

Round Table

Environmental health — for the rich or for all?

Kirk R. Smith¹

Developing countries bear the brunt of damage to health from environmental hazards. Yet most of the money the world is spending on environmental health research and on interventions to protect health from these hazards is being spent by the industrialized countries. The sheer size and intensity of this effort greatly influence the entire world agenda, sometimes in ways that do not reflect the realities of environmental risk in the developing countries and thus without due consideration of true global priorities. Two main schools of thought can be identified: one holds that the powerful environmental health movement in developed economies, by overriding needs and circumstances in less developed ones, may actually be holding back efforts to reduce damage to health; the other holds that this movement, by fostering the growth of scientific and technical knowledge, may be helping developing countries to protect their populations against environmental damage and is thereby helping to reduce global damage to health.

Examples of the harm done by the global dominance of environmental health issues by industrialized countries include the following.

- There is a drive in the industrialized world to ban all use of DDT worldwide. Yet household use, which is one of the few inexpensive ways of controlling malaria in certain parts of the world, accounts for only a relatively small amount of the DDT released into the environment, compared with the environmental impact of the vast amounts sprayed in the past. If malaria were killing a million people a year in North America and Europe, would the case for globally banning DDT be argued so forcefully?
- Fears are being voiced with increasing stridency in some industrialized countries that chlorination of drinking-water may result in the formation of possibly carcinogenic chloramines. The suggestion has been mooted that chlorination should be replaced by ozonation or other techniques that do not leave residues likely to contaminate downstream water. But these alternatives do not combat waterborne diseases as effectively. Reduction of chlorination, for example, may have played a role in a cholera epidemic that occurred in Peru in the early 1990s. And even in the more

developed countries, waterborne disease is still a serious risk.

- Powerful environmental groups in the industrialized world are successfully putting pressure on international organizations to stop funding construction of large dams in less developed countries, thereby potentially denying these countries the kind of major spur to development that currently industrialized countries have enjoyed.
- Incineration of medical waste has raised concerns in the more developed countries about the release of dioxin into the environment. These concerns have stopped international organizations from supporting hospital construction in some countries, notably India. Yet, incineration — which does release dioxin into the environment but has as yet caused no documented burden of ill-health — is often a vastly preferable alternative to the traditional disposal method of dumping medical waste on public rubbish tips, especially where these are scavenged for a living by poor people.
- Billions of dollars are being spent in the industrialized world on dealing with hazardous waste, which cannot be more than a minor risk to public health compared with the relatively uncontrolled and substantially larger exposures to some of the same chemicals in fuel supply systems and consumer products. Developing countries are being urged to make similar costly control efforts by signing international treaties and trade agreements. Would the resources not be better spent on the many more pressing priorities of the poorer countries, including the need to reduce major risks to health?
- Scientists in industrialized countries are increasingly concerned about the future long-term impact on health of climate change. This concern may be diverting attention and resources from hazards such as air pollution, water pollution, and occupational dangers, which are estimated to account for at least 15% of the current global burden of disease, mostly in the least developed countries, making them second in importance only to malnutrition. It is uncertain whether climate change would ever have such an impact on health, even in worst-case scenarios.

Examples of the benefit to be derived from the global dominance of environmental health issues by industrialized countries include the following.

- The flow of information on environmental health has to make it possible for developing countries to

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enact far more stringent environmental legislation than the industrialized ones had at an equivalent stage of their own economic development. (Unfortunately, too little attention was paid to developing the legal, administrative, and management skills needed to implement this legislation. As a result, enforcement has often been weak and environmental conditions have not improved to the same extent as they did in the more developed economies.) The information flow has certainly fostered the growth of public and scientific awareness of environmental health problems in developing countries. It also facilitates increasingly widespread access to methods of analysis and extensive databases in the developing countries, which the industrialized countries have built up only at great cost.

- Epidemiological and toxicological information from studies in industrialized countries is allowing developing countries to exert significantly more control over asbestos and lead, both of which are relatively important health hazards, earlier in the development process than would otherwise have been possible. Almost every nation in the world has taken steps to remove lead from gasoline. Even when health may not have been the primary immediate concern locally, countries have switched away from lead in order to match their energy systems to the international economy. In this sense, therefore, more rapid reduction in lead risk in developing countries has been an unintended but still real “health export” from developed economies.
- Trade agreements, often blamed for increasing the risk of environmental damage to health, can have positive effects. In implementing the North American Free Trade Agreement (NAFTA), for example, Mexico had to upgrade its food and drug regulations substantially, with considerable health benefits to the Mexican population. Moreover, trade rules relating to pesticide and bacterial contamination in exports can lead to increased protection for populations in both developing and industrialized countries. There is also evidence that, in general, transnational corporations tend to maintain higher environmental and occupational standards in their host countries than do local companies.
- There was a fear, widespread in the industrialized world of the late 1960s, that protecting the environment could stifle a country’s economy. There is now ample evidence from the more developed countries showing that this is not the case: the less developed ones can easily see that a well-protected environment is compatible with strong economic development. The question they now face is not whether they should implement strict controls, or whether such controls will work, but how soon the controls should be put in place. ■

Round Table Discussion

Better to die at 50 from cancer than at 1 from malnutrition?

Carel IJsselmuiden¹

Smith provides an insight into the consequences of the dominance of industrialized-country views on environmental health, and gives examples of its advantages and disadvantages (1). Most of the points he makes are relevant and important, but a number of problems are displayed in his statements.

Though Smith is critical of the dominance of Western views, he represents this dominance at the same time. The examples he selects make that clear: with a small concession to malaria control and DDT use, his examples concern global interests that may not adequately cover the needs in developing countries. As Africans, we will have a greater impact on health by tackling known (but perhaps no longer interesting) environmental problems such as water, food and sanitation. In addition, in this continent in particular, landmines, drought, famine, violence and war are far more substantial environmental hazards than dioxin, chloramines or air pollution from local sources, and they are not only short-term problems.

Perhaps, the tendency to ignore local problems is one of the major reasons why developing countries have such difficulty with environmental health interventions. Collectively, we have so far failed to convince either the rulers or the general public in developing countries of the importance of tackling environmental risks. “It is better to die at the age of 50 or 60 from cancer than at the age of 1 from malnutrition” is one powerful expression of the popular sentiment. It is hard to conceive that those striving for immediate survival can be interested in the next-generation effects of endocrine disruptors when their very ability to produce a next generation is not assured.

Smith states that globalization of trade may benefit developing countries as multinational industries often have better safety standards than local ones. While this may be true, this “solution” applies to only a few people, and is very much a two-edged sword. Firstly, the fact that standards in multinational industries are better than those of local industries is less important than the fact that those standards are lower than those used by the same industries in industrialized countries. While some workers may benefit, the overall message is that African lives are cheap. Secondly, globalization is a narrow economic strategy for maximizing prosperity for some without taking into consideration the distribution of this prosperity or its current and future cost to the environment. To me this argument is like the one that says: “Apartheid had its good points: at least we had less violence then”.

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Finally, the implicit definition of environmental health used by Smith is in itself an expression of the dominance of the views of industrialized countries. Smith's environmental health seems to be physical, chemical, and biological. Even famine and war fall outside this definition. The narrowness of this definition probably has two origins: the undeniable utility it has for scientific and technological development, and the fact that most environmental scientists in the developed world have forgotten that health in general, and environmental health in particular, requires as a minimum a democracy and a viable culture of human rights. The history of environmental health in the West had as much to do with science as it had with civic emancipation. In Africa, where democracies can be counted on the fingers of one hand, where corruption is rife, and where the concept of human rights hardly exists in practice, neither "health for all" nor "environmental health for all" can be achieved. Health workers in developing countries do not have the luxury of focusing exclusively on science and technology, but have to meet basic needs. While Smith argues that legal, administrative and management skills are needed to solve this problem, I argue that those skills are needed but they will not be effectively used without a more fundamental approach. Either individually as scientists and activists, or collectively with support from organizations outside the immediate sphere of health, the requirements of immediate survival and human rights must be met. Perhaps the most important shortcoming caused by the global dominance of industrialized-country views in environmental health is the narrowness of these views. ■

1. **Smith KR.** Environmental health — for the rich or for all? *Bulletin of the World Health Organization*, 2000, **78**: 1156–1157.

A case in point: occupational cancer Paolo Vineis¹

Discussions on whether to uphold the safety standards applied in industrialized countries in all efforts to foster environmental safety (1) should take into account some persuasive historical lessons.

Virtually all carcinogenic chemicals have been identified as such in developed countries. The contribution of both epidemiology and experiments with animals has been essential for the identification of environmental and occupational carcinogens. Thirty-three chemical agents used in industry or industrial processes evaluated in Monographs 1–60 of the International Agency for Research on Cancer were found to be carcinogenic in humans, and many others were carcinogenic in experimental animals. There are over 100 000 chemicals in current use,

most of which have not been adequately evaluated in terms of long-term toxicity. The knowledge we have acquired about occupational and environmental carcinogens comes from decades of research in developed countries, with a methodological experience that should not be discarded.

How many of the cancers that occur in a population are due to occupational exposure? In industrialized countries most estimates are around 4–5%. However, considerable variability among geographic areas was noted (1–40%), mainly as a consequence of variable proportions of exposed workers in the different populations studied. Within the USA, estimates for lung cancer from five similarly designed studies ranged from 3% (Louisiana) to 17% (in Pennsylvania). Although these estimates are not large, they are comparable to estimates for other environmental factors affecting health, except for smoking and diet, which are much larger. Occupational exposure, however, is more easy to prevent than lifestyle exposure.

Cancer is becoming a major cause of death in many developing countries. The total number of cases is expected to double by the year 2010. This is due partly to decreasing mortality from other causes, and the consequent rise in the mean age, and partly to increasing exposure to carcinogens, chiefly tobacco but also occupational carcinogens.

Since the 1970s, most hazardous production activities have been transferred to developing countries. Chemicals banned in the USA or Europe are now produced elsewhere. For example, asbestos transformation has been transferred from the USA to Mexico, and benzidine production from European countries to former Yugoslavia and the Republic of Korea. Pesticides are widely used in the Third World. Worldwide production now totals hundreds of tons per annum, providing sales of more than US\$ 15 000 million. While the greatest application rates per hectare historically have been in Japan, Europe, the United States, and, to a lesser extent, China, the fastest growing markets are currently in Africa, Central and South America, Asia and the Middle East.

Indirect signs of widespread high-level exposure to pesticides are the epidemics of acute poisoning taking place in some of these countries. According to one calculation, there are about 20 000 deaths each year in the world due to acute pesticide intoxications, but this is likely to be a substantial underestimate. It has been estimated that 99% of all deaths due to acute pesticide poisoning occur in developing countries, where, however, only 20% of the world's agrochemicals are used.

Prevention of occupational exposure is rare or nonexistent in most developing countries, where levels of exposure are usually much higher. For example, levels between 5 and 20 mg/day were measured for dimethoate in Sudan, and 300 mg/day for malathion in Pakistan. Such values are much higher than those found in Western countries. For 1,3-butadiene, the exposure limit set by the American

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Conference of Governmental Industrial Hygienists is 10 ppm, while the limit set in Brazil is 780 ppm, and in Mexico and Taiwan 1000 ppm. Similar differences are documented for several other carcinogens.

In summary, it would be unfair to pass hazardous technologies on to developing countries while not passing on the means of recognizing and preventing their ill-effects. ■

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The need for a developing-country perspective on the environment

Léo Heller¹

Kirk Smith (*1*) points out the two schools of thought on approaches to environmental health, as formulated from the perspective of the industrialized world. His examples show how developing countries can be harmed by or benefit from the environmental health choices made by industrialized countries.

Whatever the reasoning, the developing countries are affected and, for them, only a passive or reactive position seems possible. In Smith's examples, the harmful effects of this situation result from an uncritical acceptance of prevailing technologies (as in the case of DDT), of technological imperialism (as in the case of water chlorination), from economic and commercial pressures, and from attention being diverted from current local problems in favour of global approaches. Benefits include globalized information, trade agreements which improve some standards in developing countries, and the experience of industrialized countries since the 1960s (not necessarily reproducible in developing countries now).

When a developing-country point of view is taken, the issues look different. Examples include the following.

- Determinants of global health problems such as rising atmospheric temperature, loss of biodiversity and destruction of the ozone layer are found in the industrialized countries and are related to the levels of production and consumption adopted there, the resultant emissions and their impact on the environment.
- The global imbalance of consumption and energy use, highly favouring the industrialized countries, and the consequent generation of waste and pressure on natural resources, is clear.
- In the global economy, in which transnational corporations play a predominant role, there is a clear international division: pollution and unsafe work remain in the developing countries.

- In the prevailing politics of neoliberalism, developing countries tend to transfer the ownership and management of public services to private companies. In most cases, this entails abandoning the natural social vocation of state companies to the logic of profit, thus increasing the exclusion of the poor from the public goods.
- The priority environmental health agenda of developing countries, unlike the industrialized ones, still includes basic items such as water supply and sanitation, urban refuse collection and disposal, stormwater management, and indoor air pollution, although issues such as outdoor air pollution and food contamination are also important.
- Environmental health problems in the developing world are closely related to those of poverty, inequality and debt, all of which the industrialized countries help to perpetuate.

This view of environmental health reveals the hegemony of developed-country thinking on this whole question. Obviously, the prevailing scientific understanding of the relation between the environment and health, together with the technological, institutional and legal solutions proposed, comes from the industrialized countries. The developing-country perspective has been absent from what has been done, from the priorities that have been set and from the conceptualization of the problem itself.

A developing-country perspective on environmental health issues is very much needed, so that solidarity and fraternity can prevail, for the benefit of the whole world's population and for the promotion of human values that are not evident today in the overall policies of the developed countries. ■

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Applying the precautionary principle to the environment

Bernard D. Goldstein¹

Kirk Smith's provocative piece (*1*) comes at a time when there is much debate over the precautionary principle. It is challenging to reflect on how this principle interacts with the issues he raises, particularly as each of his "examples of harm" are examples of actions for which the precautionary principle could be invoked to a greater or lesser degree.

My thesis is that the precautionary principle applies to our actions in the name of public health and the environment just as much as it does to the actions of industry. The following three recent examples of

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public health actions resulting in harm could well have benefited from a more thorough precautionary analysis.

In Bangladesh the rapid replacement of potentially contaminated surface water with tube wells for drinking-water has caused serious arsenic poisoning because the groundwater stratum tapped by the wells has naturally high arsenic levels.

In the United States the careless requirement of methyl *tert*-butyl ether in levels as high as 15% in gasoline in order to reduce air pollution has inevitably led to significant groundwater contamination from what is now known to be a potential carcinogen,

In Egypt a hepatitis C epidemic in rural Nile villages appears to be due to a campaign to inject everyone with an anti-schistosomiasis compound. The campaign unfortunately did not include adequate needle sterilization.

Smith's "example of harm" of the push towards reducing chlorination of drinking-water is particularly relevant as many who most ardently favour replacement of chlorine are the most vocal backers of the precautionary principle.

There are two corollaries to invoking the precautionary principle. Firstly, we might be wrong: if we were reasonably certain there would be no need to invoke this principle. Secondly, there is usually a significant economic or social cost involved in taking precautionary action: if the cost were trivial the action would probably be taken without need to invoke the precautionary principle. Accordingly, it seems appropriate to analyse thoroughly the consequences of our action, including second-order and third-order issues such as those described by Smith. This is not a call for additional delay, but it is an endorsement of his challenge to do a more thorough and holistic evaluation when adopting measures aimed at environmental protection. ■

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Cooperation can solve it

Niu Shiru¹

Worldwide exchange of scientific information and practical experience is always beneficial for all concerned. It should be noted that all the countries involved, industrialized or developing, make their own contributions to this.

Very often, industrialized countries are ahead of developing ones in matters of environmental health (*1*). For instance, the chlorination of water started 100 years ago in industrialized countries and has been yielding tremendous benefits in saving lives

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from waterborne diseases all over the world, particularly in developing countries. No matter what side-effects or better substitutes (like ozonation) chlorination has, it is still used as an effective and sustainable method for water purification and disinfection in many developing countries for lack of affordable alternatives. This situation should be understood in the overall discussion.

Incineration looks like the most advanced and feasible treatment for hospital waste at present. Learning from industrialized countries, many developing countries now are putting vast investment into it. There are no convincing arguments for rejecting it at once.

Regarding the harmful effects of global warming and persistent organic pollutants, it is worth remembering that many industrialized countries have released vast quantities of harmful and toxic chemicals from various industries into the atmosphere over the last decades, and these have travelled long distances and been accumulating for a long time. Industrialized countries have the obligation to eliminate and reduce the hazards caused by their own economic and social development in the past, and to promote new affordable technologies for developing countries. There is no doubt that World Trade Organization activities will stimulate economic growth in developing countries, but there is much concern in those countries about the side of this which entails importing unhealthy processes, materials, products and even wastes, which cause occupational and environmental problems.

Evidently, worldwide multidirectional communication is a fine way to enhance understanding and cooperation over all these matters, and to make more progress in global environmental health. ■

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Hard choices

Alistair Woodward¹

Kirk Smith is right (*1*). We should pause and ask ourselves: whose interests are served by the work we do? In particular, does environmental health in rich countries help or hinder the rest of the world?

But the title of his paper may be misleading. I doubt that there really is a choice as implied. One can't simply elect to belong to one "school of thought" or the other. Research carried out in rich countries has the potential for positive *and* negative effects on populations in the developing world. The examples listed make this point well (although I am puzzled by the reference to dams. Large dams cause

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plenty of trouble for local populations, especially in the least developed countries. Opposition to these schemes is fuelled by more than the concerns of first world environmentalists.)

The really difficult question is how to strike a balance. How should we allocate our efforts in environmental health? How should we distribute person-time and dollars between the immediate, day-to-day concerns of the mass of the world's population, and advancing knowledge in ways that may benefit everyone in the future? Should we follow the principle of the greatest good for the greatest number, as I think Kirk Smith implies? This approach raises problems of fairness, for instance by down-playing the needs of minority groups. If fairness is to be taken into account, what version of equity should be applied? How? A particularly thorny question is: what weight should be given to health impacts in the future? Climate change, for instance, may seem like an esoteric and remote problem when compared with air and water pollution that is already with us. But we can't afford to put our heads in the sand — large risks are important risks, even if their full effect is uncertain and won't be felt for many years.

I think it is worth noting that these questions apply within countries with fully developed economies as well as between more and less developed regions. In many "affluent" countries there are disadvantaged communities that are not well served by mainstream environmental health research and interventions. In the case of New Zealand one need not look overseas to find communities that lack basic safe housing and water supplies. Yet health research and public policy both tend to be preoccupied with chemical and physical hazards that carry low risks. Electromagnetic fields in the home, for example, is a more fashionable topic than fire safety or enteric infections.

We need to be reminded of these questions. But this is just the first step to making the really hard choices that face us as scientists and responsible global citizens. ■

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