*Full fathom five thy father lies*
*Of his bones are Corrall made:*
*Those are pearles that were his eies*
*Nothing of him that doth fade,*
*But doth suffer a Sea-change*
*Into something rich & strange*
*Sea-nymphs hourly ring his knell.*
*Harke now I heare them, ding-dong, bell.*

# MUMBAI'S SEA-CHANGE

## SLIP SLIDING ALONG

**FINDING:** Consultant says 40% of water distributed in K-East Ward is lost in distribution. This means 114 mld out of 288 mld is lost
**BMC SAYS:** 550 mld is lost across city in a day. K-East calculation appears exaggerated
**CONSULTANT SAYS:** After further research, K-East figure may be tweaked to 21%, with a 10% margin of error

**FINDING:** No contamination in 100 water samples taken from across K-East
**BMC SAYS:** Impossible
**CONSULTANT SAYS:** New samples being taken

**FINDING:** Planned buildings get 240 litres per capita (person) a day, while slums get 130 litres per capita
**BMC SAYS:** 'Preposterous' to say slumdwellers get enough water. Supply is 90 litres per capita in slums; in some areas as low as 45 litres per capita
**CONSULTANT SAYS:** K-East slums are better off than those in other parts of city

**FINDING:** Water loss in K-West (Andheri West) and H-West (Bandra-West) is only 7%.
**BMC SAYS:** That means current system is doing well

**FINDING:** H-East (Bandra-East) gets 110 mld, but BMC bills residents for 140 mld
**BMC SAYS:** No comment

**FINDING:** No water supply studied in non-metered areas
**BMC SAYS:** Civic body needs to know what financial losses in these areas are
**CONSULTANT SAYS:** Only when a meter is in place can consumption be measured

*Castalia, the consultants for the World Bank-funded study, sub-contracted the actual data collection and collation to Black & Veatch*

Source: The Times of India

Anjali Joseph

### I Watery Grave

In the summer of 1966, as Mumbai reeled under heatwave and acute water shortage because of the tardy southwest monsoon, the city slyly, almost reluctantly, revealed one of her secrets. Water levels dropped in the reservoirs to the north of the island city and something unexpected began to peep into view from Vihar, the oldest of Mumbai's reservoirs. That something was not an amphibious monster like the one said to lurk in the cold depths of Loch Ness in Scotland. Instead, as often in Mumbai, the secret turned out to be something not new but merely forgotten: the spire of a Portuguese church built in the second half of the 16th century. When it was completed in 1577, the village where it was located was renamed Trinidade, in a Catholic revision of the earlier name Trimurti, that acknowledged a much older carved stone idol of the Hindu god Shiva, here shown with three heads. Since the area had been evacuated and then flooded to make way for the reservoir in 1860, the church of Trinidade had not been seen again, until the rains came late one year, almost four centuries later.

Mumbai's wateriness is something its inhabitants take for granted. The city, assembled on seven original islands, in the Arabian Sea, with tracts of reclaimed land that later made it into a kind of landmass, has always been surrounded by, almost inhabited by the sea, by ponds and rivers, by wells and salt pans, mangrove swamps and rice fields that flood during the rains. The sea embraces both sides of the wispy peninsula of the island city, and breezes still blow strong from west to east. Many of the grand Victorian institutional buildings like the King Edward Memorial Hospital in Parel or the Small Causes Court at Dhobi Talao, are built so that the westerly wind acts as a natural air conditioner, though that effect is lost when the originally designed rooms and passages are divided and partitioned to squeeze in extra office space.

Mumbai's success might just prove to be its own watery grave. The island city, like the rest of the Konkan coast (stretching down from Mumbai all the way to northern Karnataka) to which it geographically belongs, was originally blessed with a naturally good water supply and drainage. Sweet water was accessible by wells, just as throughout the western coast of India, whether in Goa or Kerala. Natural drains (nalas) allowed excess rainwater to run out to sea, so that flooding was not a necessary accompaniment to the rainy season.

But as property prices in Mumbai continue to rise (rates per square foot exceed those in the island of Manhattan – in absolute terms) the city has changed status. The Mumbai soil is fertile. Bandra, one of the earliest areas to have a Portugese presence, was known as a rice-producing area. Rice grown there was exported from the nearby fortified port town of Bassein (now Vasai). Until the early 1980s, rice fields were visible on Pali Hill in Bandra, among other areas. Property prices in the area now makes that seem absurd. The opportunity cost of owning and not selling even the tiniest plot of land or old house in Mumbai has encouraged haphazard development, while a political climate in which permission to construct can always be tacitly if not officially obtained, means that there has been large scale concretisation of ground to ensure easy construction. In turn, natural drains and nalas become blocked, leading to far worse flooding during the monsoons. This has affected even rural areas, like the villages

## BMC plans to put a check on wasteful consumption by installing water meters

**Neeta Kolhatkar.** Mumbai

If NY can do it, why not Mumbai? New York is consuming less water today than it did two decades back, in spite of the growth in its population, and the main reason attributed to this is the installation of water meters.

Now Mumbai appears set to take a leaf out of New York's book. Sources in the Brihanmumbai Municipal Corporation (BMC) told *DNA* that water meters will soon be installed in every building, and consumption patterns studied. Eventually, those who consume more water will also have to pay more, just like consumers of electricity.

> Water usage in New York fell from 1.5 million gallons a day in 1988 to less than 1.1million gallons today due to the use of meters and higher charges

The BMC has been compiling a computerised data bank of buildings for the past one year. Tenders have also been received from agencies for installing water meters. Once these meters are installed, each building's usage pattern will be studied for six months. Then alerts will be sent out to residents exceeding the national consumption norm of 135 litres a day per person.

Along with the meters, the BMC is also working out a variable water tariff structure. A daily usage of less than 90 litres per head may continue to get the subsidised rate, whereas 'comfort' levels of 90-135 litres and 'luxury' levels of over 135 litres may attract higher rates. "Water conservation is possible only if the authorities stop giving subsidised water," pointed out Rakesh Kumar, head of the National Environmental Engineering Research Institute (NEERI).

Implementation of the plan may run into problems, however. "Mumbai has mixed kinds of housing. If you go to Girgaum to install individual water meters, you may not be able to figure out which pipe goes where," said Rakesh Kumar.

Source: DNA

# Watered down

**407** – Litres of water consumed by an average household in Mumbai daily

**115** – Litres of water used for bathing

**82** – Litres of water used for toilets

**76** – Litres of water used for washing clothes

**67** – Litres of water used for washing dishes

**30** – Litres of water used for cleaning house

**17** – Litres of water used for drinking

**12** – Litres of water used for cooking

**90** – Litres of water an average Mumbaikar consumes per day

**69%** Households in Mumbai face water shortage

**3,340 million** Litres of water currently supplied to Mumbai every day (demand estimates reach up to 4,300 million litres)

**25%** Water that is lost due to leakage and pilferage. This adds up to 835 million litres of water a day

**2.8 billion** People in 48 countries, mostly in Africa, the Middle East and the Indian subcontinent will face severe water shortages by the year 2025

Source: DNA

Source: United Nations and the Tata Institute of Social Sciences.

outlying Vasai, which still resemble villages in Goa or the rest of the Konkan coast, with their coconut palms, banana trees, wells and rice fields.

Land reclamation isn't a new trend in Mumbai. It has been a preoccupation since the 18th century, when William Hornby, Governor between 1771-1784, began the practice by initiating a scheme to fill in the 'breach' or estuary that, at high tide, separated Malabar Hill on the island of Bombay, from Worli, another of the seven islands. Before the dam or vellard could be completed, the devis or goddesses of an old temple in the breach had to be propitiated. Sharada Dwivedi and Rahul Mehrotra recount the story in *Bombay: The Cities Within:* 'The engineer in charge, who belonged to the Prabhu community, dreamt of the goddess Lakshmi who instructed him to salvage an image of herself from the Worli creek and install it in a temple so that the vellard could be completed. The engineer did find the image and after completion of the embankment, acquired a plot in the vicinity and installed the image in the Mahalaxmi temple.'

Mumbai has many powerful 'devi's or goddesses, many of whom are associated with the sea, from Sitladevi whose shrines are all over the city, notably at Mahim (another of the original islands) to Mumbadevi, whose name is said to have provided the Marathi name for the island Mumbai/Bombay, to Mahalaxmi and to other local goddesses belonging to the Koli fisherfolk who were the islands' first inhabitants. One such shrine, at the point where Bombay island ended and, at low tide, the path began to Colaba, now at the tip of the Mumbai peninsula, is still there, It's located in what came to be the courtyard of the Colaba Police Station premises. A causeway of tar macadam was built to link Colaba and the rest of the city permanently in the late 19th century. But the sea does not always remember such changes, and at certain high tides, the courtyard floods, and the waters come back towards the Koli goddess's shrine.

As the protective mangrove belts, salt pan lands and other open spaces that can form a buffer between the city, and the sea continue to be stripped away, to provide more land for development, it begins to seem more and more likely that destructive and extreme flooding will continue to occur, especially as rainfall patterns become more erratic. The normal, heavy Mumbai monsoon shower, when sheeting warm rain can soak you within seconds, came to be seen as something more sinister after the 26th of July, 2005, when almost a metre of rain fell, and the city's overloaded 'storm-water' drains, which were installed by 19th century engineers to mimic the natural drainage of the nalas, overflowed, and massive flooding took hundreds of lives, at a conservative estimate.

### II Ghosts

If London, the city to which British Bombay was always attached by an umbilical cord of comparison and aspiration, has its lost river (the Fleet, which runs under the modern Fleet Street), Mumbai has a whole family of ghostly water bodies.

The many wells and tanks that provided water to the public and served temples or other needs were, for the most part, filled in during cholera and typhoid epidemics in the late 19th century. The tank at Mumbadevi temple was one such casualty. Many others that were filled in still exist in ghostly form since their names are used to denote a particular area. So, for example, the washermen's tank (Dhobi Talao) near where the Company Fort met the Native Town; or the Gowalia Tank, which since Independence has been renamed August Kranti Maidan in memory of the Quit India rallies held there. Hornby's 'breach' is now a chichi residential area where the United States Consulate and a clutch of expatriate schools stand. And Pydhonie, which used to be a place where a creek was shallow enough to wash one's feet (py dhona in Urdu) is just another dusty part of the city north of Bori Bunder.

The Esplanade or beach has given way to the Churchgate reclamation, and its orderly tides of Art Deco apartment blocks. The Oval Maidan stands where the sea used to, and is ringed with palm trees, as if in polite acknowledgement of the fact. Nariman Point, the business enclave built on further reclaimed land at one end of the bay, is the newest land reclamation scheme, dating to the 1960s. Other areas have been planned – sandbags and stone mark out areas near Cuffe Parade where further reclamation was to be attempted – but the sea is too strong. Instead, land acquisition plans have focused on the mangrove belts, salt pans and other open spaces. At Bandra, hundreds of acres of mangroves that moderated the tidal flow were destroyed to build the Bandra-Kurla business Complex. It floods every year, when heavy rain coincides with high tides.

### III Not a drop to drink

It's an irony of 21st century Mumbai, that the city is, threatened by excessive, sudden rainfall yet poor in water that can be used for drinking, bathing, or washing clothes. At the time of writing (September 2007), the daily deficit in water supply was about 550 million litres a day (MLD). The amount supplied is about 3250 MLD. About a third of this is lost due to leakages in the pipes, which were installed in the 19th century under the British

## 'We have to put structures in place'

Ajit Nimbalkar, chairman of the Water Resources Authority–Zarina Fernandes/DNA

**Unlike power, the water sector is in complete disarray. Right now, homes don't even have meters to measure consumption. You have your work cut out for you.**

Yes. Also, water is considered much more of a free commodity than power. It's seen as nature's gift. Unlike power, water has wholly been with the public sector. So, most of the water management was done by the state irrigation department as 80 per cent of water goes to irrigation and 15 per cent is used as drinking water. Industries are charged on the basis of metres, while farmers used to be charged on the basis of the crops they produced. We'll have to look into these aspects carefully.

**Why was the authority created?**

It is the baby of the irrigation department, which wanted to get some order into the state of affairs and plan for the future. In many cases, there are several claimants on a water source, as we have seen with the Cauvery. We are expected to tackle disputes and put structures in place as well. We don't have our own infrastructure but operate through the Water Users Associations, formed since 2001. In fact, there is almost one per village. They were accorded legal status by the Maharashtra Management of Irrigation Systems by Farmers Act, 2005.

**How will this structure work?**

Water will be distributed on volumetric basis to these associations, to ensure equitable distribution. They are responsible for maintaining the irrigation systems and protecting the environment. They will take water, distribute it and recover tariff, in return for a fee.

**The act was passed in 2005. Why did it take so long to form the authority?**

The authority was set up in 2006, but the other too members joined recently — AKD Jadhav joined two months ago. The board directors are also being appointed.

**What is the commission's agenda and has there been any headway?**

We will look at entitlement, tariff and an integrated water plan, which will comprise plans made by the irrigation corporation for the five river basins — Krishna, Godavari, Tapi, Narmada, and the west-flowing rivers. The draft plans prepared by the irrigation boards will be submitted to the state water board, under the chief secretary, which will prepare the state water plan covering all uses of water such as the quantum of water for industry, agriculture and drinking. This plan will have to be approved by the water council headed by the Chief Minister.

We have installed a device to measure the water outflow from the rivers. The commission has prepared a 30-page technical manual on how to prepare a draft plan — how to look at water conservation, drainage and how to get such information.

**Is there any move to privatise water in Mumbai?**

It's for the government and the BMC to decide.

Source: DNA

administration. In an attempt to make up the shortfall, the existing nine reservoir projects (including extension projects), most of which are out of the city, are to be added to by another extension of an existing reservoir, and two new reservoir projects that aim to fill the shortfall and plan for further growth in population.

Some of the most exclusive addresses in the city (Malabar Hill, Warden Road), interestingly, get a municipal water supply of about two hours a day. The shortfall is made up by water bought in and supplied by tankers. The less rich instead make do by filling as much water as possible in drums and buckets when the supply is on, and managing through the rest of the day with this supply.

Although the profuse monsoon rain offers a good opportunity to collect and store rainwater for purposes like washing, irrigation and bathing, so far the civic authorities have done little in practical terms to ensure that rainwater harvesting is implemented. Most of the water that pours into the city during the rains washes out again into the sea, though a few housing societies and larger associations like the Oval Maidan Residents Association have adopted the collecting and storage of rainwater.

### IV The City Beneath

The office of the Additional Municipal Commissioner for waste management, is at the prettily named Love Grove Sewage Treatment Centre, Worli, which the nose can detect at some distance. The municipal corporation still has some of the original plans showing the lines of storm water drains, sewage lines and water supply pipes that follow the city's streets to form a network of paths and junctions underneath the visible Mumbai. The three types of pipe are, naturally, not supposed to mingle, but since the pipes are old and share the same ducts in places, they do sometimes meet, the result often being an outbreak of waterborne diseases, or merely a storm water drain flooding over with objectionable matter. It must have been some such apprehension of the proximity between purity (clean water) and pollution (sewage) that deterred many higher-caste Mumbaikars from using the civic water supply when it was first introduced in the 1860s.

The corporation even has a team of seven divers and 22 machines that work to unclog the storm water drains and sewage pipes. The storm water drains, which are often left uncovered, are treated by the ordinary Mumbaikar much as is the sea: as the rightful receptacle for unwanted detritus. All kinds of things find their way into storm water drains, clogging them up until the BMC divers fish them out. Plastic bags and polystyrene packaging are among the least suspect, but it's not unusual for the odd skeleton to be found. 'There are 50,000 manholes in Mumbai. You can't watch them all and stop people throwing things down them,' was the resigned remark of the corporation's executive engineer in charge of sewer maintenance.

The storm water drains and sewage pipes are in the process of being mapped and replaced, in a massive scale project that has been partly funded by a World Bank grant.

### V Fluidity

The watery, fluid nature of Mumbai, might be extended as a metaphor for the city's sociological and cultural being as well as its physical life. Mumbai has always flourished as a node of trade; a place of cosmopolitan values where people came from all over India and further, to trade with each other or to practice their professions; where there has been a high degree of flexibility, in the way that different castes, communities and religions can live closely together and still afford each other the most metropolitan of luxuries: privacy, generated by indifference. ('Everyone should live in Bombay for a few years,' said a Pune dentist to me. 'The next man really doesn't care what his neighbour is doing there.')

Bombay/Mumbai has its own identity, an identity that's always in mutation, nearly always sardonically cheerful, and always finding a new way of making the necessary seem completely desirable, whether that's inventing Mumbai-specific food (market traders' left over vegetables fried in butter and eaten with bread: pao bhaji; puffed rice and fried potato vermicelli, tossed together with a couple of chutneys: bhel puri) or Mumbai-specific slang ('tubelight' for someone slow on the uptake, like a flickering fluorescent tube; 'Dadar-Matunga', which invokes the names of two adjacent areas to denote a shifty flick of the eyes from side to side).

As in any great city, perhaps, luck is valued more keenly than religious orthodoxy, and everyone's gods are worshipped duly. Hindus, Muslims, Christians and Parsis all visit shrines including Makhdum Baba's at Mahim, Sitladevi's temple, and Mount Mary church at Bandra as well as the Siddhivinayak temple; a place where Trimurti can be changed to Trinidade and where Hindus happily worship the 'devi' whose wooden idol, was found at sea and then installed in a church as an icon of the Virgin Mary.

And annually, just before the Jewish New Year, the few thousand Bene Israel Jews in Mumbai, who are said to have come to the Konkan coast after a shipwreck a few thousand years ago, stand at the docks on the eastern sea front and make the symbolic gesture of emptying their pockets of all grievances and concerns, into the Arabian Sea. Even the 21st century Mumbai, alternately parched and flooded, boasting of its tolerance but flinching under bombs in the streets, and on the crowded suburban trains, retains its transformative powers: the 'Sea-change'.

# Civic panel defers decision on pre-paid water meters

EXPRESS NEWS SERVICE
DECEMBER 7

WHILE political parties are treading cautiously on the proposal seeking to install pre-paid water meters for residents of unauthorised hutments and structures that came into existence after January 1, 1995, the Brihanmumbai Municipal Corporation's (BMC) Standing Committee on Friday deferred a decision on the proposal and demanded a presentation from the civic administration on the issue.

The proposal is part of the 'Sujal Mumbai' mission that aims at providing adequate and potable water to Mumbaiites on a 24X7 basis and ill requires amendment in the water charges rules and sewerage and waste removal rules. As per the existing rules, the civic body cannot provide water connections to residents of unauthorised hutments, which came into existence after January 1, 1995. " (Such) people either purchase water from middlemen who procure water unauthorisedly from the municipal system or break pipes, which leads to losses of precious water," the proposal says.

According to the proposal, such consumers will have to buy "water credits" depending on their requirement which can be loaded in their respective "water cards". The pre-paid water connections will be charged at Rs 2.25 per 1,000 litres without any separate sewerage charges.

**How will the pre-paid meters be protected from water mafia and how will it be ensured that only slum-dwellers will benefit from subsidised rates rather than hotel owners who have to pay higher charges?**

**Rajendra Lad**
MNS member

Committee members said the administration needed to be clear on how it would implement the pre-paid meters and there was a need for more discussion on it instead of a hasty approval. "How will the pre-paid meters be protected from water mafia and how will it be ensured that only slum-dwellers will benefit from subsidised rates rather than hotel owners who have to pay higher charges?" asked MNS member Rajendra Lad.

Members said that while all political parties support the proposal, there was a general discontent on providing subsidies to the unauthorised slum-dwellers in the city. "We are not collecting sewerage charges from them, which means authorised tax-paying citizens have to pay more as combined water and sewerage charge," said BJP member Bhalchandra Shirsat.

Shiv Sena member Rahul Shewale said that the proposal raised several doubts on the basic infrastructure. "For pre-paid meters, there has to be 24X7 water supply. Will the BMC have a separate line for such connections?" he asked.

Leader of the House Sunil Prabhu also said there was need to make it clear who all could avail of the facility. "Will Bangladeshi immigrants and other unauthorised people who take shelter in the city will also be provided pre-paid water connections," he asked.

Additional Municipal Commissioner (Projects) Manu Kumar Shrivastava said that pre-paid meter connections will be like pay-and-use toilets in slums. "Those who give money will get water. This does not mean that pre-paid water connections will be regularised," he said.

Source: The Indian Express