

Mumbai slum dwellers' sewage project goes nationwide



Homeless International

Children's toilets included in community-designed and constructed toilet blocks in Chikhawadi (Mumbai, India)

Mumbai's 6.7 million slum dwellers, for whom toilets are seen as a luxury, are ushering in a quiet sanitation revolution. They are building, planning and managing their own community toilets, in a 2 billion rupee (US\$ 40 million) project supported by a World Bank loan to the federal government. The project covers around a quarter of the slums. All agree it could become a turning point in the city's development.

In the Ganesh Murthy Nagar slum in the Colaba district, women have taken the initiative to form a society for managing their two-storey toilet block, now under construction. According to Padma Adhikari, a member of the community, "We had one small, smelly toilet for a population of 10 000. Women suffered the most because they had to relieve themselves in the open, and could do so only in the early mornings or after dark."

Slum societies have appointed caretakers, who will live with their families in an airy room on the second storey. The room extends onto a terrace, which holds a huge water tank, and even provides space for community meetings.

Across Mumbai, shanty dwellers are enthusiastically demanding these new toilets, and are taking responsibility for

building and managing them. A visit to some of these slums revealed a remarkable change in attitude on the part both of the residents and of the civic authorities.

Gautam Chatterjee, a commissioner of the Brihan Mumbai Corporation (BMC), said "This effort seeks to resolve the fractured development of Mumbai which has been skewed in favour of the formal city. Mumbai's slum and pavement dwellers constitute 60% of the population and provide vital services to the city. City planners have ignored their basic needs for water, functioning toilets and a dignified existence."

The sparkling white toilet blocks constructed by the project stand out amidst the squalour of Mumbai's slums. The first phase, costing Rs 600 million (US\$ 12 million), is seeing the construction of 9000 toilets in 400 locations.

Each block contains an average of 20 toilets, each intended to serve 50 persons. There is a 24-hour supply of water and electricity, wide sewerage pipes to minimize blockage, and tiles that facilitate easy cleaning. There are separate wings for women and men. For the first time in the history of public toilets in India, there is a special section for smaller children.

According to Chand Ram, the caretaker of one such block functioning in Dharavi, "My family has cleaned toilets for generations. Here, I and three of my family provide 24-hour attendance in four shifts. Each of us earns Rs 1500 (US\$ 30) a month. I had never dreamt of finding such a job, and with such accommodation, in Mumbai."

Meena Jagdish Ramani is one of the contractors involved in the construction of these toilets. "Unlike BMC's brick constructions that crumble in no time, our toilets have deep foundations, and are built with steel girders and reinforced concrete, as in big buildings," she said with quiet pride.

Meena had no previous experience in building construction. She used to sell garlic from her shack by the railway lines until she found work through the Mahila Milan, a network of slum women who have been struggling for housing rights. They are supported by the Society for Promotion of Area Resource Centres (SPARC), a local nongovernmental organization that participated in an open tender and won a Rs 440 million (US\$ 9 million) contract to construct 320 of the toilet blocks in the project.

"The commitment of Mumbai's slum communities to this cause of sanitation can be gauged from the fact that they have raised Rs 10 million (US\$ 200 000) for the creation of a maintenance fund to manage 320 new community toilet blocks," said Arputham Jockin, president of the National Slum Dwellers' Federation. The Federation is working closely with SPARC in this project.

Every adult has to make a one-time deposit of Rs 100 (US\$ 2) towards the maintenance fund. If a family consists of more than five adults, it has to pay up to Rs 500 (US\$ 10). The money is placed in a bank account, jointly managed by a BMC official and the slum society, and is earmarked to cover future repair costs.

Meanwhile, the community has to decide how it will cover routine maintenance and operation costs, and devise its own schemes of regular collection of contributions. Many are

charging Rs 10–15 (20–30 US cents) monthly, per person. They also propose to rent the terrace for community functions.

Michael Rodrigues is a member of the Bangalipura slum toilet-maintenance society at Wadala. He said “Everyone in our community has agreed to pay their share for the maintenance fund. They have instructed us not to open the new toilet blocks until a proper receipt is issued for every contribution received. Initially people did not believe that such a big project could happen in our slum. Now we are also planning to meet BMC officials directly to tackle our garbage problem, without going through middlemen.”

If this approach works it will make a big difference to public hygiene in Mumbai. There are regular outbreaks of malaria, leptospirosis, diarrhoea, dengue, and hepatitis, which are just some of the diseases attributed to poor water and sanitation facilities in Mumbai. Much will also depend on the civic authorities making good on their commitment to providing access to sewerage pipelines and garbage collection facilities.

Officials say this “demand-led participatory approach” for sanitation improvement is new in Mumbai’s slums. Seeing its success, the Corporation has issued a resolution stating that from now on, all toilet constructions in the city slums will follow this model. The city however, still has a long way to go before the sanitation revolution is complete. A Corporation survey last year revealed that Mumbai will need an investment of at least Rs 7.5 billion (US\$ 150 million) to provide reasonable sanitation to all slum dwellers.

Nevertheless, seeing the success of the Mumbai project so far, the

Government of India has launched a programme: “Nirmal Bharat Abhiyan” (“Mission for a Clean India”) — to extend its activity nationwide. ■

Rupa Chinai, *Mumbai, India*

New malaria drug candidate could cure in a single dose

A brand new synthetic antimalarial drug candidate has shown spectacular activity in mice, and could lead to Phase 1 trials in humans next year. A dose of the “peroxide” molecule cut mouse malaria parasitaemias extremely rapidly, as quickly as artemisinin — the current record-holder. But whereas artemisinin and its derivatives let the malaria parasite grow back within a few days, requiring more doses of the drug or additional drugs in combination, the new peroxide kept the parasites down for more than 60 days with just a single dose.

“It’s quite remarkable and doesn’t quite fit with the pharmacokinetics [the way the drug moves through the animal] but we are working on that to put the pieces together to understand how it’s working”, John Vennerstrom of the University of Nebraska, leader of the international research team that created the drug, told the *Bulletin*.

In June the Medicines for Malaria Venture (MMV), a public–private partnership, picked this as the most promising research funded by MMV over the past year.

Simon Campbell, former Head of Worldwide Discovery at Pfizer, who chairs the MMV Expert Scientific Advisory Committee said “This group took the well-established antimalarial ‘warhead’ found in artemisinin and developed it into a chemical series that

is now very drug-like and amenable to modern drug optimization techniques and to industrial scale-up.”

Vennerstrom would not describe the molecule precisely, because his US, Swiss and Australian research team are seeking a patent, but did tell the *Bulletin* “it’s a different type of peroxide [an oxygen–oxygen chemical bond] than the trioxane you find in the peroxide of artemisinin. Its molecular weight is in the range of 300–500: artemisinin’s is 280.”

“The peroxide is the active bit of artemisinin. But that’s where the similarity with our molecules ends. Artemisinin and its derivatives have a very elegant structure, but they can’t be economically synthesized, and they also have some undesirable properties — they are very fast-acting but they have to be used in combinations with other drugs, because they are rapidly broken down in the body. That’s where our molecule has major potential advantages.”

“We’re following up on it, and are looking at it as a prototype to make other derivatives” said Vennerstrom.

“Next we have to identify the exact candidate for drug development ... it could be this exact molecule, or another; the activity of this one is outstanding but we want to get some better pharmacokinetic properties ... we’d like to increase the stability in the plasma ... and we’re thinking about the optimal compound — one that’s as cheap as possible to produce. And then we also have to consider the toxicity/therapeutic index. We’ve not seen any toxicity in this compound, but we haven’t done all the experiments yet.”

This discovery was driven by a new synthetic reaction discovered by Karl Griesbaum of Karlsruhe University in Germany, said Vennerstrom. “We realized that his technology could enable us to synthesize some very interesting compounds, and this particular peroxide is stable enough that we can do some very interesting chemistry on it. In that way it’s quite similar to artemisinin.”

Also like artemisinin, the target of the drug is probably iron in the parasite, left over from the parasite’s digestion of haemoglobin, Vennerstrom believes.

The research began with a small grant from the UNDP/World Bank WHO Tropical Disease Research Programme (TDR), which collaborates closely with MMV. “A typical grant from

Box 1. Who lives in Mumbai’s slums?

Over 50% of Mumbai’s 12 million people live in informal settlements (slums).

Of these:

- 25–30% are blue-collar workers in formal or semi-formal occupations. Where property prices are reasonable, they would be able to buy or rent a house.
- Around 30% work in the informal sector of Mumbai’s economy, providing services to the formal sector, or are self-employed. Many have a regular job but with no security — for example as watchmen, liftmen, hospital ward boys, plumbers, or electricians. Financially they are better off than the lowest class, who are domestic workers.
- The poorest 30% work as domestic servants, drivers, doing washing, ironing and other menial tasks. They form the most vulnerable segment of the slum population, surviving on very low earnings despite working very hard.

The bottom 60% of the slum population, with incomes of Rs 60–120 (US\$ 1–2) a day, cannot afford to build private toilets, as what they earn is spent to meet immediate needs.

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TDR at that time was \$50–70 000, which gave us a technician and a PhD student.” That got the discovery process going, “then MMV gave us US\$ 1 million, so it was an order of magnitude boost at least”. The Swiss pharmaceutical company Hoffmann-La Roche is also putting in a goodwill effort. “They used to have a small malaria drug development group. It was disbanded; but there are still some people who are interested, even though they have expressed no interest at this point in developing any potential candidate” said Vennerstrom.

Vennerstrom makes the compounds in Nebraska, the Swiss Tropical Institute tests their activity against mouse malaria, and Monash University in Australia studies interactions with the body chemistry. According to Bill Charman, team leader at Monash, the global collaboration “works because people trust each other; a number of people have said that the way that we do this is better than ‘big pharma’! There’s no politics — none of that stuff happens. The slowest part in getting a readout on the metabolism and pharmacokinetics after John makes compounds in Nebraska is the Federal Express shipping time from there to here.”

If the product goes beyond Phase 1, getting a developer and ensuring access to a registered drug as a “public good” will be MMV’s job. Officially launched at the end of 1999 as a public-private partnership for the discovery and development of new antimalarial drugs, MMV is supported by the Bill and Melinda Gates Foundation, ExxonMobil Corporation, the Global Forum for Health Research, the International Pharmaceutical Manufacturers’ Association, the Netherlands Ministry for Development Cooperation, the Rockefeller Foundation, the Swiss Agency for Development and Cooperation, the UK Department for International Development, the Wellcome Trust, the World Bank, WHO, Roll Back Malaria, and TDR.

MMV’s structure should bring advantages. While bringing a new drug from discovery to market is usually estimated to cost more than US\$ 500 million, MMV aims to do it for an outlay of just US\$ 150 million — complemented by substantial in-kind support from the pharmaceutical industry. If its funding targets are

reached, MMV’s goal is to have its first commercial product available well before 2010. However there may be funding problems ahead: projections in MMV’s annual report (2001) showed a potential cumulative shortfall from funding targets of nearly US\$ 20 million by 2003.

“We are all working very hard at trying to raise the needed money, and hope the kind of results we and our collaborators have demonstrated with

the synthetic peroxides will help. We would particularly like to see new government agencies from North America, Europe and the rest of the developed world join the ranks as donors” said an MMV spokeswoman. In 2001 MMV received US\$ 6.1 million from philanthropic foundations, US\$ 4.25 million from UN agencies, and US\$ 2.8 million from government development agencies. ■

Robert Walgate, *Bulletin*

AIDS could dominate Russian budget by 2020



“It’s not my problem.” A party in Schelikovo, 500 km north-east of Moscow. Here, as in countless other villages, the main risk factor for AIDS is unawareness of the danger.

Treating AIDS patients could absorb 82% of the Russian budget by 2020, according to an epidemiological and economic model of the Russian epidemic developed by the Moscow office of the World Bank, the Russian Federal AIDS Centre and the Economics Institute of Charles University in Prague.

Vadim Pokrovsky, Chief of the Russian Federal AIDS Centre and one of the authors of the model, told the *Bulletin* that the main conclusion is “that the government must be more active in prevention — not only to fight HIV, but also because when we fight HIV we are also working for the economy.”

“At the moment HIV/AIDS doesn’t get enough attention from the government; we need to show and explain this model to decision-makers... people from the ministry of the economy, of development — the finance ministries. Of course our objective is to reach the Deputy Prime Minister or

Prime Minister Putin himself. That will be the next step.”

With 200 000 people registered as infected with HIV, the federal Russian budget for 2002 is just US\$ 6 million — including treatment and diagnostic programmes. “Of course this is very small” said Pokrovsky. “It means only one rouble per person. It is not enough for prevention. One hundred million roubles (US\$ 3 million) will be spent on treatment, 30 million roubles (US\$ 1 million) on diagnostics, and for prevention not more than 30 million roubles (US\$ 1 million), with another 30 million (US\$ 1 million) for other things.”

“This is of course not enough for Russia. There were expert estimates at the beginning of the 1990s that for effective control we’d need to spend about US\$ 140 million a year.”

“I think it will take about three to five years to explain to our government that AIDS is a real danger, because at

the moment the epidemic is in the early stages. Only 2000 have died up to now. And amongst those who are alive we have only 1000 AIDS cases. The epidemic is fresh. It began only five years ago.”

Currently the epidemic is mainly among injecting drug users and in prisons “and this creates another difficulty because people think ‘it’s not my problem’” Pokrovsky said. “But we are seeing more and more cases of heterosexual transmission. From the year 2000 to 2001 the total number of infected non-drug-using heterosexuals will rise from 2000 to 5000. And the percentage of these people among the total infected increased from 3% to 4%. So there are signs of a generalization of the epidemic into heterosexual transmission.”

Another issue is the price Russia is paying for its antiretrovirals — US\$ 4200 to US\$ 9000 a year, much the same as in the West, compared to some regimens available in Africa at only US\$ 850 a year.

“Personally I do try to negotiate with the companies, but some questions need the participation of the government” said Pokrovsky.

Christof Ruehl, Chief Economist at the World Bank Moscow Office and coauthor of the model, told the *Bulletin* that the idea has been “to put some discipline into the debate” about HIV/AIDS in Russia. “Up to now anyone could pick whatever idea they liked out of the blue sky. This model ensures that people test their assumptions against facts. Our second goal is for the model to be used as a tool for policy.”

The complete model can be downloaded and run on a PC, and adjustments made to parameters such as transmission rates and costs of ARVs, to see the effects on the economy. It is available from URL http://www.worldbank.org.ru/eng/group/hiv/hiv_e.zip. The paper on the model is available from <http://www.worldbank.org.ru/eng/group/hiv/default.htm> ■

Robert Walgate, *Bulletin*

HIV/AIDS deepens food crisis in southern Africa

Severe food shortages in Lesotho, Malawi, Mozambique, Swaziland, Zambia, Zimbabwe — and in parts of South Africa — are being worsened by HIV/AIDS. The disease is having “dramatic” effects on agriculture, a UN Food and Agricultural Organization (FAO) expert has told the *Bulletin*.

According to Marcella Villarreal, FAO’s Chief of the Population and Development Service and focal point for HIV/AIDS, the disease will cut agricultural labour by nearly a quarter in Zimbabwe by 2020. In Malawi, HIV/AIDS is even causing long-term soil erosion as labour-intensive contour ridges, used by farmers in 30% of the country to protect soil from rainwater run-off, are going unrepaired, Villarreal says.

The governments of Malawi, Lesotho, Zimbabwe and Zambia have already declared their food shortages national disasters, while Angola, Swaziland, Mozambique and parts of South Africa are also battling with food shortages. Other than HIV/AIDS, the causes vary from country to country, and are said to include drought, floods, disruptions to commercial farming, depletion of strategic grain reserves, poor economic performance, foreign exchange shortages, delays in the importation of maize, and price increases which have left some families scraping the roads for seeds dropped by passing lorries.

FAO estimates that countries in the sub-region will need to import almost 3.2 million tons of food in the next nine months to feed the 13 million people most vulnerable to starvation.

Meanwhile some 28 million people living with HIV/AIDS are in southern Africa, which has the highest prevalence rate in the world. Crop production by small-scale and subsistence farmers, many of whom are women, has been hit by sickness, time spent looking after sick relatives, and loss of income.

South African researchers led by Professor Steven Oni recently reported that rural households affected by HIV/AIDS had a far lower yearly income

(rand 13 000, i.e. US\$ 1300) than the unaffected households (rand 20 000 or US\$ 2000). HIV/AIDS-hit households spent more on medical care and hospital bills, transport and funerals, but less on housing and education.

Oni and his team also found that households met part of the cost of AIDS by selling their goats and chickens and taking their children out of school.

Villarreal says FAO has calculated the impact of HIV/AIDS on the loss of agricultural labour in all 25 countries most affected by HIV/AIDS (except Lesotho and Swaziland). The results show for example that by 2020 23% of Zimbabwe’s agricultural workers will have died, with Mozambique losing 20% and Malawi 14%.

“On top of that, another study shows that by the time a person dies of AIDS, two person-years of labour have been lost — not only because of the incapacity of the patient, but because of the care that others have to provide, and because in many places people can’t work during funerals, and so on” says Villarreal. “So we calculate that since at least seven million agricultural workers have died in these 25 most-affected countries, 14 million person-years of agricultural work have already been lost — quite apart from loss following their deaths.”

HIV/AIDS also impoverishes the household, so affected families are less able to buy food, says Villarreal. “We’ve not calculated the total effect, but a number of different studies show the impact. For example one study from Ethiopia shows that the cost of caring for one person and for the funeral are higher than the average farm income for a whole year. This is absolutely dramatic. And there are a number of cultural issues: for example, for a funeral to count as a funeral livestock must be slaughtered, and by slaughtering livestock you are losing your medium-term savings as well as your immediate food.”

Unfortunately, people are not fully aware of this, but HIV/AIDS has become a major part of the food crisis in southern Africa, Villarreal says. ■

Robert Walgate, *Bulletin*
Kerry Cullinan, *Durban*