

# Current Environmental Priorities for the Third World

by Gordon Conway\*

In the western industrialised world and in Britain in particular, we have focussed our environmental concern almost exclusively on pollution and the preservation of wildlife and the countryside. But these problems have assumed importance largely because of our high living standards. The important environmental problems of the Third World are of a different kind. They also raise ecological questions of a more fundamental nature.

In all ecosystems there is a conflict between productivity and stability. The tropical forest is highly stable but not very productive. It gives an impression of great natural wealth, yet this takes years to accumulate and only a small proportion is exploitable by man. What development entails is a shift in the natural balance to create semi-artificial ecosystems in which productivity is higher and more useful. Thus plantations and cropped fields replace the natural forest. The perennial hazard is that in the process serious instability will arise.

A hundred years ago, the practice of 'shifting cultivation' followed by the hill people of Southeast Asia and of many other parts of the humid tropics provided the basis of a livelihood but had little effect on the stability of the forest ecosystem. It worked because the cultivators appreciated the fragility of the nutrient cycle on which the productivity of the land depended. They felled and cleared the forest,

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cropped the land for a limited period and then left it fallow for 10 or more years to restore its fertility. But in recent years, high rates of population growth have put heavy pressure on the land. The old cultivation cycle has been progressively reduced and now the same patch of land may be returned to every three or four years. As there is no chance for the soil nutrients to be replenished, crop yields fall and the soil becomes eroded. Eventually, all it will support is a cover of coarse, useless grass vegetation.

Elsewhere the same effects are being produced by bad forestry practices. In many developing countries there are rich stands of commercially valuable timber which can be readily extracted and converted to foreign earnings. Inevitably there are strong incentives to maximise these earnings by employing the cheapest extractive methods, even at the expense of longer term environmental consequences. Sustained timber yields depend on long cycles of forest regeneration; but clear felling and the misuse of heavy extraction equipment are creating a kind of mechanised shifting cultivation. Good regeneration is prevented and the sequence of erosion and deterioration is repeated.

The consequences are not confined to the upland interiors. The upland soil loses its ability to absorb and store rainfall. Rivers cannot contain the periodic rushes of water and extensive flooding occurs throughout the lowlands, even as far away as the coastal towns -- Bangkok, Manila and Kuala Lumpur have all suffered badly in the last couple of years. It means also that the lowland farmer cannot rely on a steady supply of water. This takes on special importance when it is recalled that the new rice varieties will only give their phenomenal yields if there is adequate water control. Finally the heavy silt that is washed down from the uplands fills reservoirs and irrigation canals and clogs hydro-electric power plants.

### Resource Management

The plight of shifting cultivation and the pressures on good forestry practice illustrate the central dilemma of applied ecology in the Third World. How can we get development and improve standards of living without endangering the viability of the systems upon which

it all depends? The answer is not to leave the forests untouched or to return to primitive subsistence farming, but to find better agricultural and silvicultural systems. In the uplands we need systems which will give high sustained yields and at the same time provide the necessary soil and water conservation.

This dilemma arises wherever we look. The environmental problems that have followed the building of the Aswan and Kariba dams have been well publicised in the Western press. Fisheries have suffered and diseases such as schistosomiasis and sleeping sickness have increased, affecting the people (and their livestock) for whose benefit the dams were originally built. In Southwest Asia badly designed irrigation works are leading to heavy accumulation of salts in the soil. Land which has been in cultivation only a few years, has rapidly become unproductive again. One authority has suggested that, even taking into account the new irrigation works being constructed in this region, waterlogging and salinisation are probably producing a net decrease in arable land each year.

The more revolutionary the development, the more acute and complex the dilemma becomes. The green revolution has produced its own set of ecological problems. The new cereal varieties are triumphs of biological engineering, soaking up light, water and fertiliser to produce seemingly miraculous yields. But they have an inherent instability which derives from their narrow genetic stock and from the conditions of continuous monoculture under which they are grown. They are particularly prone to pests and disease attack. The danger is that in replacing locally selected cereals, the new varieties, with their low resistance, will be vulnerable to local pests or local strains of disease, and outbreaks of epidemic proportions will result.

In North America, it is true, large acreages of wheat involving relatively few varieties have been grown very successfully for many years. Nevertheless the wheat belt is subject to frequent explosive outbreaks of pests and diseases. Such outbreaks are only effectively contained by highly sophisticated extension and research services operating in conditions of constant surveillance. In the developing countries such facilities are not available and in controlling outbreaks reliance will be increasingly placed on blanket prophylactic applications

of broad-spectrum pesticides. In some situations this approach can be effective and for a number of years good control will be achieved. But repeated pesticide application can readily lead to the destruction of beneficial parasites and predators and to the evolution of pest resistance. As experience in the developing countries is already showing, pest problems are created that are considerably worse than the original ones.

The dilemma though, is not insoluble. Applied ecologists can provide answers. There are better ways of controlling pests than relying on broad-spectrum pesticides. Entomologists as far apart as Malaysia and Peru have shown that cheap and effective control can be achieved by integrating cultural and biological techniques with the judicious use of selective pesticides. In this respect the hot moist climates of many developing countries provide ideal conditions for an ecological solution to pest problems. In these climates, parasites and predators seem to play a more important role in regulating insects and this can be exploited to the full. It is in recognition of this potential that the International Rice Research Institute in the Philippines has recently appointed an insect ecologist to work on the pest problem of the new rice varieties.

A more fundamental answer to pest, disease and other similar problems lies in multiple cropping. Traditional farming in the developing countries often relies on a mosaic pattern of cropping, different crops being grown on the same land, either together or in rotation. Such systems can make a much greater use of the tropical sunlight and at the same time will minimise pest and disease problems and the effects of marketing fluctuations. Agronomists in Thailand, in the Philippines and in India are working on modern versions of multiple cropping using high yielding varieties and better techniques of cultivation. This approach also forms the corner-stone of the development programme of the new International Institute for Tropical Agriculture in Nigeria.

### Pollution

None of this is to say that pollution problems do not exist in the developing countries. There are

reports of crop losses due to mine-tailings or gases from smelters. Rivers are commonly polluted by untreated wastes from rubber or palm-oil plants or from chemical factories. There are also very serious and widespread problems of sewage disposal. The current high levels of enteric disease and the rising incidence of schistosomiasis are the direct results of the pollution brought about by poor sanitation. Problems such as these can be expected to increase as populations grow and new industrial technologies are introduced.

Nevertheless, with the exception of the problem of water contamination by sewage, pollution is by no means as serious as in the industrialised countries. It is more localised in occurrence and, in general, the hazards involved are outweighed by obvious benefits. For example, pesticides such as DDT which are commonly used in the developing countries may constitute a danger to man and wildlife. Residues in food are sometimes high and water supplies frequently contaminated. But where there is no cheap or effective alternative the benefits they bring in controlling crop pests or the insect vectors of disease may more than compensate for the possible harmful effects. Often, as in this case, the pollution is a symptom of an ecological problem of a more fundamental nature. The concern in the developing countries over pesticides is not with their potential role as pollutants of the human environment but with their effectiveness as agents of pest control. As I have said, far too often they worsen rather than solve pest problems. The challenge is in finding alternative techniques which will give better control and at the same time cut down on the risk to health.

The same arguments apply in other fields. Tourists visiting the capitals of South America or Asia object to the exhaust fumes and noise which mar their sightseeing. But in the list of priorities air and noise pollution is less important than the problem of relieving congestion and providing an efficient transport system for people and their goods.

#### The 1972 UN Conference

The first reactions of many of the developing countries to the 1972 UN Conference on the Human Environment reflected this different emphasis on environmental problems.

The main sponsors of the conference have been the more affluent industrialised nations and the developing countries felt that in a worldwide pursuit of pollution control they would be left worse off than before.

For example, they feared that in the interests of environmental quality they might be denied access to certain technologies which would aid their development programmes. This is a justified fear. There are reports that US aid agencies will bar shipments of pesticides which are subject to domestic regulations in the USA. It may well become difficult to obtain DDT for those purposes where there is no better alternative. There are also fears that the developing countries will become subject to unfair or punitive environmental standards imposed through restrictions on trade. Inevitably if the industrialised countries wish to maintain certain levels of environmental quality they will impose bans on imports which do not meet their standards. For example, they will be reluctant to allow the import of foods with high pesticide residues. Similarly, they will act to prevent their own industries being undercut by competitors in the developing countries who are using cheaper and more pollutive techniques of manufacture.

Much of the groundwork of the conference is being devoted to establishing a dialogue in these matters and to allaying some of the fears of the developing countries. The success of the conference will depend on the extent to which the different environmental priorities at stages of development are fully recognised. For the industrialised countries there are a number of important implications.

It is going to be difficult if not impossible to define absolute scales of environmental quality; for the reasons already given, standards will vary from country to country. Real progress towards international pollution control can only come from negotiated agreements in which the priorities and special problems of the Third World are given their full weight. Some problems are sufficiently of common concern for them to be tackled at a global level. Oil spillage is one of these. For others it will be more productive if common standards are first sought on a regional basis. At whatever the level of negotiation much will depend on the costs involved. Few developing countries

have the facilities or expertise to undertake pollution monitoring programmes. Enforcing control will depend on agencies and staff that are also lacking. Much of the necessary funding will have to come from outside the Third World and should be in addition to development aid.

### The Implications for Aid

The other major implication follows from a recognition that environmental issues are intimately involved in development. Improved material standards of living in the Third World are as dependent on sound ecological management of national resources as they are on political, economic and social factors. Hitherto, environmental concerns have been absent or only of minor concern in international aid programmes. This has to be changed, if only because it is in the interests of the industrialised countries, which provide most of the aid, to see that it is most profitably used by ensuring that development programmes take ecological factors into account.

This is not necessarily an argument for a great deal more aid. An ecological approach to resource management, even in the shorter term can be cheaper and more efficient. The techniques of multiple cropping and integrated pest control, referred to earlier, fall into this category. The recycling of sewage is another example. At the Asian Institute of Technology in Bangkok pilot experiments have shown that by using high-rate oxidation ponds the tropical sunlight can be harnessed to convert urban sewage into rich algal harvests. The problems of sewage pollution are avoided and at the same time the algae can be turned into food in the shape of fish and other animal protein.

But extra funds are required to foster the development of techniques such as these, and this can only come from the growth of indigenous ecological skills and experience. Most environmental problems arise within a framework of local conditions, and if mounting problems are to be avoided in the long term, there is no substitute for detailed local knowledge. The weakness of resource management agencies in the Third World and the critical lack of trained manpower results in a heavy reliance on outside experts. Too often these have little ability to fit their own knowledge and judgement to the

new environmental situation. More training abroad is only partly an answer. The danger is that students will receive an academic or specialised training which ill-equips them either to adapt techniques from the industrialised countries or to develop new ones more appropriate to the local conditions.

The industrialised countries can best help by providing aid for training in resource management in local institutions -- universities, colleges of technology, agriculture and forestry schools -- which are part of the local environment and can benefit from day to day contact and experience. They can also play a valuable role in supporting new or existing research institutions which will focus on a more interdisciplinary and integrated approach to resource development. The International Institute for Tropical Agriculture in Nigeria is an example of what can be done. Similar kinds of institutes are needed for the problems of range management, for research into the cropping of the tropical uplands and for the management of water resources.

A principal objective of the 1972 UN conference should be to lay foundations for international action on matters of common concern. In the long run the well-being and survival of the whole world will depend on a common sharing of resources and the tools and skills needed to manage them wisely. We need to move towards a greater international control of pollution, but the developing countries will more readily accept their role in this if, as an outcome of the conference, there is a concerted effort to deal with the more fundamental environmental issues which they face.