Financial and Economic Sustainability: Public-Private Partnership

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1. Introduction

Until recently the public sector in India was assigned a dominant role in planning, development and management of drinking water supply and sanitation projects. Section 2 gives reasons for assigning a dominant role for government in the past, assesses the current status of drinking water supply and sanitation in rural areas in terms of their availability, type of access and quality, and highlights the problems in continuing the centralized supply-driven approach. Section 3 argues a case for decentralized demand-driven approach based on public-private partnership. It identifies the roles for government, private firms and local communities in planning, development and management of drinking water supply and sanitation projects. It considers problems of coordination, cost sharing, pricing, access to poor, and economic sustainability. Two examples of public-private partnership are given in Section 4 to illustrate issues in the design and implementation of PPP. Section 5 contains concluding remarks.

2. Drinking Water Supply and Sanitation: Past Policy and Current Status

2.1 Dominant role for public water supply

The Government of India and the state governments have assigned a dominant role for public sector in the provision of drinking water and sanitation services in the past. The reasons are partly based on the nature and characteristics of the good/service and partly on the belief that the public provision can correct market failures and achieve social goals.

Water is a natural resource. Water resources such as rivers, canals, ponds, lakes and streams are common property resources with open access. The public trust doctrine rests on the principle that common property resources which are important to the people as a whole should not be a subject of private ownership. The state is to act as the trustee of the natural resource. Ground water in private lands is a common-pool resource. Most governments give owners of lands only the right to extract water for private use.

Drinking water and sanitation services are viewed as merit goods. Merit goods are those that are in the nature of private goods in that their consumption may not be non-rival but yet the amounts provided by the market may not be to the extent that the community would like. Some would argue that these communal wants transcend individual preferences. Water is also a basic need; it is an important means of life support. The Supreme Court of India, in its various decisions, stressed citizens' right to a wholesome environment which includes access to safe drinking water and clean air. As an essential good, the price

elasticity of demand for drinking water is low. Hence, many governments favour provision of drinking water to poor at affordable prices.

Water supply and sanitation services are regarded as public utility services. In case of a water supply system, there may be significant economies of scale in storage of water and treatment of water. One can also avoid duplication of facilities by having a monopoly. Public monopoly also provides an opportunity for provision of services to poor either at subsidized prices with government bearing the cost of subsidy, or cross subsidization of poor by rich, while ensuring reasonable return on the investments. Subsidy/cross subsidy is preferred to achieve goals such as equity (affordable prices to poor), provision of merit goods (meeting minimum needs), and realizing external benefits (savings in health costs because of safe drinking water and good sanitation services).

If the public utilities are managed efficiently in the sense of providing the services at least social costs, and achieving the goals of equity and balanced regional development, and economic sustainability, then there is a case for a dominant role for public sector in the provision of water supply and sanitation services. Let us see to what extent the expectations have been realized.

2.2 Rural water supply and sanitation: Current status

The two main sources of data on conditions of drinking water and sanitation at the national level are (a) National Sample Survey 54th round conducted during January-June, 1998, available in NSSO (1999), and (b) Census of India conducted in February 2001, available in Registrar General of India (2003).

Earlier rounds of NSS, 28th round (Oct 1973 – June 1974), 38th round (Jan – Dec, 1983), 44th round (July 1988 – June 1989), and 49th round (Jan – June 1993) contain data relating to conditions of drinking water or/and sanitation. NSS 54th round survey is based on a larger sample; it also provides new information. NSSO (1999) gives information about source, availability, right of use, distance from source, supplementary sources and quality of water for drinking water; type, right of use and distance from the place for bathroom and latrine; and a few indicators of hygiene. Census 2001 gives information about sources and distances from households for drinking water, and availability and types of bathrooms and latrines.

Table 1 gives percentage distributions of households by principal source of drinking water during January - June 1998. According to NSSO (1999), the source tap refers to 'the supply of water to the households through pipe after suitable treatment, if required, by corporation, municipality, panchayat or other local authorities, or any private or public housing estate or water treating agency' (p.6). Of all the 8 sources mentioned, only this source provides treated water. It may be noted that tap was the principal source for 18.7 percent of rural households and 70.1 percent of urban households. The shares of tube well,

handpump and wells were 75.9 percent in rural areas and 28.0 percent in urban areas. Common property resources like tank, pond, river, canal, lake and spring were principal source for 4.9 percent of rural households and 0.6 percent of urban households.

Table 1
Percentage Distributions of Households by Principal Source of Drinking Water During January – June, 1998

Source of drinking water	Percentage of households	
	Rural	Urban
Tap	18.7	70.1
Tubewell/hand pump	50.1	21.3
Well	25.8	6.7
Tank/pond reserved for drinking	1.3	0.2
Other tank/pond	0.6	0.1
River/canal/lake	1.3	0.2
Spring	1.7	0.1
Tanker	0.2	1.0
Other	0.2	0.1
All	100.0	100.0

Source: NSSO (1999), Table 1, page 22.

Apart from the rural-urban disparity at the national level, there are wide regional variations between poor states and rich states in the distributions of households by principal source of water supply in rural areas. Based on World Bank (2003), we have chosen 4 poor states with percapita annual income of Rs.7,500 or less during 1997-2000, and 4 rich states with percapita annual income of Rs.15,000 or more during 1997-2000, for a comparative assessment of principal source of drinking water supply. The poor states were Bihar, Orissa, UP and Assam and the rich states were Maharashtra, Punjab, Haryana and Gujarat. In all the 4 poor states, less than 9 percent of the rural households had tap as a principal source. In Bihar, the state with the lowest percapita annual income of Rs.4,500, less than 1 percent of the rural households had tap as a principal source. In the 4 rich states, the percentage of rural households depending on tap as a principal source varied between 14.8 in Punjab to 46.6 in Gujarat. See Table 2.

Both NSS and the Census provide information about the type of access measured in terms of distance from the principal source. NSS results for rural and urban areas are given in Table 3. In rural areas, less than one-ninth of households had access to principal water source within dwelling, but in urban areas nearly two-fifth of households had access to

principal water source within dwelling. As far tap water, the only source of treated water, among the households having tap as principal source, 19 percent in rural areas and 46 percent in urban areas had taps within dwelling. But for all households, only 8 percent in rural areas and 50 percent in urban areas had access to tap within dwelling.

Table 2
Percentage Distributions of Households Served by Principal Source of Drinking Water in Rural Areas of Poor and Rich States, January – June, 1998

State	Tap	Tubewell/handpump	Well
Bihar	0.7	70.3	27.9
Orissa	2.9	53.2	33.7
UP	8.8	63.5	22.1
Assam	7.3	49.5	27.8
Maharashtra	41.1	24.4	29.8
Punjab	14.8	82.7	2.3
Haryana	31.1	49.9	19.1
Gujarat	46.6	31.7	16.1

Source: NSSO (1999), Appendix Table 9, pages A114-A123.

2001 Census results reveal that 28.7 percent of rural households could get water supply within premises, 51.8 percent near premises and 19.5 percent away from their premises; the corresponding percentages for urban households were 39.0, 44.3 and 16.7 respectively. Table 4 gives Census 2001 results pertaining to percentage distributions of households by source of drinking water and their location. For rural households, handpump is the most important source while for urban households the dominant source is tap. As for tap, about half of urban households had this source within their premises, but in rural areas less than one-tenth of households had this source within their premises.

As for the quality of drinking water, 85 percent of rural households and 91 percent of urban households reported that the principal source was of satisfactory quality. See Table 5. Tap and spring sources had the highest quality ratings. Common property water resources such as tank/pond and river/canal/lake had relatively poor ratings. Four decades back these were the principal sources of water for rural households. Their water quality has deteriorated over time.

NSSO (1999) also gives information about the sufficiency of drinking water available from different sources during different months of a year and supplementary sources of water.

Table 3
Percentage Distributions of Households by Principal Source of Drinking Water and Distance from Source, January – June, 1998

Principal source of drinking water	Percentage of households with principal source				
	Within dwelling	Outside dwelling but within premises	Outside premises at distance		
			<.2 km	.2 to 1 km	>1 km
Rural					
Tap	19.1	22.0	55.9	2.7	0.2
Tubewell/handpump	14.9	19.3	59.8	5.7	0.2
Well	0.0	22.7	66.4	9.2	1.6
Tank/pond reserved for drinking	0.0	9.6	65.1	15.4	9.8
Other tank/pond	0.0	34.9	47.6	12.2	5.2
River/canal/lake	0.0	0.0	57.6	38.8	3.7
Spring	0.0	0.0	39.2	28.2	32.6
All	11.0	20.1	60.4	7.1	1.3
Urban					
Tap	45.8	25.3	27.1	1.6	0.2
Tubewell/handpump	29.8	29.1	37.7	3.0	0.4
Well	0.0	45.2	48.9	5.6	0.2
Tank/pond reserved for drinking	0.0	10.1	46.9	35.7	7.2
Other tank/pond	0.0	6.7	56.1	31.9	5.2
River/canal/lake	0.0	0.0	54.5	45.4	0.1
Spring	0.0	0.0	92.5	7.3	0.2
All	38.6	27.1	31.5	2.4	0.4

Source: NSSO (1999), Table 3, page 24.

According to NSSO (1999) only 19 percent of rural households and 65 percent of urban households had bathrooms. Three out of ten rural households and 1 out of 7 urban households had to go outside their premises for bathing facility. See Table 6.

According to NSSO (1999), 82.5 percent of rural households and 25.5 percent of urban households had no latrine. Of the households having latrine, the principal type is one with septic tank. Only 0.8 percent of rural latrines and 22.5 percent of urban latrines were connected to sewerage systems. Census 2001 reports that 78 percent of rural households and 26.3 percent of urban households had no latrine. See Table 7.

Table 4
Percentage Distributions of Households by Source of Drinking Water and its Location, 2001

Source	Within premises	Near premises	Away	All
		Rural		
Tap	33.5	23.6	12.5	24.3
Handpump	42.6	46.7	34.8	43.2
Tubewell	4.0	5.7	8.4	5.7
Well	19.2	20.3	31.7	22.2
Tank/pond/lake	0.6	1.1	2.7	1.3
River/canal	0.0	1.1	3.9	1.3
Spring	0.0	0.8	2.8	0.9
Any other	0.2	0.7	3.1	1.0
	100.0	100.0	100.0	100.0
		Urban		
Tap	76.0	59.7	41.7	68.7
Handpump	12.6	23.3	22.3	16.2
Tubewell	4.4	5.4	9.2	5.1
Well	6.7	8.1	14.0	7.7
Tank/pond/lake	0.1	0.5	1.4	0.3
River/canal	0.0	0.4	1.0	0.2
Spring	0.0	0.6	1.2	0.2
Any other	0.2	2.1	9.3	1.5
	100.0	100.0	100.0	100.0

Source: Registrar General of India (2003), Table H-8 Census of India, 2001.

Local authorities' role in removal of garbage from house is also dismal. According to NSSO (1999) (page A166), the percentages of rural households expressing concerns about the problems of flies, mosquitoes and foul odour were 68.5, 84.0 and 36.0 respectively. They reported that these problems increased during the last 5 years. As far these problems are concerned, the conditions are almost the same in urban areas.

Statistics on coverage of households provided by state governments in respect of drinking water supply and community toilet facilities relate to installed capacity and not actual use. The Tenth Five Year Plan notes that 'more than 3.5 million hand pumps and over 1,00,000 piped water supply schemes have been installed in the country under the Rural Water Supply Programme..... A majority of the schemes remain non-functional and many

others become permanently defunct due to lack of proper maintenance and repair for want of funds' (p.604). In Maharashtra, out of 1.4 million toilets built at a cost of Rs.4.42 billion over the past few years only 40 percent are in use. 'Either they were built at an inconvenient place or thrust upon the village regardless of whether they were needed or not' [The Hindu (2002)]. We get similar reports about women and children sanitary complexes built in rural areas and small towns. Either they are not in use or used not fully because of lack of water, electricity and poor maintenance or/and located in inconvenient places.

Table 5
Percentage Distributions of Households with Specific Principal Source of Drinking Water by Quality of Drinking Water from that Source during January – June, 1998

Source	Percentage reporting satisfactory quality	
	Rural	Urban
Tap	90.3	92.6
Tubewell/hand pump	85.3	86.1
Well	83.2	89.5
Tank/pond reserved for drinking	68.6	76.8
Other tank/pond	55.4	65.2
River/canal/lake	67.3	52.7
Spring	90.6	97.0
Tanker	89.3	89.8
Other	76.9	91.5
All	85.1	90.8

Source: NSSO (1999), Table 12, page 34.

Table 6
Percentage Distributions of Households having Bathroom/ Location of Bathing Facility

(Percent)

	Rural	Urban
A. Households with bathroom	19.0	64.7
B. Households without bathroom		
Bathing facility within dwelling	17.3	14.1
Bathing facility outside dwelling but within premises	33.2	13.6
Bathing facility less than 0.2 km outside	23.7	6.2
Bathing facility 0.2 to 1.0 km outside	5.8	1.0
Bathing facility above 1.0 km outside	0.3	0.0
C. Households not reporting	0.6	0.4

Source: NSSO (1999), Table 15 and 16, pages 37-38.

Table 7
Percentage Distributions of Households by Type of Latrine Used

(A) NSS, January- June 1998		
Type	**Rural**	**Urban**
Service latrine	2.7	5.9
Septic tank	7.5	35.2
Power flush pit	2.9	8.4
Sewerage system	0.8	22.5
Other	3.5	2.5
No latrine	82.5	25.5
(B) Census 2001		
Type	**Rural**	**Urban**
Pit latrine	10.3	14.6
Water closet	7.1	46.1
Other latrine	4.5	13.0
No latrine	78.0	26.3

Source: NSSO (1999), Table 18, page 40.
Registrar General of India (2003), Table H-10 Census of India, 2001.

2.3 Sustainability

The financial sustainability of the public water supply and sanitation system is being threatened because of the high capital costs of creating capacities, high operation and maintenance costs and poor cost recovery. UNDP – World Bank (1999) notes that during the period 1951-97, total plan outlays for rural water (including very modest amounts for sanitation) were Rs.202 billion, and for urban water (also including sanitation) about Rs.136 billion. It reports that a joint review of water resources management by the Government of India and the Word Bank arrived at 'rough estimates of recurring expenditure and investment needs for water and sanitation separately. For water in rural areas, the annual requirement just for adequate operations and maintenance is estimated at Rs.29 billion. The investment requirement is over Rs.200 billion to rehabilitate and repair all existing schemes and fill in gaps where necessary, and an additional Rs.450 billion to bring the whole rural population to the "full coverage" standard of 40 litres per capita per day within a distance of 1,600 meters' (page 10). As against the estimated annual maintenance cost of Rs.29 billion, the annual provision for this purpose is about Rs.2.5 billion !

Cost recovery rates for 15 states in India in 1993-94 were estimated at 5.16 per cent for water supply and sanitation in the (non-merit) services sector and 7.13 for sewerage and sanitation in the merit goods sector. See Government of India (Ministry of Finance) (1997). The fiscal position of both the central and state governments have been worsening. World bank (2003) estimates the combined central and state governments revenue and fiscal deficits in 2002-03, as per cent of GDP, at 6.9 and 10.1 respectively. As the public debt-GDP ratio is now more than one, deficits of these orders are unsustainable.

As the Indian economy is being liberalised and globalised, as the public water supply and sanitation system is being costly, inefficient and heavily dependent on public funds, and as the central and state governments are not in a position to raise adequate resources for this sector, there is a case for adopting a decentralised approach based on public-private partnership which can be cost-effective and financially sustainable. The arguments that drinking water and sanitation are merit goods and that major water sources are common property resources do not necessarily imply that government be the service provider. What is needed is an appropriate regulatory framework to ensure that the needs of poor are met at affordable prices and that the common property resources are managed in a sustainable manner.

3. Public – Private Partnership

3.1 Case for a decentralised approach

There is a strong case for a decentralised and participatory approach to planning, developing and managing rural water and sanitation projects[1]. By involving the beneficiaries from the planning stage to the utilization stage and using the technical and managerial expertise and resources in the private sector, government can create an enabling environment for achieving the social goals.

A decentralised approach facilitates finding location-specific solutions to rural water and sanitation problems. On the supply side, natural resource endowments differ from region to region. Annual rainfall varies from 10 cm in western Rajasthan to more than 900 cm in Chirapunji in Meghalaya. Some regions are rich in water resources while others are poor. In water resource-poor regions, water supply can be augmented by exploiting ground water, transporting water from nearby areas, rainwater harvesting, erecting recharge structures, recycling and reuse of water. The unit costs of sources vary from region to region. Users' preferences regarding source of water, type of access (individual or shared), and location within dwelling or away, and ability to pay vary from household to household. These supply side and demand side factors can be taken into consideration at the planning stage, if the decision making is done at the local level with the involvement of the beneficiaries.

A major weakness of the centralised supply driven approach is poor utilization of the capacities already created. The outputs are measured in terms of capacities created and the funds are disbursed on the basis of the output targets. For example, in case of handpumps or toilets what is measured is the number created. Little attention is paid to the factors which retard the maintenance and utilization of the assets[2]. In government budgeting new investments get high priority and maintenance of assets get low priority. In fact maintenance expenditures come under the category non-plan/non-development expenditures. As mentioned earlier, the budgetary provision for maintenance of rural water supply and sanitation works is roughly one-tenth of the funds required. As a result,

some of the assets created become non-functional. If local community is involved from the planning stage and is informed of the technology, and held accountable for management of the assets created, we can expect efficient utilisation of the assets created.

Decentralised and participatory approach can be cost-effective. According to World Bank (2003), the ratio of average wages in the public and private sectors which was 1.92 in 1993-94 has increased to 2.33 in 1999-2000, with premiums for government staff ranging from 27 per cent for engineering technicians to 145 per cent for low-end service workers (pages 36-37). Corruption and leakages are not uncommon. Rural communities can create and maintain some of the assets at lower costs because their opportunity costs of time are low.

Rural water committees and self-help groups (SHGs) can improve cost recovery at low transaction costs than government agencies. They are in a better position to allocate water resources in periods of scarcity as they have better information about supply and demand, and also use the social capital, i.e. norms, trusts and network to reach voluntary and binding agreements.

Local community based organisations possess comparative advantage over outsiders in managing common property and common-pool water resources and in arriving at location-specific solutions to manage collection, disposal and recycling of solid wastes. What is needed is creation of an institutional structure and an incentive-penalty scheme to induce them to undertake the chores in a cooperative way.

Government has to play a major role in developing water policy, designing regulatory structure, accessing and transferring cost-effective technologies, facilitating design and implementation of large projects covering many villages and towns, executing National River Action Plan and National Conservation Plan, providing hydro geomorphological information and ground water prospects to local bodies and private individuals to identify sites for constructing recharge structures and borewells, giving subsidies to poor, and supporting schemes where external/spillover effects are large[3].

The private sector and NGOs can play an important role in identifying the technical solutions, mobilizing resources, undertaking supply contracts/projects/delivery systems based on competitive bidding. They can undertake projects on build, own and operate; build, own, operate and transfer; or some other bases. Private sector may be able to achieve cost savings and minimize wastages but they must operate within a regulatory framework so that the social goals are met.

3.2 Financial sustainability of a PPP

A coordinating agency is necessary to coordinate the functions of different actors in a PPP project by designing an appropriate institutional setup specific to the needs of each

programme, and framing rules and regulations which induce the participants to realize that via cooperation each participant group can be made better off than otherwise.

Cost effectiveness should be the major criterion in capacity creation. Capacity costs can be lowered using locally available resources, traditional technologies, skills locally available, and reducing the construction time. Construction of a toilet in rural area by government costs around Rs.5,000, but we observe that many NGOs and SHGs are able to construct similar toilets at half the cost. The wage compensation for masons, plumbers and other skilled labour in rural areas are less than half of the amounts paid to similar categories of workers employed by government. Rural projects can also be supported partly using funds available under food for work, minimum needs programme and other programmes for poor.

There is ample scope for reducing operation and maintenance (O&M) costs of the assets created by entrusting the work to NGOs and SHGs. The repair and maintenance costs, revenue collection costs and monitoring costs are about half of the public sector costs when local community undertakes the responsibility. For example, rural people are willing to undertake the responsibility of managing sanitary complexes on a consolidated monthly pay in the range of Rs.900 – 1,200 in many villages.

We need an innovative mechanism for sharing capital and operating costs of rural water supply and sanitation projects. For a public utility located in a rich village or town, where all households have meters, one can fix a connection charge based on the annualized capital cost and water charge based on meter readings to cover O & M costs. If the opportunity cost of water varies in different seasons, seasonal tariff can be introduced.

In many villages, less than 50 per cent of households would be in a position to afford household connections for piped water supply. Even these households may not be in a position to pay the connection charge if the charge is fixed in such a manner as to cover the entire capital costs at the time of connection. For such households, the connection charge has to be set below the capital cost and the water charge above the unit O & M cost, so that over a period of time, say within 5 years, the capital cost of water supply attributable to them can be recovered, and thereafter they pay only the O & M cost in the form of water charge.

More than half of rural households can afford access to water supply only on a shared basis via tap, handpump, well, or tube well located near their premises. Part of the capital costs to people below the poverty line can be met using funds under Accelerated Rural Development Programme, Minimum Needs Programme, Sector Reforms Programmes, and so on. There is scope for realizing the remaining capital costs by asking the users to make contribution in the form of labour during the construction stage. The major difficulty lies in the collection of O & M costs in the form of user charges on a regular basis because their water use is not measured. Local NGOs and SHGs can play a vital role in deciding

the user charges as they can gather information about the water use by the households and as they have the capacity to monitor water usage and collect the user charges[4].

Pay and use principle is being applied in public toilets in town and cities. In some rural sanitary complexes setup by village panchayats, people do pay around Rs.20 per household per month for use of the facilities. If 60 households use this facility and pay Rs.1,200 per month, this amount is sufficient to cover the salary of a sweeper at Rs.900 per month and water and electricity charges of Rs.300 per month.

UNDP-World Bank (1999) gives many anecdotal evidences of willingness of urban poor to pay at least part of the costs of water supply and sanitation services. At the national level, NSS 54th Round results show that three-fourth of the rural households are willing to contribute money and/or labour towards improvement of sanitation in their neighbourhood. But only two-third of the households are willing to pay if the improvement takes place at the village level. See Table 8. It may be observed that in both cases, majority of the households prefer to make their contribution in the form of labour only. Hence, there is a scope for designing a total sanitation programme at village level funded partly by government and partly by villagers.

Peoples' willingness to pay for water and sanitation services will increase if they are assured of dependable and safe drinking water and hygienic community toilets and other sanitation services at convenient locations. At present well-to-do farmers incur private costs for creating own water supply arrangements by having well/tube well and also for purchase of water from private sources. Even poor people buy water for drinking purpose or/and they spend time in waiting or getting water from distant sources.

Table 8
Percentages Distributions of Households Willing to Contribute Money and/or Labour Towards Improvement of Sanitation in their Neighbourhood and in their Village.

Contribution	Own Neighbourhood	Own Village
Money and labour	16.2	15.3
Money only	6.6	5.8
Labour only	52.3	45.4
Neither	24.1	32.3
Not reporting	0.8	1.2
Total	100.0	100.0

Source: NSSO (1999), Table 23, page A-167.

4. PPP: Two Examples

PPP can be a panacea for solving drinking water and sanitation problems only if it is demand-driven, assigns complementary roles for the partners based on their capabilities, and finds solutions for market failures and government failures by designing institutions and regulatory structures to achieve economic sustainability. We illustrate issues in the design and execution of PPP projects with two examples.

4.1 Tirupur Water and Sanitation project

Background:

Tirupur in Coimbatore district of Tamil Nadu is a hosiery town. It is being acclaimed as a model of decentralised and self-generating industrial development based largely on private initiative. The export of hosiery items increased from less than Rs.100 million in 1984 to Rs.20.72 billion in 1996. Rapid growth of bleaching and dyeing units and discharge of the untreated industrial effluents on land and water bodies deteriorated water quality to such level that both ground water and surface water were unfit for drinking, and in a few areas even for irrigation purpose.

A public interest litigation culminated in an order in 1996 by the Green Bench of the Madras high Court for closure of bleaching and dyeing units which could not erect effluent treatment plants or become members of common effluent treatment plants by 1997. The Bench also ordered the bleaching and dyeing units to pay compensation for the damages. The concentration of totally dissolved solids in ground water exceeded 5,000 parts per milligram (ppm) while Tamil Nadu Pollution Control Board standard for treated water is 2,100 ppm and the desired concentration for domestic use is less than 500 ppm. As a result, both the industry and residents felt the need for safe and assured water supply. The Tamil Nadu Government was concerned about the possible loss of exports (of the order of Rs.40 billion) and the consequential losses in output, employment and incomes in Tirupur area.

Partners:

Tamil Nadu Government, Infrastructure Leasing and Financial Services (IL&FS) and Tirupur Exporters Association (TEA) took the initiative in establishing New Tirupur Area Development Corporation Limited (NTADCL), a special purpose vehicle, registered under the Companies Act 1956, in February 1995 to solve the water problem. See Box 1.

Box 1. Tirupur Water and Sanitation Project

This is the first Public-Private Partnership (PPP) project in water and sanitation sector in India. Tirupur Municipality(TM) and the adjoining villages faced severe water problem because of pollution of ground water and surface water due to the discharge of untreated effluents by bleaching and dyeing units in this area. Public concerns, court orders and the need for helping the textile units with export-earnings of Rs.40 billion, brought together the Tamil Nadu Government, the Tirupur Exporters Association and Infrastructure Leasing and Financial Services to find a permanent solution to meet the water needs of the industry and the households.

The cost of the project is Rs.10.23 billion of which equity is Rs.3.227 billion and debt is Rs.7.003 billion. The funds are contributed by the sponsors, financial institutions, insurance companies, and even foreign agencies. The project is designed by a UK firm. The construction work is done by three large Indian firms. The operation and maintenance work is entrusted to a UK firm and an Indian firm. A Special Purpose Vehicle is responsible for coordination of all the activities.

The project envisages supply of 185 million litres day (mld) of water of which 139 mld is for industry and 33 mld for domestic needs. Industry will be paying Rs.45 per kilo litre, TM Rs.5 per kilo litre and rural villages Rs.3.5 per kilo litre. The project provides for sewerage system for TM and onsite sanitation facilities for slums within TM.

Scope of the Project:

The specific services include (a) treated piped water supply for domestic consumption to 5 Way Side Unions, 15 Village Panchayats, and 3 Town Panchayats of 20.63 million litre per day (mld); (b) treated piped water supply for domestic consumption to Tirupur Municipality (TM) of 12.5 mld; (c) treated water supply to dyeing and bleaching units within Tirupur Local Planning Area of 129 mld; (d) sewerage system for TM ; and (e) onsite sanitation facilities for slums within TM. The total water requirement is envisaged at 185 mld initially and it may increase to 250 mld. The project aims at building a 55 km long pipeline from River Cauvery, developing water pumping stations, distribution network of about 350 km, and raw water and sewage treatment plant.

Design and Management:

This project is designed by Bechtel (UK). The contractors are Mahindra & Mahindra, Hindustan Construction Corporation and Larsen & Toubro. The operation and maintenance work is entrusted to United utilities of UK and Mahindra & Mahindra.

Financing Plan:

The cost of the project is Rs.10.23 billion, of which equity is Rs.3.227 billion (31.54 per cent) and senior debt and subordinate debt Rs.7.003 billion (69.36 per cent). The contributions of different institutions to equity and debt are given in Table 9. It may be observed that the three partners contribute Rs.1.527 billion, which is 47.32 per cent of the equity. Of the total debt capital of Rs.7.003 billion, two promoters (IL&FS) and TEA are responsible for raising Rs.2.665 billion (38.1 per cent of debt), financial institutions and insurance companies Rs.1.900 billion (27.1 per cent of debt) and the balance amount of Rs.2.438 billion (34.8 per cent of debt) by commercial banks.

Tariffs:

The proposed tariffs per kilo litre are:

Industries	... Rs.	45.00
Tirupur Municipality	... Rs.	5.00
Rural villages	... Rs.	3.50

The above rates are subject to escalation as per accepted formula.

Supply of services:

Water supply to industries will be available by April 2005 and water supply and sewer systems to TM will be available by October 2005.

It may be observed that industry alone would generate 97.7 per cent of the expected revenue of Rs.21.68 billion while it is likely to use only 79.6 per cent of the water consumption. TM and the rural villages would get 20.4 per cent of the water supply but their contribution to revenue will be only 2.3 per cent. Hence, the domestic consumers will be cross-subsidised by the industry.

Even in 1999 the bleaching and dyeing units were buying untreated water at the rate of Rs.30 per kilo litre. The units with individual treatment and reverse osmosis (RO) plants were spending between Rs.39 and 52 per kilo litre on effluent treatment. Common effluent treatment plants with RO plants were spending between Rs.23 and 29 per kilo litre on effluent treatment [see Sankar (2001)]. They could recycle about 70 per cent of the treated waste water and save Rs.21 per kilo litre. The expected effluent treatment cost when the new water service is available will be lower than the present costs. The industry recognizes its obligations to help the nearby residents for the past environmental damage. Thus, there is no problem in sustaining the cross-subsidisation[5].

Table 9
Tirupur Water and Sanitation Project: Financing Plan

Sl. No.	Investor	*Rs. crore*
Equity Holders		
1	TWIC (Holding Company of GoTN and IL&FS)	105.0
2	AIDEC Fund (Mauritius)	90.0
3	Wilbur Smith/Mahindra & Mahindra/United Utilities Consortium	45.0
4	Life Insurance Corporation	20.0
5	General Insurance Corporation	15.0
6	Tirupur Exporters Association	10.0
7	Others (Underwritten by TWICL)	37.7
	Total	322.7
Senior Lenders		
1	Industrial Development Bank of India	75.0
2	Small Industries Development Bank of India	60.0
3	Life Insurance Corporation	40.0
4	Central Bank of India	30.0
5	IL&FS (USAID Line of Credit)	90.0
6	IL&FS (Others)	90.0
7	Indian Overseas Bank	25.0
8	State Bank of India	50.0
9	Punjab National Bank	15.0
10	State Bank of Hyderabad	10.0
11	Bank of Baroda	20.0
12	General Insurance Corporation	15.0
13	State Bank of Patiala	10.0
14	Ban of India	10.0
15	Canara Bank	48.8
16	Oriental Bank of Commerce	25.0
	Total	613.8
Subordinate Debt		
1	IL&FS	66.5
2	Tirupur Exporters Association	20.0
	Total	86.5

Note: 1 Crore is 10 million

The Tirupur Water and Sanitation Project is the first water sector related project developed under the PPP framework in India. A special purpose vehicle has been setup to ensure coordination among different partners, stakeholders, financiers and beneficiary groups. For the project design, construction and management it relies on private sector. The project was conceived in 1995 but the services are expected from 2005. The proposed tariff structure appears to be fair and affordable. An automatic tariff revision formula linked to input costs and quality of service along with an efficient revenue collection system can ensure financial sustainability of the project.

4.2 Community Action in Olavanna

Background:

Olavanna is located in Kozhikode district of Kerala. Three rivers flowing through Olavanna Panchayat area are saline. Other non-saline surface water bodies go dry in summer months. The water scarcity forced people to walk long distances to get water for their daily needs. The water supply schemes of Kerala Water Authority (KWA) and Gram Panchayats (GPs) did not meet the needs of the people. A retired school teacher took the initiative of collecting money from 5 neighbouring families to install a 1 HP pump with an intake well. As this demonstration was a success, it triggered many small communities to find local solutions to meet local needs. DFID Field Note (1999) gives information about how a rural community treats drinking water as an economic good. See Box 2.

Institutional arrangement:

About 50 households who wish to benefit from a piped water supply scheme in a village get together, draft their by-laws and register their cooperative society under the Cooperative Societies Act of 1860. The GP facilitates the process of forming a society. The society has an Executive Committee of between 7 and 11 members which runs the day-to-day affairs of the society. The General Body which meets once a year elects the Executive Body for the next year, scrutinizes the accounts and discusses the annual report. There are about 26 such societies now.

Project:

The piped water supply scheme consists of an intake well, pumpset, overhead tank and distribution system. The location of the well is arrived at by consensus. Land is purchased for the open well and the overhead storage tank. Local technicians construct the well and the storage tank and lay the pipelines. The construction work is done within 2 to 4 months.

Water supply:

Water supply is metered. Every household is allowed 400 litres per day. Water is available 24 hours a day, except in the summer months when water supply is reduced by mutual agreement among the beneficiaries. Self-regulation is the preferred mode of regulation.

Box 2. Olavanna Community Water Project

Rural households in Olavanna concerned about saline water in nearby rivers, non-availability of surface water during summer months, and erratic and inadequate supply of water from public schemes, found a local solution to meet a local need.

Rural households which desire piped water supply join together and establish a cooperative society, an institution for planning, development and management of the water supply system. The scheme consists of an intake well, pumpset, overhead tank and a distribution system. Local technicians undertake the construction and complete the work between 2 and 4 months.

Each member pays membership fee between Rs.4,500 and Rs.12,500 depending upon the cost of individual scheme. Water supply is metered. Every household is allowed 400 litres per day. During summer, water supply is reduced by mutual consent. The beneficiaries pay all the O & M and capital costs. Penalties are imposed for joining the project after its commencement and for delayed monthly payments.

Poor households who want to become members can pay the membership fee in instalments. They are given an opportunity to earn wages during the construction of the project, that part-funds their contribution.

The schemes are functioning on self-sustaining basis. The Gram Panchayat is playing the role of a facilitator.

Members contributions:
Membership fees vary from Rs.4,500 to Rs.12,500 per household depending upon the costs of individual schemes. Households desiring to join the scheme after it has been commenced has to pay twice the initial amount. The membership fees cover capital costs of the project. The beneficiaries pay all the O&M costs. For excess consumption they pay a penalty at the rate of Rs.20 per kilo litre. Fines are imposed for delays in monthly payments.

Social concerns:
Poor families can pay their membership fees in instalments. They are given an opportunity to earn wages during construction of the scheme, that part-funds their contribution. There is no subsidy or cross-subsidy for the poor. Some poor families have not opted for the private piped water supply scheme. They depend on public water supply schemes run by GPs and KWA.

From a comparison of the private scheme with GP and KWA schemes, DFID Note (1999) concludes that the private schemes are more cost-effective, recover 100 per cent capital and operating costs and achieve user satisfaction. One drawback of the private schemes is that some poor households who cannot pay the membership fees (even in instalments) and O&M costs, are denied access to the piped water supply system.

5. Concluding Remarks

The need for PPP in drinking water supply and sanitation schemes is being felt in India to overcome the problems of market failures and government failures. Government has to fulfil its obligations in ensuring access to merit goods such as drinking water and sanitation services to all people, especially the poor. Association of private sector is desired to get technical know-how, financial resources and management skills. Stakeholders association is desired to ascertain users' preferences and demands, to reduce O&M costs of the schemes, and to ensure financial sustainability.

We considered two examples of PPP. The Tirupur Water and Sanitation Project costs more Rs.10 billion. The sponsors include the state government, the industry association and a leading infrastructure financing institution. The required finance comes from different sources – the sponsors, financial institutions, banks and even foreign sources. The project adopts a corporate management style, gets the services of international consultants and leading domestic construction companies. The project aims at meeting the water needs of the industry and residents in and around Tirupur town and sanitation needs of Tirupur Municipality. In view of the large number of agencies involved, a Special purpose Vehicle has been setup. Even then the project would take 10 years for completion. The proposed tariff structure envisages cross-subsidisation of domestic consumers by industry. It is not clear how the municipality and the panchayats will prescribe the tariffs and ensure payments to the suppliers.

The Olavanna water supply PPP is an example of finding a local solution to solve a local problem. The local government's role is only that of a facilitator. There is no dependence on external support for technology, construction or finance. It is a voluntary cooperative solution based on a participatory democracy process. It has a few incentive-penalty schemes to ensure prompt collection of membership fees and water charges, ration water in periods of scarcity and attract the poor. This scheme is cost-effective because of its use of local resources and skills and voluntary services provided by the beneficiaries. Being a private scheme, it does not aim at achieving the goal of providing water at affordable prices to the poor. The social goal of full coverage can be met if government bears part of the capital costs attributable to the poor, and the poor are given access to water on a shared basis via public taps with nominal monthly payments.

Footnotes

* I am grateful to Pieter van Dijk and Christine van Wijk for comments and suggestions on the draft paper presented at the IDPAD Water Seminar in Delft on May 13, 2003, and to Sameer Vyas for providing information about Tirupur Water and Sanitation Project.

1 The Tenth Five Year Plan urges the need for decentralisation of rural water supply. The Sector Reform Programme for Rural Water Supply and Sanitation introduced in March 1999 incorporates institutionalisation of community participation through capital cost sharing and shouldering of full O & M responsibilities.

2 The 'last mile' problem arises in the supply of many public utility services. When consumers are physically connected to service providers, as in electricity, telephone and water connections, the service providers can monitor the status and the consumers can communicate to the service providers about their supply problems. When the service is provided on a shared basis as in the case of public tap or well, monitoring the service quality is difficult. A few state governments now encourage receipts of complaints about non-functioning of rural utility assets through the electronic media.

3 Rajiv Gandhi National Drinking Water Technology Mission initiated by the Ministry of Rural Development, Government of India, in 1987 enabled preparation of hydro-geomorphological maps for locating sources of ground water and identification of suitable points to build recharge structures in 5 states.

4 A lumpsum monthly charge is easy to administer but it gives no incentive for the supplier to improve service quality and for the user to conserve the scarce resource.

5 According to Faulhaber (1975), price is subsidy-free for a user if it lies between the incremental and standalone cost for that user. If the price charged exceeds the standalone cost, the user has an incentive to seek supply from an alternative source.

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