

# **Urban water conflicts in Indian cities Man-made scarcity as a critical factor<sup>1</sup>**

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## **Abstract**

This paper discusses two important issues: The first one relates to the resource base, its availability, use and abuse and the second pertains to conflicts which have surfaced in the process of service provision in cities in India. Most cities in India are facing severe problems relating to delivery of urban services, in particular drinking water. The problems and concerns of city water supply pertain to quantity and quality as well as equity – across different segments and different sections of population. Poor sanitation, ineffective and obsolete wastewater management practices and lack of long-term vision, planning and motivation are some of the issues which need immediate attention of the policy makers. At the same time cities continue to expand at a rapid rate and eat into resources (such as land and water) available in peri-urban areas. While land in peri-urban villages is grabbed for urban housing, industrial establishments and for dumping urban wastes (both solid and liquid) very little is ploughed back by way of developing these areas. Urbanisation process cannot be blind. It has got to be inclusive and accommodative. It should ensure sustainable use of natural resources, in particular land and water – more so groundwater. Indeed, very little attention is paid to investigate the role of groundwater in the process of urban development. The surface and groundwater and land use should be an integral part of the urban and peri-urban development. In India, not only that water is never a part of the urban planning, the peri-urban issues are completely ignored and given the least importance in the overall planning process. This has resulted in serious livelihood problems in these areas. Furthermore, such unconcerned and unplanned urban expansions have triggered off conflicts between urban and peri-urban interests.

The paper is organised into four sections. The first one aims at refining a definition of urban water conflict while the next two deal with case studies of Chennai (ex-Madras) and Delhi. The final section aims at considering the rather not successful results of existing conflict resolution mechanisms in place.

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“I am not the minister of Water Resources but the minister of water conflicts”<sup>5</sup>

## 1. Introduction

Most cities in India are facing severe water scarcity. Other problems and concerns pertain to quantity and quality, equity across different segments and different sections of population, poor sanitation, ineffective and obsolete wastewater management practices and lack of long-term vision, planning and motivation. Cities expand at a rapid rate and eat into resources (such as land and water) available in peri-urban areas. While land in peri-urban villages is taken by urban housing, industrial premises and for dumping urban wastes (both solid and liquid) very little is ploughed back by way of developing these areas. Urbanisation process cannot be blind. It should ensure sustainable use of natural resources, in particular land and water – more so groundwater. Indeed, very little attention is paid to investigate the role of groundwater in the process of urban development. Available groundwater’s exploitation is unplanned and unregulated, resulting in ecological degradation. In India, not only that water is never a part of the urban planning, the peri-urban issues are completely ignored and given the least importance in the overall planning process. This has resulted in serious livelihood problems in these areas. Furthermore, such unconcerned and unplanned urban expansions have triggered off conflicts between urban and peri-urban interests.

Resource scarcity is certainly one of the reasons for such conflicts; but resource scarcity is not just the consequence of hydro-geological factors: most often it is man made (Janakaranjan, 2004). Regardless of causes, the consequences imply that water supply (both quantity and quality) are very much part of the concerns such as urban water environment, water supply and sanitation. Secondly, as indicated earlier, the looming threat of serious conflicts in resource sharing between cities and their peri-urban and rural areas is something which needs due attention. This question is of growing importance in the ongoing context of Indian urbanisation<sup>6</sup>. Keeping these two elements, this paper highlights the resource dimension in urban water conflicts along with conflicts which have surfaced in the process of service provision in cities in India, among which private sector involvement

One of the new millennium goals for the coming decades is the priority given to access to safe drinking water and its financing. The failure of policies inviting investment from the water multinationals was discussed at the Johannesburg summit. Two opposing viewpoints emerged: following the Camdessus report, advocates of the private sector are trying to work out ways of reducing the risks for operators, while challengers of water multinationals stress the growing disparity of water access in cities of developing countries (Lobina, Hall, 2003).

In India, this debate did not correspond to observed reality; until recently with the very controversial Delhi water sector project (see below). Indeed, with the exception of short

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<sup>5</sup> Quotation of the Minister for Water Resources, in a 2005 World Bank report on the water sector status in India.

<sup>6</sup> Very few articles can be found on peri-urban areas (see Kundu et al., 2002 and Annapurna Shaw, 2005 on the specific dynamics of peri-urban zones).

duration contracts for the construction of water treatment plants, attempts to initiate large-scale projects with the international private sector have failed<sup>7</sup> (Zérah, 2001). Private operators are not wholly absent, but they are small in size; they undertake local contracts, involving a limited number of operations and no investment on their part (Zérah, 2003). There are two main institutional arrangements for water services. Specific urban water bodies are in charge of water supply and sewerage. Beyond a certain size and level of autonomy, cities also take responsibility over water resource development. For smaller towns, the State (state department or state promoted agencies) plays a major role, especially in water resource development. In the case of mega cities (where population exceeds 4 million), supply is either under the Municipal Corporation or remains under the control of a separate water supply and sewerage board. Supposedly, these boards are financially and organisationally more autonomous. Urban water supply is thus largely dominated by the public sector, yet restrictions on access (complete or partial) are no less real, mostly because of the inefficiency of the public service (Zérah, 1999; Llorente, 2002).

The paper is organised into four sections. The first one aims at refining a definition of urban water conflict while the next two deal with case studies of Delhi and Chennai (ex-Madras). The case of Delhi addresses conflicts linked to water access and to compensatory strategies associated with it. The study of Chennai looks at the most critical conflict, opposing the city to the peri-urban villages, as continuous water transport, in order to supplement the city's drinking water needs, has drained water resources in peri-urban villages. A final section aims at considering the rather unsuccessful results of existing conflict resolution mechanisms in place. This socio-economic analysis will enable us to point out the main reasons that explain why conflicts are emerging. It will open the debate on the community and cooperative solutions that could be implemented at best or at minima.

## **2. Our acceptance of urban water conflicts**

A conflict always implies, irrespective of its origins, its objectives or its progress, an opposition between at least two categories of actors, whose interests are temporarily or fundamentally divergent. We shift from a tension to a conflict when one of the parties implements a credible threat. There are several indicators. For instance, one can use the media, or bring the other party before the courts or produce some signs (like a notice) or finally, both parties can enter into a direct confrontation (verbal or physical).

Conflicts can generate debate, fights, but they can also lead up to new arrangements. Therefore, we want to underline that a conflict does not necessarily constitute the last step of the degradation of a relation, neither a market failure. A conflict is a modality of coordination and negotiation, like another and it can contribute to a change, which can be both 'positive' and 'negative'. In our present context, the word 'conflict' need not be understood as referring to physical violence. It should be rather seen as a potential force for

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<sup>7</sup> Various factors explain the absence of concession contracts: absence of a political will, civil society opposition, very low tariffs - which make it impossible to achieve economic equilibrium, insufficient return on investment, lack of guarantees on the part of the federated States and the Union, etc.

competition and change. This competition could lead to stagnation or advancement of an economy depending upon degree of cooperation among stakeholders.

In the particular context of Indian cities, water conflicts take place due to one critical factor: scarcity, which is caused by imbalance between supply and demand, as service provision is inefficient<sup>8</sup> and groundwater is depleted and/or polluted. Excessive unregulated pumping results in long term lowering of water tables (in some cases, the damage due to depletion is irreversible) and groundwater pollution is caused as a result of discharge of industrial effluent, use of chemical inputs in agriculture, and leakage of domestic and municipal sewage. In both of these cases, scarcity occurs. While in the case of the former scarcity occurs due to over-extraction, in the latter, it is due to contamination.

This man-made scarcity increases competition between water users – both present and future. *We assume that a situation becomes conflicting when the existing conventional mode of supply does not suffice to provide water.* Actually, urban water conflicts in India can be divided into three main categories and more often, it is a mix of them:

- 1) Conflicts linked to quantity (conflict arise between sectors or users, like municipality vs. industries, connected vs. unconnected people, urban vs. peri-urban, present and future generations),
- 2) Conflicts linked to quality (unsafe water reduces the availability of potable water and causes water borne diseases. Poor people are more affected as they do not have any device to treat water. It is too expensive. Domestic users complain to the municipality), and
- 3) Conflicts linked to water access (legal -water rights-, economic -price- or physical barriers prevent access to water and their unfair settlements generate conflicts). For instance, all the compensatory modes of provision are equivalent to a sign that reveals the conflict (see the Delhi case).

In all the cases, the protagonists have unequal bargaining powers and there are winners and losers. Seldom will a conflict generate a win-win situation, mostly in regard of sustainability criteria. We shall analyse this in the cases of Chennai and Delhi in subsequent sections.

### 3. Conflicts linked to the issue of water access in Delhi

In Delhi, the public undertaking (Delhi Jal Board, DJB) is unable to meet water and wastewater needs of the nation's capital, and provides its citizens with an erratic and unequally distributed water supply that is well below international standards. The mismanagement of water particularly affects the urban poor: the volume of water available in slums is around 27 litres/capita/day (Llorente, 2002). On the other hand, groundwater is depleting very fast as people get water from private wells to fulfil their needs. Until now, the solution adopted by the municipality consisted in supply-oriented partnerships such as the construction and management of new water treatment plants, and it just resulted in adding more capacity to a leaky network. Low quality of service delivery was endemic and

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<sup>8</sup> We usually enumerate the following failures: wastage, bad maintenance, low service recovery, irrationalised expenses, lack of skills, lack of integrated management, no interest in sanitation leading to environmental problems and so on.

is getting acute. The situation is very conflicting among users and there is sharp criticism of the existing conventional mode of supply, e.g. water supplied through a centralised network.

The Government of India (GOI) and the Government of the National Capital Territory of Delhi (GoNCTD) recognize the urgent need for reform. They have therefore requested the World Bank's support in helping DJB improve the reliability, sustainability, and affordability of Delhi's water supply and sanitation services. But the proposed water project, resulting from a consulting study, is actually shelved as it is much criticised by NGOs<sup>9</sup>. Water delivery as a basic service is inextricably entwined with ideology and politics, which are doing nothing more than exacerbating conflicts.

Water access conflicts materialize through alternative provision modes (or compensatory strategies) and all the inequities that are generated. Limitation of access is less rigid for the better off households, but on the whole, these modes appear unsustainable (Llorente, Zérah, 2002). However, some exceptions illustrate the potential capacity of conflicts to generate sustainable change; they depend largely upon the degree of cooperation among stakeholders. A review of several of these practices will especially question their impact on access and their ability to prevent conflict in the long run.

### **3.1 Ideological debate on Delhi's water reform project favours business as usual**

The World Bank has been approached by the Government of India and the Government of Delhi (the National Capital) to support a program that would improve the reliability, sustainability and affordability of water supply and sewerage services provided by the DJB. It is planned to gradually improve service management<sup>10</sup>, extending the infrastructure to underserved parts of the city and financially strengthening the water utility through recovery of the efficient cost of operations. GoNCTD and DJB have initiated a consultation on the proposed program. This is in fact the starting point of the controversy that crystallised all the attentions, more than the project in itself.

Stakeholders requested clarifications on the role and position of the Bank in this process. As of late July, the Bank was accused to have put pressure on the Indian government to select Price Waterhouse Coopers (PWC) for advisory work on the Delhi Water Sector Project. Indian anti-corruption group Parivartan used national freedom of information laws to gain access to the correspondence between the DJB, which oversees water supply in the Indian capital, and World Bank officials (Parivartan 2005). World Bank country director for India said "the insinuation that the Bank attempted to favour PWC is completely unfounded." But details given by Parivartan put the Bank in an awkward position.

The project is currently in a preparation stage: that is, DJB is still in the process of designing and studying various aspects and preparing final documentation. The Bank's Board of Executive Directors will consider approving the loan only after this process is

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<sup>9</sup> Later, some resident welfare associations and opportunistic politicians have joined the contestation movement.

<sup>10</sup> The objective is to achieve a 24x7 water scheme, first in some pilot zones.

completed and has been appraised by the Bank. So far the Bank has provided a sum of US \$ 2.5 million under a project preparation facility to enable DJB to prepare the project.

As the controversy surrounding the Bank's role was expanding, a campaign against the project in itself also came to light (fear of a hike in tariffs increase, unequal access, etc.). Some resident welfare organisations and opportunistic politicians have joined the contestation movement, which probably translates more a feeling of general discontent. But misinter-pretation and the use of rhetoric on both sides make everybody lose time and direction, and business as usual continues. The case of Delhi illustrates how politically sensitive the water sector is to reform, even more so given that the power sector is also facing a crisis and residents are fed up with inefficient public services. However, this opposition also reflects the vested interests of the middle class as well as its will to conquer political space and influence politicians. The first priority is to focus on public action reform and to redefine the role of the different institutions involved in the governance of the water system. The key question is thus to find out the incentives that would lead the government and public agencies to perform these new roles and become accountable. It is certainly the main issue underlying the largely misleading public vs. private debate.

### **3.2 Alternative responses: an emerging conflict between present and future generations**

In most Indian cities, the distribution system is inequitable, in the sense that many areas are not served, among which peripheral neighbourhoods (both rural and newly constructed dwellings) and many slums settlements<sup>11</sup>. This is due to discontinuous spatial development and will probably persist along with the growth of the urban population. Both poor and well-off people are therefore affected by the lack of infrastructure or by inadequate supply, but of course not in the same proportion viz their respective revenues.

In this context of highly inefficient public supply, people have developed compensatory strategies, which we call “decentralized governance structures”; alternative modes of supply have emerged, the social, economic and environmental sustainability of which is questionable. They can be divided into two categories: formal and informal strategies.

*Formal strategies* consist of relying on private operators, which sell water in large quantities via water tankers (containing around 12 m<sup>3</sup>). Many people also buy bottled water and water in jars, however such strategies are affordable only to high-income households. The major problem with these sources is that water quality is not guaranteed, and some opportunistic firms simply resell public water or sell untreated groundwater. The absence of any regulation in this sector has enabled the emergence of small companies with a short-term strategy. Such companies have taken advantage of a booming market without investing in quality equipment and operate at a low cost of production.

On the other hand, companies that set up sophisticated production lines with a view to establishing themselves in the market on a long-term basis have complained of this unfair competition. They were also dissatisfied with the high taxes imposed by the State

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<sup>11</sup> Some of these have legal status while others result from illegal land occupation (squatter settlements).

government in Delhi (bottled water is considered a luxury item) and favoured stricter regulations, which, as of 2002, had not been approved. So far, these private ventures, which are a direct result of the inefficiency of the public sector, have not been able to come up with innovative solutions to provide services at affordable prices and to warrant the safety of water. The solutions they offer are only peripheral and temporary ones.

*Informal strategies* are external to any market structure. Poor and well-off households alike develop such strategies. Most of the time, the poorest people “free-ride” on public water via illegal connections onto which they install cheap devices to pump water from the network. Higher income households adopt more expensive strategies: some install electric pumps in order to pump more water from the network and get better pressure; some store water in rooftop tanks; some dig tube-wells and rely on groundwater.

### **3.3 The unsustainability of current arrangements**

All compensatory strategies generate direct investment costs (storage facilities, motors, filters, etc.). In 1995, in Delhi, the cumulated expense of households for such strategies was 6.5 times higher than what they pay directly to the public undertaking. Today, one can hypothesise that this figure is higher.

The aggregate cost of water unreliability at city level is equivalent to almost twice the amount of the annual expenditure incurred by the former Delhi Water Supply and Sewerage Disposal Undertaking (Zérah 2000). From an economic viewpoint, these decentralized strategies are not the most efficient, and they are clearly not sustainable.

Besides, these private arrangements (formal and informal) also generate indirect costs for society as a whole as they contribute to the deterioration of existing infrastructure through unauthorized water connections. During service interruptions, contaminated water enters the network and increases the risk of waterborne diseases. Multiple unregistered private tube-wells deplete the water table. Finally, private arrangements aggravate the water shortage and congestion phenomena. In other words, a system of negative externalities becomes self-sustaining with a harmful impact on the environment and on users' health.

Yet storage solutions, rainwater harvesting and water supply via tankers may offer acceptable temporary solutions provided that a well-defined regulatory framework is implemented and enforced, to avoid the present day chaos. Community participation in the management of decentralized infrastructures could then help. Our work and other research suggest that the institutionalization of community participation mechanisms is desirable for at least three reasons. First, this would allow the additional costs of compensatory strategies to be internalized and enable a more equitable redistribution system to be set up. Second, householders would be provided with an effective means for ensuring that the infrastructure is properly maintained. Third, water resources would be more effectively managed, thanks to a demand-oriented approach and by facilitating leak detection. Thus, access rights to water would be secured.

However, this would require major institutional change and, in particular, the democratic representation of all interests, the setting up of agreed-upon negotiation procedures and the abandoning of patronage relationships (Haider 1997; Llorente 2002). Current strategies are a response to an inefficient service administered by an incomplete institutional environment that is unable to provide suitable incentives. They are affected by the absence of formal

rules and this results in a chaotic allocation of the resource. Although they are not sustainable, the existence of such arrangements suggests that reform of the sector should be analyzed in a systemic way and that consideration should be given to the opportunities offered by decentralized governance structures. By a systemic approach, we mean analyzing all interaction between the agents, the resource and the institutional environment. In the case of water, this analysis reveals huge differences between developed and developing countries that preclude the mere transposition of a contractual model without any other kind of consideration.

### **3.4 The conflict as an adjustment tool: cooperative action initiated by slum communities**

In this situation, aggravated by the lack of public financing, new approaches stress the role of community-based organisations, especially in the poorer districts. They are subject to several underlying assumptions. First, these much more flexible and innovative modes of organisation can better meet the demand in the poorer areas. Subsequently, within the context of public projects, it is more effective to let the users themselves take the financial and technical responsibility for maintenance of the infrastructures (Nitti, Sarkar, 2003). In both cases, there is a positive feeling that the communities are more capable of managing the problems of access at their own level. As a result, one can witness new forms of collective action, initiated by private individuals from disadvantaged communities, or by communities themselves, and by the public operators. These modes of service are still at the experimental stage in Indian towns, but offer new perspectives outside the trinomial of inadequate public service, individual compensatory strategies and private lucrative niche markets.

Recent studies (Raghupathi, 2003) give an account of certain rather innovative practices in a few Delhi slums. For instance, in an area where DJB's water service is erratic, a resident digs his own well, installs a powerful motor and lays a not very sophisticated system of pipes through some nearby alleys. This "network" can service about 200 households for which the cost of individual connections amounts to the expenditure incurred on the necessary plumbing. The household also pays a monthly subscription, six or seven times higher than the cost of municipal water, but in return gains the advantage of a home service and neighbourhood service. In the area under study, such initiatives have multiplied and this new type of service reaches a large section of the slum. In fact, the sums invested, often by taking a loan, are recovered in two years. Such an arrangement confirms that households, even those that are the most impoverished, are capable of generating funds to pay for water, as many international and Indian studies have demonstrated. In this case, the process of commercialisation emanates from within the civil society itself: the enterprising players transform an individual solution into a common alternative.

Other modes of supply owe less to private initiative than to genuine collective action, e.g. the *gali* or alley taps described by Tovey (2002) in a very detailed analysis of three slums. Users contribute jointly for the installation and maintenance charges. A simplistic vision would be to view these *gali* taps merely as the action of residents who have organised themselves to dig channels and lay pipes for supplying water to a particular alley. This would normally result in the proliferation of illegal connections, which is condemned by the authorities. However, when conducting a chronological analysis of the connections, the

author highlights the role of political patronage and/or of local leaders as triggering factor.

Once the mechanism is operational, informal relationships come into play that sanction and maintain these connections. These relationships can take different forms depending on the type of area and the relationships developed by the local leaders. In each case, they involve different players (the police, local elected representatives, parliamentarians and employees of the DJB) and they mobilise a certain form of collective action. We are specifically concerned with the way in which regulations of the *gali* taps are instituted at the residents' level. According to Tovey (2002, 200-226), the *modus operandi* which all users have implicitly accepted largely depends upon the local context of the resource<sup>12</sup>; it applies to the distribution of the resource and to the mode of management of the service. It is at several levels rooted in a hierarchic system of the attribution of rights. Households that contributed financially to the *gali* taps have first right to the service. Residual rights are then granted to the tenants, then to households situated in the vicinity of the water points. The ultimately complex system of *gali* taps demonstrates the usage value of water. But at the same time, and especially, when there is no shortage, all the players involved recognise the social value of water, which is not monetarily calculable. This explains the attribution of residual rights to households not having contributed financially. In the same register, the police authorities, the elected representatives and the municipal employees generally justify their indulgence on humanitarian grounds, which is clearly highlighted by the author (Tovey, 2002, 273-286).

#### **4. Chennai: expanding needs and growing conflicts with peri-urban users<sup>13</sup>**

The Chennai Metropolitan Water Supply and Sewerage Board (Metro Water Board or MWB) takes the sole responsibility of augmenting water supply and sewerage in the city as well as ensuring service provision. It was formed via a legal Act of 1978, and in 1987, the Chennai Metropolitan Groundwater (Regulation) Act entrusted MWB to control abstractions and prioritise public water supply (see below, 3.3). The city of Chennai suffers from an acute water scarcity, in particular during low rainfall years. MWB supplies less than 50% of the requirement of the city's population, that too in an irregular fashion (Ruet et al., 2002). Groundwater then plays a crucial role in filling the gap<sup>14</sup>, as seems to be the case in most Indian cities. (Zérah, 2000). However, the city's groundwater is overexploited: its level has reached an alarming low and in many places intrusion of seawater has been reported. This has affected its potability as indicated by a battery of indicators (Janakaranjan 2005).

So far, there has been no solution to overcome water crisis in Chennai. Mega projects (which also involved inter-basin transfers), have been fancied but they seem too expensive. First and foremost, before launching on mega projects, it is absolutely necessary to examine what is locally available. This question is in particular important because the city's rainfall

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<sup>12</sup> The soundness of the system (capacity to negotiate, settlement of disputes) is significantly correlated to the absence of water problems. When water is scarce, the rules and conventions fall apart more quickly.

<sup>13</sup> Chennai (ex-Madras) is the capital of Tamil Nadu, a south India state.

<sup>14</sup> Estimates for Delhi are of around 50%.

is quite substantial (over 1200 mm). Despite observed cyclical fluctuations as anywhere else, over a period of past 100 years no declining trend in rainfall could be observed. Yet what the city does is to pump increasing amounts of groundwater in the periphery as it expands.

#### **4.1 The central role of peripheral groundwater in Chennai's mode of supply**

For the past two decades, MWB has relied heavily on transport of water from public wells and agricultural wells located in peri-urban villages. This impacts both local water tables and living conditions, and result in conflicts because of imbalance in the water equity between the city and peri-urban areas. In October 2004 MWB used around 6000 tanker-trucks of 10, 12 and 20 m<sup>3</sup> capacity, to carry water throughout the city, in addition to the supply through the piped network. The present supply to Chennai is about 103,000 m<sup>3</sup>/day. Water is pumped from well fields at Minjur, Panchetti and other places into the system. Plans are also there to hire about 125 field wells around Poondi to pump 30,000 more m<sup>3</sup>/day into the Red Hills water treatment plant. Groundwater extraction from village common lands is not new: in 1969, MWB dug 10 wells in the common lands of a nearby village to solve water crisis in Chennai and transported water through pipelines. MWB also compelled farmers of many villages to sell water from their irrigation wells, and many agreed.

It is interesting to note that a large share of this water is actually provided to a small number of industrial users (Gambiez and Lacour, 2003). Yet, to convince reluctant farmers, MWB put forward the needs of the thirsty urban dwellers. In fact, through a rapid cost assessment based upon a study of two villages, Gambiez and Lacour made the point that profits were made by MWB by selling groundwater to these industrial users at a higher rate. Indeed, these industries, especially a cluster located in the north of Chennai, contribute a considerable share of MWB's revenues (Ruet, Saravanan and Zérah, 2002). This highlights the distorted allocative process of water, further leading to intra-urban conflicts. Among the circa 6000 private tankers in operation daily during last summer, not to mention those hired by MWB, the fraction supplying water to the city's residents is decreasing. A number of apartment buildings were prepared to pay the money, but the quality of water was not assured. As industry sources point out, a number of fly-by-night operators, most of them with just one lorry, got into the business, seeking good fast money. But, with groundwater levels going down, water quality is suffering. According to industry sources, a 12 m<sup>3</sup> tanker of water is on average available for Rs 450 - 600, depending upon the area of supply and the periodicity with which water is required. In 2004, a well owner was paid Rs.3.30 per m<sup>3</sup> of water by MWB, while water consumers paid as much as Rs.80 per m<sup>3</sup> to MWB, and even more to the private lorry owners. For purified mineral water the amount is as high as Rs.50 per 25 litres or Rs.2000 per m<sup>3</sup> of water. Rs.2 is being charged for 25 cl of polythene water sachets. Altogether, MWB spends around Rs.500 million to buy 3.7 million m<sup>3</sup> of water each month. In summer months, the amount is expected to go even higher: at the peak of summer last year, a 12 m<sup>3</sup> tanker of water would cost as much as Rs 800 - 1,000<sup>15</sup>.

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<sup>15</sup> 1 US\$ = 50 INR

## 4.2 Impact on poverty and livelihoods

From a resource perspective, the existing system looks more like a stopgap policy.

Groundwater is under threat and there is a consensus to consider Tamil Nadu as one of the worst States in terms of underground resource degradation. Clearly, the way in which urban water needs are met conflicts with environmental sustainability. Notwithstanding this fundamental dimension, we rather focus here on the socio-economic tensions generated by overuse of peri-urban groundwater.

In one of the villages affected by this agreement, fieldwork carried out by Gambiez and Lacour (2003) has produced very interesting results. The authors distinguish three types of farmers. The first type owns wells and sells its water to MWB. The second type does not have wells and depends on the former to buy water and irrigate its fields. The third does not give its water to MWB and is not affected by the tripartite agreement. The authors assessed the evolution of agricultural practices and its consequences in terms of income. The results show that the independent farmers, who serve as a reference group, suffered a slight fall in their income due to the reduction of the cultivated area. We can hypothesise that this trend is explained by the growing influence of the city, as can be seen from the transformation of the peri-urban zones: a steady decline of agricultural employment had already been recorded in the last census. On the other hand, for the two other categories the evolution of both cultivated areas and incomes is very marked. Between 2000 and 2001, farmers contracting with MWB reduced their cultivated area by 43%. Out of the approximately thirty farmers selling water, only three, owners of several borings, have maintained their previous level of activity. The others reduced their cultivated area, as the sale of water is much more lucrative than agriculture: their revenue increased by 80% between 1999 and 2002. Dependent farmers were the losers: whereas 15 farmers supplied water to them before 2001, only two of them have maintained this relationship. This has resulted in a considerable reduction of the irrigated area and, in consequence, a substantial drop in income for the dependent farmers. This arrangement initiated by a public undertaking highlights certain crucial issues of urban growth. Following the example of other metropolises (Kundu *et al.*, 2002), the city of Chennai is expanding and developing by imposing new social and environmental costs.

In-depth research carried out by Janakarajan (2005) substantiates and reinforces the preceding results (see appendix). A comparison of present occupation with the situation 20 years ago in the selected villages, clearly shows that there has been a huge shift from agricultural employment to non-agricultural employment. Similarly, the research also highlights inter-village variations. On the whole, although the worst affected in terms of lack of agricultural activity, one of the villages is doing better mainly because of availability of better alternate employment opportunities. This is correlated to locational advantage (proximity to Chennai) and connectivity factors (the village is on an expressway).

The close look at these conflicts between city requirements and agricultural activities is very important in the Indian context particularly because of rapid urban expansion. The conventional notion that cities are the engines of development needs much closer examination. After all, there is a vicious cycle: declining agricultural activities and ecological and environmental degradation compels people to migrate to cities; growth

of slums and pollution in turn results in stress on urban infrastructure – serious problems for drinking water and sanitation. In order to cope with this pressure city expands in an unplanned manner and this process goes on indefinitely (Janakarajan, 2005).

### **4.3 Inefficiency of regulations**

These tensions occur despite a stringent regulatory system, with specific laws designed to curb over-extraction of groundwater. However, in a sharply polarised political arena the laws are twisted. The main example refers to the groundwater legislation in place in Tamil Nadu.

By mid 1980s, when the available sources of water supply to Chennai started dwindling, an Act was felt necessary: the Chennai Metropolitan Area Ground Water (Regulation) Act, was passed in 1987. Its main features are : (i) MWB is the entitled to grant / not to grant permits to sink wells in the designed area, and to grant /not to grant license for extraction, use or transport of ground water, (ii) a data base has to be maintained showing the number of wells that were in existence in the area, (iii) no person shall extract or use groundwater in the planned area for any purpose other than domestic, no person shall transport groundwater by means of lorry, trailer or any other goods vehicle.

However, after almost two decades the Government agency is the main violator of the Act. MWB has been mainly responsible for groundwater overdraft in many peri-urban villages. It draws groundwater from the identified areas but also from surrounding peri-urban areas as far as 50 km away from the city limits, and its lorries run without license. Many private lorry-tankers are also drawing water up to 50 km from the city without any licence. Some of them complain that having applied for a permit or a licence a long time ago, they have not received any, and therefore they break the rule and then supply water mostly to industries. As concerns new well/borewell licensing, the procedure is mere eyewash and stays only on paper. Many industries are not only drawing groundwater in violation of the Act but the also degrade the quality of the groundwater. All of them have never paid any penalty nor has MWB taken any stringent action against them. A more recent act has also been passed as well as government resolutions. However, loopholes and weakness of implementation remain the same (Geetalakshmi and Janakaranjan, 2005). Indeed, India has a powerful set of legislation but enforcement remains a major issue. Other conflict resolution mechanisms, such as Public Interest Litigation (see section 4) are not leading to policy implementation.

In the specific case studied here, even though in some cases villagers are eager to sell water, the tension level between rural and urban interests are strong. It can even lead to open conflict (see appendix). But mostly, there is clearly an asymmetry of bargaining power among actors. Local opposition raised by some villagers is not credible enough to stop powerful actors, backed up by the priority given on drinking water by National Water Policy, to supplement their water requirements with short term measures.

## **5. Is there a way out for peri-urban problems?**

The critical question is how to reach the point where one can anticipate a win-win situation – from conflicts to cooperation. It isn't easy to define this path nor the time frame needed to

travel through it: On the one hand free riders are also politically and economically powerful; this group will lose if cooperation is attained. On the other hand present losers are vulnerable and therefore fatalists; this group would be willing and more than happy to participate in dialogue and reach the level of cooperation, but can it speak up? Precisely for these reasons, it is not going to be easy to involve these diverse groups in a meaningful dialogue until one reaches a *threshold level of crisis*; but it does not mean that one should not start the dialogue process before. This is precisely where multi-stakeholders platform (MSP) and multi-stakeholders dialogue (MSD) play a key role (Janakarajan 2005a).

MSP and MSD are important tools for achieving sustainable development everywhere individual rationality is in contradiction with collective rationality. While initiating a MSD process, it is important to remember that dialogue is not a one-off phenomenon: it is a process and it is time consuming; facilitator should not work with a finite time frame and should have patience, be sufficiently motivated and be emotionally stable besides having some access to resources. And most of all, a MSD initiative will be successful only with the support of the democratically elected government.

### **5.1 MSD experience in Chennai and peri-urban water conflicts**

Field research, followed by stakeholder analysis and then multi-stakeholders' dialogue process was initiated in Chennai peri-urban area. A survey of 64 villages in different segments of the city's peri-urban area, helped not only to collect data and document ongoing conflicts; but also to build contacts with various stakeholders within villages. Finally, the MSD process was initiated on negotiating and finding solutions to the city and peri-urban water conflicts.

Several local multi-stakeholder meetings were held from July 2004 to February 2005, which were attended by researchers, NGOs, farmers from peri-urban villages and some Government officials. Subsequently, after completing the meso-level survey in 64 villages, two regional stakeholder workshops were held. They helped to build both knowledge of the situation and contacts. One of the main goals of the project was to develop an MSD process. Furthermore, the regional meetings have helped understand more about socio-economic and political status of peri-urban stakeholders, about extent of water transport and its implications on livelihood.

As soon as September 2004, a Round Table was organized in Chennai to set up a 65 members multi-stakeholders' committee of water users of urban and peri-urban areas: farmers from peri-urban villages (both water sellers and non-water sellers), landless agricultural labourers, women self-help groups, NGOs, researchers, lawyers, urban water consumers and a few government officials. It was decided to include more members into the committee later. The first Committee meeting was held on November 26, 2004 in Chennai with full – active participation of all members. Invited government officials came but refused to talk. The Committee met again on February 4, 2005. It addressed several key issues such as declining groundwater levels; declining agricultural activities and emerging serious livelihood problems; seawater intrusion and deteriorating water quality problems; water and soil pollution; drinking problems, sand mining and people's growing unrest. The Committee agreed to work on the specific agenda within a given period, and came up with new ideas.

## 5.2 Alternative solutions to Chennai water problems

It was agreed to first consider the availability of water resources from within the city: there are at least 70 temple tanks and ponds located in different parts of the city, which used to get filled during monsoon months. Now most of them are silted up and supply channels have disappeared because of civil constructions all over. One should restore all these tanks to their original condition and re-capture flow of rain / flood water during monsoon months. Simplest way would be to link storm water drains with these tanks; otherwise, huge amount of floodwater will wastefully flows into sewage drains or into the city's polluted rivers. This particular measure would not cost much compared what is spent on big projects. The potential benefits and costs are remarkable and need to be scientifically assessed.

Second, the city generates about 700,000 m<sup>3</sup>/day of sewage which is under utilized. Only around 100 to 150,000 m<sup>3</sup>/day are supplied after primary treatment for industrial use, to Chennai Petroleum and to a fertilizer company (MFL). The rest is discharged into the city's rivers either untreated or after primary treatment. There is scope for recycling this water even for some domestic uses. At least 80% of the sewage can be recovered and recycled; sludge has a very good commercial value and could be used as bio-manure after proper treatment. This means at least 500,000 m<sup>3</sup>/day of water can be retrieved and supplied to the population; it represents 70% of city's domestic water requirements. Environmental engineering experts point out that the cost of sewage tertiary treatment is cheaper than seawater desalination.

Third, according to old records, in the peri-urban areas around Chennai, there are 3600 tanks (in Tiruvallur and Kancheepuram – adjoining districts of Chennai), which are at present only partially used for agriculture. Many farmers have left their villages or land is sold out for urban use. These tanks are mostly silted and encroached. There is an urgent need for revamping them, restore inlet channels, desilt them, strengthen bunds and restore water supply during monsoon months. In other words, rainwater should be harvested in these tanks, if only to reduce farmers' unrest in peri-urban villages: the steady decline of the water table causes seawater intrusion in several villages located close to the coast. If tanks are restored, groundwater levels in these villages will improve considerably; which will ensure better livelihoods through rejuvenated (and peri-urban) agriculture. Surplus water can be diverted to Chennai's requirements. This is a clear win – win situation in contrast to the present arrangement, where city benefits only on the short term, but peri-urban areas lose.

Fourth, new check dams in Araniar and Kosathaliar would help save more rain water. And, finally, water treatment and supply should be decentralized in order to cover both city and peri-urban areas more effectively and efficiently.

Now these proposals must be checked with additional research: a survey of all water bodies in and around the city, an economic study of wastewater recycling, and feasibility studies of check dams. This phase would necessarily require the State's cooperation, in particular the support of the agencies such as MWB, Tamilnadu Water Supply and Drainage Board (TWAD board), farmers associations, NGOs etc). The MSD process pointed out the necessity of these measures but we need to think seriously how to implement them, within which time frame, with which community implication, and with which public funding.

## 6. Conclusive lessons

It should be particularly stressed that a rationed water supply and an often inefficient service in the cities, together with the disregard of formal rules (that are moreover vague), lead various users to a 'pumping race', and over-exploitation of the resource, through either individual or joint initiatives. All these decentralized solutions have a fairly high cost, despite water being apparently free. Presently unsustainable, they however have a potential for improvement, subject to several conditions.

One concerns the institutionalization of community participation mechanisms. They are welcome for at least three reasons: it would help to internalise costs and facilitate the organization of a system of transparent redistribution; residents would actually be able to ensure the up-keep of the decentralized installations; it would facilitate a more effective management of the resource through the detection of leaks and better demand management. The rights of access would be better ensured. This requires considerable institutional improvements, and in particular the setting up of consultation, negotiation mechanisms and above all of regulation.

Private markets for the resale of water are not sustainable in the long term given the present state of affairs. The lax regulatory framework offers private operators, a position to supply a private commodity at an excessive price, but the quality of which is not guaranteed. Only can the most affluent households take advantage of this service, which ultimately contributes to the segmentation of the different categories of the population. These are provisional solutions that do not really meet the overall requirements of urban management, nor of the resource. They reduce the scope for territorial equalization systems or any other unifying mechanism, specific to a public service monopoly.

These modes of organization reveal the incapacity of the institutional environment to stop agents from carrying on, as most of the rules can be bypassed. In return, they cannot evolve much, being tuned to major malfunction and growing discontent. Each of the system's factors is governed by its internal dynamics, without clear interaction with others, which emphasizes the magnitude of the institutional deadlock. Thus we have a situation of tacit *laissez-faire*, which contributes to the depletion of the resource and the degradation of the infrastructures.

The role of the institutional environment is, among others, to lay down the rules enabling transactions to take place and at a lower cost, i.e. to ensure the transfer of rights that accompanies these transactions. In most Indian cities, several problems combine to exacerbate the bad management of water and infrastructures: poor coordination between various agencies, both vertically and horizontally, which results in erratic planning; political instability, which constitutes a permanent threat, holding the public to ransom; the problem of corruption ; the judicial system, independent but overworked and unable to keep the rules.

All these problems are, of course, very difficult to resolve and we can only indicate the goals that should be kept in view. This confers a very normative character to our

propositions. The first goal should be the simplification of the institutional framework by redefining responsibilities in order to better coordinate the various decision levels, avoid the overlapping of tasks and limit the intervention capacity of discretionary powers. The second stresses the concept of a democratic decision-making process in which all the interest groups in the system would be represented (from the infra-local level to that of the whole area), which would act like a broad-based regulatory framework. Lastly, we consider it essential to redefine the constituents of the public service and its articulation in operational terms. It especially implies a reversal of the perspective, in the sense that the service should not be conceived in a technocratic top-down manner by imposing arbitrary norms, but in terms of the fundamental needs that should be met, taking into account the different systemic effects.

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## **Appendix: Water conflicts in two peri-urban villages of Chennai city**

### **1. Palayaseevaram Village**

This village is located 50 km away from Chennai on the National Highway. Its population is 5285 (as per 2001 census). The village has witnessed a sharp increase in land value.

#### **Main irrigation surface sources and their command areas**

A series of tanks, spring channels; 5 kulams (small tanks used by villagers for non-irrigation purposes such as washing etc.) and 4 kuttais (ponds used for washing cattle)

#### **Wells**

In 1980, there were 71 wells with depths in the range of 24 to 27 feet. Now there are 150 wells with depth in the range of 60 to 100 feet. 50 are bore wells and the rest are open wells. At present only 20 wells are in use. Quality of water is reduced as water table dropped.

#### **Drinking water**

In 1990 drinking water was supplied for 5 hours/day vs only 1 h/d in 2002.

#### **Background to conflicts**

Original plan was to pump water from Palar river bed to supply to the adjoining areas of Chennai city. The estimated demand for this region was 22.5 mld in 1979. It must have at least doubled since then.

The people of Palayaseevaram village opposed this move on the grounds that it would affect the groundwater availability. A memorandum was also submitted to the District Collector. The matter was taken to the then Chief Minister, who took a decision in favour of the city and against the village population. And the CM sought the support of the village people who eventually gave their consent to pump and transport the Palar water. The work was executed.

Originally in 1972, the TWAD Board dug 5 wells in the Palar bed. Basically these wells are collection points of water in the riverbed. For the past 5 years, supply of water in these wells has been reduced drastically. Six more wells were then dug in 2004 on the other bank of the river. The main reason for decreasing availability in these wells is substantial and illegal sand mining in the riverbed, much beyond permissible limits. This has drastically reduced the water withholding capacity of the riverbed aquifer, and also groundwater availability in the village even for drinking; agriculture is badly hit due to water scarcity

In the entire stretch in this region, groundwater was pumped in the years 2003-04 to supply water to the city – water was transported by MWB through tanker-trucks. Everyday at least 2500 loads were sold from these areas (1 load = 12,000 litres). This has also affected groundwater supply in the Palayaseevaram village

A sugar mill was built in the year 1987 despite opposition from the village. It discharges a good deal of untreated effluents into a tank which is supposed to irrigate 423 acres. The sugar factory has not only occupied / purchased land irrigated by the spring channel, the mill has blocked the water flow which eventually was supplying water to the Al Kondan tank.

#### **Outbreak of Conflicts**

MWB wanted farmers to sell water from their irrigation wells, and many farmers agreed in the region. But as concerns Palayaseevaram village, the TWAD Board objected to this proposal, claiming first in time rights, with already have 12 wells of their own. Therefore, the farmers of this village were requested not to sell water. Only one sold water for one month.

**How was the conflict represented?**

Several petitions / memorandums were sent to the government; NGOs organized a series of demonstrations and issued notices to public. They also organized a public hearing on the issue of illegal sand mining in Chennai which attracted considerable attention of civil society and the media. Lawyers condemned severely the illegal sand mining and suggested to the Government to appoint a Committee to go into the details of damage done to the river and to suggest ways to protect it.

**Mediatory / legal process :** Nil

**Outcome of conflicts:** Nil

**Present status:** Passive struggle, people are absorbing the shock created due to water depletion or leaving the village for urban employment, many have sold their lands (growing absentee landlords) and many more are planning to sell land. The village is Located on the main corridor linked to Chennai

Sand mining is a lucrative activity, as well as sugar mill, which has a powerful lobby having highest political connections and threatening local people. There is both growth of non-farm employment, and unavailability of farm labourers who find more gainful employment in non-farm activities.

**Responses**

The responses from media and civil society are encouraging. But the political parties are seemingly not interested in this issue, and the village's population does not mobilise itself.

**2. Velliyur Village**

This village is located at a distance of 50 km from Chennai city with a total population of 4379. Very high increase of land value.

**Main surface irrigation sources and their Command areas**

2 Tanks, 2 Kulams and 1 kuttai

**Wells**

In 1980, there were 280 wells and depths were in the range of 50-80 ft. Now there are 220 wells and the depth is in the range of 130-160 ft. Quality of water is bad compared to 10 years ago. Until mid 1960s, there existed only dug wells; borewells have become common after the introduction of the HYV technology in the region. Since 1990, dug wells have become literally useless; at least 60 dug wells are abandoned.

**Drinking water**

In 2000 drinking water was supplied round the clock from 4 bore wells. In 2004 it is supplied only 2 h/day from a total of 12 bore wells.

**Background to conflicts**

In 1969, 11 bore wells were installed to pump water from the common land of the village in order to provide additional water to Chennai city and to supply nearby industries. The estimated water supplied from this village was 16 mld in 1969. In 2000, out of the 11 bore wells, 9 had failed; since then water is purchased from farmers.

In the village farmers sell water (40 mld) from a total of 75 wells, but out of these 75 bore wells, only 55 were working in the year 2004. Furthermore, the TWAD Board was planning to install 7

more bore wells in the common lands of Velliyur in order to supply water to Thiruvallur town; but due to farmers' resistance only 4 were actually commissioned.

Groundwater availability considerably shrunk in the village even for drinking; agriculture is badly hit due to water scarcity; water sales from 75 irrigation belonging to individual farmers made things worse; landless labourers were forced to migrate; extensive and intensive sand mining activities also drastically reduced water yields in wells; But it is the TWAD board project which triggered-off conflicts.

### **Narration of conflict**

The people of Velliyur village had remained quite passive for more than 3 decades. However, when groundwater table decreased progressively, farmers had to spend quite substantially on deepening activities. This prompted the NGO, which worked in the area to motivate the Self Help Groups (SHG) and other landless population. Subsequently, SHGs started to oppose water sales on April 26, 1995. SHGs insisted that the Panchayat should pass resolution banning water sales from Velliyur village; the Panchayat did not do so since groundwater is pumped only from Government land. Now since 2000, water is purchased from the farmers; this led to severe water crisis, impacting on agriculture and creating serious livelihood problems in the village. This was precisely the reason why SHGs and the SC, ST population of the village prompted by the local NGO got themselves organized to oppose water sales and pressed for passing a resolution in the Panchayat against water sales again. This time also the Panchayat refused to pass a resolution on the grounds that it is individual farmers who sell water from their own land. Since the property rights on groundwater are undefined nothing much could be done.

Some of the village residents filed a case in the court to ban water sales from the village. They were successful in getting the standing but soon it was vacated through an appeal petition filed by a water-seller who was supported by MWB. Under such duress, in the year 2003, almost all the agricultural land was left uncultivated and the labourers out-migrated in search of employment.

Meanwhile, there was sand mining by government from the river Kosathalaiyar, which drastically reduced the groundwater table. The farmers who were selling water took the sand mining issue to the Metro water and informed that water sales would be stopped if sand mining was allowed. Metro water took the issue to the government and stopped sand mining. So the labourers who were working in sand mining got affected and started opposing water sales severely. Though the conflict was fuming between the sellers and non-sellers it broke out on 15<sup>th</sup> August, 2004. The entire village apart from the sellers asked the Panchayat to pass a resolution to ban water sales and resorted to road blockage. The Metro water officials, RDO, Thasildar and some other officials arrived at the scene and tried to solve the issue. Since the entire villagers were against water sales a peace committee was formed consisting of water-sellers, non-sellers, SHG's and officials. During the peace committee meeting it was decided to stop the water sales from farmers to MWB after 15<sup>th</sup> September 2004. Everyone including the MW officials, sellers, non-sellers and all other villagers agreed to abide by this decision. After the peace committee decision entire issue was put into cold storage until 14<sup>th</sup> September 2004. On the 15<sup>th</sup> of September, MW officials reported that water purchase will not be stopped since their own higher authorities did not accept the agreement reached at the Peace Committee meeting; water-sellers were also willing to sell water. In the mean time water sellers tried to move the court and obtain stay from the court against the decision taken during the peace committee meeting. Since the non-sellers had a doubt that the sellers might seek legal protection, they also moved the court to get a stay on water sales; It was an unsuccessful move for both sellers and non sellers. On the evening of 15<sup>th</sup> September 2004 a notice was issued to the villagers by the sellers stating that the non-sellers who were objecting to the sales are rich enough and they were trying to fool the poor people; and that they had encroached upon the common lands and were cultivating them which could have been given to the poor people if the non sellers had real concern for the poor. But this notice had no effect.

Since water pumping was not stopped even on 16<sup>th</sup> September 2004 till 11.00 AM the entire village was gathered near the sump from where water was pumped. The road was blocked. Though the officials (including the RDO, Thasildar and MW engineers) arrived they did not agree for stopping water purchase; At this point of time, some people from the agitating group broke the pipeline structures which belonged to MWB. After this violent protest from people, police arrested 47 people belonging to Velliyur and filed a FIR. They were booked under Public Property Damaging Act. MWB requested the court to order Rs.30,000 damages towards compensation for breaking their infrastructure. The court also instructed the arrested farmers to pay the compensation but the case was never withdrawn. But, they were let on bail and the case is pending in the court.

**Present status**

Water selling was stopped. Again MW officials are asking the farmers to sell water and some of the farmers are willing to sell. MW has posted a notice and even circulated it among the farmers stating that whoever is willing to sell water can approach the MW to have an agreement for one year and the tender should be submitted before 22/2/05. But till date water sales have not started.

**Responses**

The responses from media and civil society and the political parties are encouraging. The present MP (DMK) of the Sriperumbudur constituency visited the village and asked the police to release the arrested persons immediately stating that the public has rights to question and that the government had failed to keep the promises made in the peace committee meetings, which compelled the people to resort to such violent reactions.

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