Pollution & Public Health Fact Sheet

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Some basic facts about pollution

We can do something about pollution and success stories abound. After decades of effort and attention, *industrial pollution* is now only an occasional worry for most of the developed world. Although there are a few remaining threats, pollution is generally regarded as an issue that is carefully regulated, managed and watched over. Stricter environmental regulations in industrialized countries have triggered the introduction of cleaner technology and technological improvements, especially in the power generation and transport sectors. This does not mean, however, that such countries may sit on their laurels: as past super-polluters and present producers of greenhouses gases far beyond their fair share (population-wise) they are ethically bound to help poorer nations deal with and contain pollution. In fact, pollution continues to be a major source of death, illness and long-term environmental damage in the developing world. Here, by shortening lives and by damaging children's development and growth, pollution creates a background of chronic illnesses that makes strong and sustained economic development very hard to achieve.

➢ Air pollution facts

The main pollutants affecting the air in most countries are carbon monoxide, nitrogen dioxide, sulphur dioxide, lead, ground level ozone, small particles and cancer causing chemicals like benzene. These pollutants, when present at concentrations beyond certain levels, are detrimental to public health and can cause or aggravate a number of illnesses.

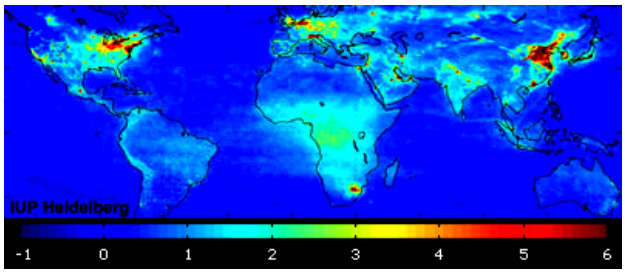

Fig.1. Based on 18 months of Envisat observations (2002-2004), this high-resolution map shows global atmospheric levels of Nitrogen dioxide (NO_2). This gas is mainly man-made through burning of fossil fuels by power plants, heavy industry and vehicles. Excess exposure to the gas causes lung damage and respiratory problems (European Space Agency ESA).[i]

- Many parts of the world already experience near-surface ozone levels greater than 40 ppb, which can injure leaves and reduce crop yields.[ii]
- In the US, where 66% of all freight is shipped by truck and 16% is shipped by train, ground freight (diesel trucks, trains) emit 40% of NOx and 30% of particulate matter pollution.[iii]

➢ Water pollution facts

Through dumping and surface water runoff, many pollutants end up in water bodies: in rivers, in lakes and in the sea.

- Some 300-500 million tons of heavy metals, solvents, toxic sludge, and other wastes accumulate each year from industry.
- Industries based on organic raw materials are the most significant contributors to the organic pollutant load with the food sector being the most important polluter.
- The food industry contributes significantly to the production of organic water pollutants: 40% of such pollutants in high-income countries and 54% in low-income countries come from this industry.
- More than 80% of the world's hazardous waste is produced in the United States and other industrialised countries.
- In developing countries, 70% of industrial wastes are dumped untreated into waters where they pollute the usable water supply.[iv]

➢ Land degradation facts

Contaminated land is a problem in industrialised countries, where wastes such as heavy metals linger in the soil where factories and power stations once stood. It can also occur in developing countries, sometimes used for dumping pesticides. Soil degradation is more widespread.

- Agricultural practices can pollute land though the use of pesticides, nitrate-rich fertilizers and slurry from livestock. When the contamination reaches rivers it may cause eutrophication and could eventually create dead zones off the coast (e.g. Gulf of Mexico).
- As can be seen in Figure 2, vast areas of arable land have been degraded worldwide due a number of factors, many or most of which are tied to human development. The primary causes are deforestation, overexploitation for fuel-wood, overgrazing, agricultural activities and industrialization.[v]
- Each year, 24 billion tons of the world's soil blows or washes away, largely because of ploughing.[vi]

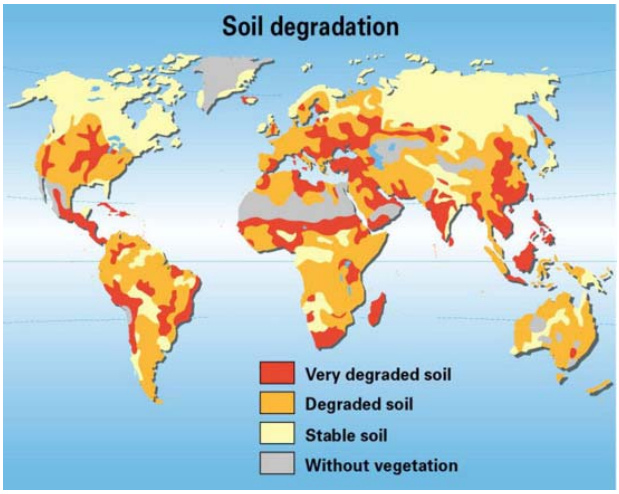

Fig. 2. Overview of the state of soil degradation in the world.

Impacts and Risks

➢ In general

- Globally, 7 per cent of all deaths and diseases are due to inadequate or unsafe water, sanitation and hygiene. Approximately 5 per cent are attributable to air pollution.
- Thirteen million deaths annually and nearly a quarter of all disease worldwide—including 33 percent of illnesses in children under age five—are due to environmental causes that could be avoided or prevented, according to a report by the World Health Organization (WHO).
- According to this 2006 report[vii], diarrhoea, lower respiratory infections, various forms of unintentional injuries, and malaria are the four main diseases caused by or spread by environmental factors.

➢ Air pollution

- The World Health Organization (WHO) says 3 million people are killed annually worldwide through exposure to outdoor air pollution from vehicles and industrial emissions and 1.6 million deaths are caused by indoor air pollution through the use of solid fuel. Most are in poor countries.
- The WHO report adds that indoor air pollution is responsible for 2.7 percent of the global burden of disease, with pneumonia accounting

for the deaths of two million children every year.

➢ Water pollution

One of the major Millennium Development Goals concerns the access to safe drinking water; in certain areas, water contamination due to unregulated urban and industrial development or pastoralist practices makes such a goal ever harder to attain.

- More than a billion people—almost one-fifth of the world's population—lack access to safe drinking water, and 40 percent lack access to basic sanitation, according to the 2nd UN World Water Development Report. Many children die from infections and diseases due to the consumption of contaminated fresh water. Heavy metals and poisons building up in fish, mollusc and crustacean tissues may seriously affect the health of human communities depending on such organisms for food.
- Water-borne diseases are responsible for 80% of illnesses and deaths in developing countries, killing a child every eight seconds. Each year 2.1 million people die from diarrhoeal diseases associated with poor water.

What can we do about pollution?

What we should be doing now

➢ Air pollution. Education, efficient stoves and the use of cleaner and safer fuels can reduce indoor air pollution considerably in developing countries. As regards outdoor air pollution, the first step is assessment. As scientists investigate outdoor air pollution and develop standards for measuring the type and amount of some serious air pollutants, biologists and health-care experts need to determine how much exposure to pollutants is harmful. Once exposure levels have been established, political and legal steps can be undertaken to reduce exposure to air pollution and to identify and regulate the sources.

➢ Water pollution. "The solution to pollution is dilution" is a dictum which summarizes a traditional approach to pollution management whereby sufficiently diluted pollution is not harmful. Far from being true in all cases and very false as regards persisting toxins (e.g. DDT) and radioactive wastes, this older approach nevertheless governs practices throughout the world in the absence of a superseding principle. For instance, it is dilution rather than elimination that inspires legislation that provides for the gauging of concentrations of effluent for release in the environment and defines the concentrations exceeding which restrictions or penalties are applied. Such legislation needs to introduced, updated and enforced urgently in many countries, at least as a 'first step', but we should strive to go beyond this 'first step'. In many cases, migration from the 'dilution' to the 'elimination' mentality is hindered by challenging economical and technological barriers; furthermore it may be globally more 'polluting' (including greenhouse gas emissions) to completely eliminate a certain type of pollution than to reduce it to levels in which it may be 'safely' released in the environment.

In any case, better water resource management is not only a question concerning big industry and the government: the promotion of safe household water storage, better hygiene and more judicious use and management of toxic substances at home and work is a must at home and community level, especially in poorer countries.

What we should be looking forward to

➢ Adopting the "Cradle-to-cradle" concept. There is a growing worldwide understanding that we need to find ways to make our industrialised society more conservative in its use of materials and resources. At present, the use of materials and other inputs to industrial processes (such as energy and water) is primarily linear: resources are harvested, products are manufactured, waste is generated and then disposed of at the end of the process. Sooner or later, the products themselves end up as waste to be thrown away. By contrast, the 'cradle to cradle' concept is a vision of cyclical flows of materials: materials making up products are reused over and over again, hence ideally eliminating the whole concept of waste and converting industrial production into a cycle that mimics natural ecological processes. The experience of the companies that have already adopted the 'cradle-to-cradle' strategy shows that effective design not only generates positive externalities but can also make good business sense.[viii]

➢ Taxing polluting activities and trading environmental credits. This is a pragmatic approach in a capitalist world that may produce good results in the global market if all major nations collaborate and if defectors are punished by effective organisms such as the WTO. Environmental assets are treated as property owned by the human race and by future generations, and businesses, individuals and local governments are obliged to include the use and maintenance of such an asset in their costing and investment exercises. We may go much further than simply trading carbon credits: in an increasingly 'free-trade' world, trade blocks may chose to levy environmental taxes on products imported from polluting countries and multinationals to finance their 'green' policies.

➢ Reducing emissions and investing in clean energy and technology (the "stick and carrot" approach). By consistently imposing more stringent laws aimed at reducing emissions, richer nations (that often benefit rather than suffer from the costs involved in the upgrading) force companies to develop and market cleaner technologies and to make them widely available through economies of scale. For instance, the recent (2007) diesel emissions laws voted California may affect Chinese car makers wanting to penetrate the US market and may eventually lead to cleaner cars being cheaply available in poorer countries. Pumping money intelligently into university and non-profit research may lead to breakthroughs; other 'carrots' may include 'green' tax incentives (e.g. tax waivers or subsidies on solar panels, electric cars etc.) and the promotion of organic farming.

➢ Reducing the consumption of products and services whose provision and use entails considerable pollution. In developed nations, everyone should strive to adopt a lifestyle that seeks to minimise city waste generation (by using and demanding simpler, biodegradable or reusable packaging) as well as electricity and fuel consumption (by using energy-saving bulbs, buying energy-efficient consumer goods, using better insulation of homes leading to more efficient air conditioning or heating, adopting the 'go small' attitude). Habit-changes are painful but necessary: the use of metropolitan transport and trains rather than cars and planes, waste separation, intelligent shopping and simple lifestyle — all this is readily available if and when there is a will.

➢ Lobbing and increasing awareness. Pollution issues in China, India, Mexico, Brazil, South Africa and other developing nations geared or gearing up for rapid industrial growth need to be dealt with effectively to avoid repeating the mistakes of the West and the former Soviet Union. Increasing awareness (hazards involved, citizen rights under national and international legislation), advocacy, and promotion of democratic structures (freedom of the press, freedom of association, formation of environmental lobbies promoting effective legislation designed to curb pollution, efficient judiciary, accountability and honesty in the civil service) are of utmost importance. Also, aid and incentives from wealthier nations promoting capital investment in cleaner technology and better regulation of emissions is urgently needed.

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[i] http://www.esa.int/esaCP/SEM340NKPZD_index_0.html
[ii] S. Sitch, P. M. Cox, W. J. Collins & C. Huntingford in Nature Magazine, July 2007
[iii] http://www3.industryweek.com/ReadArticle.aspx?ArticleID=14461
[iv] Based on figures provided by the United Nations Industrial Development Organization (UNIDO)
[v] Global soil degradation. (1997). In *UNEP/GRID-Arendal Maps and Graphics Library*. Retrieved 10:50, August 1, 2007 from http://maps.grida.no/go/graphic/global_soil_degradation.
[vi] Science Now Magazine, from publication Proceedings of the National Academy of Sciences during the week of Aug 7, 2007
[vii] Preventing disease through healthy environments: Towards an estimate of the environmental burden of disease: www.who.int/quantifying_ehimpacts/publications/preventing-disease/en/index.html.
[viii] The Second UN World Water Development Report (March 2006).