

URBAN ENVIRONMENT

POLLUTION

Did you know that 75 percent of solid wastes in transition countries is going untreated into open dumps?



Vladimir Akimov/Topham Picturepoint/UNEP

Unnatural cycles?

The economic system takes resources from the natural environment, and returns the wastes generated by production and consumption - a cycle which may be harmful if the concentration of wastes exceeds the capacity of the environment to assimilate them. The subsequent pollution of the air, seas, lakes, rivers and underground fresh water resources - as well as the land's surface - affects not only human beings, but all living organisms and buildings. Most of the affected groups are not themselves producers of pollution. Since there is rarely a charge for creating pollution, the external costs of environmental degradation are often imposed disproportionately upon the poorest. The unprecedented growth of cities in the 20th century make them major contributors to local, regional and global environmental problems. The amount of the earth's surface needed to absorb the waste products of a large city is likely to be much greater than its boundaries - the ecological footprint - though this can depend on the fuels used for heating, energy generation and manufacturing, the amount of motorized traffic, the technologies used for the disposal of solid and liquid waste, as well as on local climatic conditions. To date, most cities cannot assimilate their waste products; they burn them and thus contribute to environmental pollution.

No respect for boundaries

Air and water pollution may have trans-border effects. Acid rains are created by sulfur dioxide and nitrogen dioxide, and clouds that contain these substances may be carried to other countries and precipitate there. Similarly, rivers that flow through several countries may carry pollutants discharged upstream, causing problems for countries located along the way, or on the seas or lakes which eventuate. Consequently, some countries are exporters of acid rain and other pollutants, and neighbouring countries cannot stop such substances entering their territories.

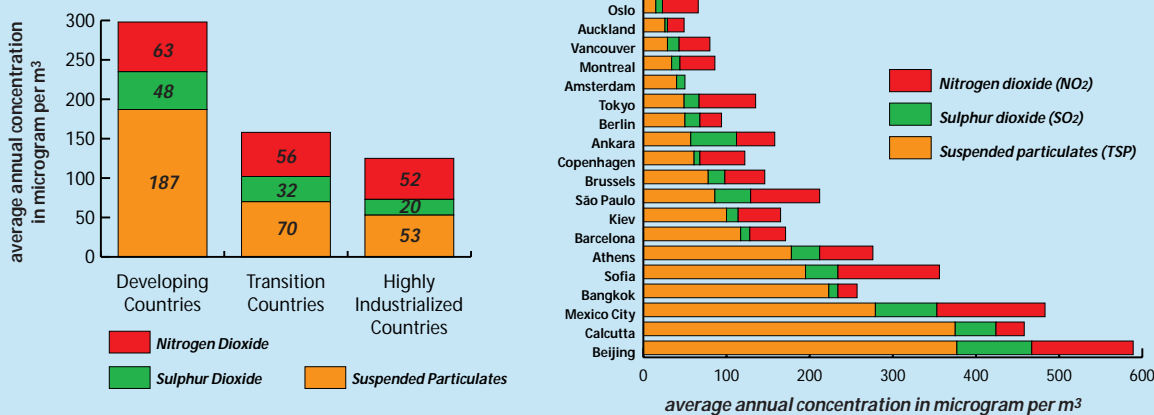
Carbon dioxide emissions are among the primary determinants of the green house effect in the atmosphere, leading to global warming with all its negative and irreversible consequences. For this reason high carbon dioxide emissions and other greenhouse pollutants impose external costs not only on the neighbours of high emission countries but also on the rest of the world. In other words, the damage caused by greenhouse pollutants is an externality in both space and time. Global concern for environmental pollution therefore focuses on two main objectives: the first is to make cities and other human settlements healthy and livable places for their inhabitants; the second is to control trans-boundary effects of pollution and to stop the degradation of the global ecosystem. These can only be achieved by the concerted efforts of all countries.

The principal sources of pollution

Air Pollution

In spite of increasing environmental awareness, air pollution levels are still high in many parts of the world, and cities continue to grow without taking appropriate environmental measures. Trends indicate that transport in the cities of developing countries is a key factor, often responsible for 70-80 percent of local air pollution. In industrialized developing countries like China, which depend on coal as a major source of energy, industry is a major source of air pollution. In developed countries such as the USA, high energy consumption patterns further contribute to urban air pollution and GHG emissions. World averages of carbon dioxide emissions - which are primarily related to levels of energy production and types of fuel used - increased from 3.4 metric tonnes per capita in 1980 to 4 metric tonnes in 1996. Although there has been some increase in the emission levels in low and middle-income countries in the same period, from 0.9 to 1.6 in the former, and from 2.5 to 4.6 in the latter, emissions in high-income countries remained at much higher levels, with an unchanging 12.3 metric tonnes per capita.¹

Air pollution is higher in cities of developing countries



Suspended particulates and sulphur dioxide are mainly related to coal use for heating and energy generation, whereas nitrogen dioxide is associated with high concentrations of motor vehicles and industry.

Source: World Resources Institute, 1990-1995 (based on a sample of 79 cities)

Water Pollution

There are great regional differences in emissions of organic water pollutants. A continuous inverse relationship between per capita income and the intensity of organic water pollution has been shown by a World Bank study. For each 1 percent increase in per capita income, there is a 1 percent decline in pollution intensity. The fastest decline occurs before countries reach middle-income status. Total emissions show great variation between countries, depending on the level of industrialization and emission level per worker.

Land Pollution

Land degradation is prevalent in many arid and semi-arid areas, and is sometimes accelerated by waste generation and disposal, along with increased use of fertilizers and pesticides. On the other hand, urbanization often plays a positive role by reducing human pressure on agricultural lands. Both the quantity and type of waste generated by cities are major sources of degradation, and are increasingly voluminous, non-degradable and contain high percentages of toxic substances. In OECD countries, municipal waste per capita increased from 410 kg to 510 kg per year from 1980 to 1995, and total waste generated increased from 347 million tonnes to 484 million tonnes within the same period². Insanitary landfill generates greenhouse gasses and unpleasant smells, and may pollute underground fresh water resources.

Impacts

Pollutant levels exceeding WHO or national standards have adverse health effects, ranging from a loss of IQ points in children due to airborne heavy metal particles; cardiovascular and respiratory disorders due to particulate matter and sulphur-dioxide; and cancers due to hydrocarbons. In developing countries, women suffer most from indoor air pollution caused by biomass cooking. Water pollution may affect marine life, transferring pollutants to humans. Human activities are not only accelerating local air pollution, but also contribute to long-term effects such as ozone depletion and climate change.

Management and Policy Implications

Local measures can ensure energy conservation, cleaner industrial production techniques, cleaner transportation fleets and better transport demand and management options. At the local level, there is a need to manage water demand and mitigate water pollution. This would include increased sewage and effluent treatment, waste water treatment and recycling, reduced pesticide use, cleaner industrial production, developing and enforcing appropriate drinking water guidelines and commensurate public health practices and education.

National governments may choose incentive-based instruments for environmental policy, as emission taxes and corresponding subsidies or tradeable emissions permit systems. However, with few exceptions, direct regulation - in the form of prohibitions, specifications of behaviour, or non-marketable permits to discharge - has been the dominant approach throughout the world. The difficulty and cost of monitoring emissions, and the varying effects of emissions due to local climatic conditions, have been the primary reasons for choosing direct regulation.

Internationally determined emissions standards, established by the WHO in particular, have to be put into effect by national and local governments. Current emission levels in various countries indicate that additional efforts and initiatives are needed for the achievement of a less-polluted environment worldwide. Global Conventions to protect the environment, such as the UNFCCC, its Kyoto protocol, as well as the Montreal protocol, also provide unique opportunities for nations and their cities to contribute to a global campaign for better air quality.

www.alt.ec.gc.ca/pollution/land
www.ec.gc.ca/water/index.htm
www.alt.ec.gc.ca/pollution/air.html
www.geocities.com/capecanaveral/4833
www.unep.org/Geo2000/
www.worldbank.org/wbi/cleanair/initiative
www.who.int/peh/air/airindex.htm
www.epa.gov/airnow/