


# Godot in Bombay: a Tragicomedy in Two Decades

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## ABSTRACT

 An exploration of the two-decade-long political and discursive battles over water “privatization” in the Indian city of Mumbai reveals how, beginning in the 1990s, the water department, “got stuck in between public and private infrastructures.” This essay demonstrates how widespread speculation among policymakers, bureaucrats, and engineers on the likelihood and desirability of privatization entrenched some of the very dynamics that such solutions were supposed to cure – dynamics that ironically, would ultimately derail a privatization initiative when it finally arrived.

Beginning in the 1980s, issues of water access in the world’s growing and globalizing cities were increasingly understood through the lens of the “privatization” debates. Since water was famously declared “an economic good” at the 1992 United Nations International Conference on Water and the Environment in Dublin,<sup>1</sup> the notion that the full “costs” of water provision should be recovered from consumers has shaped international debates on water management. In a statement released at the conference’s conclusion, it was proclaimed that

Water has an economic value in all its competing uses and should be recognized as an economic good. Within this principle, it is vital to recognize first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Past failure to recognize the economic value of water has led to

wasteful and environmentally damaging uses of the resource. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources (World Meteorological Organization, cited in Budds 2003: 91).

The Dublin Conference both reflected and sparked international debates on the various roles and responsibilities of states and markets in allocating and distributing water. Meanwhile, international lending and aid organizations – particularly the World Bank (Goldman 2007) – began to advocate the widespread reconceptualization of water as an economic good, as well as to recommend increasing private-sector involvement as a way to stem the supposed inefficiency and corruption of public utilities, while utilizing market incentives to extend services to underserved ‘consumers.’ “Artisanal”

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<sup>1</sup> The conference was organized by the World Meteorological Organization, the UN’s branch focusing on weather, water and climate. The conference resulted in the establishment of four “principles,” known as the Dublin Principles: 1) that fresh water is a “finite and vulnerable resource”; 2) that water needs to be managed using a “participatory approach”; 3) that women have a central role to play in water management; and 4) that water is an “economic good.”

provisioning systems, as well as “public good” conceptions of water were largely sidelined in the official discourses of various lending institutions by a notion of the individual citizen as a consumer. Borrowing states and municipal governments were encouraged to make choices about infrastructure developments and private-sector involvement based on information or ideas about the infrastructural demands of paying customers.

The ideological battles over privatization<sup>2</sup> have received enormous amounts of scholarly and media attention, effectively colonizing the political and discursive space around questions of municipal water access for over a decade. This global-level ideological shift set the stage for a handful of high-profile privatization debacles. Most famously, in 1999, the signing of a 40-year concessional contract for municipal water operations in the Bolivian capital city of Cochabamba led to spectacular price hikes when the American corporate consortium Bechtel attempted to implement a full-cost pricing scheme (Finnegan 2002). The dramatic popular uprisings that ensued led the Bolivian government to withdraw the contract, and became a powerful symbol and inspiration for anti-privatization activists worldwide. Social scientists thus responded to these kinds of privatization battles largely by attempting to theorize the pros and cons of market-based delivery approaches, and by attending to the successes and failures of attempts to privatize various aspects of water management and municipal delivery systems.<sup>3</sup> Scholars of social movements rushed to study the coordinated and often quite forceful opposition to municipal privatization agreements, contributing to a growing literature on the transformative power of transnational social movements (e.g., Keck and Sikkink 1998; Mertes, 2004; Pauw 2003). Yet while much ink has been spilled debating the benefits and

pitfalls of private sector involvement in municipal infrastructure, there has been very little attention to the effects that the debates *themselves* have had on the form and functioning of infrastructural networks and on hydraulic outcomes. An exploration of the two-decade-long political and discursive battles over water “privatization” in the Indian city of Mumbai reveals how, as one of Mumbai’s water engineers described to me, beginning in the 1990s, the water department, “got stuck in between public and private infrastructures.” This essay demonstrates how widespread speculation among policymakers, bureaucrats, and engineers on the likelihood and desirability of privatization had the effect of entrenching some of the very dynamics that privatization solutions were supposed to cure – dynamics that would ultimately derail a privatization initiative when it finally arrived.

The transnational debates over how and whether to increase private sector involvement in the urban service sectors – water, electricity, transport, and sanitation – intersected with (and fueled) national-level debates in India over pension reform. According to rules framed at the time of India’s Independence in 1947, jobs within Bombay’s Municipal Corporation (home of the city’s water department) are pensionable according to the Central Government’s pension scheme. In the 1980s, however, in response to increasing life expectancies among the laboring classes, coupled with international ideological trends urging the scaling back of the public sector, the Government of India began to push for amendments to pension laws – an effort that met with overwhelming political opposition due to the enormous size of the public sector. In the ‘80s, senior sources inside the Municipal Corporation maintain, while these political battles were sorted out, the Corporation’s

<sup>2</sup> The term “privatization” can signify a number of different things, but generally it refers to some sort of contractual arrangement between a government and a private enterprise. The contents as well as the duration of the contracts described by the term “privatization” can vary dramatically, from an agreement in which the private company is granted short-term authority over the operations and maintenance of the utility, to the complete “divestiture” of the utility, including sale of the asset to be provided. In between are a range of options, which can involve many different kinds of risk- and investment-sharing arrangements. The commonly-heard term “public-private partnership” refers to the huge variety of arrangements that falls short of complete divestiture.

<sup>3</sup> For scholarly analysis of the pros and cons of various aspects of water sector “privatization,” see Goldman (2007), Bakker (2003), Bakker (2010) Budds, J. and McGranahan, G. (2003). These well-documented debates do not need to be rehearsed here; the scope of the present paper is not to adjudicate the role of the private sector in water distribution, but rather to attend to the political and hydraulic effects of these debates.

recruitment office was simply instructed by “Delhi”<sup>4</sup> not to fill vacant engineering and laborer posts. As the former Additional Municipal Commissioner who recently oversaw a highly-politicized (and ultimately failed) water privatization effort in Mumbai explained, “We were thinking to outsource these activities, so the Municipal Commissioner made a unilateral decision to ban the recruitment of laborers.” He explains, “If it’s going to go private, and we’ve hired all these people, we’re going to be stuck paying pensions until they die.”

In the past decade, Mumbai’s water supply itself has grown in volume by 30% and the (official) city population has grown by 20%. Yet, as of 2009, engineers report that during that same period the department staff did not increase at all; on the contrary, as the existing crop of engineers and laborers reaches retirement age, the department staff has rapidly shrunk. I met with the acting Deputy Hydraulic Engineer (Planning and Control) – a man named Gurav – one day when a correspondent for the English-language daily *Times of India* came for a weekly press conference. Gurav – a man in his late 50s with an acerbic wit and the good-humored bluntness of someone who no longer sees a need for euphemism – introduced himself to the reporter – a woman in her mid 30s named Mariam. Gurav explained to Mariam – who had begun her interview with the seemingly-harmless question of Gurav’s title – that he is not *actually* the Deputy Hydraulic Engineer (Planning and Control); he is really only the *in-charge* of the Deputy position; his actual position is Executive Engineer (Central Control), but because of understaffing, he is the acting head. “We’re supposed to have ten Deputy Hydraulic Engineers in the department,” he explained, however since all but one of the positions are empty, in practice each of the remaining nine Deputy positions is manned by an Executive “acting as the in-charge.” Mariam, stunned into distraction from her prepared interview questions (about reports of water shortage in the upscale western suburbs), asked for explanation; Gurav amusedly obliged: “You see, our staffing schedule is based on figures from 1973 – the population, the size and lengths of water mains, the number of municipal

councilors... the official numbers of engineers and laborers are based on those outdated figures – but even *those* posts aren’t all filled, madam.” Mariam’s request to see a copy of this “schedule” that Gurav mentioned produced confusion among staffers. When Gurav explained to a young clerk what it was that the reporter was requesting, she looked baffled and shrugged helplessly and explained that she had heard of no such schedule. (The question of whether or not there actually exists a schedule is revealed by this exchange as entirely irrelevant; there is in practice no relationship between official and actual numbers of engineers and laborers). I left Mariam while she was quizzing Gurav on the relative numbers of “scheduled” and filled posts for a story to be printed over the following days. While I suspect that Mariam wrote the article, it was never printed; the following day’s paper instead offered a piece about a burst water main in an upscale neighborhood of central Mumbai – apparently deemed to be a more news-worthy subject than that of empty posts from a rumored staffing schedule from the 1970s.

Perhaps the most significant legacies of the staffing shortage have been the increased fragmentation of the water department’s formal knowledge of the distribution network of pipes, and the abandonment of the practice of “auditing” the city’s 110 water zones. Until the mid-1980s, the water department had a functional “survey” section whose sole responsibility was to “update the maps” when a new water main was commissioned. There was a “set rule,” a retired senior engineer explained to me, that any time a new water main was laid, the local ward office would tell the survey department, who would send someone to go and “survey” the new line – to actually go to the site and see, “with their own eyes,” the physical location of the new pipe. Members of the survey section known as “tracers” would then draw the new main onto existing maps. The evidence and memory of this reportedly-functional system of recording and updating information about the water supply network presents a needed corrective to much current theorizing of urban infrastructure in the global South, which tends to depict infrastructure cities like Mumbai as somewhat timeless in their dysfunction.

<sup>4</sup> Engineers’ accounts of the sources of the hiring freeze vary. While two senior engineers cited “Delhi” as the origins, others point out that – officially speaking – central government officials have no authority over the human resources offices of the Municipal Corporation; the hiring freeze, these others maintain, was pushed by IAS officers (Additional Municipal Commissioners) at the State-government level. These disagreements in the accounts of the hiring freeze are notable insofar as they gesture towards the somewhat-spectral, highly-intangible and dispersed quality of the de-staffing impetus.

The survey section of the water department was never officially disbanded, but simply starved of staff as the shrinking ranks of engineers and laborers were reallocated to the more-immediate concerns of keeping the water flowing through (and hopefully not bursting out of) the growing city's constantly-expanding network of pipes and valves. The disbanding of the survey section, however, has meant that not only are many new pipes unmarked, but that the department has lost track of the location of many older pipes due to changes in the above-ground built space of the city. This informational deficit was for many years compensated for by informal mechanisms like personal memory; any question regarding the location of a particular main could usually be answered by asking around a little until someone who remembered the main could describe its precise location. As the city has grown, however, many of the city's roads have been widened and – more recently – paved over with concrete. The speed at which the above-ground face of the city is changing often outpaces and supersedes the department's informal information-sharing mechanisms. A good-humored engineer named Kadam related to me the following story:

A few years back, we were trying to find a trunk main that was laid in 1976, and we simply couldn't find it. The problem was that on our maps, the landmark was a post office gate, which had been moved. We dug and dug, day and night, for four days. We called up the fellow who was recorded as having supervised the laying of the main – he was retired of course, but we were desperate. We just wanted to ask if he remembered where it was, but he got defensive, thinking we were accusing him of not having laid it at all. He insisted "I laid it! I laid it!" But we didn't doubt he had laid it, because water was coming into the areas fed by the main; we simply couldn't *find* it. Finally, one of the workers pointed to a fellow, a drunken homeless fellow who was sleeping in a culvert a little ways off. The worker said "that man is always here, he probably knows where it is." I was desperate – I'd have asked a donkey if there was one there to ask! – So we approached this fellow and woke him up. He said, come, I'll show you. He took us to within a few feet of the main. We asked him how he knew where it was, and he told us that he used to work in the water department – he was a valve operator. We asked him, why didn't you come and tell us? You've been

here watching us for days as we dig up the whole street! He said, "I was having a good time watching you. And besides, you didn't ask me."

The upgrading of roads through concretization and widening has thus layered additional obstacles to accessing knowledge about below-the-surface networks of flow, both by rendering existing maps obsolete, as well as by paving a physical barrier to regular surveillance and maintenance, which requires extraordinary mobilizations of labor, time, and equipment to overcome.



Figure 1:  
Searching for a water main.

Mapping was not the only departmental practice to suffer during the years of the privatization debates. Until the early 1990s, the water department used to routinely audit each of 110 isolated "water zones." Using a "low-tech" system known as "pito gauging," the department would, every six months, measure the pressure and quantity of water traveling through certain water mains, and were thus able to assess pressures and losses due to leakage in each of the zones. In the 1990s however – in the context of the staffing shortage – the water department purchased a set of high-tech, labor-saving flow meters, abandoning the pito-gauging system. "Pito gauging involves manual recording," a senior, retired engineer explained, "whereas in case of new meters, recording is done automatically and transmitted electronically to the central control



station.” The new meters promised to provide much relief to overworked engineers and laborers. But, the engineer explained, because the new meters were very expensive – not to mention bureaucratically-complicated and labor-intensive to mount since installation involves road breaking – they were not provided at all of the locations that had previously been monitored by the pito-gauging system; “More flow meters are still required to measure the flows in each ward or in each water supply zone,” he tells me. Yet, while the department, as of 2009, *still* has plans to install the rest of the meters, in the interim years, the status of knowledge about water flows has become even more fragmented. “The new meters are more accurate,” the engineer explained, “but at this point we know very little about how much water flows into and out of each zone.” The department has thus long abandoned the practice of regularly auditing the water supplied to the zones; nowadays, he tells me, “the department does not even measure water flowing *out* of the service reservoirs, just water flowing *into* them. Honestly, we don’t know how much water we give [to each of the 110 water zones] because we have no way of measuring.”

By the 1990s, the challenges posed by staffing shortages inspired senior water engineers to begin to look into possibilities for private-sector involvement in various aspects of water distribution. When unionized staff went on strike in October 2000, senior department engineers were left unable to manage the openings and closings of the city’s more than 800 (or so)<sup>5</sup> daily-opened valves, whose operation allows water to flow *intermittently* through the zones. Indeed, while water engineers repeatedly told me that *inertia* explains the continued functioning of Mumbai’s water distribution system in the face of the described challenges (understaffing, inadequate maps, outdated equipment, and political malfeasance), Mumbai’s taps do not produce water without a stunningly-elaborate choreography performed on a 24-hour basis by water department laborers who produce the city’s constantly-shifting landscape of water.

Since it is the responsibility not of the laborers but of the Deputy Hydraulic Engineer (Planning & Control) to orchestrate the operations of the city’s valves, the laborer strike in 2000 should not, formally

speaking, have posed such a problem. The official system works like this: every year, a senior engineer named Sharma tells me, on the first of October (after the monsoon has subsided) the Chief of Planning “takes stock” of the supplies in the lakes that supply Mumbai’s pipes. After assessing the capacity of the lakes, the Chief of Planning draws up a plan according to a calculated per-day availability of water. Based on that assessment, he decides how much should be drawn from these sources, how much will be filtered every day, how much will be supplied to each of the Master Balancing Reservoirs and to each of the city’s 27 service reservoirs. He then decides upon the quantity of water to be released daily from each service reservoir. The implementation of the supply plan is the responsibility of the city’s three Assistant Engineers (Control) who sit in each of Mumbai’s regional offices, in the Eastern Suburbs, Western Suburbs, and in the Island City; it is thus – formally – the responsibility of the team of engineers under the DyHE (Planning & Control) command to calculate the precise number of valve turns and timings according to which the water will be allowed to flow through the network of pipes.

Yet, because of the complexity of the system of valves, as well as because of the absence of official data on the precise location, size, and number (and even direction) of turns required to open each valve to the required degree (a casualty of understaffing triage) the task of deciding upon valve choreography has been informally devolved to ward-level offices.<sup>6</sup> The frequency with which ward-level engineering staff are transferred, however, combined with the already-mentioned general abandoning of documentation practices due to grievous understaffing in the department, has meant that practical knowledge of valve operations resides almost exclusively with each ward’s three or four laborers known as *chaviwallas* – or “sluicemen.” Indeed, while engineers are transferred every few years, laborers generally spend the entirety of their careers in a single ward, and thus acquire an intimate knowledge of the internal workings and flows of the water distribution system. Thus, during the union strike, Sharma recalls, it was “impossible for engineers to operate the system. So many [valves] were broken, and each one had its own characteristics – the diameter, type, operating

<sup>5</sup> The number “800” is the one generally given in reference to the number of daily-operated valves in the city, but the operation of valves – by whom and in what way – is a fluid and deeply contested process.

<sup>6</sup> Mumbai’s water department is decentralized into 24 administrative wards.

torque required, number of turns of the key required to open and close, size of its cap and fitting key [...]”<sup>7</sup> Outraged by the water department’s failings, angry Mumbaikars stopped traffic on arterial roads, blocked trains from running, besieged the BMC<sup>8</sup> headquarters, and even burned one of the union offices to the ground. Sharma recalls this episode as the “first time in history” that Mumbai’s water supply was “in chaos.”

After the strike incident in 2000, Sharma explains, “we decided to replace all the valves with identical characteristics” so that the system could be “operated with a machine.” The department floated a tender, Sharma recalls, “but we were not able to choose the valves that we wanted! We had to give the contract to lowest bidder who could provide valves that met the standards of the Indian Standard Institute. We had to go with the cheapest – it’s public money after all, so we have to pick the cheapest – and they were no good.” In the end, 80 valves were replaced; most of them have since failed for various reasons. So, Sharma tells me, the department decided to try and “give the whole valve business to a private operator and then *they* can buy whatever materials they want to keep the system functional.” The strike incident, it seems, finally gave political impetus to the idea of expanding private-sector involvement in the city’s water distribution system.

In order to investigate private-sector possibilities, in 1999 senior water department engineering staff formed a Privatization Cell, whose four or five members conceived of a pilot study in the K-East Ward. The pilot project was, in essence, to be a privatization *experiment*, in which various aspects of K-East Ward’s water distribution system would be contracted out to a private operator. However, the Privatization Cell decided that before the experiment itself could be moved forward – in order, that is, for tender documents to be floated and the scope of the work to be specified – it would be necessary to

conduct a water audit in the K-East Ward in order to pinpoint precisely how much water is provided to and consumed by the residents, industries, and commercial enterprises of K-East.

Department engineers’ decision to pursue a pilot project in K-East Ward coincided with the World Bank’s International Water Year of 2001. “There were all sorts of seminars” in Delhi, an engineer named Kulkarni recalled, and various IAS<sup>9</sup> officers were invited and encouraged to attend.<sup>10</sup> During this period of seminars and workshops touting the virtues of 24x7 water supply, fancy high-tech equipment, and increased private-sector involvement in management and distribution, World Bank officials in Delhi responded enthusiastically to the Mumbai water department’s request for help in funding their experiment in the K-East Ward. But rather than offer the department a loan to purchase the materials they wanted, Sharma explains, Bank officials in Delhi encouraged them to engage private-sector experts to draft a management contract for the whole privatization study in the K-East Ward, inviting the Department engineers to themselves decide the terms of payout. While this was not what they had wanted, Sharma tells me, “we said, okay”:

We suggested [to the Bank officers] that the payment be linked to some kinds of parameters of result. If the contractor achieves some result, then they’ll get paid; if they don’t, maybe they’ll get less. We wanted there to be safeguards – because anyone can manipulate a survey! So I said, we’ll put a pressure recorder – this would be an independent assessment. We would identify points in the network and put automatic meters there. Then we’d pay according to pressure. Pressure is the only neutral measure – if pressure goes up, it means that leakage has been reduced, and we would pay accordingly. But this idea was

<sup>7</sup> Another engineer explained to me that because the threads on the valves become worn over time, only the sluicemen know how many turns are useful; “so maybe the first few turns are totally useless, but even the engineers do not know which valves have what kind of threading missing or worn.”

<sup>8</sup> Bombay Municipal Corporation

<sup>9</sup> Indian Administrative Service

<sup>10</sup> Kulkarni recalls that during these meetings, the World Bank’s Senior Sanitary Engineer from Delhi forged a close friendship with one of Mumbai’s Deputy Municipal Commissioner’s - who was soon after was promoted to become the Corporation’s Additional Municipal Commissioner (Special Projects), and was pivotal in advancing the K-East Ward audit project.

shot down by [the World Bank officer] – he said that no one will be interested in such a contract.<sup>11</sup>

The issues at stake in this particular standoff – how to measure leakage reduction given the fragmented state of knowledge about water flows and pressures as well as who should bear the not-insignificant financial and political risks of assuming responsibility for an a system characterized by so many unknowns – describe the contours of the social and political debates that would preoccupy the Department for the following decade.

After half a decade of negotiations with the World Bank, the consultant, Castalia, finally arrived in Mumbai in 2006 to carry out a ward-level water audit in preparation for a pilot privatization project in Mumbai's K-East Ward. Yet by the time the Castalia team arrived, two decades of speculation on the likelihood and desirability of private sector involvement had decimated the Department's formal knowledge of the water distribution network: staffing shortages had led to the abandonment of the survey section, resulting in the increasing fragmentation and personalization of knowledge about the pipe locations, pressures, timings, and flows; the regular practice of auditing the city's 110 water zones using the labor-intensive pito-gauging system was (in conjunction with overzealous enthusiasm for high-tech gadgets) another casualty of understaffing; increasingly-stressful working conditions resulted in frequent requests for transfers by engineers who sought placement in other departments or in the private sector; the rapid and dramatic transformation in the built space of the city meant that decades-old maps had come to bear decreasing resemblance to anything that might be found on or under the ground; and finally, local-level political dynamics fostered the criminalization of water access for large numbers of the city's residents, giving rise to a host of politically-mediated hydrological interventions/innovations that are neither 'on the map,' nor have any clear place in the conceptual and legal framework through which water is – officially speaking – supposed to be

provided. The years of speculation on privatization that preceded Castalia's arrival in Mumbai, in other words, simultaneously entrenched the very conditions that privatization was proposed to cure (for example, leakage-related water losses or dry pipes due to decreased water pressure and timings), while posing significant obstacles to the production of reliable data on those conditions.



Figure 2:  
*Forgotten pipes*

Indeed the unreliability of the department's maps and flow-meter readings as predictors of where, when, and how much water might flow ultimately rendered it exceedingly difficult for the consultants *themselves* to produce data shoring up the case for privatization. When Castalia submitted its report on the technical operations of the K-East Ward's water distribution system to the Municipal Corporation in June 2007, the report's findings and recommendations sparked angry debates among department engineers, activists, politicians, NGOs and in the media. The consultant's report – which attempted to pinpoint figures on efficiency, leakage, bill recovery, contamination, and customer service – made four basic claims: first, that intermittent water supply in K-East led to contamination during

<sup>11</sup> Extensive conversations with senior engineers reveal no aversion to accepting Bank loans for the carrying out of this particular survey, which was conceived of by water department engineers themselves. While the anti-privatization literature tends to depict recipient governments either as victims who have been bullied into accepting loans, or as complicit capitalists, shamelessly profiteering from the sale of public assets, the recollections of Mumbai's department Engineers reveal a more subtle set of power relations and exchanges. The water department was not strong-armed into the project, but was very much interested in learning more about the various possibilities for expanding private-sector involvement in limited and select activities, such as metering and valve operations.

monsoon months; second, that distribution was inequitable across neighborhoods; third, that customer complaints were not promptly attended to; and finally that approximately 40% of water supplied in the ward went “unaccounted for” (MCGM 2007). Department engineers were incensed by the report’s findings – particularly its claims regarding leakage. According to Castalia, the estimate of 40% “unaccounted for” water was arrived at by subtracting billed water from supply estimates taken from flow meters, which were installed at various points of entry into the ward. One senior engineer became animated when I asked him about the episode: “it’s ridiculous!” he proclaimed: “If we start from a figure of 40% leakage, then the private operator will come in, do nothing, and collect the money!” By way of explanation for these absurd numbers, he explained that Castalia’s auditing methods were flawed: since they were not familiar with the intricacies of inflow and outflow in K-East, they did not manage to isolate the ward’s hydrology; they were unable to account for the quantities of water that pass *through* K-east on their way to the neighboring K-West, or H-Wards.

Attracting equal disdain from department engineers was the Castalia report’s pronouncement that there is no contamination in Mumbai’s water – a finding that contradicted one of the Report’s *own* recommendations: that in order to *prevent* contamination, the water department needed to do away with its intermittent system, patch leaks, and pressurize its pipes continuously. Anyone who has spent any time at all in Mumbai, it was pointed out, can attest that popular complaints and reports of water-borne illness regularly appear during the annual monsoon season, when Mumbai’s groundwater rises high enough to intermingle with the contents of centuries-old sewerage pipes, and seeps into often-cracked consumer connections – which are not-infrequently laid in open drains themselves.<sup>12</sup> Senior engineers pointed to Castalia’s use of these two measures as further evidence of the cynicism with which the Bank-funded study was carried out – a study, they insisted, in which the recommendations had already been decided upon before the study was even commissioned. One engineer who had been centrally involved in the K-East Ward project recalled that, due to

the implausible numbers, “there was resistance – especially from the politicians,” who questioned the data generated by the Castalia study. He shrugged, indicating the straightforwardness of the whole affair: “They gave a bunch of recommendations and the BMC threw out the recommendations.”



Figure 3:  
*Consumer connections vulnerable to contamination*

In the heat of the debates in November of 2007, the Municipal Commissioner – representing the administrative wing of the Municipal Corporation – presented a letter to the Standing Committee (the deliberative branch of the Municipal Corporation) in which he wrote: “In the context of Mumbai’s aspirations to emerge as a truly world class city, it is necessary for the Municipal Corporation of Greater Mumbai to give adequate and pure water to the citizens on a 24x7 basis.” The letter details a series of supply-side, demand-side, and source-augmentation proposals – together dubbed “Sujal<sup>13</sup> Mumbai Mission” – to be put up for discussion by the Standing Committee. Amidst the political turmoil, however, the Standing Committee approved only bits and pieces of the proposed Sujal Mumbai reforms. For example, in order to “encourage conservation” and to “create awareness among consumers,” the Municipal Corporation revised its billing rate schedule, such that higher-volume consumers would pay more as their water consumption

<sup>12</sup> This is a non-standard but common practice, since the challenges of securing road-breaking permission often precludes the ‘proper’ placement of consumer connections.

<sup>13</sup> Sujal means “good water” in Hindi and Marathi.



increased.<sup>14</sup> While the water department itself voiced concern that this reform would not do much,<sup>15</sup> the new rate schedule encountered another, somehow-unforeseen problem: significant numbers of Mumbai's consumer connections do not have functional meters; water bills are generated either based on past consumption levels, or are calculated based on supply norms.<sup>16</sup> In November of 2008, after the implementation of the new rate schedule, the Water Department was flooded with complaints by residents who claimed that, despite cutting back on water use in line with the new charges, water bills reflected older levels of consumption. The department, recognizing that many meters were probably missing and admitting to not having conducted a survey of the meters before implementing the new rates, quickly suspended the telescopic rate reforms (Tatke 2008). If department engineers were skeptical about the potentials of rate revision to begin with, why was the initiative ever pursued? Department staff explain that the demand-side measure was strongly advocated by the Additional Municipal Commissioner, who was eager to get on with Mumbai's transformation into a 'world class city' by implementing the recommendations of the Castalia Report. On-the-ground realities of missing or broken meters, however, seem to have been in the implementation of this 'easily-implementable' reform.

The following year, however, World Bank consultants in Delhi once again approached the Department, pointing out that some of the PPIAF funds from the K-East Ward project were still available; why not use this remaining money to bring in an expert to write a tender document for a city-wide water audit? Thus it happened that, in February 2009, Castalia's team of consultants returned to Mumbai to attend a World Bank-sponsored series of discussions on the preparation of bid documents for the newly-christened "Water Distribution Improvement Project" (WDIP) – a series of workshops and meetings that I was fortunate enough to attend. In an air-conditioned conference room inside the Municipal Corporation in 2009, a senior water department engineer – flanked

by a team of consultants from the World Bank and Castalia – beseeched his skeptical colleagues to be open-minded about the WDIP's goal of providing round-the-clock water across the city. Mumbai, he pointed out, has a domestic per capita water availability of 180 liters, but presently makes this water available to consumers for only two to four hours per day. Other large cities provide round-the-clock water with much less availability! London provides 24x7 supply with only 150 lpcd, we are told; Kuala Lumpur with only 120. All we need to do is patch the leaks and incentivize (financially) a project manager to incrementally increase the number of consumers provided round-the-clock water. Other senior engineers were skeptical: why should we aim for round-the-clock supply? Our goal should be to improve the distribution system – to patch the leaks! – Can we not incentivize some measurable indicator that is more directly related to leakage reduction? The consultant pleaded: with 24x7 supply you get it all: better quality, quantity, pressure, and duration (the tautology of this claim seemed to baffle the room into silent assent). Furthermore, much new technology is designed for 24x7 pressurized systems: ground-penetrating leakage detection radars, high-tech meters and automatic meter readers... they only work on 24-hour pressurized systems. And this technology, the consultant argued, is much less vulnerable to political pressures than the human-centered approach that the department currently takes....

In the months following the February 2009 meeting, a core group of senior engineers continued to communicate with World Bank representatives in Washington, sending amended versions of the tender document back and forth. By July, however, the initiative had run out of steam: "To be honest," a senior engineer involved with the negotiations told me, "it's not going anywhere. The Bank has lost interest [...] they think that we won't have any offers after we finish amending the documents; they're afraid we'll modify it." The central sticking point, he tells me, had to do with the system of payouts and bonuses, and with who would

<sup>14</sup> The Tariff Structure was revised in the following way: consumption up to 150 litres per capita per day (lpcd) would be billed at the standard rates; consumption of between 150 and 200 lpcd would be billed at double the standard rate; from 200-250, rates would be tripled; consumption above 250 lpcd would be billed at a quadrupled rate.

<sup>15</sup> "White Paper", 2009, p. 18. Engineers gave me two reasons for their lack of faith in the potential of telescopic billing: first, water charges are low enough that even quadrupling rates would not amount to a serious financial deterrent to "high end consumers" who would almost certainly continue to draw as much water as possible from their pipes. Secondly, residential consumers don't have individual meters, but rather share meters other housing society residents. Water charges for a society as a whole are generally factored into a housing society's monthly fees. Thus, since extra charges would be socialized – and as no one really knows who is using how much water – no single family has an incentive to cut back.

<sup>16</sup> Departmental records report that 14% of connections are unmetered while approximately half of the meters on the remaining 86% of connections are not functional.



Figure 4:  
Washing laundry and rickshaws in pools of clear water leaked from below-ground water main.

assume the considerable financial risks inherent in a system so fraught with unknowns: unknown pipe locations, unknown pressures; unknown – and unknowable – numbers of undocumented water connections (of ambiguous and varied legal standings). The consultants, an engineer named Gupta explained, sought to transfer all of these risks to the Department, insisting on guaranteed set payments to the contractor, who would be rewarded for each additional connection that is made to produce 24-hour water pressure regardless of whether the contractor can demonstrate that the feat has been achieved through a reduction of leakage. He points, by way of emphasis, to a line in the tender document draft stating that if the project manager does not fulfill the goals according to the standards of the Hydraulic Engineer, then the project manager will receive no bonus. He shakes his head. “The implication of course is that they will get their regular payments even if they accomplish nothing at all! Of course they won’t get a bonus.” He concludes: “See, here in India, we know these things, we’re very alert.”

In July 2009, Gupta told me that the World Bank officer in Delhi “used to [email] every day, but now he hardly writes at all. If we want the document, we need to show more interest, but the department’s not interested, so [the Bank has] lost interest too.” I asked him to explain why the department engineers have lost interest, and explained that, really, there was never much interest to begin with; the issue of the city-wide audit had come to be seen by engineers as a largely-futile project: “we either have a [water-auditing] system or we don’t. Another senior, now retired engineer added that, in any case, “if we do [an audit], we’ll just know [about pressures and volumes] for that particular *moment*; these things change again and again. That kind of precise and constant monitoring system is very expensive to maintain.” And besides, engineers explain, the department has other priorities – like keeping the water flowing... and updating the maps.

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