

Identifying the groups most vulnerable to urban environmental hazards¹

Low-income residents tend to be among the most vulnerable to exposure from environmental health hazards, the most susceptible when they are exposed, and the least able to cope with the consequences. Certain sub-groups are especially at risk, including children, women and particular occupational groups.

2.1. Low-income and vulnerability

It is not surprising that low-income groups suffer most from the ill-health, injury and premature death caused by environmental hazards. Individuals and households without adequate incomes are less able to afford accommodation that protects them from environmental risks – that is, good quality housing in neighbourhoods with piped water and adequate provision for sanitation, garbage collection and drains. In their struggle to secure a livelihood, they are liable to undertake work that exposes them (and often their families) to environmental hazards. They have the least resources to cope with illness or injury when they occur. Also, they generally have the least political power to demand that these problems be addressed.

The range and severity of the environmental health problems in many low-income settlements often go unrecognised, however:

- Their houses and neighbourhoods are the worst served with water, sanitation, garbage collection, paved roads and drains. This can be seen in the scale of the differentials between wealthy and poor areas in environmental hazards, in access to public services and in health indicators. Infant or child mortality rates in poorer districts of cities are often four or more times those in richer districts, with much larger differentials apparent when smaller areas are compared.
- It is generally poorer groups who live in the locations where the pollution levels are worst. They often choose to live in such locations, as these are the only places where they can find affordable land for their housing, close to sources of employment. There is also the tendency for polluting industries, waste dumps and waste management facilities to concentrate in the vicinity of low-income neighbourhoods, where there is less effective political resistance.
- It is generally poorer groups who suffer most from floods, landslides or other disasters because housing and land markets price them out of safe, well-located areas. Thus, they occupy the most hazardous sites, often not planned for residential settlement, and with little investment in either

¹ This briefing paper series is based on a report prepared by IIED for Danida, entitled *Urban environmental improvement and poverty reduction* (London, 2001).

infrastructure to mitigate the impact or in disaster preparedness to limit the damage and ill health when disasters occur.

- Low-wage jobs often expose workers to a range of environmental hazards that threaten their health and well-being. Thus street vendors are exposed to high levels of vehicular pollution, waste pickers are exposed to hazardous materials, and cramped and crowded working conditions can create a wide range of environmental risks.

It is not only that low-income groups generally face higher levels of risk but also that they have less possibility of getting rapid and appropriate medical treatment if they are injured or fall ill as a result of some environmental hazard. They can least afford treatment and medication or income loss while recovering from sickness or injury, and often have jobs that do not provide for health insurance or sick leave. Low-income households rarely have assets that can rapidly be converted to cash to cover food expenses when an income-earner is off work or to pay for treatment to hasten recovery. Low-income groups are generally at much higher risk of suffering from psycho-social health problems because they live and work with much higher levels of environmental stress factors – for instance, greater noise levels, higher levels of overcrowding, less security and fewer services. They also have to cope with the stresses caused by much higher levels of ill-health and injury and of infant and child death within their households which are, themselves, partly the result of environmental factors.

There is considerable variation in the range and severity of environmental hazards even within and among 'low-income groups'. This can have important operational implications for attempts to improve the urban environment and simultaneously to reduce poverty. In this context, it can be useful to distinguish vulnerability from susceptibility.

2.2. Vulnerability and susceptibility

The presence of an environmental hazard (for instance, a pathogen, pollutant or physical hazard) does not necessarily mean that it will harm someone, and the characteristics of the individual, household or social group exposed to the hazard also play a role in its effect.

People or households may be more at risk from environmental hazards because they are:

- Less able to avoid them (e.g. living in a settlement lacking provision for protected water, sanitation and drainage).
- More affected by them (e.g. infants are at much greater risk of death from diarrhoea and acute respiratory infections than older groups).
- Less able to cope with the illness, injury or premature death they cause (e.g. persons who cannot afford treatment from a doctor or medicine).

Individuals or households that combine all of these disadvantages are generally termed vulnerable. But in many circumstances it is important to distinguish between **susceptibility** (where the increased risk is related to endogenous factors such as a person's nutritional status, the state of their immune system

or their genetic makeup) and **vulnerability** (where it is external social, economic or cultural conditions that increase the risk – for instance, through an increased likelihood of exposure to environmental hazards or less capacity to cope with or adapt to an illness or injury).

Characteristics that influence susceptibility to environmental hazards include:

- For many biological pathogens: weak body defences (mostly a function of age, nutrition and overall health status, some a function of artificially induced immunity as in the protection given against certain diseases by vaccines). High-risk groups include those suffering under-nutrition and those with immune systems compromised by HIV. Pregnant women and their foetuses and infants are also high-risk groups, especially in situations where there are high risks of infectious and parasitic diseases and under-nutrition.
- For physical hazards: limited mobility, strength and balance (as is evident in young children and many older people, and in people with physical disabilities).
- For exposure to chemicals: age and health status at the time of exposure. There are also certain groups such as asthmatics and elderly people with chronic respiratory diseases who are particularly susceptible to certain air pollutants.

Vulnerability to environmental hazards is much influenced by household income and assets, gender, the quality of housing and basic services, and environmental health risks within the workplace. So, among the most vulnerable groups are:

- **Individuals/households living in poor quality homes and neighbourhoods** that lack adequate provision for water, sanitation, drainage and garbage removal, and as such also lack safe indoor and outdoor living and play environments. For people living in shacks made of inflammable materials such as wood and cardboard, the risk of accidental fire is much increased, particularly when households also use open fires or portable stoves for cooking and/or heating and have no electricity so that kerosene lights or candles are used for lighting. As indicated for water and sanitation in Box 2.1 at the end of this Briefing Paper, this vulnerability can extend to a large share of the urban population in many cities.
- **The persons doing the 'dangerous' tasks within households**, which increases the duration and/or severity of exposure to environmental hazards. An analysis of vulnerability has to be gender and age aware, since many dangerous tasks are allocated to women and children. For instance, it is generally women who have to manage the disposal of human excreta where provision for sanitation is inadequate. Where there are high levels of indoor air pollution, it is generally women and young children who spend longest indoors because they have been allocated most household tasks.
- **Income-earners with particularly hazardous work** – for instance, working in factories with high levels of exposure to dangerous chemicals or hazardous machinery. Those who make a living from picking and sorting wastes also face many hazards; especially those working at large waste

dumps (where residential wastes are often mixed with industrial and commercial wastes, including some toxic wastes).

- **Groups facing discrimination** in obtaining adequate incomes, housing and basic services; in many societies, particular ethnic groups or castes face discrimination in all these.

Often susceptibility and vulnerability go hand-in-hand. Economic deprivation, in particular, can increase both. As described above, low-income groups tend to be particularly vulnerable to environmental hazards. While few of the characteristics that influence susceptibility are a direct result of income-poverty, there are some strong associations, particularly in the case of biological pathogens. Overall nutritional and health status tends to be lower in low-income groups. The age structure of many low-income countries, where small children make up a large share of the population, increases susceptibility to biological pathogens. And in many low-income cities, particularly in Africa, HIV/AIDS has greatly increased susceptibility to environmental hazards.

Women are more vulnerable than men to many environmental hazards because of gender relations (i.e. as a result of the particular social and economic roles that women have, determined by social, economic and political structures). In many societies, women face discrimination within labour markets and with regard to obtaining housing, land, basic services and credit. Women are also especially susceptible to many environmental hazards when pregnant, since the reproductive system is particularly sensitive to adverse environmental conditions.

2.3. Vulnerability to disasters

The death toll from disasters of a comparable type and scale varies greatly from place to place. In a wealthy, well-managed city, it is rare for many people to die from a hurricane, flood or earthquake, but large death tolls are common in lower-income, poorly managed cities. These differences are greatly influenced by how much preventive action has been taken to reduce people's vulnerability to the disaster.

In most cities, it is low-income groups that are heavily concentrated in the sites most at risk from disasters - flood plains, steep slopes, sites around heavy industry and sites most at risk from earthquakes. Indeed, hazardous sites suit low-income groups well because the fact that they are hazardous makes other groups avoid building there, thus keeping down their value and often making them the only sites which poorer groups can occupy which are close to income-earning opportunities. Low-income groups inevitably have less money to spend on building or renting a house designed to avoid or limit damage in the event of a disaster and it is also generally the low-income neighbourhoods that have the least provision for protective infrastructure. Low-income groups also have the least resources on which to call when some disaster damages or destroys their housing.

2.4. Reducing vulnerability

The most obvious means of reducing vulnerability to environmental hazards is to improve the quality of the urban environment. This is the principal topic of many of the following Briefing Papers. A person's or household's vulnerability is also much influenced by the extent to which they can cope with the consequences of the illness, injury or premature death caused by environmental hazards. For instance:

- Can they get (and afford) treatment and medication they need?
- Can they get emergency services when needed?
- Can they get a loan to help them manage a sudden drop in income?
- Do they have assets they can call on (monetary and non-monetary)?

Thus, among the factors that reduce vulnerability and risks for susceptible groups are:

- The extent of public, private and community provision for prevention-oriented health care (including provision for immunisation and services for ante-natal, childbirth and post-natal care) and emergency response to accidental injuries and acute diseases.
- Good quality homes and neighbourhoods, which reduce exposure to biological pathogens, chemicals and physical hazards, and are not vulnerable to 'natural' disasters.
- Good standards of occupational health and safety, and control of air pollution.
- Good standards of traffic management, and a transport infrastructure that can safely accommodate the non-motorised transport often used by vulnerable groups.
- Good provision for children's needs at different ages (e.g. good quality day care, pre-school, school, children's play at different ages).
- Good standards of nutrition.

There are also many different ways in which vulnerability to disasters can be reduced. For instance, for the inhabitants of a settlement at risk from flooding, vulnerability may be reduced by:

- Reducing the risk of flooding – which may be achieved 'upstream' through better watershed management.
- Offering them a safer site and help in moving there (although care is needed to offer appropriate alternatives, since hazardous sites often serve the needs of low-income households well in all other aspects so it may be difficult to find a less hazardous site that will serve their other needs).
- Helping make their homes and neighbourhoods better able to cope with floods – for instance, structural modifications to buildings and improved storm and surface drains (but tenants often face particular problems since landlords are reluctant to invest or allow tenants to alter their homes).
- Developing an effective early warning system to predict when floods are likely (so that people can take protective measures or move away temporarily).
- Ensuring emergency services are ready to respond rapidly in the event of a flood; and

- Having in place the supports the inhabitants need to cope with their losses after the flood.

There is often considerable overlap in the means needed to reduce people's vulnerability to disasters and to reduce their vulnerability to 'everyday' hazards. As external agencies have learnt to work in more participatory ways with 'vulnerable' groups, the analyses of hazards and vulnerabilities have also come to include analyses of local capacities to identify and act.

2.5. *Strengthening asset bases*

The key role that assets play in helping low-income individuals or households avoid deprivation is now more widely recognised. However, the discussion of the role of assets in this has generally concentrated on those that are important for generating or maintaining income or for helping low-income people cope with economic stresses or shocks. Too little attention has been paid to the role of good quality housing, infrastructure and services in reducing low-income groups' vulnerability by protecting them from exposure to environmental health hazards, and to the role of health care services and emergency services in reducing their health impact. In this sense, it is the quality of housing and basic services that is the asset – regardless of whether the house is owned, rented or borrowed. Discussions on housing as an asset tend to concentrate on its capital value or its potential income-earning possibilities rather than on its potential role in helping its inhabitants avoid environmental hazards.

Box 2-1: Inadequacies in provision for water and sanitation in urban areas

When piped water and sanitation are lacking, urban dwellers are particularly vulnerable to environmental hazards. Many health problems are linked to water - its quality, the quantity available, the ease with which it can be obtained (and the cost), and the provisions made for its removal, once used. The health links with sanitation are also obvious; human excreta is an extremely hazardous substance. Around half of the urban population in Africa, Asia and Latin America is suffer from one or more of the main diseases associated with inadequate provision for water and sanitation.

Hundreds of millions of urban dwellers have no access to piped water supplies. Hundreds of millions more have 'access to piped supplies' but do not have a piped supply into their home or yard and thus have to rely on standpipes or other communal or public supplies to which access is often difficult and time-consuming. Large numbers of those with piped supplies only receive water through the pipe intermittently, and the quality of the water is often poor. Those not served by piped supplies often rely on vendors or kiosks, which provide an important service, but typically at a very high price: in many cities those who buy from vendors spend 5-10 per cent of their total income on water.

Perhaps as many as two-thirds of the urban population in Africa, Asia and Latin America and the Caribbean have no hygienic means of disposing of excreta and an even greater number lack adequate means to dispose of waste waters. Most urban centres in Africa and many in Asia have no sewers at all. When sewerage systems do exist, they rarely serve more than a small proportion of the population – typically the richer residential, government and commercial areas. Pit latrines and bucket latrines, often shared between many people, are the most common response. Open defecation is also a common response for the tens of millions of households who have no sanitation facility within their home or yard and no convenient public provision nearby. Ditches, gullies, streams, canals, and rivers are where most human excrement and waste water ends up, untreated. Official statistics for sanitation in most nations understate the problem because they do not distinguish between households with a toilet within their home and those that rely on communal or public provision. Many also assume that if a household has some toilet facility, it is adequate.

Related Readings

Bartlett, S et al. (1999), *Managing Cities as if Children Mattered: Children's Rights, Poverty and the Urban Environment*, Earthscan, London.

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McGranahan, G, P Jacobi, J Songsore, C Surjadi and M Kjellén (2001), *The Citizens at Risk: From Urban Sanitation to Sustainable Cities*, Earthscan, London.

Pugh, C (editor) (2000), *Sustainable Cities in Developing Countries*, Earthscan, London.

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WRI (1996), *World Resources 1996-1997: The Urban Environment*, The World Resources Institute, Oxford University Press, Oxford and New York.