6. Environmental Problems in Third World Cities – in the Home, Workplace and Neighbourhood

The term "environmental problems" covers many areas; this and a subsequent chapter consider environmental problems in terms of an inadequate supply of a resource essential to good health (for instance, water) or the presence of toxic substances or pathogens (disease causing agents) in the environment which can damage human health or physical resources such as forests, agricultural land and fisheries. Such problems will be discussed under four different headings. The first two, the focus of this chapter, are those within the home or workplace and the district or neighbourhood. The second two, the focus of Chapter 7, are the wider city environment (i.e., the environment that cities provide for their inhabitants in terms of air and water quality) and regional impacts, the links that cities have with their wider locality and the extent to which city-based activities draw on limited resources such as fertile land, fossil fuels and fresh water, and create environmental problems which impact on the wider region.

Information about environmental problems in the Third World is relatively scarce so these two chapters will only give a somewhat impressionistic sketch. Very few Third World nations have a range of citizen groups working on environmental issues comparable to those in Europe, North America and Japan. In the First World, it is largely through the efforts of individual activists, citizen groups and non-governmental organizations that attention was drawn to environmental problems. Although First World governments have been slow to react, the fact that most have taken some action despite the opposition of powerful vested interests is a demonstration of democratic processes at work.

Such democratic processes are strongly controlled or even repressed in many Third World nations. This is one reason why there are so few Third World environmental NGOs, although their number and influence is growing. Third World NGOs also suffer severe lack of funds to develop sustained programmes of research, monitoring and lobbying. The examples of environmental problems in this chapter cannot claim to point to the worst cases for many of them have probably not been documented. This chapter draws on the publications of Third World based citizen groups working in this area, and these publications are listed on pp. 362-5.

The indoor environment – at home and at work

Chapter 3 described the very poor quality of different kinds of accommodation used by poorer groups. This section will concentrate on the impacts on inhabitants' health. Of course, different kinds of housing present different health problems; the health problems of a family renting one room in an inner city tenement with one kitchen, bathroom and WC shared among 30-40 people are not the same as, for example, those of a family who have built their own shelter on illegally occupied land where there is no piped water, sewers and the collection of garbage.

But almost all the different kinds of housing used by poorer groups share two environmental problems: the presence in the human environment of pathogens because of no infrastructure or services to remove and safely dispose of them; and crowded, cramped conditions. A lack of readily available drinking water, of sewage connections (or other systems to hygienically dispose of human wastes), of garbage collection and basic measures to prevent disease and provide primary health care ensure that many diseases are endemic among poorer households – diarrhoea, dysentery, typhoid, intestinal parasites, food poisoning among them. Most cities in Africa and many in Asia have no sewage system at all – including many cities with a million or more inhabitants. Rivers, streams, canals, gullies and ditches are where most human excrement and household waste water ends up, untreated. For those cities with a sewage system, rarely does it serve more than a small proportion of the population – typically the richer residential, government and commercial areas. Box 6.1 gives some examples of the inadequacies in the supply of water and sanitation in different cities.

Box 6.1: Inadequacies in water supply and sanitation

BANGKOK: About one-third of the population has no access to public water supplies and must obtain water from vendors. Only 2 per cent of the population is connected to a sewer system;
SQUATTER CITIZEN

human wastes are generally disposed of through septic tanks and cess pools with their effluents, as well as waste water from sinks, laundries, baths and kitchens discharged into stormwater drains or canals.

CALCUTTA: Some 3 million people live in bushes and refugee settlements which lack potable water, endure serious annual flooding and have no systematic means of disposing of refuse or human wastes. Some 2.5 million others live in similarly blighted and unserviced areas. Piped water is only available in the central city and parts of some other municipalities. The sewage system is limited to only a third of the area in the urban core. Poor maintenance of drains and periodic clogging of the system have made flooding an annual feature.

COLOMBO: About 31 per cent of houses have water piped indoors and another 20 per cent have piped water outside. A waterborne sewage system serves half the city’s population.

DAKAR AND OTHER SENEGALESE TOWNS: Senegalese towns have no provision for the removal of household and public waste. Of the five urban centres with sewage systems, generally only the inner urban population has access to these facilities. In Dakar, the capital, a survey in 1980–81 found that 28 per cent of households have private water connections while 68 per cent rely on public standpipes and 4.2 per cent on buying water from carriers. A survey in Pikine, the outer part of Dakar, found an average of 696 persons per standpipe with 1,513 in one neighbourhood. In Dakar, nearly one-sixth of human solid wastes is dumped outside proper toilet facilities.

DAR ES SALAAM: From a survey of 660 households drawn from all income levels in 1986/87, 47 per cent had no piped water supply either inside or immediately outside their houses while 32 per cent had a shared piped water supply. Of the households without piped water, 67 per cent buy water from neighbours while 26 per cent draw water from public water kiosks or standpipes. Only 7.1 per cent buy water from water sellers. Average water consumption is only 23.6 litres a day. For sanitation, only 13 per cent of the dirty water and sewage produced is regularly disposed of. Of the 660 households, 89 per cent had simple pit-latrines. Only 4.5 per cent had toilets connected to septic tanks or sewers. Most households have to share sanitary facilities. Overflowing latrines are a serious problem, especially in the rainy season and provision to empty septic tanks or latrines is very inadequate.

JAKARTA: Less than a quarter of the city’s population have direct connections to a piped water system. Some 30 per cent depend solely on water vendors with water costing five times that of piped water. The city has no waterborne sewage system. Septic tanks serve about 25 per cent of the city’s population; others use pit latrines, cesspools and ditches along the roadside. Much of the population have to use drainage canals for bathing, laundring and defecation.

KARACHI: Potable water has to be brought more than 160 km from the Indus and is available for only a few hours a day in most areas. One third of households have piped water connections and most slum dwellers and squatters must either use public standposts or buy water from vendors at inflated prices.

KHARTOUM: The systems of water supply, sewage disposal, refuse disposal and electricity supply are all inadequate both in the coverage of the urban area and the maintenance of the service ... the water supply system is working beyond its design capacity while the demand continues to rise. The coverage is poor, with the low income groups in squatter settlements suffering the cost through paying the most for water, often bought from vendors. Breakdown and cuts in the supply system are common ... The municipal sewage system serves only about 5 per cent of Khartoum urban area. Even that system is susceptible to breakdowns when waste is discharged either directly into the river or onto open land.... for most people in the low income areas, there is no system of sewage disposal.

KINSHASA: There is no sewage system in Kinshasa. Around half the urban population (some 1.5 million people) are not served by a piped water network. High income areas are often 100 per cent connected while many other areas have 20–30 per cent of houses connected – essentially those along the main roads. The sale of water flourishes in areas far from the network – in these areas water is usually obtained from wells, the river or deep wells.

MADRAS: Only 2 million of the 3.7 million residential consumers within the service area of the local water supply and sewerage board are connected to the system. On average, they receive some 36 litres per day per capita. The rest within the
Many of the health problems are linked to water – its quality, the quantity available, the ease with which it can be obtained and the provisions made for its removal, once used. Hundreds of millions of urban dwellers have no alternative but to use contaminated water – or at least water whose quality is not guaranteed. A small minority have water piped into their homes while rather more have piped water nearby which has to be collected. As one specialist in this area commented, “those not served are obliged to use water from streams or other surface sources which in urban areas are often little more than open sewers or to purchase water from insanitary vendors. It is little wonder that their children suffer frequently, often fatally, from diarrhoeal diseases”.2

The quantity of water available to a household and the price which has to be paid for it can be as important to a family’s health as its quality.3 The cost of water and the time needed to collect it influence the quantity used. Where public agencies do not provide any water supply – as is common in illegal settlements – the poor often obtain water from private vendors and can pay 20–30 times the cost per litre paid by richer groups with piped supplies.4 Water vendors probably serve between 20 and 30 per cent of the Third World’s urban population.5

Where there is a public supply – a well or public standpipe – consumption will depend on the time and energy involved in collecting and carrying it back to the home. In many instances, there are 500 or more persons for each tap; in one part of Dakar, there were 1,513 persons per tap.6 One can imagine the time needed to queue for the water – and very often, water will only be available in the piped system for a few hours a day. There is also the fact that water is very heavy, so water consumption will be much influenced by the distance that it has to be carried.

Because low income people often work very long hours, time spent queuing for the use of a tap or transporting buckets takes up time which could be used in earning an income. Limited quantities of water mean inadequate supplies for washing and personal hygiene – and for washing food, cooking utensils and clothes. Eye and ear infections, skin diseases, scabies, lice and fleas are very difficult to control without sufficient supplies of water. No drains or sewers to drain away waste water – and rainwater – will lead to waterlogged soil and stagnant pools which can transmit diseases like hookworm. Pools of standing water can convey enteric diseases and provide breeding grounds for mosquitoes which spread filariasis, malaria and other diseases. Inadequate or no drainage often means damp walls and damp living environments.

Some statistics on domestic water consumption in the metropolitan zone of Mexico City reveal the differences between the consumption of the rich and the poor. Consumption among residents in the high income Chapultepec zone averages 450 litres per person daily while in low income Nezahualcoyotl, it averages only 50 litres. Just 9 per cent of the domestic consumers account for 75 per cent of all consumption and more than 2 million people have very limited access to any supplies.7

Removing and safely disposing of excreta and waste-waters coming from washing, bathing and other domestic uses is also a critical health need. Around two-thirds of the Third World’s population have no hygienic means of disposing of excreta and an even greater number lack adequate means to dispose of waste waters.8 For instance, in India, defecating in the open is common practice.
since one-third of the urban population (over 50 million people) have no latrine of any kind while another third rely on bucket latrines. A third may use latrines connected to sewers but only 10% per cent have sewage connections in their homes. As many as 50 different infections are caused by the ingestion of excreta and the diseases these cause rank among the chief causes of sickness and death in the Third World.

Although official figures suggest that people in urban areas are better served than in rural areas, public provision to remove and safely dispose of human excreta is usually no better in the housing and neighbourhoods used by poorer groups than it is in rural areas and the health problems are usually greater, as higher densities make more difficult the protection of people from contact with excreta. Box 6.1 helps illustrate the scale of the problem; for instance, in Dar es Salaam virtually all the population rely on pit latrines but these regularly over-flow and the public authorities only have the equipment to empty a tiny proportion of them; in Jakarta there is no waterborne sewage system so much of the population uses the canals for bathing, laundry and defecation. Even in the larger and richer cities, where a higher proportion of homes are connected, millions still suffer; for instance, although 70 per cent of metropolitan Mexico City's population has sewers serving their housing, there are still 3 million people not served. It is also common for official statistics to understate the proportion of people adequately served; for instance, people in neighbourhoods with public latrines are often considered adequately served when there are 100 or more persons per latrine and the maintenance and cleaning of the latrines so poor that they are a major health hazard and many people avoid using them.

Official statistics or those produced by aid agencies as to how many people they have reached with "adequate" services are often open to doubt. For instance, claims by governments in Bolivia, Jordan and Kenya that 100 per cent of their urban populations were adequately served with piped water in 1980 cannot be taken seriously. Nor can the claim that 100 per cent of the urban population in Bolivia and Jordan had adequate excreta disposal facilities. The figures presented by many aid agencies as to the number of households their projects have reached with "adequate water" or "sanitation" are also open to question. The criteria used to make such claims are often not revealed. All too often, visits to project sites where everyone has apparently been provided with "adequate water supplies", reveal a few water standpipes serving hundreds of households, some of which

no longer work while at those that do, there are long queues and many households have to carry water hundreds of metres. A family of six needs at least 300-400 litres a day to ensure enough for drinking, washing, cooking, laundry and bathing. That is equivalent to some 30-40 buckets a day. Anyone who has carried two full buckets of water will appreciate the difference between the level of service people need and what many governments or certain aid agencies might choose to call "adequate standards".

Removing and disposing of excreta in ways which prevent human contact is central to reducing the burden of disease; Box 6.2 helps illustrate the health impacts of doing so.

Box 6.2: The health effects of improved water and sanitation

There is overwhelming evidence that the economic burden of disease and ill-health which is in large part the result of deficiencies in both water supply and sanitation is very great in the Third World — particularly for the poor. Some studies have suggested that around one tenth of each person's productive time is sacrificed to disease in most Third World nations.

It has proved difficult to quantify the benefits of improved sanitation as distinct from other influences such as improved availability and quality of water, better nutrition arising from increased incomes and changes in personal hygiene. But the impact of improved sanitation on just one health problem — diarrhoeal disease in young children — gives some clue as to its importance. A recent review of the literature by the World Health Organization suggests the following:

| % median reduction in diarrhoeal morbidity (disability) |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| Improved water quality | 16%             | Improved water availability | 25%             |
| Improved water quality and availability | 37%             |
| Improved excreta disposal | 22%             |

It also noted that reductions in the number of deaths can be even greater. But it should be stressed that water supply, sanitation and personal hygiene should all be improved together, for substantial improvements in communities' health.
In addition, the changes necessary for an effect on health are most likely to occur where there is a real demand for sanitation — such as in high density urban areas.


A second characteristic shared by most kinds of housing used by poorer groups is crowded, cramped conditions which mean that diseases such as tuberculosis, influenza and meningitis are easily transmitted from one person to another — their spread often being aided by low resistance among the inhabitants due to malnutrition. In Kanpur, one of India's major industrial centres, the development authority estimates that 60 per cent of the children in slums have tuberculosis.13 Diseases like mumps and measles also spread more rapidly; while measles holds few worries for children in richer households, among poorer households it is often one of the most common causes of infant or child death. Household accidents are also common, perhaps not surprisingly when five, six, seven or more persons live in one room and there is little chance of giving the occupants (especially children) protection from fires, stoves and kerosene heaters. Where open fires or relatively inefficient stoves are used for cooking and/or heating, smoke usually causes serious respiratory problems for most or all inhabitants. The impact on those who spend most time in the home — usually women and children — is particularly serious.

Increasing numbers of health studies in Third World cities show the degree to which lower income groups' lives are dominated by ill health, disablement or premature death. Box 6.3 gives examples of the health problems evident in illegal settlements in Allahabad (India) and Buenos Aires (Argentina). Virtually all of the deaths and most of the diseases and injuries to infants and children would not have occurred if the children had been born into households in the same city with sufficient income to ensure adequate diets and in reasonable quality houses with piped water and sanitation.

Box 6.3: Health problems in low income settlements in Third World cities

In Chheetpur, a squatter settlement in the city of Allahabad with some 500 people in 1984, 55 per cent of the children and 45 per cent of the adults had intestinal worm infections while at the time of the survey 60 per cent had scabies. Most inhabitants had food intakes of less than 1,500 calories a day; among infants and children up to the age of four, 90 per cent had intakes significantly below the minimum needed. Over a period of 14 years, 143 children's deaths had been recorded; malaria was the most commonly identified cause of death followed by tetanus, injuries from accidents or burns, and diarrhoea, dysentery or cholera. Malnutrition was an important contributing factor in many of these deaths. The settlement's site is subject to flooding in the rainy season and a lack of drainage means stagnant pools for much of the year. Two standpipes serve the entire population's water needs and there is no public provision for sanitation or the removal of household wastes.

In San Martin, a squatter community in one of the municipalities which ring the central city of Buenos Aires, clinical tests on a small sample of inhabitants showed that more than half had intestinal worms. Many children were underweight and malnutrition was widespread, especially in terms of protein, vitamin and mineral intake. Physical examinations for a larger sample found 15 per cent of children with infections in the upper breathing passage; among adults who underwent physical examination, one in four men and one in ten women had chronic bronchial affections. Diarrhoea was a major problem, especially in the summer. Although 60 per cent of the households obtained water from piped public supplies — since the inhabitants simply tapped into a nearby mains supply — the quantity of water available was frequently inadequate and many households could not afford the cost of piping water into their houses. Most of the 40 per cent who did not have access to piped water used water pumped from wells; tests on water quality found that first level ground water had high levels of bacteriological contamination. There was no site drainage apart from some open drains dug by inhabitants.
According to the World Health Organization, in many illegal settlements, an infant is 40–50 times more likely to die before the age of five than an infant born in a Western nation. A review of nutrition and health by S. Basta published in 1977 stressed the extent to which poor urban groups suffer from very poor health. A study in the slums of Haiti’s capital, Port au Prince, found 200 infants dying per 1,000 live births with another 100 dying before their second birthday. Comparable infant mortality rates were found in the bustees of Delhi, where the rate was 221 per 1,000 live births. Among the lowest castes, the infant mortality rate rose to more than double this figure – more than two in five infants had died before their first birthday. In Manila, the infant mortality rate in squatter communities was found to be three times the average for the rest of the city; the proportion of people with tuberculosis was also nine times higher and diarrhoea was twice as common.

Studies of the health problems of poorer groups point not only to the high proportion of infant and child deaths but also high rates of death, disablement and serious injury from household accidents, and high proportions of people in each age group suffering from ill health for substantial proportions of their lives. Malnutrition is very common. The studies also suggest that it is in the house and its surrounds that most injuries and diseases are contracted and that there are many problems involving poisoning or chemical hazards. It is hardly possible to prevent children from coming into contact with harmful chemicals used in the household (for instance bleach or kerosene), or keep medicines in a secure place, when whole families live in one or two rooms.

Poor people have very little chance of obtaining a healthy house – that is one with sufficient space, security, services and facilities. Poorer groups also have the constant concern about eviction from their homes; this is a permanent worry for most tenants, temporary boarders in cheap rooming houses, those in illegal settlements and land renters on which a house has been built.

The environmental health problems evident within the homes of so many inhabitants of Third World cities are a direct result of their low incomes and of the refusal by government to provide basic services. If an individual or household finds minimum standard accommodation too costly, they have to make certain sacrifices in the accommodation they choose to bring down the price to what they can afford. And they usually make sacrifices in environmental quality. Although this means health risks and considerable inconvenience, these are less important for their survival than other items. For instance, expenditure on food or on children’s education or on (say) purchasing a second-hand sewing machine to allow a member of the family to earn additional income all are more important for survival than minimum standard accommodation.

Each low income individual or household will choose their own sacrifices in terms of size of accommodation, terms under which it is occupied, suitability of site, housing quality, location and access to infrastructure and basic services. For example, to bring down housing costs, a household of five persons might sacrifice space and live in one room, or sacrifice secure tenure and access to piped water and live in a self-constructed house on illegally occupied land. To understand the possibilities for improving the housing environment of such people, one must understand their very diverse needs and priorities. Complex questions have to be explored, including legality of site or house occupation, legality of the housing structure, and the terms under which the occupants live there (i.e. are they tenants, illegal tenants, illegal tenants, sub-tenants or owners).

Environmental problems arising in the workplace are also a major problem in most Third World cities and are evident in workplaces from large factories and commercial institutions down to small backstreet workshops and work done in the home. Among the hazards are dangerous concentrations of toxic chemicals and dust, inadequate lighting, ventilation and space, and inadequate protection of workers from machinery and noise. These environmental factors are made all the more serious by the lack of social security; there is little or no provision by most employers of sick pay or of compensation if workers are injured or laid off.

A paper on Bangkok’s environmental problems noted that a remarkable number of Thai workers are exposed to poor working environments but that the number of workers suffering from occupational diseases is small. "This may be a reflection of the difficulties of linking disease to working conditions rather than revealing a satisfactory condition." This point has relevance to virtually all Third World nations since people’s long term exposure
to dust, excessive noise, inadequate lighting and pollutants in the workplace often contributes much to ill health, disablement and premature death but it is difficult to link them — or to prove the link, if compensation is being sought. There are many examples of industrial workers killed or permanently injured from chemicals they handle or inhale at work, but the health impacts which take longer to become apparent are more worrying in that these affect such a high proportion of all industrial workers.

A report in 1983 stated that one third of those working in asbestos factories in Bombay suffer from asbestosis while many of those working in cotton mills suffer from byssinosis (brown lung). A study of workers in the Bombay Gas Company found that 24 per cent were suffering from chronic bronchitis, tuberculosis and emphysema.

It is perhaps appropriate to consider environmental problems associated with work in the home in that many poor city-dwellers use their homes as a workshop to produce goods for sale or as a store for goods sold on the street or as a shop, bar or cafe. The environmental problems which arise here are too diverse to be covered in a short summary. But clearly, there are often problems with levels of light and ventilation. There are also major problems for many home-workers arising from the use of toxic chemicals or flammable chemicals in the home as part of the work done there. One common way in which this happens is through out-working; here, well organized (and often large) enterprises commission people (usually women) working in their homes to fabricate some product, for instance, sandals or articles of clothing. These enterprises will often supply the out-workers with the raw materials and chemicals they need and collect the finished articles. Many of these chemicals are a serious fire-hazard and should only be used in carefully controlled conditions in factories with special provisions to limit inhalation or skin contact and to guard against fire hazards. The advantages of such home-workers to the enterprise are obvious — low wages, no costs involved in building and running factories, no costs for social security and usually few problems with labour unrest since the workforce is too scattered to allow them to organize.

Most nations have legislation of some sort which is meant to curb such abuses but it is rarely implemented. Quite a lot of attention has been paid to improving the legislation but, in our experience, too little attention is given to its implementation.

The neighbourhood environment

Added to health risks associated with the presence of toxic substances or pathogens inside the home must be added dangers from the sites on which many poorer households live. The two are not easily separated since deficiencies in the one impact on the other — as in the case of no sewers to remove excreta and waste water so these are dumped in open drains which then present health dangers for the whole neighbourhood. But three problems are worth emphasizing within the neighbourhood environment — dangerous sites, no collection of household garbage, and inadequate site infrastructure.

With regard to the site, large clusters of illegal housing often develop on steep hillsides, floodplains or desertland. Or they develop on the most unhealthy or polluted land sites — for instance around solid-waste dumps, beside open drains and sewers or in and around industrial areas with high levels of air pollution. They also develop in sites subject to high noise levels — for instance close to major highways or airports. Poor groups do not live here in ignorance of the dangers; they choose such sites because they meet more immediate and pressing needs. Such sites are often the only places where they can build their own house or rent accommodation. The sites are cheap because they are dangerous. Polluted sites next to industries are close to jobs. Finally, if they occupy such land illegally, they are less likely to be evicted because the land is unsuitable for commercial developments. To the dangers inherent in the site are added a lack of infrastructure — for instance, storm and surface water drains are rarely installed in most new residential developments. Frequent flooding, water-logged sites, lack of paved roads or paths, damp housing all take a serious toll on health. Examples can be seen on hillsides prone to landslides in Rio de Janeiro (Brazil), Guatemala City, La Paz (Bolivia) and Caracas (Venezuela) or on sandy desert as in Lima (Peru), or on land prone to flooding or tidal inundation or under water as in Guayaquil (Ecuador), Recife (Brazil), Monrovia (Liberia), Lagos and Port Harcourt (Nigeria), Port Moresby (Papua New Guinea), Delhi (India), Bangkok (Thailand), Jakarta (Indonesia) and in many other cities.

In Mexico City, approximately 1.5 million people live on the drained lake-bed of Texcoco. This area "is the most uninhabitable part of the Valley of Mexico, plagued by constant flooding, dust storms in the dry season and an almost complete lack of urban services". The use of this land for housing developments is illegal. Yet
these *colonias populares*, in common with many others in and around the city, were built because no more suitable sites were within the economic reach of lower income groups. The hundreds of people killed or seriously injured and the thousands made homeless by mudslides in Rio de Janeiro in 1988, in Medellin in Colombia in 1987 or in Caracas in 1989 are illustrations of a much larger and more widespread problem. Low income groups have no option but to occupy such dangerous sites since no other site is available to them within reach of possible sources of employment. The dangers inherent in such sites can often be greatly reduced by paving access roads and installing drains and other safeguards.

House sites, structures and surrounds increase the risk of burns, scalds, cuts, bites and injuries in and around the house. Children are particularly at risk from pathogens or toxic substances within the neighbourhood - from the problems of (say) contracting diarrhoea through ingesting pathogens from fecal matter which contaminates the land on which they play, or from coming into contact with some toxic chemical in a nearby stream or dumped on a land site nearby. Risks posed by road traffic are often particularly serious since many illegal settlements have developed next to major roads or highways.

There is the additional problem of inadequate or non-existent collection of garbage. It is estimated that 30-50 per cent of solid wastes generated within urban centres remains uncollected and such refuse accumulates on wasteland and streets (sometimes to the point where it actually blocks roads). Of course, it is the poorer areas of the city which have inadequate or no garbage collection service. The resulting problems are obvious and almost always given far too low a priority by government - the smells, the disease vectors and pests attracted by garbage (rats, mosquitoes, flies, etc.), the drainage channels which become clogged with garbage and overflow. Uncollected garbage can also be a serious fire hazard and a serious health hazard for children playing on the site.

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**Box 6.4: Household garbage collection in nations' largest cities**

BOGOTA: Around half the 1.5 million tons of garbage generated every year is collected and disposed of by local authorities. Every day, some 2,500 tons is left uncollected - some is partially recycled informally while the rest is simply left to rot in small tips or in canals, sewers or the streets.

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**ENVIROMENTAL PROBLEMS IN THIRD WORLD CITIES**

BANGKOK: Although 80 per cent of the population is served by a refuse collection service, in 1987 24 per cent of solid wastes were dumped, mostly onto vacant land or in canals and rivers.

DAR ES SALAAM: Just 24 per cent of daily refuse is collected.

JAKARTA: Around 30 per cent of the garbage is not collected and ends up in canals and rivers and along the roadside where it clogs drainage channels and causes extensive flooding during the rainy season.

KARACHI: Only one-third of the solid waste produced in the city is being removed.

KINSHASA: The collection of household waste is only undertaken in a few residential areas. In the rest of the city, household waste is put out on the road, on illegal dumps, in stormwater drains or buried on open sites.

SAO PAULO: One-third of the population are living in areas without any service to collect solid wastes.

Sources: See note 29. These are simply cities for which data is available; several of them seem relatively well-served compared to many cities which could not be included here for lack of accurate data.

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The impact of the burns, cuts, scalds and other injuries contracted in and around the home is further magnified by a lack of provision of first aid within the neighbourhood, and the difficulties in rapidly transporting a sick or injured person to hospital (and, of course, ensuring that the person will receive rapid treatment once at the hospital). A lack of paved roads and house sites which are on steep slopes, waterlogged or in other ways difficult to cross with motorized vehicles also mean that in the event of fires, neither fire engines nor ambulances can reach the settlement, at least not without long delays.

In concluding this section, it is worth asking why the environmental health problems associated with housing have been ignored. One reason is that the architects, planners and engineers who work for government departments of housing or public works know very little about the health problems faced by those they are meant to serve. Their training may not even consider this as being an issue - especially if the curriculum for their training is based on Western models. Where a government department or ministry of
the environment is set up, these problems may also fall outside their brief.

In looking at health problems associated with the home, it is important to look beyond the house's structure. It is the environment provided for people by the house, the services and facilities it should contain, and the neighbourhood within which each house is located which should act as a defence against injury and disease. In most Third World cities, the largest and most pressing environmental issue is to improve the housing and living environment of the poor majority of citizens by reducing or eliminating the most serious health hazards present within their homes, workplaces and neighbourhoods — and by guaranteeing prompt action in the event of an accident. Since there is a growing interest among governments in the problems of managing and disposing of toxic wastes, it would seem appropriate to put human excrement as the most serious "toxic waste" — and, indeed, one whose safe disposal is relatively cheap.

Tackling environmental health problems

As Chapter 7 will outline, the idea that environmental quality and pollution control are expensive luxuries to be pursued when a country is rich enough is slowly being eroded, at least with regard to city-based industries. But attitudes regarding the cost of safe and hygienic disposal of household and human wastes and the provision of safe water supplies seem more rigid. It has taken 30 years or more for many governments to accept that land invasions are not a threat to established institutions but a growing movement that emerges out of poor people having no alternative way of securing a house site. Let us hope that it does not take so many years for governments to accept the need for action to tackle environmental problems. One reason for little action is certainly that this has the heaviest impact on poorer groups. It is common for richer residential areas and the main commercial and industrial concerns to receive good quality water supplies, sewers and drains while 30 per cent or more of the population in the poorer residential areas receive little or nothing.

There is also the question of costs and cost recovery. National and city governments frequently claim that extending piped water, sewers and drains to poorer areas is too expensive, but the claim is based on the cost of systems in Europe and North America.

Take first the question of excreta disposal. There are various alternatives that are far cheaper than conventional waterborne sewerage systems and sewage treatment plants, but far more effective and hygienic than the standard pit latrine or bucket latrine systems. World Bank research involving field studies in 39 communities in 14 nations found a wide range of household and community systems which could greatly improve the hygienic disposal of human waste. Within this range were options which could be implemented to match local physical conditions, social preferences and economic resources. Several of these options had a total annual cost per household of between one-tenth and one-twentieth that of conventional sewerage systems. Most demanded far lower volumes of water to allow for their efficient operation. Some demanded no water at all, although of course household water needs for drinking, cooking and washing were essential. And it is also possible to install one of the lowest cost technologies initially and then upgrade it in a series of steps over time; an example of this is given in Box 6.5.

**Box 6.5: Incremental development of improved sanitation**

Initially, ventilated improved pit latrines, could be installed in a settlement where there are serious water shortages since these demand no water for their operation. Of course, it is important to minimise water use in sanitation if water is scarce and members of the household have to collect it by hand. This latrine is likely to cost a tenth (or less) that of a system based on sewerage or a septic tank. Then, if households' access to water is improved (say a supply piped to the house or yard), dry latrines can be converted into a pour-flush latrines. This too can be upgraded when piped water into the house is installed so the system is connected to a small bore sewer system. Many other combinations and upgrading options are possible.

service. Given the high cost to poorer households from paying private water vendors for the water they need, a proper piped water system can often replace water vendors, and provide these same households with a more economical and convenient supply for the same price that they previously paid to vendors. A case study in Lima, Peru found that lower income groups were spending three times the amount per month on water from water vendors than that paid by those with piped house connections, despite the fact that lower income groups' daily consumption was less than a sixth that of those with house connections. In effect, poorer groups were paying more than 18 times the amount per litre of richer groups. In a review of water supply options for the urban poor, Sandy Cairncross notes that a thriving informal market for water is evidence of a demand unsatisfied by the formal sector. It is also evidence of the money value which even the poorest are ready to give to the time they would have to spend carrying water if they did not buy from vendors. It is an indication of how much they would be willing to pay for an adequate conventional water supply, were it made available to them. Cairncross also points out that better management and maintenance of existing water systems can improve services more cheaply than increasing capacity. Many water supply systems lose 60 per cent of their water to leaks in the pipes. Reducing the leakage rate from 60 per cent to 12 per cent (the typical figure for systems in Britain or the United States) would more than double the amount of water available for use. Often, just 20 per cent of the leaks account for 80 per cent of the water losses. In Sao Paulo, the proportion of water leaking out of the system has been reduced by some 50 per cent over a ten year period. Again, the approach needed is one which analyzes local problems and assesses which combination of actions best utilizes local resources. Cairncross suggests various approaches which may be considered unconventional by Western-trained engineers but which may prove to be the cheapest and most effective option in certain localities. For instance, in some localities, government support to make water vendors more efficient and to improve water quality might be the most cost-effective option. In others, making use of local water resources for small independent networks for particular city areas may be more cost effective than extending the water mains system. In areas with sufficient rainfall, grants to households to install gutting and rainwater tanks may be a cheap way of improving supplies. Where piped systems are installed, modifications to the official standards can often produce major cost savings with little or no reduction in performance; for instance, the size of pipes and depth to which they must be sunk according to official regulations are often inappropriate, because they copied foreign practices without modification to local circumstances; the minimum depth set for laying sewage pipes hardly needs to be to a depth to protect it from 40 ton trucks if the pipe is being installed in a high density, low income settlement. Standards appropriate to local circumstances do not always mean lower standards; indeed, higher standards may be appropriate in some cases to compensate for lower levels of maintenance.

Involving residents in decisions about the level of service they want and what level of payment they can afford can also produce surprises; assumptions made by professionals and technicians as to what people can afford for piped water are often too low because they underestimate the value placed by poorer households on the saving in time and energy in collecting water from a public standpipe.

But virtually all the above measures are forms of better local practice which depend on competent local government. One returns to the fact that most municipal governments lack the trained personnel and the financial base and autonomy to provide the needed investments. This weakness of city governments also makes other changes difficult to implement – from the enforcement of environmental legislation to the efficient collection of garbage, management of solid waste sites and improvement of traffic management.

The role of privatization

Low income groups need safe and sufficient supplies of water close to their homes (preferably piped into their homes). They need drains to take away waste water and, where possible, sewers to take away excreta. Where this is too expensive, they need regular services to empty pit latrines or septic tanks. They need regular services to collect garbage, health-care services and all-weather roads. Many governments and aid agencies are promoting privatization as a way to improve provision for such basic needs. The idea that privatization can improve provision and solve the problems already outlined is greatly overstated...

In the Third World, the justification for privatization given by its proponents is usually that the government is short of capital. Their
hope is that the private sector will provide the capital needed to expand and improve services, if offered the opportunity. In this instance, the private sector would be taking over some of the responsibilities of local government.

In most Third World cities, many of the poorest inhabitants already rely on "private" services. Private (often informal or illegal) enterprises are already the substitute for local government since they are the main suppliers of certain services in illegal settlements. In illegal settlements, private enterprises are often the main supplier of water through water vendors. In many, they are the providers of rental housing. Illegal sub-divisions are the private sector taking on the task of supplying building plots outside government regulation. The lack of infrastructure and services supplied in most illegal sub-divisions, the level of tenant exploitation and the very poor conditions in most rental housing does not support the idea that privatization will necessarily improve standards for poorer groups. The high price and the often poor quality of the water sold by water vendors also suggests problems with privatization.

Most of the services which are the main concern of this chapter are natural monopolies since they require large capital investments to set up the supply but once set up, the cost of extending it to more people is relatively low. Piped water supply or sewers are good examples. They are very costly to set up but once in place, extending them to another household or neighbourhood nearby is relatively cheap. Once a water supply or sewer system is built, it is virtually impossible for another business to compete by starting to build another piped water or sewer system. It is also ridiculous to think of two or more companies, each with their own piped water or sewer system, competing against each other to serve the same households.

There is also the complementary nature of the services, and the large cost savings if they are installed together. Water supplies piped to each house require drains connected to each house and, preferably, sewers. Sewers need sufficient supplies of water to stop them getting blocked. House sites need drains for rainwater. Roads and other paved areas need drains. Drains need efficient garbage collection otherwise they get blocked with garbage; so on occasion do sewers. The public good is served when all four are undertaken since this brings the greatest improvement in health, if only water supply is improved, this may increase health problems as waste water forms stagnant pools which then serve as breeding grounds for insects which spread diseases.

But private companies are unlikely to want to take on water, sanitation, drainage and garbage disposal. Water supply is probably the most attractive to them because people pay as they consume and often pay for the initial cost of connection. Enforcing payment is easier because supplies can be cut off, if payment is not made. Garbage collection may also be attractive since the capital costs needed to set up the service need not be high and again, services can be stopped to households who do not pay. But site drains cannot be cut off when a household cannot pay. In addition, there are large cost savings if the installation of piped water, drains and sewers are done together, along with the paving of roads and footpaths.

If a natural monopoly is privatized, it has to be very carefully regulated both in terms of prices charged and quality of the service provided. If a private firm runs the water supply in a city, residents have no other piped supply they can turn to, if prices get too high or quality too low. But if water supplies are privatized because local governments are so weak, how can local governments regulate the private firms? How can they ensure that water quality is guaranteed?

In particular cities or parts of cities, the weakness or inefficiency of local government or of national agencies providing, say, electricity and telephones, may provide a strong case for the private supply of certain services or certain kinds of infrastructure. Public companies which fail to provide adequate services to businesses who can pay for such services constrain the growth in production and employment. As Lee has pointed out in his study of deficiencies in infrastructure provision in Nigeria, the failure of government to supply businesses with adequate standards of water supply, electricity, telephones and drains means that these businesses make very large investments to guarantee their own supplies, that is their own electricity generators, wells for water, and microwave telephone systems. The costs to each business are enormous and any larger scale supplier (public or private) could meet their demands far cheaper.

In other services, especially those which are not a natural monopoly, private enterprises can help improve quality. In public transport, private enterprises often provide a cheaper, more flexible service than public sector bus companies; private buses, mini-buses, shared taxis, powered rickshaws and a whole host of other kinds of paratransit either replace or supplement public-sector buses in virtually all Third World cities. Garbage collection may also be improved at an affordable cost, with appropriate encouragement and regulation by local government.
Where household water comes mainly from vendors, supplies should be cheaper and of better quality if different vendors compete with each other. Here, one option for local government is to help water vendors and private paratransit firms to improve services as well as regulating quality. But it is more difficult to conceive of private companies helping to improve and extend piped water supplies, sewers, drains, roads and pavements, especially to poorer households and poorly-located residential areas.

One reason why private companies can operate more profitably than public enterprises is that they are often more efficient at collecting payments for the services provided. Public companies which are lax about collecting payments for, say, a water supply are subsidizing those who do not pay (often not among the poorer households) and penalizing those who do. They are also penalizing all households that have no piped water service since this lowers the returns to the company and thus inhibits new investment to expand the service. Improving cost recovery – in terms of reducing the proportion of households who do not pay for some service – is one important way to pay for better maintenance of the system and its expansion to reach new households. But improved cost recovery cannot be at the expense of the poorest households not receiving services.

Improved cost recovery in a privatized service may penalize the poorest households. It may also not result in improved services but in higher profits for the owners. Private companies will always be reluctant to extend their services to poorer areas especially if this requires a large investment. For instance, it would not cost much for a private company to see if a new bus service to a squatter community would be profitable. If this does not prove profitable, the company loses no capital investment. But laying water pipes or sewers to a squatter community is a much greater risk, since it is far more expensive and the company can hardly dig up the whole system and try again elsewhere.

In effect, allowing private enterprises to provide certain services now inadequately provided (or not provided at all) by local government can be useful and worth considering, especially in the services which are not natural monopolies. But the services which are the main concern of this chapter, there will be problems with quality and with reaching poorer households without a strong and competent local government to supervise levels of private service and charges. If local government is strong and competent, it should be able to provide such services more cheaply and effectively itself. It is worth considering one of the underlying causes of the failure of government provision in the larger and faster growing cities: the physical expansion of the city and its demographic growth outstripping the needed expansion of the powers, capacities and revenue base of city and municipal government. The institutions have changed far slower than the growth in the scale of their responsibilities. It is counter-productive for government to inhibit private enterprises that can provide people with a better level of services for which they can pay, if government itself cannot deliver such a service.

In the final analysis, the aim is to seek a compromise between guaranteeing a basic level of service to everyone and to maximizing cost recovery. New technologies and innovative institutional arrangements can greatly cheapen the cost of supplying a basic level of services – and thus greatly narrow the gap between basic service cost and what poorer households can afford. They can also make it easy for households to obtain better services, once they can afford to pay more – i.e., bring piped water into the house rather than in the yard outside. Privatization is only valid if considered within the more important long-term goal of strong, competent and representative local government.

Another role for NGOs

A more interesting and more relevant debate about privatization has to do not with private commercial enterprises, but with non-profit organizations and with organizations set up by residents of particular areas. Such organizations can not only match private enterprise's record in cost recovery but also provide cheaper services (since no profit is made) and be more immediately accountable to their customers. There is tremendous potential in new partnerships between local governments and local community organizations – which could be regarded as privatization in another form, but where control of some service rests largely with representatives of the consumers of that service.

The possibility of tackling the most serious health problems with limited resources needs co-operation between local government and community-based or neighbourhood-based citizen groups. Joint programmes can be set up, for example to drain stagnant pools, to reblock existing settlements so pipes, sewers, ditches and access roads can be installed and space made for schools and clinics, to locate and destroy disease vectors within homes and their surrounds, to design
educational programmes on health prevention and personal hygiene, to set up emergency life saving systems through which first aid can be provided immediately in each neighbourhood and through which seriously ill or injured persons can be rapidly transported to a hospital. In most instances, none of these can be provided at an affordable cost without the support of those living in low income settlements. It is not simply that money is saved because local residents contribute labour free (many poor households lack free time because of long working hours). There are major savings in the time of architects, planners, surveyors and other expensive professionals, as community consultations work out and resolve such issues as moving certain houses which stand in the way of access roads, and collect funds from households to pay for improvements. There are also major savings as specialized equipment and materials are used to install not only piped water but also provision for sanitation, drainage and all weather roads and paths.

As in new policies to improve housing conditions, intermediary non-profit organizations can become particularly important in health. Consider the example of the Orangi Pilot Project where an NGO formed by local professionals worked with community organizations in an unauthorized settlement to build sewers (Box 6.6).

Box 6.6: The Orangi Pilot Project in Karachi, Pakistan

Orangi is an unauthorized settlement with some 700,000 inhabitants; most inhabitants built their own houses. There was no public provision for sanitation; most people used bucket latrines which were emptied every few days, usually onto the unpaved lanes running between houses. More affluent households constructed soakpits but these filled up after a few years. Some households living near creeks constructed sewage pipes which emptied into the creeks. The cost of getting local government agencies to lay sewage pipes in Orangi was too much for local residents - who also felt that these should be provided free.

A local organization called the Orangi Pilot Project (OPP) was sure that a cheaper, more appropriate sanitation system could be installed and paid for, if local residents were fully involved. OPP staff organized meetings for those living in 10-15 adjacent houses each side of a lane, showed them the benefits of improved sanitation and offered technical assistance. Where agreement was reached among households, they elected their own leader who formally applied for technical help. Their site was surveyed, with plans drawn up and cost estimates prepared. Local leaders kept their group informed and collected money to pay for the work. Sewers were then installed with maintenance organized by local groups. As the scope of the sewer construction programme grew - as more local groups approached OPP for help - the local authorities began to provide financial support. By December 1985, over half of the lanes within Orangi had sewage systems.

Women were very active in local groups; many were elected group leaders and it was often women who found the funds to pay for the sewers, out of household budgets. But women had difficulty visiting health centres since custom dictates that they should stay at home. OPP has set up mobile training teams to visit local groups with information about sanitation and preventive measures against common diseases. In addition, women's work centres have been set up.


Table 6.1 sketches the actions needed to tackle environmental problems in the home and the neighbourhood. It suggests that these must be linked to actions at the level of the district and city. Support is needed from national government. The actions in Table 6.1 are in effect the health aspects of what was termed the "popular approach" to housing in Chapter 5.

The actions described in Table 6.1 are not beyond the means of most Third World governments. They do demand a decentralized, multi-sectoral approach with government agencies' inputs guided by low income groups and the organizations that they form. Ironically, the fact that resources are so scarce actually requires local governments in the Third World to be more sophisticated, innovative and flexible than First World local governments. Ideally, each house should be provided with piped water and sewers and each residential
<table>
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<tr>
<th>Health risks</th>
<th>Action at individual and household level</th>
<th>Public action at neighbour or community level</th>
<th>Action at city or district level</th>
<th>Action at national level</th>
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<tr>
<td>Contaminated water – typhoid, hepatitis, dysenteries, diarrhoea, cholera etc.</td>
<td>Protected water supply to house; promote knowledge of hygienic water storage</td>
<td>Provision of water supply infrastructure. Knowledge and motivation in community</td>
<td>Plans to undertake this and resources to do so</td>
<td>Ensure that local and city governments have the power, funding base and trained personnel to implement actions at household, neighbour- hood, city and district level. Review, and where appropriate, change legislative framework and norms and codes to allow and encourage actions at lower levels and ensure infrastructure standards are appropriate to needs and the resources available. Support for training courses and seminars for architects, planners, engineers etc</td>
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<td>Inadequate disposal of human wastes – pathogens from excreta contaminating food, water or fingers leading to faecal-oral diseases or intestinal worms (e.g. hookworm, tapeworm, roundworm, schistosomiasis)</td>
<td>Support for construction of easily maintained latrine/WC matching physical conditions, social preferences and economic resources; washing facilities; promote handwashing</td>
<td>Mix of technical advice, equipment installation and its servicing and maintenance (mix dependent on technology used)</td>
<td>Plans to undertake this plus resources. Trained personnel and finances to service and maintain</td>
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<td>Waste water and garbage – water logged soil ideal to transmit diseases like hookworm; pools of standing water becoming contaminated, conveying</td>
<td>Provision of storm/ surface water drains and spaces for storing garbage that are rat, cat, dog and child proof.</td>
<td>Design and provision of storm and surface water drains. Advice to households on materials and construction techniques to make</td>
<td>Regular removal or provision for safe disposal of household wastes and plan framework and resources for drains</td>
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<td>enteric diseases and providing breeding ground for mosquitoes spreading filariasis, malaria and other diseases. Garbage attracting disease vectors.</td>
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<tr>
<td>Insufficient water, washing facilities and personal hygiene – ear and eye infections (including trachoma), skin diseases, scabies, lice, fleas</td>
<td>Adequate water supply for washing and bathing. Provision for laundry at household or community level</td>
<td>Health and personal hygiene education for children and adults. Facilities for laundry at this level, if not within individual houses</td>
<td>Support for health education and public facilities for laundry</td>
<td>Technical and financial support for educational campaigns. Co-ordination of housing, health and education ministries</td>
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<td>Disease vectors or parasites in house structure with access to occupants/ food/water e.g. rats, cockroaches and other insects (including vector for Chagas disease)</td>
<td>Support for improved house structure – eg tiled floors, protected food storage areas, roofs/ walls/floors protected disease vectors</td>
<td>Technical advice and information; part of adult/child education programme</td>
<td>Loans for upgrading house. Guarantee supply of cheap and easily available materials, fixtures and fittings</td>
<td>Ensure building codes and official procedures to approve house construction/improvement are not inhibiting individual, household and local government actions. Support for</td>
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<tr>
<td>Health risks</td>
<td>Action at individual and household level</td>
<td>Public action at neighbourhood or community level</td>
<td>Action at city or district level</td>
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<tr>
<td>Inadequate size house/ household ventilation helps spread diseases like TB, influenza and meningitis (aerosol drop transmission) and increases frequency of diseases transmitted through inter-human contact (eg mumps and measles). Risks of household accidents increased with overcrowding; it becomes impossible to safeguard children from poisons and open fires or stoves</td>
<td>Technical advice and financial support for house improvement or extension and provision of cheap sites with basic services in different parts of the city to offer low income groups alternatives to their current shelter</td>
<td>Technical advice on improving ventilation; education on overcrowding related diseases and accidents</td>
<td>Loans (including small ones with flexible repayments); support for building advice centres in each neighbourhood</td>
<td>Nationwide availability of building loans, cheap materials (where possible based on local resources) and building advice centres. Produce technical and educational material to support this</td>
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<td>Children playing in and around house site constantly exposed to dangers from traffic, unsafe sites or sites contaminated with faeces or pollutants</td>
<td>Organization of child-care services to allow care for children in households where all adults work</td>
<td>Provision within each neighbourhood of well drained site separated from traffic, kept clean and free from garbage and easily supervised. Ensure first aid services are to hand</td>
<td>Support given to neighbourhood level play, sport and recreation facilities.</td>
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<tr>
<td>Indoor air pollution through open fires or poorly designed stoves can exacerbate respiratory illness, especially in women and children</td>
<td>Posters/booklets on improved stove design and improving ventilation etc</td>
<td>Ensure availability of designs and materials to build improved designs and investigate possibilities of promoting use of alternative fuels</td>
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<td>House sites subject to landslides or floods as result of no other land being affordable to lower income groups</td>
<td>Regularize each household's tenure if dangers can be lessened; relocation through offer of alternative sites as last resort</td>
<td>Action to reduce dangers and encourage upgrading or offer alternative sites</td>
<td>Ensure availability of safe housing sites that lower income groups can afford</td>
<td>National legislation and financial and technical support for interventions by local and city governments in land markets to support lower level action. Training institutions to provide needed personnel at each level</td>
</tr>
<tr>
<td>Illegal occupation of house-site or illegal subdivision with disincentive to upgrade, lack of services and mental stress from fear of eviction</td>
<td>Regularize each household's tenure and provision for piped water, sanitation and storm and surface water drainage</td>
<td>Local government working with community to provide basic infrastructure and services and incorporation into 'official city'</td>
<td>Support for incorporating illegal sub-divisions and for providing tenure to squatter households</td>
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<tr>
<td>Nutritional deficiencies and low income</td>
<td>Action to reduce worm burden and worm transmission. Support for income generating work within the house</td>
<td>Food supplements/school meals. Support for enterprises in low income settlements or set up by their inhabitants. If land is available, promote its use for growing vegetables. If malnutrition is serious, consider most appropriate programme to</td>
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<td></td>
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<td>Structural reforms, funds for food supplement or other emergency nutrition programmes and other</td>
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<tr>
<td>Health risks</td>
<td>Action at individual and household level</td>
<td>Public action at neighbourhood or community level</td>
<td>Action at city or district level</td>
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<td>No or inadequate access to curative/preventive health care and advice</td>
<td>Widespread availability of simple primer on first aid and health in the home with home visits by health workers to promote its use</td>
<td>Primary health care centre; emphasis on child and maternal health, preventive health and support for community action and for community volunteers</td>
<td>Small hospital (first referral level) and resources and training to support lower level services and volunteers</td>
<td>Measures to improve poorer groups’ real income</td>
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<tr>
<td>No provision for emergency life saving services in event of injury or serious illness</td>
<td>Widespread availability of simple primer on first aid and health in the home with educational programme on minimizing risks</td>
<td>Basic equipment (e.g. stretchers, first aid) available and accessible 24 hours a day. Community volunteers with basic training on call and arrangements for rapid transfer of sick person to hospital. Equipment to rescue and treat people saved from burning houses</td>
<td>Support for neighbourhood level equipment plus organization of training programmes for community volunteers. Fire fighting equipment, contingency plans for emergencies</td>
<td>Technical and financial support for nationwide system of hospitals and health care centres. Preventive health campaigns (e.g. immunization) and nationwide availability of drugs and equipment.</td>
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</table>

Discussion with individuals and community organizations about some minimum changes in site layout to improve emergency vehicle access and create fire breaks

Note: Many of the above actions to improve or extend houses or to improve the quality of the services and facilities that the house contains will often be constrained for houses, flats, rooms or house sites which are rented. One should recall that a high proportion of the lowest income individuals and households rent their accommodation in most Third World cities and improving their quality and reducing health risks will need government programmes and actions which are not summarized in this table.

Source: Jorge E. Harrey and David Santchaitwe, “Housing and Health: Do architects and planners have a role?”, Cities, vol. 4, no. 3, 1987.
area with paved roads, electricity and storm/rain-water drainage. There should be regular collection of household wastes, nutrition programmes for vulnerable groups and health care and emergency life saving services. But this may be too expensive so local governments in consultation with citizen organizations must make pragmatic choices as to where limited funds should be spent. They need considerable sophistication and sensibility to detect the major health problems and to design and implement appropriate interventions.

The issue is certainly about making the suppliers of services more responsive to consumer demands. It is about local government giving the private sector more power in decision making, more role in service provision and more rights in determining priorities. But the private sector is made up of low income citizens and their community organizations – and the non-profit professional groups who pioneer new ways of working with them.

7. Environmental Problems at the City and Regional Level

The city environment

Environmental problems such as air and water pollution might be assumed to be less pressing in the Third World than in the West for two reasons. First, a smaller proportion of the population lives in cities. Second, the Third World is less industrialized; in 1980, the Third World (excluding China) with half of the world’s population had 11 per cent of the world’s industrial production. Rural and agriculturally-based environmental problems such as deforestation, soil erosion, loss of topsoil, water pollution and deaths and dislocations from biocide use (and over-use) may seem more urgent even if, as described later, some of these have important linkages with cities. Thus, industries’ and cities’ appetite for water (and its subsequent pollution and disposal), and problems of air pollution and solid waste disposal may be assumed to be less of a problem than in the more urbanized and industrialized West.

However, the aggregate picture hides the fact that there are hundreds of Third World cities or wider city-regions which do have high concentrations of industries. Nations such as China, India, Mexico, Brazil and South Korea figure prominently amongst the world’s largest producers of many industrial goods. Not surprisingly, Third World cities or city-regions with high concentrations of industries (especially heavy industries) suffer comparable industrial pollution problems to those experienced in Europe, Japan and North America.

Indeed, the problems may be more serious. Industrial production has increased very rapidly in many Third World nations in the last 30 years in the absence of a strong and effective planning and regulation system. More than 35 nations recorded annual average growth rates for industrial production of 5 per cent or more during the 1960s and/or the period 1970–85. The more rapid the growth in industrial production, the more serious the problem is likely to be. Very few governments have had much interest in controlling industrial