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Introduction

Peri-urban areas are undergoing rapid transformations in the form of economic development, urbanization, demographic changes, environmental hazards, all of which are having implications on the demand and supply of water. Water policies are not able to adapt to these rapid transformations and water supply falls short for present and future requirements in these areas. Therefore, a growing population lacks sufficient access to water, in terms of being supplied by a large distribution network or by informal water suppliers using alternative means.

Small-scale providers of water have long been an important part of service delivery, particularly in peri-urban areas with failing public utilities. Despite a growing recognition of the role of independent providers in meeting households' water needs, little work has been done to understand the capacity of these providers.

This paper addresses the features of informal water supply meeting households' needs in the peri-urban territories of Mumbai. The starting point of this article is the idea that peri-urban areas experience a deficit in water services and they constitute the main markets for small-scale private operators. They survive and thrive in areas un-served and under-served by the water utility.

The aim of the paper is to provide a better understanding of small-scale water providers. It is structured in four main parts. In the first section, we will present access to water in the peri-urban territories of Mumbai, water being supplied for the municipal network or from informal water suppliers. In the second part, we will present the household water demand in the area, in order to better understand, which needs private water suppliers satisfy. In the third part, we will identify the specificities of informal suppliers in the studied areas. Finally, we will develop the limits of the generalization of the phenomenon.

1. Water supply in the Vasai-Virar Sub-Region

A study¹ was conducted in the peri-urban areas of Mumbai in 2005, focusing on household access to water and the compensatory strategies of households in order to cope with insufficient water supply. This fieldwork concentrated on the Vasai-Virar Sub-Region (VVSR), in the North-East part of the peri-urban territories of Mumbai. This area is 380 km² wide and includes four towns (Vasai, Navghar-Manikpur, Nallasopara, Virar), forty-seven villages, two industrial zones and agricultural and forest land. The economic development and urbanisation of the area started in the 1970s with the development of a suburban railway system and the implementation of the Urban Land Ceiling and Regulation Act². The rapid urbanisation of the area can be explained by a high birth rate and a double migration movement: the first one from Mumbai to its peri-urban territories, the second one from the hinterland to the peri-urban territories. With the rapid increase of land prices in Mumbai, middle and low-income households find affordable housing in these areas, while commuting

¹ This work was financed by the French Ministry of Foreign Affairs and the Centre de Sciences Humaines in New Delhi.

² Urban Land Ceiling and Regulation Act, 1976: This law imposes restrictions in urban development in Greater Mumbai and some peri-urban centres (Thane, Mira-Bhayandar, Kalyan).

in Mumbai to work. The population growth of the four towns was very important. It increased from 60,000 in 1971 to 107,000 in 1981, 226,000 in 1991 and reached 468,000 in 2001.

Access to water from the municipal network

Originally, the water supplied in Vasai-Virar Sub-Region was taken from (public and private) wells and borewells. The first kilometres of piped network were set up in the 1980s. Since 1985, water policies and local planning and management have been established, as new water sources were mobilized. At the same time, conflicts in the use of water sources have appeared. Agricultural demand is opposed to household, commercial and new industrial demands.

Universal coverage of the population by conventional infrastructures, as far as the water sector is concerned, is still an unmet goal in the area. According to official data³ in:

- Vasai town, out of a population of 49,346 inhabitants, 30,000 people are connected to the municipal network.
- Nallasopara, out of a population of 184,538 inhabitants, around 150,000 people are connected to the municipal network.
- Navghar-Manikpur, out of a population of 116,700 people, municipality officials reckon that around 110,000 are “connected”.
- Virar town, the local authorities indicate a 100% coverage of the population.

The supply from the municipal network (individual, group connexion and standpost) is 25.5 MLD in the four towns. Today, a new water supply scheme⁴ is in progress in order to supply 100 MLD to the Sub-Region.

There are major differences in service access across towns and neighbourhoods in each town. Local authorities' figures are estimates, as it is very difficult to have accurate figures concerning the number of households “connected”, as the number of households sharing public taps and outdoor group connexions is only estimated. Nevertheless, being connected to the network does not mean that people's needs are satisfied. Although additional people have gained access to services over the recent years, fieldwork interviews indicate that households' needs cannot be met, and the demand–supply gap is growing. The survey showed that a significant number of households have more than one source of water supply.

Water supply service in VVSR has neither urban, nor rural water features. Because of a lack of adequate planning, funds, political will, transparent pricing, technical capabilities and managerial skills, the service is unreliable (intermittence of the supply, irregular service, bad quality). The municipal network cannot be generalized, at least in a short-term period. It is segregative and there is a minimum network developed, which brings about exclusion. It cannot completely satisfy present water needs and projected urban population growth, in these areas, suggests that urban services will face great challenges over the coming decades to meet fast-growing needs.

The survey indicates that both rich and poor people are affected by an irregular water supply, as well-regularised and non-regularised settlements suffer from an inadequate water supply and a huge disparity in water supply exists between the various parts of the city. The complexity and inefficiency of conventional water supply creates a market for small private water providers, they appear in order to satisfy the water needs of the peri-urban population.

The role of informal water suppliers in the studied area

There is no standard definition to describe and classify small-scale private providers. What we see is the emergence of new hybrid arrangements in order to fill the supply gap in the studied

³ Census population of 2001 and connection data of 2005 collected from the four Municipal Councils.

⁴ The Surya Water Supply Scheme will provide 100 MLD to the four towns and forty-seven surrounding villages.

territories. There is an extremely diverse range of operators, some of whom are simply one part of a larger supply chain, while others control a natural water source and sell the water directly to the final consumer.

We consider that the term of informal suppliers refers to all types of water suppliers who are not operating in the legal framework of water management in an area. They are usually small-scale private operators, which constitute alternatives and are complementary to legal operators, such as the municipalities or authorised private operators. These private operators have no official status. They are unregulated and untaxed and they belong to the non-formal sector of the economy. In spite of this, they operate in parallel and at the margins of the established legal framework, with no agreement between the two parties and no formal recognition from the local authorities.

Informal water operators are present in all the peri-urban territories of Mumbai. Indeed, the type of suppliers differs and their location is not homogenous over time and space. Even if small-scale water providers are viewed as temporary agents, many have been in operation in the area for over 20 years and nothing indicates a decline of the phenomenon. In the Vasai-Virar Sub-Region, we identify four types of water providers:

- **Private tankers:** Private tankers have been present in the area since the mid-1980s. They are small companies, each one owning 1-3 lorries. They are not registered but there are organised in associations. The aim of the association is to organise the tankers' water supply in each town, to control the price and the entrance of newcomers on the market and to share the new consumers between tankers. In 2005, 320 water lorries existed, they belonged to 220 suppliers. Tankers are common in the areas with growing middle and high-income households, who get an insufficient supply from the network. In the studied area, water tankers supply Navgar-Manikpur and Nallasopara towns through the year and Virar in summer. It is difficult to even roughly estimate what share of the water market these vendors supply. It is reckoned that water tankers supply 15 MLD to 75 MLD to the four towns daily.

- **Owners of wells, borewells:** Today, many households sink wells and borewells in order to match demand and ensure a continuous supply. There are no official data about the number of wells and borewells and the quantity and quality of water withdrawn daily in the Sub-Region. Owners of wells and borewells use water either for their own consumption or/and they sell it directly to their neighbours or to the tankers. The availability and quality of water varies a lot between seasons and the location of the sources in the area. Since the 1990s, the Sub-Region has experienced problems of overexploitation and salinization of groundwater.

Private reselling of groundwater to neighbours is a general phenomenon of the area. They are mostly located in areas with an important slum population, who cannot afford the borewell construction charges (Acholle) and where middle-income bungalows are settled (Diwanman). It is estimated that the four towns get 15 MLD from wells and borewells.

- **Resellers of municipal network water:** This practice refers to households unofficially selling water from a utility connection. This practice is officially prohibited, but the prohibition is generally not enforced. In areas where some households are connected to the network, and others are not, water is typically obtained from neighbours (Diwanman). As connected households pay flat rates to the utility, the volume of water sold does not affect the household's monthly bill, and water reselling can be a very lucrative business. In Diwanman, monthly water charges are Rs 200 and a reseller charges a household Rs 50-70/month. This survey indicates that reselling of municipal water may be a very lucrative activity for some households.

- Free open sources of water: In this category, we include all sources of water which are not directly chargeable⁵, such as public wells and borewells, lakes and rain water. We consider these sources of water as “informal” as there is no control over them. The fieldwork indicates that only few urban households depend completely on free sources of water. In areas where these sources are available, most low-income households fetch water regularly. The quality of these sources depends on the season and their location in the area.

2. Household water demand

Several studies in household water demand highlight the fact that users accept to pay for a service that fits within their expectations. As our survey indicates, households would like to get clean water at home to avoid wasting time in queuing and fetching water. They ask for a reliable service (daily and at fixed times, not necessarily a 24-hour-service) at affordable price that provides enough water to cover their daily needs. Regarding management, they ask for a reduction and flexibility in payment in connection charges and the use of meter connections. At the same time, the survey indicates a loss of confidence of households in public utilities because of a long experience of unreliable water supply, an unaccountable water department and unkept promises of better service, extension of the network and coverage of the area. They are unwilling to pay more for new promises made from the water utilities⁶, even if a private connection is the wish of most households. The lack of reliability of public utilities explains the choice of some households not to be connected to the network⁷.

While the norm for supply in the studied towns are 70 lpcd⁸, the survey indicates lower daily supply over three towns, except Vasai (100 lpcd). Municipalities announce a supply of 69 lpcd for Navghar-Manikpur, 40 lpcd for Nallasopara, 55 lpcd for Virar. But beyond these official data, our survey shows the average daily consumption of water from all sources of water is respectively: 50 lpcd, 40 lpcd, 40 lpcd and 50 lpcd. In addition, as mentioned earlier, disparities exist between the different parts of each city and this is in terms of being supplied from the municipal network or from informal providers.

The survey indicates that households classify their needs according to the necessary quantity and quality of water for each use. They identify the type of source, the necessary quantity and quality and then, for each type of consumption, they define their capacity of payment.

3. The specificities of informal suppliers in the Vasai-Virar Sub-Region

Informal suppliers have appeared because of the failure of conventional utilities to satisfy a growing number of urban households. Given the limited municipal resources, the intermittent supply and low coverage of utility networks, people rely on alternative forms of service, which are run and delivered by local entrepreneurs.

The role played by informal operators in water supply is strongly linked to the water service provided by the water utilities. They are able to fill service provision gaps for clients where the public utilities have been unable to satisfy and in areas where city water authorities are reluctant to invest.

Independent providers are especially active into under-served areas where the municipality has low connection rates and low levels of service, and in areas left un-served by the city authorities at the edge of the city where new settlements are being created. There are areas where the city's piped network has not yet been extended and where new arrivals are settling down. This phenomenon concerns both the supply of slums, as well as high-income neighbourhoods.

⁵ Some indirect costs may exist: transport cost, rainwater harvesting equipment, treatment cost.

⁶ Many interviewed households repeat “Why should it be different this time?”

⁷ These households are located in Vasai town, an area rich in good quality groundwater through the year.

⁸ Norm of water supply for small towns with no sewerage system (CPHEEO, 1999).

The activity of small-scale water providers is not uniform in the area, as they respond to specific local demand. The presence of these operators depends on the physical and temporary availability and accessibility of water, the location of the demand, the type of settlements and the household's financial means.

The independent providers face different contexts in each location. The suppliers present in an area and the type of service proposed is specific to each area, each neighbourhood. As the field work indicates, there is a big disparity in access to water from the alternative water providers. For example, Navghar-Manikpur and Nallasopara towns have insufficient groundwater through the year, shortage problem is more acute in summer and these areas⁹ depend mostly on tankers and reselling. At the same time, the supply is not uniform across the town. Nallasopara East side (low-income households) gets water from resellers, while Nallasopara West side (middle class households) is supplied by private tankers.

The demand may be seasonal (only in summer, when the municipal supply is insufficient), exceptional (for festivals and celebrations) or on a more regular basis. Exceptional supply conditions may upset the water market. Extreme drought, heavy monsoon rains, or mechanic breakdown of the network may disturb water markets. For example, the heavy rainy season of July-August 2005, which destroyed kilometres of pipelines, made tankers' water supply essential for the survival of large parts of the peri-urban population of Mumbai.

The main advantages of independent providers are their ability to respond quickly to changes in demand, to adapt their offer to local conditions and to offer flexible, convenient services perfectly tailored to the needs of diverse customers with a flexible payment system. Thus, technical, operational solutions found in one part of the city will not necessarily be transferable to another location. For example, households in Nallasopara, with no network access, will get water from borewells and private resellers. In the rainy season, many households collect rain water and, by doing so, they preserve groundwater and spend less money buying water from the resellers¹⁰.

The main constraints about small-scale water providers are their pricing strategies, service quality, and the lack of coordination with public authorities. Water suppliers are often blamed for supplying unsafe water. Households are very sensitive to this feature. The survey showed that people associate a certain quantity and quality of water for each use. Households are very keen to get at least 20-40 litres of good quality water per day for drinking and cooking. The good quality of water is very subjective, depending on the socio-economic structure of the households. Most interviewed households are complaining about the bad quality of the water, mostly in summer and the rainy season.

Another important feature concerning access to water from small-scale water providers is water price. Tankers' and resellers' water is very expensive. Tankers' regular clients are charged Rs 500 (Rs 0,50/l) for a 10,000-litre tanker, but in summer, due to scarcity of the resource and the long distances to fetch it, they can charge up to Rs 1,000 (Rs 1/l). Households buying water from resellers get water 6/7 days, 20-40 l/day and they pay Rs 50-70/month (Rs 0,10/l). Groundwater is very cheap: owners selling to tankers charge Rs 50 for one lorry; for their neighbours, they charge an average of Rs 50¹¹ monthly with no restriction in quantity. Furthermore, we can attribute other indirect costs: treatment and purification costs, and the costs related to the service: collection of water, as well as travelling expenses.

⁹ The supply of the area does not depend on local resources: tankers' water is fetched in the rural areas and the reselling concerns municipal water.

¹⁰ Rainwater is often considered as "pure water" for drinking and cooking.

¹¹ Water is more expensive only when a motor pump is used.

4. The limits of small-scale water providers

Since the 1980s, India has been engaged in economic and political reforms. The 74th Amendment of the Constitution makes water supply a mandatory function of the urban local bodies. Nevertheless, the transfer of decision making power has not been paired with the allocation of more funds at the local level. Municipalities are short of financial capacities to satisfy a growing demand from the urban population.

Considering water supply in the peri-urban of Mumbai, some crucial questions arise about its development and the role of informal providers in terms of access to water. Today, can we consider the informal water supply as a long term partner of water utilities, or is it simply a kind of status-quo, which cannot be changed? For tomorrow, can we imagine Indian municipalities where the water utilities collaborate with informal private suppliers in order to plan the water supply of an area?

The answer to these questions is not obvious.

Only recently have small-scale private service providers gained acceptability as a viable alternative for developing and managing private water supply systems and contributing in local development. From this point of view, working with these providers to establish measures to improve their quality, efficiency and affordability and expand their service coverage, may be more profitable for consumers than continuing to ignore them.

Some other scholars think that collaborating with small-scale water providers is a solution which in term will enforce a dual segregative system, where ideally a part of the population, will have regular and good quality water from the network, and other people should combine different sources in order to satisfy their needs. From this perspective, this would induce a change in the very conception of public utilities and the status of water.

Bibliography

- Allen (A.), 2003, "Environmental planning and management of the peri-urban interface: perspectives on an emerging field", *Environment&Urbanization*, vol 15, n° 1 pp. 135-148.
- Conan (H.), *Scope and scale of small-scale independent private water providers in 8 Asian cities*, preliminary findings, ADB, p. 6.
- Development Plan of Vasai-Virar Sub-Region 2001-2021, 2005, Report, Committee appointed by Government of Maharashtra under section 162 of the M.R. and T.P. Act 1966.
- Draft Regional Plan for Mumbai Metropolitan Region 1996-2011, 1995, Bombay Metropolitan Regional Development Authority.
- Franceys (R.), 2001, *Public-Private community partnerships in urban services for the poor*, ADB, p. 62.
- Kariuki (M.), Schwartz (J.), 2005, *Small-scale private service providers of water supply and electricity: a review of incidence, structure, pricing and operating characteristics*, World Bank Policy Research Working Paper 3727, october, p. 38.
- Raghupathi (U.), 2003, "Small private water providers. An alternative solution for the poor", *Shelter*, vol. 6, n°3.
- Raghupathi (U.P.), 2003, "Small-scale private water providers, a growing reality", *Urban finance newsletter*, NUIA, vol 6, n°3, sept, New Delhi, p. 4.
- Snell (S.), 1998, *Water and sanitation services for the urban poor: small-scale providers : typology and profiles*, UNDP – World Bank, Water and Sanitation Program, dec. 1998, p. 59.
- Subherendu (K.), Pattanayak (S.K.), Yang (J-C), Whittington (D.), Kumar (K.C.B.), 2005, "Coping with unreliable public water supplies: averting expenditures by

households in Kathmandu, Nepal”, *Water Resources Research*, vol 41,W02012, doi :10.1029/2003WR002443.

- Tovey (K.S.), 2002, *The institutional responses to the water needs of the urban poor : a study of collective action in Delhi slums, India*, A dissertation to the university of Cambridge for the degree of Doctor o Philosophy, June, p. 320.
- World Bank, 2003, *Small and medium enterprises across the globe: a new database*, World Bank Policy Research Working Paper series 3127.
- Zérah (M-H.), 2006, “Urban water and waste water”, in *India Infrastructure Report 2006*, pp. 130-159.