

## **Mega Cities and Mega Slums in the 21st Century**

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### *The Problem – 1*

#### **A PERMANENT DEMOGRAPHIC SHIFT**

Behind today's urban sanitary crisis in the developing world are twin phenomena — rapid population growth and rapid urbanization — occurring simultaneously in countries which are poor. Rapid population growth is, ironically, the result of improvements in public health and disease control. Rapid urbanization is the outcome of deteriorating livelihoods on the land and the magnet of urban jobs and economic opportunity — a magnet drawing in all classes of people but especially the poor. Together, these phenomena have ignited an urban demographic explosion. Since it takes time for people to adapt their intimate behavior to the constrictions of urban life, typical rural newcomers to the slums and shantytowns of the Third World initially tend to maintain their prevailing high birth rates. This accelerates urban population growth, 61 percent of which is among existing inhabitants.

### *The growth of urban populations*

The number of people living in the urban developing world is growing at a much faster rate than in the urban industrialized world.

The pace of urban expansion in the developing world sharply distinguishes the process from its historical precursor in Europe. It took London from 1800 to 1910 to multiply its population by seven, from 1.1 million to 7.3 million; this growth rate has been achieved by some African cities within a generation; many Asian cities have increased fourfold in the same period. In 1950, there were just two cities in the world with a population of more than eight million : London and New York. By 1990, there were six such cities in industrialized countries, a number not expected to change before the end of the century. In the Third World there were 14 such cities, and by 2000 there will be 23. The largest are already huge: Mexico City has over 20 million people.

Such a rate of growth would stretch urban planners, architects, engineers and civic administrators to the very limit even if resources were plentiful. But in many countries, particularly in Africa and South Asia, resources are very few. They are often constrained by the same forces — low agricultural prices, debt, economic recession, flood or drought disasters — driving people off the land. Towns and cities are finding it very difficult to cope.

Many of the newcomers fetch up in settlements where municipal investment in services — roads, water supplies, drainage — is negligible or non-existent. The proportion of “urban poor” in many cities is between 30 and 60 percent, and in some is spectacular: in Addis Ababa, 79 percent; in Luanda, 70 percent; in Calcutta, 67 percent. And the population growth rate in slums is higher than in virtually any other environment in the world; it may be — as in Bangladesh — four times the rate of a country's population as a whole. By 2000, the numbers of those living in what are variously described as favelas, barrios, bastis and bidonvilles will be well over one billion worldwide.

### *The mega-cities*

By 2000, 23 cities in the world contain over 10 million people, and 18 of these mega-cities are in the developing world.

The transition of humankind from rural to city dwellers represents a major, and permanent, demographic shift. By 2010, the total rural population in the world will — according to the United Nations — reach its peak at 3.1 billion and thereafter begin to decline. By 2030, global urban populations will be twice the size of rural populations, and cities will have grown by 160 percent over the period. The huge numbers of people living in towns and cities, and the increasing proportion living in slums, will present the 21st century with its most important environmental health challenge.

### *The Problem — 2*

#### **URBAN PRESSURE ON WATER AND SANITATION**

Some cities in the developing world are already facing critical environmental degradation. This is the result of overload on water sources, improper waste disposal, contamination of rivers and streams, the reckless extraction of water from depleted aquifers, and a long list of service management deficiencies. Water boards and public utilities fight a losing battle to provide a functioning service in the face of increasing demand; as the quantity of available water dwindles and the quality declines, disruptions — even sabotage — of existing

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systems become more acute. A vicious circle develops in which the service is so poor that it cannot recover its costs from users; and the income generated so low that the service cannot be improved.

Outright shortage of water is the first of many problems. History tells of ancient and not-so-ancient cities which drank up their surrounding water and perished — Babylon and Persepolis in the Middle East, Fatehpur Sikri in Northern India. It is not too fanciful to imagine that, in the 21st century, water shortage could cause similar damage. In China, at least 50 cities face acute shortages as the water table drops by one to two meters a year. Having over-drawn traditional surface and underground sources, cities such as Amman, Delhi, Santiago and Mexico City are pumping water from increasing distances and up increasing heights (see box below). In both Jakarta and Bangkok, excessive pumping of groundwater has led to intrusion of seawater into the aquifers and to land subsidence.

### ***CITIES RUNNING DRY***

**CHINA:** Between 1983 and 1990, the number of cities in China that were short of water rose from 100 to 300; those with a serious water problem, from 40 to 100. In the year 2000, Beijing Municipality suffers a daily water shortfall of 500,000 cubic meters.

**MEXICO:** Mexico City, having over-pumped the Mexico Valley aquifer, is now forced to pump its water supply a distance of 180 kilometers and up 1,000 meters from the Cutzamala River at much higher cost. The city faces the prospect of exhausting its supply in the year 2000.

**INDONESIA:** Jakarta has so depleted its underground aquifers that seawater has seeped 15 kilometers inland making the supply saline. Investments in pipelines to bring water from other sources are eventually expected to top \$1 billion.

*IWSA, Managing the Global Environment; National Report from Beijing Municipal Waterworks Company, 1993. McIntyre, Peter; Protecting the Well, Noordwijk Conference, The Netherlands, March 1994.*

According to a review of schemes financed by the World Bank, every time a new engineering scheme replenishes a typical urban supply from further away, the unit cost of raw water doubles. Water from the sky is free; but the mounting cost of transporting it long distances to a household tap and preserving its quality is turning it to liquid gold. Water is a commodity like any other, and its price is soaring. But in developing countries there is a marked reluctance to come to terms with water costs. Urban consumers in most industrialized countries pay all the recurrent costs for their water supplies and sewerage connections. In developing countries, however, those provided with services pay far less: only on average 35 percent of the costs, according to the World Bank. The proportion of investment generated internally by utilities and water boards is also dropping, and their financial situation is therefore consistently worsening.

During the 1980s, the United Nations International Drinking Water Supply and Sanitation Decade, 80 percent more townspeople are reported to have gained access to an adequate supply of water and 50 percent more to a system of waste disposal. But because of the huge rise in urban populations, the number of those without water remained the same, and the number of those without sanitation rose by 70 million. The task of responding to the backlog of demand and to the expanding settlements of new urban dwellers becomes more difficult every year, especially as the extra strain on many existing systems leaves them in constant need of repair.

Other dynamics are at work. Where incomes and standards of living rise, per capita water consumption similarly shoots up (see box above). This places more pressure both on the water supply and on the system delivering it. Increased usage also generates a larger volume of waste. The growing outflow of dirty water has major environmental implications; but drainage and water treatment are frequently ignored by urban development planners, as is solid waste disposal. In Latin America, no more than 2 percent of human waste is treated — it is simply washed into waterways. Increased pollution exacerbates the pressure on supplies, and raises their cost. Shanghai has been forced to spend \$330 million moving its water intakes 40 kilometers further away. In Lima, Peru, upstream pollution has increased treatment costs by 30 percent.

### ***Developing country populations lacking water and sanitation***

Although the number of people with access to safe water and sanitation grew between 1980 and 1990, population growth erased any substantial gain, especially in urban areas. Between 1990 and 2000, an extra 900 million people were born in places without water and sanitation.

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### ***THE PROFLIGATE URBAN CONSUMER***

A relatively small proportion of domestic water is used on the essential purposes needed for life and health. Daily per capita consumption on essentials in a typical modern household with a piped supply providing 150 — 200 liters per head is as follows:

Drinking and cooking = 3-6 liters,

Washing and personal hygiene = 15-20 liters, (excluding use of flush toilets, baths and showers).

Cleaning the house = 3-10 liters.

Total = 21-36 liters. (*Bhutia, R, Cestti, R. and Winpenny, J.; World Bank, 1993; in Managing Water as an Economic Resource, ODI, 1994.*)

In Britain, 83 liters a head daily are used on toilets, baths, showers, washing machines and dishwashers. Garden use, car washing, dripping taps and leakage consume 49 liters per head. (*Water Companies Association, 1993.*)

Many cities which refuse to see water as a precious resource squander their supplies. In Manila, 58 percent of the water expensively channeled into city pipes is unaccounted for: it just disappears. The record in Cairo, Jakarta, Lima, and Mexico City is not much better; in Latin America generally, 40 percent of the urban water supply vanishes unaccounted and unpaid for by customers.

Explanations include cracked and leaking pipes; the unreliability of the service, which causes people to tamper with it; lack of functioning water meters; and managerial inefficiency and corruption in the public bodies responsible. These may be demoralized by lack of resources and an unhelpful climate of bureaucracy and inappropriate regulation, rendering their Augean task of keeping the city clean and healthy all but impossible.

### ***The Problem — 3***

#### ***THE IMPACT ON POOR URBAN DWELLERS***

The impact of water shortage, pollution, wastefulness and mismanagement falls most heavily on the poor. However inadequate the main's services, those in Third World cities with household connections typically receive a supply sufficient for healthy living and one that is heavily subsidized. But in the slums and shantytowns there are frequently no services at all.

People in many cities buy their water from vendors. These are private service suppliers: licensees of standpipes owned by businessmen, as in Nairobi, Kenya, or traditional water carriers. Between 20 percent and 30 percent of Third World urban dwellers are thought to be dependent on the water-by-the-bucketful they provide. According to one study carried out in 16 cities, the cost of water from a vendor is between four and 100 times more expensive than the cost of water from a piped supply. In Lima, for example, a poor family pays a vendor \$3 per cubic meter, 20 times the amount paid by a middle-class family with a household connection.

Not only can the cost of water be a major household item for a poor and struggling family — 20 percent of a slum dweller's income in Port-au-Prince, for example — but its costs do not end there. It is very likely to be unsafe and fuel will be needed to boil it. After the 1991 cholera outbreak in Peru, residents were advised to boil their drinking water. The cost of doing so would, according to one estimate, amount to 29 percent of the income of a family in a squatter compound. The cost of a sanitary latrine — one that confines human waste so that it does not pollute either surface or groundwater — is often too high for a single household to manage; and proper sanitation, however desirable, is not essential to human life in the same way as drinking water, so slum families may regard it as an unaffordable luxury.

Domestic water shortages in slums, especially in tropical cities, and unsafe drinking water, carry serious public health risks. The historical record is graphic: typhoid and cholera epidemics plagued 19th century European cities, and are today reappearing in Latin America and elsewhere. In 1852, the average age of death in the boom town of Dudley in England was 17 years, a state of affairs attributed to a complete absence of piped water in the town and the presence of human excrement in all “back streets, courts and other eligible places.” Sanitary reform was the major influence in raising life expectancy in 19th century Britain, which rose by four to five years nationally in the 50 years preceding 1890 and by more among the “laboring classes.” In French cities,

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life expectancy rose from 32 to 45 between 1850 and 1900.

Better public health undoubtedly requires sound public health engineering. The problem today is that public health engineering solutions based on 19th century precepts of centralized systems built and maintained by subsidized public agencies are inappropriate to the extraordinary pace and character of the contemporary urbanization process in the developing world.

### *The Problem — 4*

#### **THE URBAN POOR HAVE BEEN NEGLECTED**

In the Third World, the situation of the urban poor has been obscured by the bias that attributes poverty to rural areas and describes cities as well off because the well off live in them. Data from urban areas — where virtually all of the middle and upper classes of most Third World countries permanently reside — show that city dwellers are healthier and have better services than villagers. This distorts reality. It is applicable only to those inhabitants — the one-half to two-thirds — not living in the slums. Some governments leave conditions in the slums out of all their calculations. Certain countries report that 100 percent of their urban residents have access to safe water; yet cursory inspection of the poorer quarters of their capital cities reveals that this is palpably untrue.

There are few accurate statistics about life chances and health risks in Third World slums (see box over). But those that do exist show that the urban poor can be much worse off than the rural poor. Thus the infant mortality rate (IMR) in the slums of Dhaka, Bangladesh, is higher than that in the countryside: 142 per 1,000 live births compared to the national rate of 90 or the rural rate of 93. Many of the deaths are associated with diarrhoeal disease and infections stemming from poor hygiene. In Manila, diarrhea among the urban poor is twice as common as in the rest of the city. In Port au Prince, mortality among slum infants is three times that among rural infants.

The lack of information from most cities about the state of those living in the most squalid environments is strange because the health advantages of water and sanitation tend to dominate arguments for service extension. A health rationale was the underpinning for the UN Water and Sanitation Decade, and the case put forward by the World Health Organization (WHO) seems compelling: the annual saving of two million child deaths from diarrhoeal infection; the saving of 200 million bouts of diarrhea and 300 million intestinal parasite infections; the eradication of guinea worm and river blindness; reductions in malaria, trachoma and schistosomiasis.

### *Ill-health in the slums*

Data from cities often obscures the state of ill-health and high death rates in the poorest urban areas, which may be worse than in any other environment in the country — as in Bangladesh.

In fact, in recent years, UNICEF and others have put more emphasis on pills, powders and injections to prevent and cure this caseload of disease than on the need for clean water and sanitation. This is partly because the direct impact on disease and death rates of water and sanitation services has been hard to prove — although their relationship with health is unquestionable (see chart below). Unhygienic human behavior may get in the way of maximizing benefit. And the health argument for services is rarely put by the intended users but only by those delivering services on their behalf. Most people living in Third World villages and slums know little of the germ theory of disease. They usually want water and sanitation services not to control infection but because of more fundamental needs: simply put, they must drink and defecate daily. Women, who always have to shoulder the task of fetching domestic water where there is no household tap and are its main users, feel the need most acutely.

The health risks of inadequate services in congested, dirt-strewn and poverty-stricken urban areas are far more acute than in the countryside — in fact, the perception of water-borne health risk is an urban perception. But the health argument has mainly been used to support the extension of services to poor rural people. The urban poor have largely been forgotten. And in the space and fresh air of the countryside, except in places prone to guinea-worm or specific water-related infection, the health argument is both less applicable and less persuasive. Because many rural populations have greeted health arguments with disinterest or skepticism, the assumption has developed that poor people do not want services and must be cajoled into receiving them. In urban slums this is far from the case: else how could water vendors and stand-

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pipe licensees successfully charge such high prices?

### *THE EFFECTS OF IMPROVED WATER AND SANITATION ON DIARRHOEAL DISEASE*

*WHO has examined the extent to which water and sanitation services reduce the incidence of diarrhoeal infections. The benefits of sanitation were found to be greatest where there is a real demand, as in high-density urban areas.*

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<i>Condition</i>	<i>percentage reduction</i>
<i>Improved water quality</i>	16
<i>Improved water availability</i>	25
<i>Both the above</i>	37
<i>Improved excreta disposal</i>	22

*WHO Bulletin, vol 63, no 4, 1985.*

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The rural bias against anti-poverty programs in the developing world means that too little is known about slum dwellers generally. Not only are there few studies on death and disease rates in the slums; unproven assumptions are also often made that they have easy access to amenities such as schools and health care. Slum and squatter populations are often left out of urban planning altogether — because they are occupying land illegally; because they are too poor to pay for conventional housing; or in the vain hope that if they are ignored they might conveniently go away.

The Victorians watched the proliferation of their own industrial slums with horror: they believed that such a great concentration of the poor, without roots in the land or society, must threaten to overwhelm the propertied minority. This horror has been paralleled by reactions to the modern influx into Third World cities. The newcomers are treated as transients from rural areas who have strayed temporarily into town. They are described as “marginal” — belonging properly neither to the urban economy, nor to the place where they live. Their housing is “temporary” — made out of waste materials and erected on vacant land. This land is often low-lying, precipitous or hazardous in some way and its undesirability as a habitat is the reason its residents are allowed to stay — for a while. This imposed culture of impermanence is an excuse not to provide slum dwellers with services. Arguments that amenities in slum areas would attract ever more rural indigents have long justified deplorable neglect of slum populations. Extreme measures — bulldozers and mass evictions — have frequently been used against them.

Urban development has been designed largely for the better-off. Most slum and squatter settlements fall outside the realm of urban infrastructural projects: roads, electricity, drainage and water supply are usually extended only to newly planned or “improved” areas which exclude the poor by definition. Where services are provided, security of tenure at manageable rents may not be guaranteed. Land prices rise and the slum-dwellers are forced out, only to make new “impermanent” settlements elsewhere.

The high costs of most urban services have led critics to accuse cities of featherbedding feckless humanity and devouring more than their fair share of national resources. But these services and resources are not being put at the disposal of the urban poor, against whom both urban and rural biases in development policy manage to conspire.

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*The Problem — 5*

### **NEEDED: A NEW SANITARY REVOLUTION**

The celebratory accounts of the 19th century sanitary revolution in Britain and elsewhere tend to gloss over the many obstacles and delays, and its dependence on the fruits of industrial progress and civic wealth. But its success over time left a legacy of assumptions about right solutions which, today, are inhibiting alternatives from emerging in very different environments. The sanitary reformers so elevated the role of engineering that issues of public health and disease control were removed from the province of individual action into the realm of public administration. This triumph characterized the subsequent history of water supply, sewerage and drainage not only in the industrialized countries but all over the world. The slogan of the Water Decade — “Water and Sanitation for All” — echoes the idea of a social right, justified on grounds of health and equity, to be provided principally at the public expense.

### *Investments needed for urban water supply and sanitation in developing countries*

The scale of investments needed to provide underserved populations with water and sanitation are variously estimated, depending on the cost of technology to be used and other variables. This 1991 World Bank estimate is based on the cost per person of \$120 for water supply and \$150 for sewerage (1985 dollars).

For the mega-city challenge of the developing world, particularly for their slum populations, the supremacy of public engineering works and the removal of responsible action from individuals and households is simply not going to work. In the social and economic context of most poor countries, this approach is suited only to city centers, industrial areas, and suburbs where urban life is moneyed and well ordered. And even providing and maintaining highly engineered systems to these parts of town often extends the capacities of municipal utilities beyond their managerial limits. A World Bank review of 120 projects in the developing world found the water authorities performing well in only four countries. Examples of incompetence were legion. In Accra, Ghana, only 130 connections had been made to a system designed for 2,000. In Caracas, Venezuela, and in Mexico City, 30 percent of connections were unregistered.

Many of the problems faced by these bodies stem from the fact that water supply, drainage and sewerage has been vested in the hands of a public bureaucracy which is neither motivated nor empowered to function cost-effectively. Customers are inadequately billed and inadequately charged. Technology is usually imported and difficult and expensive to maintain. Both those from abroad who promote high-technology engineering schemes, and those who “purchase” them with foreign “aid” or subsidized loans, belong to establishments schooled to think in certain ways and dependent for personal or business reasons on large and remunerative contracts. In spite of widespread international recognition that poor countries’ sanitary needs cannot be met in this way — financially, technologically, or managerially — 80 percent of investments in the sector are still allocated to high-cost systems.

From the perspective of the expanding urban slums, the provision of water supplies and sanitation by this type of technology and institution is not “Water and Sanitation for All” but “Water and Sanitation for an Elite Minority.” If their technological and management regimes remain unaltered, the prospect that most existing municipal utilities can advance the urban water and sanitation frontier either conceptually or physically is dim. The same activist and argumentative vision which transformed sanitary fortunes in the past now needs to be harnessed to the demands of the Third World mega-city for the 21st century. The case for reform rests not only on the desirability of a healthy urban environment for city populations, but on the sustainability of supplies, and on human need and dignity. The reforms needed would benefit not only urban but rural populations, whose needs remain acute and should not in their turn be allowed to languish.

In the 19th century, serious effort to design appropriate systems, pass regulations, implement them, and find the resources locally and nationally for public health and sanitary care, only occurred in the wake of cholera. Will we again have to wait until cholera epidemics in Latin America and elsewhere strike terror into cities and continents? In many rapidly urbanizing countries where life-threatening diarrhoeal disease is still endemic and erupts in periodic outbreaks, the urban sanitary crisis is a crisis simply waiting to happen.

**The question is: Can the crisis be avoided, and if so, how?**