prohibitive cost of connecting to the system (especially so in systems run by PWSCs, SOEs and STPC/CPCs) and the location of the poor, often on the periphery of settlements. The above-mentioned government subsidy policy could also start addressing how the poor can gain access to services. The question is how to target the poor, specifically, what is the best manner to ensure their access to services.

A majority of households prefer to have connections and use piped water. If there is no substitute water source and they are not able to purchase tanks for storing rainwater or to dig wells, they have to buy water from neighbors with a higher price. In a group discussion, people in Can Giuoc town said: "*It is possible to live without eating for 3 days, but how can we live without water for 2 days?*", or people from Nam Giang: "*People sometimes need water more than electricity, short of water for one week is really a nightmare.*"

Cross subsidies need to be studied further to fully understand the role they may play in reaching the poor, especially with regard to the system of cross-subsidies that is at work in PWSCs and SOEs and possibly STPC/CPCs managed systems. The fact that many PWSCs have profitable businesses flourishing alongside their water supply business (including construction-related businesses – pipeline installation contracts with districts, and communes, bottled water, and the like), the question arises, how sustainable the actual water supply business in these companies is? Although cross-subsidies are a means of funding water supply investments, more insight into how the different systems are subsidized could help rationalize the government's subsidy policy and the water company's tariff policies.

14 Poor households usually do not own fields. Their only livelihood is farming, or they do not have a stable job. Average monthly per capita income is low – normally below VND 60,000-100,000. They live in simple houses that lack basic facilities and convenience. They usually have more children than the average household, and their children are not properly educated because of the lack of means.

Annex 1 Description of small towns and townlets studied

Province/ Region	Town/ Townlet Name	Population	Design Capacity (m^3/head)	Starting Operation time	Management Model	Water Resource
Nam Dinh (North)/ Red River Delta	NamGiang (T)	15785	1000	03 / 1998	Water Supply Cooperative	Surface
	Trung Lao (T)	6,811	500	04/ 1998	Agricultural Cooperative	Surface
	Giao Tien (T)	17,877	900	01 / 1999	Commune People's Committee	Surface
Than Binh (North)/ Red River Delta	Vu Thu (ST)	6,585	1000	2/1999	District Water Supply Company	Surface
	Lu (T)	1316	100	1999	Community self-managed.	Surface
	Village 4 (T)	2746	120	10 / 2000	Community self-managed.	Surface
	Dong Sam (T)	3949	200	6 / 2000	Private investment and operation	Surface
Ha Nam (North)/ Red River Delta	Kien Khe (ST)	8,977	600	2 / 1999	Community self-managed.	Surface
	Que (ST)	5,024	1000	8 / 1997	Town People's Committee direct management	Surface
Long An (South)/ Mekong River Delta	Ben Luc (ST)	17450	1000	1996	District Water Supply Company and Multi-Service Enterprise	Ground
	Can Giuoc (ST)	10,670	1000	4 / 1998	Provincial WSC	Ground
	Thu Thua (ST)	14,497	1000	1996 Almost Rehabilitated 1940	District WSC	Ground
Tien Giang (South)/ Mekong River Delta	Tan Hoi Dong (T)	7,367	400	4 / 1996	Provincial Rural Water Supply Exploitation and Management Company	Ground
	Nhi Quy (T)	11,153	800	3 / 1996	Private investment and operation	Ground
	Cai Be (ST)	14990	3000	1994 partially rehabilitated 1940	PWSC	Ground and surface
	Tan Hiep (ST)	5,747	640	1994 fully Rehabilitated 1970	PWSC	Ground
Quang Ninh North-East	Quang Yen (ST)	8,176	2,000	1,976	District Division of Transport and Public Works	Surface
	Mao Khe (ST)	31,559	2,000	1,976	PWSC	Surface and ground
	Cai Rong (ST)	6,989	1,000	1,993	DPC	Springs
	Mong Cai (ST)	30,000	4,500	1,992	Environmental Services Company	Surface
Thua Thien Hue North-Central	Tu Ha (ST)	7,574	4,000	1,970	PWSC	Surface
	Sia (ST)	9,632		1,999	From Tu Ha and Hue systems	Surface
	Quang An (T)	10,190	1,000	1,999	Private	Surface
	Khe Tre (ST)	3,163	500	1,995	PWSC	Surface

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