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IN DEFENCE OF THE EARTH

The basic texts on environment:
Founex • Stockholm • Cocoyoc



United Nations Environment Programme

IN DEFENCE OF THE EARTH

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- 1 In defence of the earth:
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alternative lifestyles and
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IN DEFENCE OF THE EARTH

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Founex • Stockholm • Cocoyoc



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Foreword

Executives in both the public and private sectors need to be kept abreast of relevant information vital to decision-making.

With this in view, and recognizing the "threats to both the inner-limits of basic human needs and the outer-limits of the planet's physical resources", the United Nations Environment Programme is launching a series of executive summaries on environmental themes in order to provide a convenient reference for the educators, scientists and decision-makers of the world.

The first in this new series, *In Defence of the Earth*, contains the three basic documents upon which the fundamental principles of environmental management are based: the Founex Report, the Stockholm Plan of Action and the Cocoyoc Declaration.

The 1971 Founex Report delineated clearly and cogently many of the principal issues in the field of environmental decision-making that were to confront Governments of both industrialized and developing countries as they assembled in June the following year at Stockholm. At Founex it became obvious that "development" and "environment" were but two sides of the same coin.

Perhaps the greatest achievement of the Stockholm Conference was that Governments realized how fragile their "Only One Earth" was and how interdependent they were. In the Declaration Plan of Action, Recommendations and Resolutions adopted at this UN Conference on the Human Environment, they undertook singly and collectively to correct the balance. They dedicated themselves to preserve and enhance the environment for present and future generations.

The Cocoyoc Declaration which resulted from a UNEP/UNCTAD Symposium held in Mexico in October 1974 identified the economic and social factors inherent in environmental

degradation, the increasing limits of resources and the rising pressures on them. At Cocoyoc the concept of "development without destruction" was crystallized.

The next summary in this series, *Choosing the Options*, will be based on five regional seminars—held in Addis Ababa for the Economic Commission for Africa region, Bangkok for the Economic and Social Council for Asia and the Pacific region, Santiago for the Latin America region, Ljubljana for the Economic Commission for Europe region, and Beirut for the Economic Commission for West Asia region—on alternative lifestyles and development patterns.

DEVELOPMENT AND ENVIRONMENT: THE FOUNEX REPORT

Founex, Switzerland, 4-12 June 1971

CHAPTER ONE

Over-all Perspective

The current concern with the Human Environment has arisen at a time when the energies and efforts of the developing countries are being increasingly devoted to the goal of development. Indeed, the compelling urgency of the development objective has been widely recognized in the last two decades by the international community and has more recently been endorsed in the proposals set out by the United Nations for the Second Development Decade.

To a large extent, the current concern with environmental issues has emerged out of the problems experienced by the industrially advanced countries. These problems are themselves very largely the outcome of a high level of economic development. The creation of large productive capacities in industry and agriculture, the growth of complex systems of transportation and communication, the evolution of massive urban conglomerations, have all been accompanied in one way or another by damage and disruption to the human environment. Such disruptions have indeed attained such major proportions that in many communities they already constitute serious hazards to human health and well-being. In some ways, in fact, the dangers extend beyond national boundaries and threaten the world as a whole.

The developing countries are not, of course, unconcerned with these problems. They have an obvious and a vital stake in them to the extent of their impact on the global environment and on their economic relations with the developed countries. They have also an interest in them to the extent that they are problems that tend to accompany the process of development and are in fact already beginning to emerge, with increasing severity, in their own societies. The developing countries would clearly wish to avoid, as far as is feasible, the mistakes and distortions that have characterized the patterns of development of the industrialized societies.

However, the major environment problems of developing countries are essentially of a different kind. They are predominantly problems that reflect the poverty and very lack of development of their societies. They are problems, in other words, of both rural and urban poverty. In both the towns and in the countryside, not merely the "quality of life", but life itself is endangered by poor water, housing, sanitation and nutrition, by sickness and disease and by natural disasters. These are problems, no less than those of industrial pollution, that clamour for attention in the context of the concern with human environment. They are problems which affect the greater mass of mankind.

It is evident that, in large measure, the kind of environmental problems that are of importance in developing countries are those that can be overcome by the process of development itself. In advanced countries, it is appropriate to view development as a cause of environmental problems. Badly planned and unregulated development can have a similar result in developing countries as well. But, for the greater part, developing countries must view the relationship between development and environment in a different perspective. In their context, development becomes essentially a cure for their major environmental problems. For these reasons, concern for environment must not and need not detract from the commitment of the world community—developing and more industrialized nations alike—to the overriding task of development of the developing regions of the world. Indeed it underscores the need not only for a maximum commitment to the goals and targets of the Second Development Decade, but also for their redefinition in order to attack that dire poverty which is the most important aspect of the problems which afflict the environment of the majority of mankind.

Whilst the concern with human environment in developing countries can only reinforce the commitment to development, it should serve, however, to provide new dimensions to the development concept itself. In the past, there has been a tendency to equate the development goal with the more narrowly conceived objective of economic growth as measured by the rise in gross national product. It is usually recognized today that high rates of economic growth, necessary and essential as they are, do not by themselves guarantee the easing of urgent social and human problems. Indeed in many countries high growth rates have been accompanied by increasing unemployment, rising disparities in incomes both between groups

and between regions, and the deterioration of social and cultural conditions. A new emphasis is thus being placed on the attainment of social and cultural goals as part of the development process. The recognition of environmental issues in developing countries is an aspect of this widening of the development concept. It is part of a more integrated or unified approach to the development objective.

The incorporation of environmental issues and goals in the sense discussed here in the concept of development raises—as does the incorporation of other social goals—important issues for planning and policy making. To the extent that these objectives support or reinforce economic growth—and it can be shown that some of them do—their place in the pattern of priorities would be more readily established. But where conflicts are involved, particularly in the short or medium run, more difficult choices would have to be made regarding the “trade off” between these and the narrower growth objectives. These choices can only be made by the countries themselves in the light of their own situations and development strategies and cannot be determined by any rules established *a priori*. Subsequent sections of this report attempt to identify and elaborate upon the specific environmental problems faced by developing countries and the ways in which these could be categorized as aids to planning. But the importance of distinguishing between measures or programmes that are conducive to growth, or at any rate not in conflict with it, and those that may involve some sacrifice in growth objectives is clear enough. It is similarly important to distinguish between measures or programmes whose claims on financial resources are likely to be relatively modest from those which are likely to prove more costly. The employment creating potential of environmental programmes is yet another aspect that is of relevance to the planning process.

Whilst the environmental problems of developing countries are in large measure those that have arisen from the lack of development, it is also true that problems arising out of the process of development are also in evidence in these countries to an extent that depends on their relative levels of development. Indeed as the process of development gets under way the latter type of problem is likely to assume increasing importance. The processes of agricultural growth and transformation, for example, will involve the construction of reservoirs and irrigation systems, the clearing of forests, the use of fertilizers and pesticides and the establishment of new communities.

These processes will certainly have environmental implications. Similarly, industrialization will result in the release of pollutants and react on the environment in a number of ways. Again, the growth of the entire economic infrastructure of transport and communications will have consequences for the ecological system. Urbanization is already a pressing problem for many developing countries and some of their cities are experiencing problems common to those of the industrialized countries. In addition, with the urgent need for the rural areas to sustain a growing population, the problems of rural environment assume a new significance.

The problems are already severe enough in developing countries. But in the absence of resolute action, they will tend to attain formidable dimensions in the decades ahead. The very growth of population, when not accompanied by adequate economic development, brings out the prospect of rising unemployment, further impoverishing the countryside and swelling the drift to the towns and creating human problems of the deepest intensity. They can only aggravate the serious social and political tensions that even now prevail in these societies. There can indeed be little doubt about the urgent need for corrective action.

These issues are elaborated upon in succeeding chapters of this report. To the extent that some of the advanced environmental consequences of the process of development could be avoided by better planning and regulation, the developing countries have an opportunity to profit from the experience of the advanced countries. The importance of establishing adequate safeguards and standards in project planning and preparation is thus underlined. These standards must necessarily be those that are appropriate to the specific conditions of these countries and be capable of being observed within the resources available to them. All this reflects the vital importance of data and of research. It also raises the question of the instruments by which environmental policies could be implemented, particularly in situations where decisions are undertaken by private investors, whether domestic or foreign, in the context of market forces.

Environmental issues may come to exercise a growing influence on international economic relations. They are not only a formidable competitor for developed countries' resources (which in some instances might have been channelled towards development assistance), but they are also a factor which, to an ever-increasing degree,

could influence the pattern of world trade, the international distribution of industry, the competitive position of different groups of countries, their comparative costs of production, etc. Environmental actions by developed countries may have a profound and manifold impact on the growth and external economic relations of developing countries.

Some environmental actions by developed countries (restrictions on the importation and use of certain commodities, imposition of environmental regulations, standards and other non-tariff barriers on imports as well as increased production costs reflected in higher export prices) are likely to have a negative effect on developing countries' export possibilities and their terms of trade. Recycling of raw materials may also tend to diminish the volume of primary commodities consumed and imported into developed countries.

In some fields, environmental issues open up new possibilities for developing countries. The structural changes in production and trade, as well as the geographical relocation of productive enterprises which might be necessitated by environmental considerations, should provide new opportunities for meeting some of the developmental needs of the developing nations. This relates first of all to the relationship between natural and synthetic products and the re-opening of certain markets to exports of natural products. In some cases, developing countries might have a possibility of increasing the inflow of foreign capital and of creating new industries. If such opportunities are to be fully realized, they will require new and concerted measures on the part of developed and developing countries in the fields of international trade and investment, as well as in the control of private foreign enterprises.

The desire to retrieve some of the past damage to the environment and to minimize the environmental cost of future development will, in most cases, represent a new claim on productive resources and an additional element in the cost of production. Some of this burden may be reduced in the future as science and technology itself responds to the needs of environmental management. Still, one of the major questions which would arise from the increased concern with the preservation of the environment is how the higher cost of future development would be shared as between developed and developing nations. There are misgivings in the developing countries that, given their peripheral role in the international economy, arising not only from their present low economic capacity and bargaining

power but also from a declining relative share in world trade and the increasing gap in per caput income, they might not be able to take full advantage of the fresh opportunities that may arise from environmental control, while at the same time they might have to bear part of the extra burden which such control would entail. The increased cost burden arising from greater attention to environmental problems should be accompanied by a greater willingness to provide additional assistance and induce a greater effort to reduce the inefficient allocation of productive resources arising from indiscriminate protection of agriculture and industry in both developed and developing countries. It certainly should not provide fresh argument for even greater protection.

The focusing of attention on environmental issues has, therefore, implications that go beyond national policies in developing countries. The international aspects of the present environmental concern are discussed in a subsequent chapter. But we would like to stress here that the extent to which developing countries pursue a style of development that is more responsive to social and environmental goals must be determined by the resources available to them. Clearly there is scope for a better allocation of the presently available resources, but the results that could be obtained within their present resource constraints must necessarily be limited. If the concern for human environment reinforces the commitment to development, it must also reinforce the commitment to international aid. It should provide a stimulus for augmenting the flow of resources from the advanced to the developing countries. Unless appropriate economic action is taken, there are a number of ways in which the developing countries could suffer rather than profit from the new emphasis on environment. The latter could have implications for aid, trade and the transfer of technology. The developing countries are vitally concerned that these implications should be positive and beneficial rather than negative and harmful.

Environmental Issues in the Development Process

The preceding chapter has indicated that the environmental problems of developing countries fall broadly into two categories—the problems arising out of poverty or the inadequacy of development itself, and the problems that arise out of the very process of development. The problems in the first category are reflected in the poor social and economic conditions that prevail in both the rural and urban areas. For most developing countries these are, by far, the problems of greatest importance. But as the process of development gets under way the problems in the second category also begin to emerge and to gain in significance.

The environmental policies of developing countries must naturally be concerned with both categories of problems. But, as the preceding chapter has indicated, the remedial approaches to the first set of problems are closely interwoven with policies for over-all development. These policies should, of course, embrace wider dimensions than the growth of gross national product alone, and must include some of the major environmental problems that arise in the context of urban and rural poverty. As already mentioned, problems of poor water supplies, inadequate sewerage, sickness, nutritional deficiency, and bad housing need to be dealt with in the process of planning and policy making. Goals and objectives in these fields should be incorporated into development plans as much as targets for the growth of output.

The present Report does not attempt to elaborate upon the environmental issues of the kind referred to above, nor upon the manner in which they should be dealt with in the planning process. They are so much a part of social and economic conditions in developing countries that their treatment is but one aspect of the whole approach to social and economic development. Each country needs

to identify the complementarities and conflicts that characterize the relationship between social and economic goals in the circumstances specific to itself, and to determine its own priorities concerning the allocation of resources. The present Report seeks to do no more than draw pointed attention to the compelling urgency of the environmental problems that arise out of poverty, to the need for a new awareness of the importance of remedial measures, and above all, to the need for reinforcing the commitment, both nationally and internationally, to the development objective itself. It is to be hoped that the emphasis that is now being given to a more unified approach to development will result in a better recognition and treatment of the environmental problems that arise out of mass poverty.

The rest of the present chapter and, to a large extent, the succeeding chapter as well is mainly devoted to the second category of environmental problems that was mentioned earlier—problems that arise out of the process of development itself. These problems, though possibly of lesser importance in the early stages of development, are clearly likely to gain in significance as the process of development gathers momentum. As mentioned before, the transformation of agriculture, the development of industry, the creation of networks of transportation and communication, and the growth of towns, are all integral parts of the development process. They must, therefore, form part of the major goals of development policy and planning. But it needs to be recognized that the process of development and change in each of these sectors can be accompanied by adverse side effects which could in many cases be avoided, or at least mitigated, by sound planning and policy. The experience of the developed countries has shown that these side effects could, if ignored, attain formidable dimensions and cause damage and disruption on a wide scale. The developing countries have an opportunity to avoid some of the mistakes or distortions that have characterized the development process in the past. By paying attention to these dangers they can, perhaps, attain a more satisfactory pattern of development than that achieved by the advanced countries.

The present chapter attempts, in a broad way, to identify some of the negative side effects that can arise out of the process of development in several sectors of the economy. The succeeding chapter discusses the ways in which these problems might be dealt with through better policies and planning methods. The main issue is how the benefits of development in each sector could be obtained with

minimum adverse side effects. In presenting a selected catalogue of environmental consequences which can be, and have been, experienced in various sectors of the economy, our intention is not to describe a long list of adverse repercussions so as to imply inaction, since every action may affect environment in some manner: our intention is merely to bring together some of the available knowledge on this subject so that the developing countries can draw their own conclusions in the context of their development policies. We would also like to point out that the existing knowledge on this subject is fairly thin and sketchy and a lot more research work is needed to identify the nature and dimensions of environmental problems in various sectors of the economy.

The discussion that follows attempts to identify and describe some of the environmental side effects that have been known to accompany, in varying degrees, the process of development in agriculture, industry, transport and human settlement. These side effects take several forms and may be grouped into a number of categories. These are:

1. *Resource deterioration*: the deterioration, for example, of mineral, soil or forest resources;
2. *Biological pollution*: the pollution represented by agents of human disease, and by animal and plant pests;
3. *Chemical pollution*: arising out of air pollutants, industrial effluents, pesticides, metals, and detergent components and similar agents;
4. *Physical disruption*: as reflected, for example, by thermal pollution, silting and noise; and
5. *Social disruption*: of which congestion and loss of a sense of community are examples.

These side effects manifest themselves in varying degrees depending on the sectors concerned, the particular geographical regions involved, and the stages of development attained by different countries. The first two categories are commonly experienced by most developing countries as are also silting and perhaps social disruption, whilst urban air pollution is becoming a problem of increasing importance in the larger cities of certain developing countries.

Although these side effects are likely to manifest themselves in the process of development, they need to be assessed within a framework which helps to establish their relative importance. A basic

consideration would be the way in which a development activity relates to the carrying capacity of a country's natural, and even social, system. Such issues as the speed at which environmental degeneration is taking place, the degree of its severity, the area that it covers, whether the environmental impact is reversible or irreversible, and at what cost and over what period of time are all of relevance in this connexion. The scale and pattern of a country's production and consumption structure are also of relevance in assessing the impact of environmental side effects. The use and disposal of materials and their environmental implications are, for example, influenced by the level of technology since this is relevant to the nature of inputs and outputs in the production process. Similarly, consumption patterns are of importance. In societies where the levels of non-discretionary expenditure—i.e. expenditures on basic necessities—are high, the process of consumption exerts adverse environmental effects of a lower order of magnitude. On the other hand, higher levels of discretionary consumption, particularly of more sophisticated manufactured goods, generally produce a greater environmental impact. The social structure of a society, and its pattern of income and wealth distribution, are thus factors which are also of relevance.

Within a framework appropriate to its situation, a country may ascertain the nature of its environmental problems and examine alternative forms of action in dealing with environmental policies. Environmental side effects which are encountered in the development of various sectors should receive selective treatment. They should first be evaluated in terms of the development priorities which guide the planning considerations of any country. Those side effects which directly frustrate the development objective should be given the most immediate attention for remedial action. Those of peripheral concern will inevitably receive less emphasis.

AGRICULTURE

The process of agricultural development often involves the transformation of low productivity systems of agriculture into systems where productivity is relatively high. In the course of this transformation, cultivation practices on existing lands are improved, the infrastructure of facilities and services for agricultural production is expanded and new lands are brought under cultivation through

extensive systems of irrigation and river basin development. These changes are crucial to the development process itself. But they may also generate environmental side effects of varying degrees of importance. Some of the more common of these side effects are described here.

Traditional Agriculture

Environmental side effects may manifest themselves even within the framework of traditional systems of agriculture under the pressure of rapid population growth. These systems have often persisted for centuries, sometimes successfully cultivating the same lands without irreversible damage. But a new situation may be created by the rapid growth of population that is now taking place. This may impose pressures that were perhaps not experienced before and which could give rise to environmental problems.

Traditional agriculture in many tropical regions is characterized, particularly under stress of expansion, by a range of environmental hazards. These include leaching—notably the rapid leaching of nutrients and degradation of planted farmland following the removal of a forest; rapid soil depletion resulting from permanent cultivation which the relative infertility of the soil cannot support without the addition of nutrients; soil erosion through variable and heavy rainfalls and prolonged droughts or flash floods; and indiscriminate loss of forest resources through slash-and-burn techniques. Although much of this kind of environmental deterioration can be corrected if unlimited funds are available, some is so costly to correct as to be effectively irreversible. The fragility of tropical ecosystems may cause environmental deterioration to proceed rapidly and their recovery to be slow. In one instance, the establishment of an agricultural colony failed when deforestation resulted in the hardening of lateritic fields within five years; restoration on the other hand will take decades. In another case, previously ungrazed savanna was destroyed by overgrazing in two to three years, and will probably be lost to production for a very long period. There are opportunities for preventing some of these environmental hazards through proper planning and anticipatory action. For instance, underemployed labour that frequently abounds in rural areas may be mobilized in terracing mountain sides and in reforestation programmes. Many of Africa's current marginal lands, for example, have all the necessary elements for successful reclamation through new management techniques.

Modern Agriculture

The environmental hazards in the case of modern agriculture arise mainly from the chemical control of weeds and pests and from irrigation works. Fertilizers, on the other hand, would not appear at present to pose a threat even at the prospective level of their use in the developing countries. The side effects of insecticides and pesticides need to be watched fairly carefully. Their toxicity to fish and birds, as well as their persistence and mobility, make them a hazard beyond their target area. Irrigation projects, unless matched by drainage facilities, can result in salinization and water-logging. In one country modern canal irrigation serviced forty million acres in 1949, of which five million acres suffered from salinization and water-logging by 1959. However, much of this land has since been reclaimed through appropriate management. Even the welcome emergence of the high yielding varieties of wheat, rice, maize and other cereals can sometimes give rise to certain negative side effects, both because these varieties require large quantities of chemicals such as pesticides and also since they replace hardy native species which, by natural selection, are often better suited to the adversities of local conditions and are valuable for interbreeding. Again, constant tillage which is facilitated by mechanization can also damage the soil structure. Let us reiterate that modern agriculture would be impossible without the use of chemical fertilizers and pesticides, high yielding varieties of seeds and irrigation works, and a degree of mechanization, but it is important that their side effects should also be taken into account in planning the use of these inputs to expand agricultural production.

RIVER BASIN DEVELOPMENT

River basin development projects are instruments of major importance for economic and social development, and are often an essential part of the development programmes. However, many of the environmental problems which are commonly discussed have arisen in connexion with the construction of these projects. This underlines the need for careful study and analysis in the design of large dams or dam sites, so that their negative side effects can be minimized through proper planning. Some of the environmental problems which are generally associated with river basin development projects include the spawning of waterborne diseases, the filling of reservoirs with sedimentation, the drying-up of down-stream fisheries, the spread of

salinization and water-logging in associated irrigation projects, the inundation of valuable agricultural and forestry land, the displacement of population and the loss of mineral resources, wild life areas or valuable historical sites. The emergence of most of these adverse effects is generally gradual. Some of them can be readily corrected but others are practically irreversible because the capital investment is very large and fixed. Some of the consequences can be on a very large scale and may even be such as to frustrate the purpose of the development project or plan. However, many of them can be anticipated by preliminary analysis. For these reasons, environmental aspects of such projects clearly merit high priority for analysis but it must be borne in mind that many of the associated environmental costs may have to be assumed in the pursuit of benefits offered by the project, or that remedial action could be taken to minimize these costs. It is often wrongly assumed that in the past all adverse side effects have come as surprises.

INDUSTRY

Pollution emanating from industrial development represents more of a potential than an actual threat at this time in many developing countries. However, there are a number of isolated instances of industrial pollution even in these countries. The developing countries have an advantage in so far as they can learn from the experience of the developed nations. By taking sensible decisions of the location of industries and their waste disposal, and by instituting social controls under which the private sector must function, they can avoid some of the worst environmental problems that have arisen in connexion with industrial pollution. Developing countries should give careful consideration to the question of location of industries and formulate concrete guidelines in the context of their own national situation, which would prevent the rise of major environmental problems. It would also be useful to identify cases where labour-intensive technologies may produce less environmental disruption. This seems to us a high priority area for research.

TRANSPORT

A basic choice in the field of transport is between systems that provide mass transportation and the owner-operated vehicle. In the

United States, and increasingly in Western Europe and Japan, the choice of the motor vehicle as the primary means of personal transportation is now resulting in critical environmental consequences: air pollution with damage to people, vegetation and landscape, increased accidents; pressure on urban space, and distorted configuration of human settlements. Here there is a clear area of choice. In the transport policies adopted by the developing countries some of these environmental problems can be avoided by providing means of mass transportation and by thereby reducing the need for owner-operated vehicles. This is, in any case, dictated by their own level of development and the need to reduce visible disparities among various income groups. Mass transit facilities represent the obvious alternative in urban areas to the kind of environmental problems that have arisen already as a result of emphasis on owner-operated motor vehicles in more developed societies.

HUMAN SETTLEMENTS

Rural Areas

The development process will have its inevitable impact on human settlements. The predominant part of the population in most developing countries still lives in the rural areas. Often, these communities suffer from an inadequacy of services of one kind or another. Problems of health, nutrition, potable water supplies, and drainage are often severely felt in rural areas no less than in the towns. An inadequate infrastructure of agricultural and credit services is also a familiar feature of the rural scene, contributing to the persistence of low levels of production and hence of incomes. The stress of rapid population growth can, in certain situations, aggravate these problems and impose further strains on rural resources.

In such situations, there is often a drift of population to the towns which causes a further worsening of urban conditions. A preoccupation with growing urban problems could, in turn, result in a further neglect of rural areas. Modern social, cultural, and economic activities capable of attracting educated youth may not exist in the rural areas and this could itself be a contributory factor to growing urban concentration and unemployment. Moreover, the process of rural-urban interaction can result in the disruption of traditional systems of social security, such as that of the extended family without the provision of suitable substitutes.

It is important that the planning process take account of these problems. With the rapid growth of population, developing countries are likely to face an increasingly urgent problem of employment creation. It is, however, unlikely that the expansion of economic activities in the urban areas alone through industrialization and related developments will suffice to provide employment opportunities for the full increase in the work force. A substantial part of the increment to population and to the work force will need to remain in the countryside, and it is therefore vital not only that employment opportunities be created in rural areas, but that the whole structure of social and economic services in these areas be developed. This places a new emphasis on rural environment and on planning and policy-making in this field. It would indeed be unfortunate if the new environmental concern over the effects of development on urban areas should result in an excessive concentration of resources on urban expenditures at the cost of environmental improvements in the rural sector.

Urban Areas

As mentioned before, in the urban areas of the developing world, environmental quality is virtually synonymous with social welfare. Urbanization within a country can, of course, be accompanied by increased economic and social welfare, and urban concentration of dynamic enterprises can serve a valuable function as "development poles", generating growth throughout wider regions. However, the carrying capacity of any city submitted to rapid population growth is eventually overextended, and the economies of size are displaced by the diseconomies of inadequate infrastructure. Disease, water supply shortages, lack of sewage treatment, congestion and deteriorating housing are all manifestations of environmental stress. The more developed urban areas are now confronted with chemical contamination of air and water and the hazards of social disorganization.

The major cities of the developing world experienced a fourfold increase in their populations between 1920 and 1960. Today, in many developing countries, the influx of population is straining the existing capacity of cities. Their failure is symptomatic of imbalance in the development process, which could produce total breakdown in some instances in the coming decade. Each city has its own carrying capacity, which changes over time. This depends on the level and combination of population, economic and human resources, and

infrastructure, which are in turn in constant evolution. But once that carrying capacity is exceeded, degradation proceeds very quickly. There is, however, a high possibility of reversibility in this trend, which is not the case with natural systems. Government actions can reverse the city's deterioration, if sufficient resources can be mobilized.

The urban renewal projects in the industrialized countries are one line of attack. Often, however, such projects merely displace the slum population to new slums while more well-to-do-people move into the renewed areas. Another line of attack is urban dispersal, contingent upon planned allocation of new growth poles in conjunction with newly established industries and new urban settlements. Such planning is already under way in many developing countries. Less capital-intensive renewal schemes, especially ones drawing upon abundant labour, should be accorded a very high priority. Solid waste collection could also be resolved through mobilizing popular participation. In implementing municipal sewerage systems, methods emphasizing the use of labour could be selected. Rather than relying on large inputs of technology or capital, multiple aerated lagoons which are stocked with fish, or spray irrigation to enhance soil conditioning, could be used.

It is widely recognized that deviant social behaviour emerges from a loss of community and social organization. Many developing societies display a high degree of social organization and a considerable sense of community, even in urban settings, as a result of the transplantation of traditional social structures in the process of rural-urban interaction. Where traditional social systems—with broad citizen participation—are conducive to integration as well as change, urban planning should make room for such traditional patterns.

Some Considerations for Environmental Policy Formulation

We discussed in the last chapter some of the major environmental issues which may arise in the process of development. We turn now to a number of considerations which are relevant in formulating environmental policies in the developing countries. In describing these, we wish to make it quite clear that no general guidelines or specific formulas can be prescribed at this uncertain stage of our knowledge regarding the interaction of environmental and developmental policies. Each country must find its own solutions in the light of its own problems and within the framework of its own political, social and cultural values. The formulation of environmental goals, as indeed the formulation of economic and social policies in general, falls entirely and exclusively within the sovereign competence of the developing countries.

It is important that environmental policies are integrated with development planning and regarded as a part of the over-all framework of economic and social planning. As we have stressed so often before, environmental concern is only another dimension of the problem of development in the developing countries and cannot be viewed separately from their development effort. The objective should be to regard environmental improvement as one of the multiple goals in a development plan. The developing countries have certain inherent advantages in integrating environmental and developmental policies. Most of them are already committed to planning so that imposition or acceptance of social controls is nothing new for them. They are also making a fresh start in many fields and can anticipate the environmental effects and provide for them in their current planning. The overriding constraint in the developing countries is, of course, the limitation of resources which poses fairly sharp choices between various objectives of planning. Since environ-

mental improvement can be regarded only as one of the multiple objectives of planning, its priority in relation to other objectives should be determined by each society in the light of its own urgent economic and social problems and its own stage of development. Basically, this is a question of alternative uses of resources within the framework of comprehensive economic and social planning.

As we have already pointed out, the integration of environmental concern with development planning would require a broader definition of development goals than a mere increase in gross national product. The redefinition of development objectives must include greater stress on income distribution and employment, more attention to social services and welfare-oriented public goods, and greater provision for political participation. There should also be a quantification of social goals in development plans so that actual progress can be measured against these goals. Besides quantitative targets in the fields of income growth and employment, similar targets should also be spelt out for income distribution, public health, nutritional standards, housing and other welfare-oriented public goods. In other words, the quality of life in a poor society should be defined in terms of a selective attack on the problems of mass poverty, and development plans should attempt to quantify the improvement that is being sought in eliminating the worst forms of malnutrition, squalor, disease and ignorance.

One of the ways to quantify social goals in development plans would be to establish the concept of minimum environmental standards. Each developing country can define for itself the minimum environmental standards that it is seeking in various fields and sectors such as public health, nutrition, water supply, etc. The formation of these environmental standards can facilitate redirection of the efforts and energies of these societies towards certain concrete goals. Environmental indicators can then be devised to measure the progress of the society towards the norms it has established for itself. It should be stressed that environmental standards cannot be fixed for all time to come and must necessarily change over time as development proceeds. Again, it is quite possible that the resources of many of these societies may not be sufficient to achieve even the very minimum environmental standards in the short run. However, the advantage of establishing these standards is that they can serve as a focus for national effort. The concept of minimum—or threshold—environmental standards would also help in disaggregating the

target of GNP growth. Many developing countries are increasingly turning from a preoccupation with "how much to produce and how fast" to "what is produced and how it is distributed". The formulation of quantitative social goals and minimum environmental standards merely gives a concrete expression to this growing concern.

The integration of environmental concern in development planning would require national action by developing countries on a fairly broad front. Some of the major policy areas will include location of industries, land use policy, urban-rural interaction and community development, and sectoral policies as described in the last chapter. Greater attention is also needed for physical planning of facilities so that individual development projects and programmes get integrated into the over-all physical environment. There is some possibility that surplus labour in the developing countries could be mobilized in the cause of environmental improvement, especially through projects of community development in the rural areas, since such projects may be found particularly attractive by the community and since they may require a larger labour input. These possibilities should be carefully explored through further research and study, especially as many developing countries are currently faced with the prospect of growing unemployment and under-employment and they have not been very successful so far in mobilizing their surplus labour to promote economic development.

From the macro-level of redefinition of development goals, establishment of minimum environmental standards and formulation of environmental policies on an aggregative and sectoral basis, the developing countries need also turn to the macro-level of devising appropriate techniques for including the environmental factor in the appraisal of development projects. It is necessary to find techniques for quantifying the impact of development projects on environment, both favourable and unfavourable, so that the society can choose these projects with a fuller knowledge of their social costs and benefits. All too often the social costs of various projects have been ignored in the initial appraisal, especially when development proceeded under a regime of free enterprise, so that the society's awareness of many of the environmental disruptions resulting from these projects came at too late a stage, when the construction had already been completed. It is important that the social costs should be ascertained before undertaking development projects, so that the society can carefully choose whether these costs are still worthwhile in view of the other

economic and social benefits of the project, whether some of these costs could and should be minimized in the design of the project, and whether some of the costs could and should be postponed through adoption of alternative technology.

The basic idea of social cost calculus is to make individual enterprises and units responsible to society at large. The society suffers when the individual unit does not assume all the costs which it generates. For an individual enterprise, environment is a free good which can be used and contaminated at will in the pursuit of high and quick profits or planned production quotas. For the society as a whole, environment is a part of its real wealth and cannot be treated as a free resource. This is why the traditional cost-benefit analysis is inadequate unless it is broadened to reflect social costs and benefits. While an individual can afford to ignore these costs, the society as a whole cannot, and it has every right to insist that these costs be carefully calculated and deliberate decisions made as to who pays these costs and how much.

Some of the factors which may have to be considered in making allocation decisions are the following :

1. The quantity and quality of known and required natural resources, and the possible effects and probable date of their exhaustion;
2. The availability or possible development of alternative technologies, including their relative costs;
3. The suitability of alternative sites;
4. The existing level of air and water pollution;
5. The opportunities for waste disposal and for the recycling of raw materials;
6. The environmental impact of the project, speed of degeneration, degree of severity, possibilities of reversibility and costs of various alternatives.

This is not a comprehensive list of the questions to be raised in the case of each development project but only illustrative of some of the concerns which should be formulated into specific questions whenever a development project is being appraised.

There is a considerable debate at present on how specific guidelines should be formulated for project appraisal, taking into account environmental considerations in each sector and field. We have learnt that some work on guidelines is already under way in certain international financial institutions. While we recognize the need for specific

guidelines for project appraisal, we must enter a note of caution here. In the present state of our knowledge, there is need for extreme care in devising specific guidelines so that they do not become bottlenecks in the implementation of development projects, or raise such issues of detail as are irrelevant in the current state of development in many of the developing countries. In any case, it is for the developing countries to formulate such guidelines in the light of their own experience and requirements. We suggest, therefore, that the developing countries should take an initiative in this regard and also discuss this issue at the level of the United Nations regional economic commissions, regional banks and other relevant international agencies. No rigid guidelines should be laid down by multilateral or bilateral donors at this stage unless there has been an opportunity for adequate consultations with the developing countries through various appropriate forums.

In order that social costs and benefits be properly calculated and reflected in the allocation of scarce resources, developing countries will have to consider the framework of social controls that they need to establish over economic decision making, particularly in the private sector. There is a wide variety of social controls which can be considered in this context. There are indirect controls relying on the imposition of disincentives, such as taxes, effluent charges, etc., and on giving incentives through fiscal subsidies for environmental improvement. There are direct controls which range from outright prohibition, statutory regulation or the curtailment of production of toxic materials, to administrative measures taken to control location of industrial production or of human settlements. No general guidelines can be laid down as to the effectiveness of direct or indirect controls in various developing countries, since this will depend on a wide variety of factors, including their political systems, their social and cultural values and the economic strategy being pursued by them. Each society must find its own balance between the range of direct and indirect controls available in this field. Since a large proportion of total investment in developing countries is generally under public control, directly or indirectly, and since these countries are already using a number of administrative controls as well as fiscal incentives to regulate private activity, it should be easier for them to find a judicious balance between various forms of social controls for environmental improvement. We suggest that more study and research should be undertaken on

the effectiveness of direct and indirect social controls over environment, so that a range of specific policies is available to the developing countries from which they can choose in accordance with their own requirements and preferences.

In order to formulate environmental policies, the developing countries require a lot more information and knowledge than they currently possess. We suggest therefore that one of the first priorities should be to broaden their knowledge and information in the environmental field. It would be useful if the developing countries undertake a survey of their present state of environment and the major hazards to which they are exposed. They should also undertake studies and research to define the kind of environmental problems that are likely to arise in the process of development over the course of the next two to three decades. It would also be helpful to compile all existing legislation regarding environmental control, including the regulations dealing with urban zoning, location of industries, protection of natural resources, and so on. This accumulation of information and knowledge should enable the developing countries to get a clearer perspective of their environmental problems and of the corrective action that they may require at different stages of development. Since public participation in any such efforts is vital, efforts should also be made to build the environmental concern into education curricula, and to disseminate it to the general public through media of mass information. We would like to stress once again the need for a good deal of careful research and study in this field, and the importance of avoiding hasty guidelines and action.

Once the developing countries have integrated the environmental concern in their framework of development planning, and undertaken studies of specific policy action required at the national level, concrete institutional arrangements would be needed to implement policies of environmental control. It is premature at this stage to spell out in great detail what institutional arrangements may be required under different conditions, nor can we say anything definite at present about the kind of special legislation that may have to be devised. A number of institutional arrangements have been suggested for the consideration of the developed countries including establishment of separate ministries or departments dealing with environmental control; setting-up of environmental standards and indicators and their monitoring by special institutions; proposals for establishing environment, technology and location assessment boards

and for environmental quality management services; specific legislation to establish norms for the maintenance of clean air and clean water; new liability legislation regulating compensation for environmental disruption; enunciation of common or collective property rights with regard to such free and hitherto unprotected resources as air, water, soil, etc. Many of these institutional arrangements have greater relevance to the problems of the developed countries than to the developing societies though the latter can study the experience of the developed countries with the implementation of these proposals with some profit. As we have repeatedly stressed, the problems of environmental disruption are still a relatively small part of the development concern of the developing countries and it may be premature for many of them to divert their administrative energies to the establishment of new institutions or machinery; they can just as well try to integrate their environmental concern within the framework of existing machinery for planning and development. In any case, the developing countries will have to undertake their own experimentation and improvisations in devising their institutional arrangements for environmental control in the light of their own specific needs and requirements as these emerge in the course of development.

It has been our aim in this chapter to provide an overall framework within which the developing countries can consider their own specific national action for environmental control. As we said in the beginning, no general guidelines or specific prescriptions are possible, or indeed desirable, at this stage. The basis of national action is so much rooted in the varied conditions in each country that all we could do was to draw attention to certain over-all considerations rather than to prescribe any specific policies. We recommend that further work should be done by the developing countries themselves on the range of national action which would suit their individual requirements, and that this be discussed at the level of regional commissions meetings and at the Stockholm Conference.

CHAPTER FOUR

Implications for International Economic Relations

We have discussed in the earlier part of our Report the changing nature of environmental issues in the development process and environmental policies relevant to different stages of development. While we believe that continued development is the only answer to many of the environmental problems of the developing countries, we also believe that these countries cannot afford either to neglect the environmental problems or to treat environment as a free resource as the presently developed countries too often did in their initial stages of economic progress. The character of these problems, of course, is quite different in the developing countries and the priority to be given to them in resource allocations is a critical issue, but what is important is that the long-term costs of environmental problems are fully understood and reflected in the current planning policies of the developing world.

Even if the developing countries were to regard the present environmental concern of the developed countries to be an irrelevant irritant, they can hardly remain indifferent to, or be unaffected by it. Inevitably, the environmental concern will cast its shadow on all international economic relations. One can perceive these international implications only a little dimly at this stage: much more thought and research work is needed before the outlines become any clearer. But it is important to anticipate the adverse implications for international economic relations on the one hand and the great opportunities which may open up on the other, and then to suggest policy measures and institutional arrangements which could reduce the former and maximize the latter. There is, in fact, no other choice if a confrontation between the developed and developing countries is to be avoided.

There are growing fears in the developing world that the current

environmental concern in the developed countries will affect them adversely in the fields of trade, aid and transfer of technology. Some of these fears may be no more than the inherent fears of the weak in any confrontation with the stronger members of the international community. But it is important that they be articulated clearly, analysed objectively and provided for in any international arrangements which are made.

There is a fear that the insistence of the developed countries on rigorous environmental standards of products exchanged in international trade may well give rise to a "neo-protectionism". Many of the developed countries will be loathe to see their production and employment suffer if their exports prices rise as environmental standards are enforced; they may try to argue that imports from the developing countries based on less rigorous environmental standards should either be taxed or banned. The import-competing sectors and organized lobbies are likely to join in this outcry. Agricultural products may be the first to suffer. Some industrial products, notably chemicals, may fare no better. And from specifics, the argument can quickly go on to a general level. Why be liberal in admitting the products of the developing countries if they are the outgrowth of a "sweated environment"? The humanitarian concern for environment can far too easily become a selfish argument for greater protectionism. The developing countries still confront the argument of "sweated labour": the argument of "sweated environment" will be equally fallacious but even harder to beat.

In analysing these fears regarding trade disruption, we have to make several distinctions. First, there may be some exports of the developing countries (e.g. lead, high sulphur fuel) which are increasingly displaced by the development of a non-pollutive technology. The recycling of raw materials may also reduce the demand for some primary exports from the developing countries. This is merely the outcome of technological advancement and all that we can suggest is that there should be an anticipatory study of such export threats, development of an early warning system and measures to enable the seriously affected countries to restructure their investment, production and exports. Second, as has already happened in the case of some products on sanitary grounds, there is the possibility of a rise in non-tariff barriers against those exports of the developing countries which carry some environmental hazards. Dairy products, fish, meat, fruits and vegetables are among the likely

products where the developed countries may enforce very high environmental standards. Already the import of fruits and vegetables carrying traces of DDT has been banned in certain European countries. Insofar as the standards enforced in the developed countries are primarily meant to prevent health hazards and some international agreement is reached on maximum acceptable standards, it should not be interpreted as a discriminatory move against the exports of the developing countries. But in the meantime action should be taken to cushion the disruptive effects of such measures on the trade of the developing countries through a system of prior consultation and warnings by the developed countries of environmental actions contemplated by them. In certain cases, the possibility of channelling additional aid towards adapting export industries in developing countries to the new requirement in developed countries or towards a diversification of their exports should also be studied. The real danger is if the environmental standards enforced by the developed countries are unrealistic and unilateral and are arbitrarily invoked by them to keep some of the exports of the developing countries out of their own markets. Finally, the major danger that both developing and developed countries have to guard against is that the argument for better environment may be turned into an argument for greater protection by vested interests. When the concern spreads from the quality of a product to the environment in which such a product was produced, the alarm bells should ring all over the world, for it would be the beginning of the worst form of protectionism.

As a first step, it appears necessary to draw advance attention to the implications of environmental concerns for the continued growth of international trade. Appropriate procedures for prior notification, consultation and co-ordination will be needed to avoid adverse effects for world trade arising from national measures designed to promote pollution control. Conflicts of trade interests arising in this area should be resolved through existing and evolving arrangements and procedures. In this connexion, the existing GATT framework—under which most of the industrialized countries have assumed specific rights and obligations—should be further used to mitigate such problems, so as to reduce the fears of the developing countries that a desire for a better environment may lead to an increase in protectionism.

It is important that the dimensions of this problem should be carefully defined and more concrete information accumulated so as

to serve as the basis of international action. We therefore recommend that a number of specific studies be undertaken to analyse the implications of the current environmental concern for trade disruption. First, a comprehensive study should be made, possibly by UNCTAD, of the major threats that may arise to the exports of the developing countries, the character and severity of such threats, and the corrective action that may be possible. Second, FAO should continue its present useful work on food standards considerations, including contamination, and should seek to establish agreed environmental standards and guidelines for the export of foodstuffs. Third, GATT should undertake to monitor the rise of non-tariff barriers on grounds of environmental concern and bring out pointedly any such trends in its Annual Reports.

There is also a fear in the developing countries that excessive preoccupation with environmental problems will lead to a diminution of aid resources from the developed countries. Since there is an increasing concern in the developed countries about the deteriorating quality of life, and more attention is likely to be given to their own problems of slums, pockets of poverty and poor public services, it is argued that this may divert resources from foreign assistance to domestic needs. In a more exaggerated form, the fear is that the concern for environment may become a priority unto itself in the developed countries, like space exploration in the 1960s, and take away resources badly needed for other purposes. Since there has been a progressive weakening of the will in a part of the developed world for giving foreign assistance to the developing countries, anxiety on this score is not entirely unfounded.

Aid priorities and project appraisal may also, it is feared, be distorted by an excessive tendency by the developed countries to apply their own environmental standards unthinkingly to the developing countries. To the extent that aid priorities are influenced by, and are an extension of, the current concerns in the developed countries, it is inevitable that they will respond to the growing environmental concern. Aid donors may well believe that projects meant for environmental improvement should claim a fairly high priority in the developing countries while the latter may give these projects a lower priority in the context of their own competing needs. Again, development projects may be held up for their presumed impact on environment if extensive guidelines for projects appraisal are developed by the donors, as seems to have happened in the case of some recent

hydro-electric projects. These projects may also become more expensive if much higher environmental standards are insisted upon than are appropriate to the developing countries at their present stage of development. By their very nature, environmental diseconomies are very difficult to measure or quantify and there can be greatly different judgements on the time period over which they may occur and the priority that should be attached to their elimination or reduction in the current design of a project. There is a fear as such that there may be serious distortions in the allocation of aid funds to various projects and even greater delays in the processing of projects in the view of the growing environmental concern in the developed countries and its unthinking extension to the context of the developing countries. It is imperative, therefore, that multilateral and bilateral donors do not rush into the preparation of detailed guidelines for project appraisal from an environmental viewpoint without adequate consultation with the developing countries and without providing adequate safeguards against arbitrary guidelines and undue project delays. We realize that the question of a shift of aid from a project basis to a programme basis is already under debate and raises many issues beyond the purview of our discussion, but the danger which we point out above should add one further consideration in favour of such a shift. It seems to us desirable that environmental considerations be discussed between donor and recipients on their own merits and the danger must be avoided that discussion of environmental aspects of projects may delay and reduce the flow of aid.

Besides the flow and direction of aid, the kind of technology that is transferred from the developed to the developing world may be seriously affected. It is quite likely that future technological developments in the developed world will be influenced by their current preoccupation with non-pollutive technology. To the extent that these developments are shaped by the environmental problems faced by the advanced countries and do not take into account the conditions in the developing countries, technology which is transferred from the developed to the developing regions may become even more inappropriate than it often is at present. It is also obvious that some of this non-pollutive technology would be quite costly for the developing countries. No definite estimates are at present available as to how costly the non-pollutive technology may be (vague estimates ranging between five and twenty per cent are often mentioned). We

propose that further research be undertaken in this area, preferably under the auspices of the United Nations Advisory Committee for Science and Technology. If such equipment is significantly more expensive than the present technology, its export to developing countries under tied credits will further reduce the real content of foreign assistance.

All these are legitimate fears. But they should not be exaggerated. In any case, the best strategy for the developing countries is to articulate them fully and to seek opportunities to turn the environmental concern in the developed countries to their own advantage or at least neutralize its adverse implications.

There is, first of all, a prospect that the global concern for environment may reawaken the concern for elimination of poverty all over the globe. An emerging understanding of the indivisibility of the earth's natural systems on the part of the rich nations could help strengthen the vision of a human family, and even encourage an increase in aid to poor nations' efforts to improve and protect their part of the global household. There is at least a chance that the legislatures in the developed world may be more, not less, forthcoming in their allocations for foreign assistance as they face up to the problem of deteriorating quality of life at home in the midst of obvious affluence. This opportunity must be seized. For this, the environmental problem has to be placed in its proper perspective both in the developed and the developing countries. It should be treated as a problem of the most efficient synthesis of developmental and environmental concerns at different stages of social transitions. Furthermore, it must be emphasized in all international forums, including the Stockholm Conference, that it is for the developed countries to reassure the developing world that their growing environmental concern will not hurt the continued development of the developing world nor would it be used to reduce resource transfers or to distort aid priorities or to adopt more protectionist policies or to insist on unrealistic environmental standards in the appraisal of development projects.

The environmental concern can also be utilized for greater support for projects and programmes in the social sectors. Traditionally, the aid-giving agencies have tended to frown upon such projects and programmes for their presumed low rate of return, at least in the short run. But investment in human resources is now catching the imagination of the donors. Programmes in education,

nutrition, public health, water supply and other social services are beginning to be regarded favourably. Here is another opportunity that can be grasped. The developing countries can use the growing concern for social services in the developed world to escape from the tyranny of financial rates of return in traditional project appraisal, to seek broader international support for their social programmes in conformity with their own national priorities, and to obtain a greater amount of local currency financing for these programmes and projects.

There may well be other opportunities. If there is a growing concern about the pollutive effects of synthetic industries, the present rate of substitution for natural resources of the developing countries may at least tend to slow down. If there is a concern about the depletion of natural resources, opportunities may open up for re-examination of prices negotiated under long-term commodity agreements and renegotiation of concessions for minerals and oil. If there is a technology based on recycling of raw materials, it could also help the developing countries by opening up opportunities for savings in resource use, use of waste materials, and more efficient management of their own development. If there is a universal concern for global environmental problems, additional financial resources may become available from the developed world to combat these problems at an earlier stage in the developing countries. Special attention could also be given to seeking out other possibilities of achieving complementarity between the Second Development Decade strategies and efforts in the field of human environment. The main strategy should be to seize these and other similar opportunities, to enlarge their scope and to build upon them the edifice of more beneficial international economic relations. Attitudes of isolationism and indifference will hardly help in a world drawn increasingly closer; the developing countries must articulate their own interests and insist on international arrangements to protect these interests in the changing pattern of trade, aid and technology.

In this context, there are two major issues that we considered at some length: the opportunity for relocating industries with pollutive implications in the developing countries and the possibility of setting up a Special Fund for financing the implications of the environmental concern of the developing world. Our deliberations on these two issues follow.

The enforcement of higher environmental standards in the

developed countries is likely to raise the cost of production of several "pollutive" industries such as petroleum and chemical industries, metal extracting and processing industries, paper and pulp industries. Such a development opens up an opportunity for the developing countries to move into some of these industries if their natural resource endowments, including relatively less used environmental resources, create a comparative advantage in these fields. Such efforts should not, however, lead to a discarding of environmental standards adopted by the developing countries. Unfortunately, this whole subject bristles with controversies. There are those who argue vigorously that there should be no export of pollutive industries from the developed to the developing world. There are others who believe just as strongly that the opportunity for a better geographical distribution of industries must be seized immediately irrespective of any environmental costs. The elements of a sensible policy probably lie somewhere in the middle of these two extreme viewpoints. Firstly, industries which may be regarded as pollutive in some advanced countries because of their more limited environmental carrying capacity may well not be pollutive, or much less so, in the context of the developing countries with much less environmental pollution at present. Secondly, environmental standards and costs are likely to be quite different from the developed to the developing world, so that the developing countries may still possess comparative advantage in some of these industries despite the adoption of certain environmental controls in conformity with their own requirements. Thirdly, there is no reason why the developing countries should permit foreign investment, which comes to their countries into pollutive industries, to escape more stringent environmental standards back home if it results in a high rate of remittance of profits and even a lower net transfer of resources. In any arrangement that is made, it must be ensured that (a) foreign investment is on favourable terms and conditions, (b) it adds to the net transfer of resources, and (c) it conforms to the environmental standards that the recipient country wishes to impose in the light of its own stage of development and its own cultural and social objectives. So long as these safeguards are provided, there is no reason why the developing countries should not increasingly specialize in certain industrial fields, both for home market production and export purposes, which are going to become more costly for the developed world because of their growing concern with environmental standards.

We have also discussed the question of who pays for the higher costs arising out of the environmental concern and how the burden is to be shared between the developed and the developing world. Looking at the problem strictly from the point of view of the developing countries, it is quite clear that additional funds will be required to subsidize research for environmental problems for the developing countries, to compensate for major dislocations in the exports of the developing countries, to cover major increases in the cost of development projects owing to higher environmental standards and finance restructuring of investment, production or export patterns necessitated by the environmental concern of the developed countries. There was some discussion on how these additional funds should be provided. A proposal was made that a Special Fund should be set up specifically for this purpose. It was, however, felt that the consideration of a Special Fund was premature at this stage and the additional funds could as well be channelled through the existing international machinery so long as they could be clearly earmarked for the above-stated objectives, and clearly recognized as being additional. While the precise mechanism for the channelling of additional funds could not be discussed by us in any comprehensive manner, it was generally agreed that additional resource flows in one form or another will be needed.

Finally, there is a need for co-ordinating various international activities in the field of environment as well as for diffusing knowledge among developing countries of the nature and scope of these activities. Adequate institutional arrangements should be ensured for this purpose.

The subjects discussed in this chapter are closely related to the Strategy for the Second Development Decade as adopted by the United Nations. It is suggested that the considerations set out here should be taken into account during the review and appraisal of that strategy.

Implications for Policy Action

Our effort in this Report has been to draw attention to the inter-relationship between development and environment and to provide an over-all framework within which environmental policies can be formulated. We have hesitated to make many specific proposals both because we did not have the full information or the time to consider them and because we believe that these proposals can only be formulated by the developing countries themselves in the light of further research and study. In the present chapter, we are grouping together some of our recommendations which have implications for policy action, with a view to focus attention on a few selected areas of policy. The list is neither complete nor exhaustive; it is only an invitation to further work and thought.

We have stated our recommendations in a summary fashion below, since elaboration of all of them is available in the relevant chapters.

Development Strategy

1. The projected review and appraisal of *International Development Strategy* for the Second Development Decade should aim at integrating the environmental concern within the framework of development policies.
2. The developing countries should include environmental improvement as one of the multiple goals in a development plan and define its priority and dimensions in the light of their own cultural and social values and their own stage of economic development.
3. The development objectives should be redefined to include greater stress on income distribution and employment, more attention to social services and welfare-oriented public

- goods, and greater provision for political participation. There should also be a greater quantification of social goals.
4. Each developing country should define for itself the minimum environmental standards that it is seeking in various fields and sectors, such as public health, nutrition, water supply, etc., and measure its progress towards these "norms" by developing environmental indicators.
 5. In order to incorporate the environmental concern in development planning, greater attention should be devoted to the policy areas concerning location of industries, land use policy, physical planning and community development.
 6. The developing countries should attempt to mobilize surplus labour for projects of environmental improvement.

Project Appraisal

7. The developing countries should formulate specific guidelines for project appraisal, taking into account environmental considerations. The social costs and benefits of projects, including their favourable and unfavourable impact on environment, should be fully reflected in these guidelines.
8. The developing countries should take the initiative to discuss formulation of such guidelines at the level of the regional economic commissions, regional banks and other relevant international agencies.
9. It would be undesirable that rigid guidelines for project appraisal from an environmental viewpoint be laid down by multilateral or bilateral donors at this stage without adequate consultations with the developing countries through various appropriate forums.

Research and Study

10. The developing countries should initiate surveys of the present state of their environment and the major hazards to which it is exposed.
11. It would be useful to compile all existing legislation regarding environmental control, including the regulations dealing with urban zoning, location of industries, protection of natural resources, and so on.

Implications for Policy Action

12. Research should be concentrated into matters of urgent environmental concern, such as soil conservation, land management, rural-urban interaction patterns, location and physical planning of new urban centres, and other such environmental issues in each sector as are of immediate relevance to the conditions of individual countries.

Institutional Requirements

13. There is need for more study and research on the effectiveness of various forms of direct and indirect controls over environment so that a range of specific policies is available to the developing countries from which they can choose in accordance with their requirements and preferences.
14. The developing countries should make appropriate institutional arrangements for the implementation and monitoring of environmental policies, including establishment of any new institutions or legislation for this purpose.

Information and Education

15. Some thought should be given to building the growing environmental concern into education curricula.
16. Public opinion should be informed of environmental problems and policies through programmes of mass information.

Trade and Aid

17. A comprehensive study should be made, possibly by the United Nations Conference on Trade and Development, of the major threats that may arise to the exports of the developing countries, from the environmental concern of the developed countries, the character and severity of such threats, and the corrective action that may be possible.
18. The Food and Agriculture Organization should continue its present useful work on food standards considerations, including contamination, and seek to establish agreed environmental standards and guidelines for the export of foodstuffs.
19. The General Agreement on Tariffs and Trade should undertake to monitor the rise of non-tariff barriers on grounds of environmental concern and bring out pointedly any such trends in its Annual Reports.

20. The developing countries should explore the possibilities of increased specialization in certain industrial fields, both for home market production and export purposes, which are going to become more costly for the developed world because of their growing concern with environmental standards. Such efforts should not, however, lead to an indiscriminate export of pollution by developed countries or to a discarding of environmental standards adopted by the developing countries.
21. The aid agencies should consider greater support for projects in the social sectors, both by providing larger assistance, and through the provision of local currency financing and programme lending.

International Action

22. The developed countries should ensure that their growing environmental concern will not hurt the continued development of the developing countries, or result in a reduction of resource transfers, or distortion of aid priorities, or adoption of more protectionist policies, or insistence on unrealistic environmental standards in the appraisal of development projects.
23. Additional aid funds will be required to subsidize research on environmental problems for the developing countries, to compensate for major dislocations in the exports of the developing countries, to cover major increases in the cost of development projects owing to higher environmental standards, and to finance restructuring of investment, production or export patterns necessitated by the environmental concern of the developed countries. A suitable mechanism for the channelling of these funds should be devised.
24. Research should be undertaken on how costly the non-pollutive technology is likely to be in various sectors and fields, preferably under the auspices of the United Nations Advisory Committee for Science and Technology.
25. Adequate institutional arrangements should be made for co-ordinating various international activities in the field of environment as well as for diffusing knowledge among developing countries of the nature and scope of these activities.

THE STOCKHOLM DECLARATION

Stockholm, Sweden, 5-16 June 1972

Declaration on the Human Environment

The United Nations Conference on the Human Environment, having met at Stockholm from 5 to 16 June 1972, and having considered the need for a common outlook and for common principles to inspire and guide the peoples of the world in the preservation and enhancement of the human environment, proclaims that:

1. Man is both creator and moulder of his environment, which gives him physical sustenance and affords him the opportunity for intellectual, moral, social and spiritual growth. In the long and tortuous evolution of the human race on this planet a stage has been reached when, through the rapid acceleration of science and technology, man has acquired the power to transform his environment in countless ways and on an unprecedented scale. Both aspects of man's environment, the natural and the man-made, are essential to his well-being and to the enjoyment of basic human rights—even the right to life itself.
2. The protection and improvement of the human environment is a major issue which affects the well-being of peoples and economic development throughout the world; it is the urgent desire of the peoples of the whole world and the duty of all Governments.
3. Man has constantly to sum up experience and go on discovering, inventing, creating and advancing. In our time, man's capability to transform his surroundings, if used wisely, can bring to all peoples the benefits of development and the opportunity to enhance the quality of life. Wrongly or heedlessly applied, the same power can do incalculable harm to human beings and the human environment. We see around us growing evidence of man-made harm in many regions of the earth: dangerous levels of pollution in water, air, earth and living beings; major and undesirable disturbances to the ecological

balance of the biosphere; destruction and depletion of irreplaceable resources; and gross deficiencies harmful to the physical, mental and social health of man, in the man-made environment, particularly in the living and working environment.

4. In the developing countries most of the environmental problems are caused by under-development. Millions continue to live far below the minimum levels required for a decent human existence, deprived of adequate food and clothing, shelter and education, health and sanitation. Therefore, the developing countries must direct their efforts to development, bearing in mind their priorities and the need to safeguard and improve the environment. For the same purpose, the industrialized countries should make efforts to reduce the gap between themselves and the developing countries. In the industrialized countries, environmental problems are generally related to industrialization and technological development.

5. The natural growth of population continuously presents problems for the preservation of the environment, and adequate policies and measures should be adopted, as appropriate, to face these problems. Of all things in the world, people are the most precious. It is the people that propel social progress, create social wealth, develop science and technology and, through their hard work, continuously transform the human environment. Along with social progress and the advance of production, science and technology, the capability of man to improve the environment increases with each passing day.

6. A point has been reached in history when we must shape our actions throughout the world with a more prudent care for their environmental consequences. Through ignorance or indifference we can do massive and irreversible harm to the earthly environment on which our life and well-being depend. Conversely, through fuller knowledge and wiser action, we can achieve for ourselves and our posterity a better life in an environment more in keeping with human needs and hopes. There are broad vistas for the enhancement of environmental quality and the creation of a good life. What is needed is an enthusiastic but calm state of mind and intense but orderly work. For the purpose of attaining freedom in the world of nature, man must use knowledge to build, in collaboration with nature, a better environment. To defend and improve the human environment for present and future generations has become an imperative goal for mankind—a goal to be pursued together with, and in harmony

with, the established and fundamental goals of peace and of worldwide economic and social development.

7. To achieve this environmental goal will demand the acceptance of responsibility by citizens and communities and by enterprises and institutions at every level, all sharing equitably in common efforts. Individuals in all walks of life as well as organizations in many fields, by their values and the sum of their actions, will shape the world environment of the future. Local and national governments will bear the greatest burden for large-scale environmental policy and action within their jurisdictions. International co-operation is also needed in order to raise resources to support the developing countries in carrying out their responsibilities in this field. A growing class of environmental problems, because they are regional or global in extent or because they affect the common international realm, will require extensive co-operation among nations and action by international organizations in the common interest. The Conference calls upon Governments and peoples to exert common efforts for the preservation and improvement of the human environment for the benefit of all the people and for their posterity.

CHAPTER TWO

Declaration of Principles

States the common conviction that :

Principle 1. Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being, and he bears a solemn responsibility to protect and improve the environment for present and future generations. In this respect, policies promoting or perpetuating *apartheid*, racial segregation, discrimination, colonial and other forms of oppression and foreign domination stand condemned and must be eliminated.

Principle 2. The natural resources of the earth including the air, water, land, flora and fauna and especially representative samples of natural ecosystems, must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate.

Principle 3. The capacity of the earth to produce vital renewable resources must be maintained and, wherever practicable, restored or improved.

Principle 4. Man has a special responsibility to safeguard and wisely manage the heritage of wildlife and its habitat which are now gravely imperilled by a combination of adverse factors. Nature conservation including wildlife, must therefore receive importance in planning for economic development.

Principle 5. The non-renewable resources of the earth must be employed in such a way as to guard against the danger of their future exhaustion and to ensure that benefits from such employment are shared by all mankind.

Principle 6. The discharge of toxic substances or of other substances

and the release of heat, in such quantities or concentrations as to exceed the capacity of the environment to render them harmless, must be halted in order to ensure that serious or irreversible damage is not inflicted upon ecosystems. The just struggle of the peoples of all countries against pollution should be supported.

Principle 7. States shall take all possible steps to prevent pollution of the seas by substances that are liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.

Principle 8. Economic and social development is essential for ensuring a favourable living and working environment for man and for creating conditions on earth that are necessary for the improvement of the quality of life.

Principle 9. Environmental deficiencies generated by the conditions of under-development and natural disasters pose grave problems and can best be remedied by accelerated development through the transfer of substantial quantities of financial and technological assistance as a supplement to the domestic effort of the developing countries and such timely assistance as may be required.

Principle 10. For the developing countries, stability of prices and adequate earnings for primary commodities and raw material are essential to environmental management since economic factors as well as ecological processes must be taken into account.

Principle 11. The environmental policies of all States should enhance and not adversely affect the present or future development potential of developing countries, nor should they hamper the attainment of better living conditions for all, and appropriate steps should be taken by States and international organizations with a view to reaching agreement on meeting the possible national and international economic consequences resulting from the application of environmental measures.

Principle 12. Resources should be made available to preserve and improve the environment, taking into account the circumstances and particular requirements of developing countries and any costs which may emanate from their incorporating environmental safeguards into their development planning and the need for making available to them, upon their request, additional international technical and financial assistance for this purpose.

Principle 13. In order to achieve a more rational management of resources and thus to improve the environment, States should adopt an integrated and co-ordinated approach to their development planning so as to ensure that development is compatible with the need to protect and improve the human environment for the benefit of their population.

Principle 14. Rational planning constitutes an essential tool for reconciling any conflict between the needs of development and the need to protect and improve the environment.

Principle 15. Planning must be applied to human settlements and urbanization with a view to avoiding adverse effects on the environment and obtaining maximum social, economic and environmental benefits for all. In this respect, projects which are designed for colonialist and racist domination must be abandoned.

Principle 16. Demographic policies which are without prejudice to basic human rights and which are deemed appropriate by Governments concerned should be applied in those regions where the rate of population growth or excessive population concentrations are likely to have adverse effects on the environment or development, or where low population density may prevent improvement of the human environment and impede development.

Principle 17. Appropriate national institutions must be entrusted with the task of planning, managing or controlling the environmental resources of States with the view to enhancing environmental quality.

Principle 18. Science and technology, as part of their contribution to economic and social development, must be applied to the identification, avoidance and control of environmental risks and the solution of environmental problems and for the common good of mankind.

Principle 19. Education in environmental matters, for the younger generation as well as adults, giving due consideration to the underprivileged, is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving environment in its full human dimension. It is also essential that mass media of communications avoid contributing to the deterioration of the environment, but, on the contrary, disseminate information of an educational nature, on

Principle 25. States shall ensure that international organizations play a co-ordinated, efficient and dynamic role for the protection and improvement of the environment.

Principle 26. Man and his environment must be spared the effects of nuclear weapons and all other means of mass destruction. States must strive to reach prompt agreement, in the relevant international organs, on the elimination and complete destruction of such weapons.

the need to protect and improve the environment in order to enable man to develop in every respect.

Principle 20. Scientific research and development in the context of environmental problems, both national and multinational, must be promoted in all countries, especially the developing countries. In this connexion, the free flow of up-to-date scientific information and transfer of experience must be supported and assisted, to facilitate the solution of environmental problems; environmental technologies should be made available to developing countries on terms which would encourage their wide dissemination without constituting an economic burden on the developing countries.

Principle 21. States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

Principle 22. States shall co-operate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of such States to areas beyond their jurisdiction.

Principle 23. Without prejudice to such criteria as may be agreed upon by the international community, or to standards which will have to be determined nationally, it will be essential in all cases to consider the systems of values prevailing in each country, and the extent of the applicability of standards which are valid for the most advanced countries but which may be inappropriate and of unwarranted social cost for the developing countries.

Principle 24. International matters concerning the protection and improvement of the environment should be handled in a co-operative spirit by all countries, big or small, on an equal footing. Co-operation through multilateral or bilateral arrangements or other appropriate means is essential to effectively control, prevent, reduce and eliminate adverse environmental effects resulting from activities conducted in all spheres, in such a way that due account is taken of the sovereignty and interests of all States.

Recommendations for Action

HUMAN SETTLEMENTS MANAGEMENT

1. The planning, improvement and management of rural and urban settlements demand an approach, at all levels, which embraces all aspects of the human environment, both natural and man-made. Accordingly, *it is recommended:*

- a) That all development assistance agencies, whether international, such as UNDP and IBRD, regional or national, should in their development assistance activities also give high priority within available resources to requests from Governments for assistance in the planning of human settlements, notably in housing, transportation, water, sewerage and public health, the mobilization of human and financial resources, the improvement of transitional urban settlements and the provision and maintenance of essential community services, in order to achieve as far as possible the social well-being of the receiving country as a whole;
- b) That these agencies also be prepared to assist the less industrialized countries in solving the environmental problems of development projects; to this end they should actively support the training and encourage the recruitment of requisite personnel, as far as possible within these countries themselves.

2. *It is recommended* that Governments should designate to the Secretary-General areas in which they have committed themselves (or are prepared to commit themselves) to a long-term programme of improvement and global promotion of the environment.

- a) In this connexion, countries are invited to share internationally all relevant information on the problems they encounter and the solutions they devise in developing these areas.

- b) Countries concerned will presumably appoint an appropriate body to plan such a programme, and to supervise its implementation, for areas which could vary in size from a city block to a national region; presumably, too, the programme will be designated to serve, among other purposes, as a vehicle for the preparation and launching of experimental and pilot projects.
- c) Countries which are willing to launch an improvement programme should be prepared to welcome international co-operation, seeking the advice or assistance of competent international bodies.

It is further recommended:

- a) That in order to ensure the success of the programme, Governments should urge the Secretary-General to undertake a process of planning and co-ordination whereby contact would be established with nations likely to participate in the programme; international teams of experts might be assembled for that purpose;
- b) That a Conference/Demonstration on Experimental Human Settlements should be held under the auspices of the United Nations in order to provide for co-ordination and the exchange of information and to demonstrate to world public opinion the potential of this approach by means of a display of experimental projects;
- c) That nations should take into consideration Canada's offer to organize such a Conference/Demonstration and to act as host to it.

3. Certain aspects of human settlements can have international implications, for example, the "export" of pollution from urban and industrial areas, and the effects of seaports on international hinterlands. Accordingly, *it is recommended* that the attention of Governments be drawn to the need to consult bilaterally or regionally whenever environmental conditions or development plans in one country could have repercussions in one or more neighbouring countries.

4. 1 *It is recommended* that Governments and the Secretary-General, the latter in consultation with the appropriate UN agencies, take the following steps:

- a) Entrust the overall responsibility for an agreed programme of environmental research at the international level to any central body that may be given the co-ordinating authority in the field of the environment, taking into account the co-ordination work already being provided on the regional level, especially by the ECE;
- b) Identify, wherever possible, an existing agency within the UN system as the principal focal point for initiating and co-ordinating research in each principal area and, where there are competing claims, establish appropriate priorities;
- c) Designate the following as priority areas for research:
 - i Theories, policies and methods for the comprehensive environmental development of urban and rural settlements;
 - ii Methods of assessing quantitative housing needs and of formulating and implementing phased programmes designed to satisfy them (principal bodies responsible: ESA, regional economic commissions and UNESOB);
 - iii Environmental socio-economic indicators of the quality of human settlements, particularly in terms of desirable occupancy standards and residential densities, with a view to identifying their time trends;
 - iv Socio-economic and demographic factors underlying migration, including the problem of transitional settlements (principal bodies responsible: ESA (CHBP), UNESCO, WHO, ILO, FAO);
 - v Designs, technologies, financial and administrative procedures for the efficient and expanded production of housing and related infrastructure, suitably adapted to local conditions;
 - vi Water supply, sewerage and waste-disposal systems adapted to local conditions, particularly in semi-tropical, tropical, Arctic and sub-Arctic areas (principal body responsible: WHO);
 - vii Alternative methods of meeting rapidly increasing urban transportation needs (principal bodies responsible: ESA—RTD and CHBP);
 - viii Physical, mental and social effects of stresses created by living and working conditions in human settlements, particularly urban conglomerates, for example, the accessibility of buildings to persons whose physical mobility is

impaired (principal bodies responsible: ILO, WHO, UNESCO, ESA).

2. *It is further recommended* that Governments consider co-operative arrangements to undertake the necessary research whenever the above-mentioned problem areas have a specific regional impact. In such cases, provision should be made for the exchange of information and research findings with countries of other geographical regions sharing similar problems.

5. *It is recommended:*

- a) That Governments take steps to arrange for the exchange of visits by those who are conducting research in the public or private institutions of their countries;
- b) That Governments and the Secretary-General ensure the acceleration of the exchange of information concerning past and on-going research, experimentation and project implementation covering all aspects of human settlements, which is conducted by the United Nations systems or by public or private entities including academic institutions.

6. *It is recommended* that Governments and the Secretary-General give urgent attention to the training of those who are needed to promote integrated action on the planning, development and management of human settlements.

7. *It is recommended:*

- a) That Governments and the Secretary-General provide equal possibilities for everybody, both by training and by ensuring access to relevant means and information, to influence their own environment by themselves;
- b) That Governments and the Secretary-General ensure that the institutions concerned shall be strengthened and that special training activities shall be established, making use of existing projects of regional environmental development, for the benefit of the less industrialized countries, covering the following:
 - i Intermediate and auxiliary personnel for national public services who, in turn, would be in a position to train others for similar tasks (principal bodies responsible: WHO, ESA—CHBP, UNIDO, FAO);
 - ii Specialists in environmental planning and in rural development (principal bodies responsible: ESA—CHBP, FAO);

- iii Community developers for self-help programmes for low-income groups (principal body responsible: ESA—CHBP);
- vi Specialists in working environments (principal bodies responsible: ILO, ESA—CHBP, WHO);
- v Planners and organizers of mass transport systems and services, with special reference to environmental development (principal body responsible: ESA—RTD).

8. *It is recommended* that regional institutions take stock of the requirements of their regions for various environmental skills and of the facilities available to meet those requirements in order to facilitate the provision of appropriate training within regions.

9. *It is recommended* that the WHO increase its efforts to support Governments in planning for improving water supply and sewerage services through its community water supply programme, taking account, as far as possible, of the framework of total environment programmes for communities.

10. *It is recommended* that development assistance agencies should give higher priority, where justified in the light of the social benefits, to supporting Governments in financing and setting up services for water supply, disposal of water from all sources, and liquid-waste and solid-waste disposal and treatment as part of the objectives of UNDD II.

11. *It is recommended* that the Secretary-General ensure that during the preparations for the 1974 World Population Conference, special attention shall be given to population concerns as they relate to the environment and, more particularly, to the environment of human settlements.

12. 1. *It is recommended* that WHO and other UN agencies should provide increased assistance to Governments which so request in the field of family planning programmes without delay.

2. *It is further recommended* that WHO should promote and intensify research endeavour in the field of human reproduction, so that the serious consequences of population explosion on human environment can be prevented.

13. *It is recommended* that the UN agencies should focus special attention on the provision of assistance for combating the menace of human malnutrition rampant in many parts of the world. Such assistance will cover training, research and development endeavours

on such matters as causes of malnutrition, mass production of high-protein and multipurpose foods, qualitative and quantitative characteristics of routine foods, and the launching of applied nutrition programmes.

14. *It is recommended* that the intergovernmental body for environmental affairs to be established within the UN should ensure that the required surveys shall be made concerning the need and the technical possibilities for developing internationally agreed standards and measuring and limiting noise emissions and that, if it is deemed advisable, such standards shall be applied in the production of means of transportation and certain kinds of working equipment, without a large price increase or reduction in the aid given to developing countries.

15. *It is recommended* that the Secretary-General, in consultation with the appropriate UN bodies, formulate programmes on a world-wide basis to assist countries to meet effectively the requirements of growth of human settlements and to improve the quality of life in existing settlements, in particular, in squatter areas.

16. The programmes referred to in recommendation 15 should include the establishment of subregional centres to undertake, *inter alia*, the following functions:

- a) Training;
- b) Research;
- c) Exchange of information;
- d) Financial, technical and material assistance.

17. *It is recommended* that Governments and the Secretary-General take immediate steps towards the establishment of an international fund or a financial institution whose primary operative objectives will be to assist in strengthening national programmes relating to human settlements through the provision of seed capital and the extension of the necessary technical assistance to permit an effective mobilization of domestic resources for housing and the environmental improvement of human settlements.

18. *It is recommended* that the following recommendations be referred to the Disaster Relief Co-ordinator for his consideration, more particularly in the context of the preparation of a report to ECOSOC.

1. *It is recommended* that the Secretary-General, with the assistance of the Disaster Relief Co-ordinator and in consultation with the appropriate bodies of the UN system and non-governmental bodies:

- a) Assess the over-all requirements for the timely and widespread distribution of warnings which the observational and communications networks must satisfy;
- b) Assess the needs for additional observational networks and other observational systems for natural disaster detection and warnings for tropical cyclones (typhoons, hurricanes, cyclones, etc.) and their associated storm surges, torrential rains, floods, tsunamis, earthquakes, etc.;
- c) Evaluate the existing systems for the international communication of disaster warnings, in order to determine the extent to which these require improvement;
- d) On the basis of these assessments, promote, through existing national and international organizations, the establishment of an effective world-wide natural disaster warning system, with special emphasis on tropical cyclones and earthquakes, taking full advantage of existing systems and plans, such as the WWW, the WMO's Tropical Cyclone Project, the International Tsunami Warning System, the World-Wide Standardized Seismic Network and the Desert Locust Control Organization;
- e) Invite WMO to promote research on the periodicity and intensity of the occurrence of droughts, with a view to developing improved forecasting techniques.

2. *It is further recommended* that UNDP and other appropriate international assistance agencies give priority in responding to requests from Governments for the establishment and improvement of natural disaster research programmes and warning systems.

3. *It is recommended* that the Secretary-General ensure that the UN system shall provide to Governments a comprehensive programme of advice and support in disaster prevention. More specifically, the question of disaster prevention should be seen as an integral part of the country programme as submitted to, and reviewed by, the UNDP.

4. *It is recommended* that the Secretary-General take the necessary steps to ensure that the UN system shall assist countries with their planning for pre-disaster preparedness. To this end:

- a) An international programme of technical co-operation should be developed, designed to strengthen the capabilities of Governments in the field of pre-disaster planning, drawing upon the services of the resident representatives of the UNDP;

- b) The Disaster Relief Office, with the assistance of relevant agencies of the UN, should organize plans and programmes for international co-operation in cases of natural disasters;
- c) As appropriate, non-governmental international agencies and individual Governments should be invited to participate in the preparation of such plans and programmes.

NATURAL RESOURCES MANAGEMENT

19. *It is recommended* that FAO, in co-operation with other relevant international organizations, should include in its programme questions relating to rural planning in relation to environmental policy, since environmental policy is formulated in close association with physical planning and with medium-term and long-term economic and social planning. Even in highly industrialized countries, rural areas still cover more than 90 per cent of the territory and consequently should not be regarded as a residual sector and a mere reserve of land and manpower. The programme should therefore include, in particular:

- a) Arrangements for exchanges of such data as are available;
- b) Assistance in training and informing specialists and the public, especially young people, from primary school age onwards;
- c) The formulation of principles for the development of rural areas, which should be understood to comprise not only agricultural areas as such but also small- and medium-sized settlements and their hinterland.

20. *It is recommended* that FAO, in co-operation with other international agencies concerned, strengthen the necessary machinery for the international acquisition of knowledge and transfer of experience on soil capabilities, degradation, conservation and restoration, and to this end:

- a) Co-operative information exchange should be facilitated among those nations sharing similar soils, climate and agricultural conditions;
 - i The Soil Map of the World being prepared by FAO, UNESCO and ISSS should serve to indicate those areas among which transfer of knowledge on soil potentialities and soil degradation and restoration would be most valuable;

- ii This map should be supplemented through the establishment of international criteria and methods for the assessment of soil capabilities and degradations and the collection of additional data based upon these methods and criteria. This should permit the preparation of a World Map of Soil Degradation Hazards as a framework for information exchange in this area.
 - iii Information exchange on soil use should account for similarities in vegetation and other environmental conditions as well as those of soil, climate, and agricultural practices;
 - iv The FAO Soil Data-Processing System should be developed beyond soil productivity considerations, to include the above-mentioned data and relevant environmental parameters, and to facilitate information exchange between national soil institutions, and eventually soil-monitoring stations;
- b) International co-operative research on soil capabilities and conservation should be strengthened and broadened to include:
- i Basic research on soil degradation processes in selected ecosystems under the auspices of the Man and the Biosphere Programme. This research should be directed as a matter of priority to those arid areas that are most threatened;
 - ii Applied research on soil and water conservation practices under specific land-use conditions with the assistance of FAO and, where appropriate, other agencies (UNESCO, WHO and IAEA);
 - iii Strengthening of existing research centres and, where necessary, establishment of new centres with the object of increasing the production from dry farming areas without any undue impairment of the environment;
 - iv Research on the use of suitable soils for waste disposal and recycling; UNIDO, FAO and WHO should enter into joint consultations regarding the feasibility of an international programme in this area;
- c) These efforts for international co-operation in research and information exchange on soils should be closely associated with those of the UNDP/WMO/UNESCO programme of agricultural biometeorology, in order to facilitate integration of data and practical findings and to support the national

programmes of conservation of soil resources recommended above.

- d) It should moreover be noted that in addition to the various physical and climatic phenomena which contribute to soil degradation, economic and social factors contribute to it as well; among the economic contributory factors, one which should be particularly emphasized is the payment of inadequate prices for the agricultural produce of developing countries, which prevents farmers in those countries from setting aside sufficient savings for necessary investments in soil regeneration and conservation. Consequently, urgent remedial action should be taken by the organizations concerned to give new value and stability to the prices of raw materials of the developing countries.

21. *It is recommended* that Governments, FAO and WHO, in co-operation with UNESCO and IAEA, strengthen and co-ordinate international programmes for integrated pest control and reduction of the harmful effects of agro-chemicals:

- a) Existing international activities for the exchange of information and co-operative research and technical assistance to developing countries should be strengthened to support the national programmes described above, with particular reference to:
- i Basic research on ecological effects of pesticides and fertilizers (MAB);
 - ii Use of radio-isotope and radiation techniques in studying the fate of pesticides in the environment (joint IAEA/FAO Division);
 - iii Evaluation of the possibility of using pesticides of biological origin in substitution for certain chemical insecticides which cause serious disturbances in the environment;
 - iv Dose and timing of fertilizers' application and their effects on soil productivity and the environment (FAO);
 - v Management practices and techniques for integrated pest control, including biological control (FAO and WHO);
 - vi Establishment and/or strengthening of national and regional centres for integrated pest control, particularly in developing countries (FAO and WHO);
- b) Existing expert committees of FAO and WHO on various aspects of pest control should be convened periodically:

- i To assess recent advances in the relevant fields of research mentioned above;
- ii To review and further develop international guidelines and standards with special reference to national and ecological conditions in relation to the use of chlorinated hydrocarbons, pesticides containing heavy metals and the use and experimentation of biological controls;
- c) In addition, *ad hoc* panels of experts should be convened by FAO, WHO and, where appropriate, the IAEA, in order to study specific problems and facilitate the work of the above-mentioned committees.

22. *It is recommended* that FAO, under its "War on Waste" programme, place increased emphasis on control and recycling of wastes in agriculture:

- a) This programme should assist national activities relating to:
 - i Control and recycling of crop residues and animal wastes;
 - ii Control and recycling of agro-industrial waste;
 - iii Use of municipal wastes as fertilizers;
- b) The programme should also include measures to avoid wasteful use of natural resources through the destruction of unmarketable agricultural products or their use for improper purposes.

23. It is recommended that Governments, in co-operation with FAO and other agencies and bodies, establish and strengthen regional and international machinery for the rapid development and management of domesticated livestock of economic importance and their related environmental aspects as part of the ecosystems, particularly in areas of low annual productivity, and thus encourage the establishment of regional livestock facilities, councils and commissions, as appropriate.

24. *It is recommended* that the Secretary-General take steps to ensure that the UN bodies concerned co-operate to meet the needs for new knowledge on the environmental aspects of forests and forest management:

- a) Where appropriate, research should be promoted, assisted, co-ordinated, or undertaken by the Man and the Biosphere Programme (UNESCO), in close co-operation with FAO and WMO, and with the collaboration of ICSU and IUFRO;

- b) Research on comparative legislation, land tenure, institutions, tropical forest management, the effects of the international trade in forest products on national forest environments, and public administration, should be sponsored or co-ordinated by FAO, in co-operation with other appropriate international and regional organizations:
 - c) FAO, in conjunction with UNESCO and other appropriate international organizations, should give positive advice to member countries on the important role of forests with reference to, and in conjunction with, the conservation of soil, watersheds, the protection of tourists sites and wildlife, and recreation, within the over-all framework of the interests of the biosphere.
25. *It is recommended* that the Secretary-General take steps to ensure that continuing surveillance, with the co-operation of Member States, of the world's forest cover shall be provided for through the programme of FAO and UNESCO.
- a) Such a World Forest Appraisal Programme would provide basic data, including data on the balance between the world's forest biomass and the prevailing environment, and changes in the forest biomass, considered to have a significant impact on the environment;
 - b) The information could be collected from existing inventories and on-going activities and through remote-sensing techniques;
 - c) The forest protection programme described above might be incorporated within this effort, through the use of advanced technology, such as satellites which use different types of imagery and which could constantly survey all forests.
26. *It is recommended* that FAO co-ordinate an international programme for research and exchange of information on forest fires, pests and diseases:
- a) The programme should include data collection and dissemination, identification of potentially susceptible areas and of means of suppression; exchange of information on technologies, equipment and techniques; research, including integrated pest control and the influence of fire on forest ecosystems, to be undertaken by IUFRO; establishment of a

forecasting system in co-operation with WMO; organization of seminars and study tours; the facilitation of bilateral agreements for forest protection between neighbouring countries, and the development of effective international quarantines:

- b) Forest fires, pests and diseases will frequently each require separate individual treatment.

27. *It is recommended* that FAO facilitate the transfer of information on forests and forest management:

- a) The amount of knowledge that can usefully be exchanged is limited by the differences of climatic zones and forest types;
- b) The exchange of information should, however, be encouraged among nations sharing similarities; considerable knowledge is already exchanged among the industrialized nations of the temperate zone;
- c) Opportunities exist, despite differences, for the useful transfer of information to developing countries on the environmental aspects of such items as: (i) the harvesting and industrialization of some tropical hardwoods; (ii) pine cultures; (iii) the principles of forest management systems and management science; (iv) soils and soil interpretations relating to forest management; (v) water regimes and watershed management; (vi) forest industries pollution controls, including both technical and economic data; (vii) methods for the evaluation of forest resources through sampling techniques, remote sensing, and data-processing; (viii) control of destructive fires and pest outbreaks; and (ix) co-ordination in the area of the definition and standardization of criteria and methods for the economic appraisal of forest environmental influences and for the comparison of alternative uses.

28. *It is recommended* that FAO strengthen its efforts in support of forestry projects and research projects, possibly for production, in finding species which are adaptable even in areas where this is exceptionally difficult because of ecological conditions.

29. *It is recommended* that the Secretary-General ensure that the effect of pollutants upon wildlife shall be considered, where appropriate, within environmental monitoring systems. Particular attention should be paid to those species of wildlife that may serve as indicators

for future world-wide environmental disturbances, with an ultimate impact upon human populations.

30. *It is recommended* that the Secretary-General ensure the establishment of a programme to expand present data-gathering processes so as to assess the total economic value of wildlife resources.

- a) Such data would facilitate the task of monitoring the current situation of animals endangered by their trade value, and demonstrate to questioning nations the value of their resources;
- b) Such a programme should elaborate upon current efforts of FAO and might well produce a yearbook of wildlife statistics.

31. *It is recommended* that the Secretary-General ensure that the appropriate UN agencies co-operate with the Governments of the developing countries to develop special short-term training courses on wildlife management:

- a) Priority should be given to conversion courses for personnel trained in related disciplines such as forestry or animal husbandry;
- b) Special attention should be given to the establishment and support of regional training schools for technicians.

32. *It is recommended* that Governments give attention to the need to enact international conventions and treaties to protect species inhabiting international waters or those which migrate from one country to another:

- a) A broadly-based convention should be considered which would provide a framework by which criteria for game regulations could be agreed upon and the over-exploitation of resources curtailed by signatory countries;
- b) A working group should be set up as soon as possible by the appropriate authorities to consider these problems and to advise on the need for, and possible scope of, such conventions or treaties.

33. *It is recommended* that Governments agree to strengthen the International Whaling Commission, to increase international research efforts, and as a matter of urgency to call for an international agreement under the auspices of the International Whaling Commission

and involving all Governments concerned, for a 10-year moratorium on commercial whaling.

34. *It is recommended* that Governments and the Secretary-General give special attention to training requirements on the management of parks and protected areas:

- a) High-level training should be provided and supported:
 - i In addition to integrating aspects of national parks planning and management into courses on forestry and other subjects, special degrees should be offered in park management; the traditional forestry, soil and geology background of the park manager must be broadened into an integrated approach;
 - ii Graduate courses in natural resources administration should be made available in at least one major university in every continent;
- b) Schools offering courses in national park management at a medium-grade level should be assisted by the establishment or expansion of facilities, particularly in Latin America and Asia.

35. *It is recommended* that the Secretary-General take steps to ensure that an appropriate mechanism shall exist for the exchange of information on national parks legislation and planning and management techniques developed in some countries which could serve as guidelines to be made available to any interested country.

36. *It is recommended* that the Secretary-General take steps to ensure that the appropriate UN agencies shall assist the developing countries to plan for the inflow of visitors into their protected areas in such a way as to reconcile revenue and environmental considerations within the context of the recommendations approved by the Conference. The other international organizations concerned may likewise make their contribution.

37. *It is recommended* that Governments take steps to co-ordinate and co-operate in the management of neighbouring or contiguous, protected areas. Agreement should be reached on such aspects as mutual legislation, patrolling systems, exchange of information, research projects, collaboration on measures of burning, plant and animal control, fishery regulations, censuses, tourist circuits and frontier formalities.

38. *It is recommended* that Governments take steps to set aside areas

representing ecosystems of international significance for protection under international agreement.

39. *It is recommended* that Governments, in co-operation with the Secretary-General and FAO where indicated, agree to an international programme to preserve the world's genetic resources:

- a) Active participation at the national and international levels is involved. It must be recognized, however, that while survey, collection, and dissemination of these genetic resources are best carried out on a regional or international basis, their actual evaluation and utilization are matters for specific institutions and individual workers; international participation in the latter should concern exchange of techniques and findings;
- b) An international network is required with appropriate machinery to facilitate the interchange of information and genetic material among countries;
- c) Both static (seed banks, culture collection, etc.) and dynamic (conservation of populations in evolving natural environments) ways are needed.
- d) Action is necessary in six interrelated areas:
 - i Survey of genetic resources;
 - ii Inventory of collections;
 - iii Exploration and collecting;
 - iv Documentation;
 - v Evaluation and utilization;
 - vi Conservation, which represents the crucial element to which all other programmes relate;
- e) Although the international programme relates to all types of genetic resources, the action required for each resource will vary according to existing needs and activities.

40. *It is recommended* that Governments, in co-operation with the Secretary-General and FAO where indicated, make inventories of the genetic resources most endangered by depletion or extinction:

- a) All species threatened by man's development should be included in such inventories;
- b) Special attention should be given to locating, in this field those areas of natural genetic diversity that are disappearing;
- c) These inventories should be reviewed periodically and brought up to date by appropriate monitoring;

- d) The survey conducted by FAO in collaboration with the International Biological Programme is designed to provide information on endangered crop genetic resources by 1972, but will require extension and follow-up.

41. *It is recommended* that Governments, in co-operation with the Secretary-General and FAO where indicated, compile or extend, as necessary, registers of existing collections of genetic resources:

- a) Such registers should identify which breeding and experiment stations, research institutions and universities maintain which collections;
- b) Major gaps in existing collections should be identified where material is in danger of being lost;
- c) These inventories of collections should be transformed for computer handling and made available to all potential users;
- d) In respect of plants:
 - i It would be expected that the "advanced varieties" would be well represented, but that primitive materials would be found to be scarce and require subsequent action;
 - ii The action already initiated by FAO, several national institutions, and international foundations should be supported and expanded;
- e) In respect of micro-organisms, it is recommended that each nation develop comprehensive inventories of culture collections:
 - i A cataloguing of the large and small collections and the value of their holdings is required, rather than a listing of individual strains;
 - ii Many very small but unique collections, sometimes the work of a single specialist, are lost;
 - iii Governments should make sure that valuable gene pools held by individuals or small institutes are also held in national or regional collections;
- f) In respect of animal germ plasm, it is recommended that FAO establish a continuing mechanism to assess and maintain catalogues of the characteristics of domestic animal breeds, types and varieties in all nations of the world. Likewise, FAO should establish such lists where required;
- g) In respect of aquatic organisms, it is recommended that FAO compile a catalogue of genetic resources of cultivated species

and promote intensive studies on the methods of preservation and storage of genetic material.

42. *It is recommended* that Governments, in co-operation with the Secretary-General and FAO where indicated, initiate immediately, in co-operation with all interested parties, programmes of exploration and collection wherever endangered species have been identified which are not included in existing collections:

- a) An emergency programme, with the co-operation of the Man and the Biosphere Programme, of plant exploration and collection should be launched on the basis of the FAO List of Emergency Situations for a five-year period;
- b) With regard to forestry species, in addition to the efforts of the Danish/FAO Forest Tree Seed Centre, IUFRO, and the FAO Panel of Experts on Forest Gene Resources, support is needed for missions planned for Latin America, West Africa, the East Indies and India.

43. *It is recommended* that Governments, in co-operation with the Secretary-General and FAO where indicated:

1. Recognize that conservation is a most crucial part of any genetic resources programme. Moreover, major types of genetic resources must be treated separately because:

- a) They are each subject to different programmes and priorities;
- b) They serve different uses and purposes;
- c) They require different expertise, techniques and facilities;

2. In respect of plant germ plasms (agriculture and forestry), organize and equip national regional genetic resources conservation centres:

- a) Such centres as the National Seed Storage Laboratory in the USA and the Vavilov Institute of Plant Industry in the USSR already provide good examples;
- b) Working collections should be established separately from the basic collections; these will usually be located at plant and breeding stations and will be widely distributed;
- c) Three classes of genetic crop resources must be conserved:
 - i High-producing varieties in current use and those they have superseded;
 - ii Primitive varieties of traditional pre-scientific agriculture (recognized as genetic treasures for plant improvement);

iii Mutations induced by radiation or chemical means;

- d) Species contributing to environmental improvement, such as sedge used to stabilize sand-dunes, should be conserved;
- e) Wild or weed relatives of crop species and those wild species of actual or potential use in rangelands, industry, new crops, etc., should be included;

3. In respect of plant germ plasms (agriculture and forestry), maintain gene pools of wild plant species within their natural communities. Therefore:

- a) It is essential that primeval forests, bushlands and grasslands which contain important forest genetic resources be identified and protected by appropriate technical and legal means; systems of reserves exist in most countries, but a strengthening of international understanding on methods of protection and on availability of material may be desired;
- b) Conservation of species of medical, aesthetic or research value should be assured;
- c) The network of biological reserves proposed by UNESCO (MAB) should be designed, where feasible, to protect these natural communities;
- d) Where protection in nature becomes uncertain or impossible, then means such as seed storage or living collections in provenance trials or botanic gardens must be adopted;

4. Fully implement the programmes initiated by the FAO Panels of Experts on forest gene resources in 1968 and on plant exploration and introduction in 1970;

5. In respect of animal germ plasms, consider the desirability and feasibility of international action to preserve breeds or varieties of animals:

- a) Because such an endeavour would constitute a major effort beyond the scope of any one nation, FAO would be the logical executor of such a project. Close co-operation with Governments would be necessary, however. The International Union for Conservation of Nature and Natural Resources might, logically, be given responsibility for wild species, in co-operation with FAO, the Man and the Biosphere Programme (UNESCO), and Governments;
- b) Any such effort should also include research on methods of preserving, storing, and transporting germ plasma;

- c) Specific methods for the maintenance of gene pools of aquatic species should be developed;
 - d) The recommendations of the FAO Working Party Meeting on Genetic Selection and Conservation of Genetic Resources of Fish, held in 1971, should be implemented;
6. In respect of micro-organism germ plasms, co-operatively establish and properly fund a few large regional collections:
- a) Full use should be made of major collections now in existence;
 - b) In order to provide geographical distribution and access to the developing nations, regional centres should be established in Africa, Asia and Latin America and the existing centres in the developed world should be strengthened;
7. Establish conservation centres of insect germ plasm. The very difficult and long process of selecting or breeding insects conducive to biological control programmes can begin only in this manner;
44. *It is recommended* that Governments, in co-operation with the Secretary-General and FAO where indicated, recognize that evaluation and utilization are critical corollaries to the conservation of genetic resources. In respect of crop-breeding programmes, it is recommended that Governments give special emphasis to:
- a) The quality of varieties and breeds and the potential for increased yields;
 - b) The ecological conditions to which the species are adapted;
 - c) The resistance to diseases, pests and other adverse factors;
 - d) The need for a multiplicity of efforts so as to increase the chances of success.
45. *It is recommended* that Governments, in co-operation with the Secretary-General of the United Nations and FAO where indicated:
1. Collaborate to establish a global network of national and regional institutes relating to genetic resource conservation based on agreement on the availability of material and information on methods, on technical standards, and on the need for technical and financial assistance wherever required:
- a) Facilities should be designed to assure the use of the materials and information: (i) by breeders, to develop varieties and

breeds both giving higher yields and having higher resistance to local pests and diseases and other adverse factors; and (ii) by users providing facilities and advice for the safest and most profitable utilization of varieties and breeds most adapted to local conditions;

- b) Such co-operation would apply to all genetic resource conservation centres and to all types mentioned in the foregoing recommendations;
- c) Standardized storage and retrieval facilities for the exchange of information and genetic material should be developed:
 - i Information should be made generally available and its exchange facilitated through agreement on methods and technical standards;
 - ii International standards and regulations for the shipment of materials should be agreed upon;
 - iii Basic collections and data banks should be replicated in at least two distinct sites, and should remain a national responsibility;
 - iv A standardized and computerized system of documentation is required;
- d) Technical and financial assistance should be provided where required; areas of genetic diversity are most frequently located in those countries most poorly equipped to institute the necessary programmes;

2. Recognize that the need for liaison among the parties participating in the global system of genetic resources conservation requires certain institutional innovations. *To this end:*

- a) *It is recommended* that the appropriate UN agency establish an international liaison unit for plant genetic resources in order:
 - i To improve liaison between governmental and non-governmental efforts;
 - ii To assist in the liaison and co-operation between national and regional centres, with special emphasis on international agreements on methodology and standards of conservation of genetic material, standardization and co-ordination of computerized record systems, and the exchange of information and material between such centres;
 - iii To assist in implementing training courses in exploration, conservation and breeding methods and techniques;

- iv To act as a central repository for copies of computerized information on gene pools (discs and tapes);
 - v To provide the secretariat for periodic meetings of international panels and seminars on the subject; a conference on germ plasm conservation might be convened to follow up the successful conference of 1967;
 - vi To plan and co-ordinate the five-year emergency programme on the conservation of endangered species;
 - vii To assist Governments further, wherever required, in implementing their national programmes;
 - viii To promote the evaluation and utilization of genetic resources at the national and international levels;
- b) *It is recommended* that the appropriate UN agency initiate the required programme on micro-organism germ plasm:
- i Periodic international conferences involving those concerned with the maintenance of and research on gene pools of micro-organisms should be supported;
 - ii Such a programme might interact with the proposed regional culture centres by assuring that each centre places high priority on the training of scientists and technicians from the developing nations, acting as a necessary liaison; and lending financial assistance to those countries established outside the developed countries;
 - iii The international exchange of pure collections of micro-organisms between the major collections of the world has operated for many years and requires little re-enforcement;
 - iv Study should be conducted particularly on waste disposal and recycling, controlling diseases and pests, and food technology and nutrition;
- c) *It is recommended* that FAO institute a programme in respect of animal germ plasm to assess and maintain catalogues of the economic characteristics of domestic animal breeds and types and of wild species and to establish gene pools of potentially useful types;
- d) *It is recommended* that the Man and the Biosphere project on the conservation of natural areas and the genetic material contained therein should be adequately supported.
46. *It is recommended* that Governments, and the Secretary-General in co-operation with FAO and other UN organizations concerned,

as well as development assistance agencies, take steps to support recent guidelines, recommendations and programmes of the various international fishing organizations. A large part of the needed international action has been identified with action programmes initiated by FAO and its Intergovernmental Committee on Fisheries and approximately 24 other bilateral and multilateral international commissions, councils and committees. In particular, these organizations are planning and undertaking:

- a) Co-operative programmes such as that of LEPOR (Long-Term and Expanded Programme of Oceanic Research), GIPME (Global Investigation of Pollution in the Marine Environment) and IBP (International Biological Programme);
- b) Exchange of data, supplementing and expanding the services maintained by FAO and bodies within its framework in compiling, disseminating and co-ordinating information on living aquatic resources and their environment and fisheries activities;
- c) Evaluation and monitoring of world fishery resources, environmental conditions, stock assessment, including statistics on catch and effort, and the economics of fisheries;
- d) Assistance to Governments in interpreting the implications of such assessments, identifying alternative management measures, and formulating required actions;
- e) Special programmes and recommendations for management of stocks of fish and other aquatic animals proposed by the existing international fishery bodies. Damage to fish stocks has often occurred because regulatory action is taken too slowly. In the past, the need for management action to be nearly unanimous has reduced action to the minimum acceptable level.

47. *It is recommended* that Governments, and the Secretary-General in co-operation with FAO and other UN organizations concerned, as well as development assistance agencies, take steps to ensure close participation of fishery agencies and interests in the preparations for the United Nations Conference on the Law of the Sea. In order to safeguard the marine environment and its resources through the development of effective and workable principles and laws, the information and insight of international and regional fishery bodies, as well as the national fishery agencies, are essential.

48. *It is recommended* that Governments, and the Secretary-General in co-operation with FAO and other UN organizations concerned, as well as development assistance agencies, take steps to ensure international co-operation in the research, control and regulation of the side effects of national activities in resource utilization where these affect the aquatic resources of other nations:

- a) Estuaries, intertidal marshes, and other near-shore and in-shore environments play a crucial role in the maintenance of several marine fish stocks. Similar problems exist in those fresh-water fisheries that occur in shared waters;
- b) Discharge of toxic chemicals, heavy metals, and other wastes may affect even high-seas resources;
- c) Certain exotic species, notably the carp, lamprey and alewife, have invaded international waters with deleterious effects as a result of unregulated unilateral action.

49. *It is recommended* that Governments, and the Secretary-General in co-operation with FAO and other UN organizations concerned, as well as development assistance agencies, take steps to develop further and strengthen facilities for collecting, analysing and disseminating data on living aquatic resources and the environment in which they live:

- a) Data already exist concerning the total harvest from the oceans and from certain regions in respect of individual fish stocks, their quantity, and the fishing efforts expended on them, and in respect of their population structure, distribution and changes. This coverage needs to be improved and extended;
- b) It is clear that a much greater range of biological parameters must be monitored and analysed in order to provide an adequate basis for evaluating the interaction of stocks and managing the combined resources of many stocks. There is no institutional constraint on this expansion but a substantial increase in funding is needed by FAO and other international organizations concerned to meet this expanding need for data;
- c) Full utilization of present and expanded data facilities is dependent on the co-operation of Governments in developing local and regional data networks, making existing data available to FAO and to the international bodies, and for-

malizing the links between national and international agencies responsible for monitoring and evaluating fishery resources.

50. *It is recommended* that Governments, and the Secretary-General in co-operation with FAO and other UN organizations concerned, as well as development assistance agencies, take steps to ensure full co-operation among Governments by strengthening the existing international and regional machinery for development and management of fisheries and their related environmental aspects and, in those regions where these do not exist, to encourage the establishment of fishery councils and commissions as appropriate.

- a) The operational efficiency of these bodies will depend largely on the ability of the participating countries to carry out their share of the activities and programmes;
- b) Technical support and servicing from the specialized agencies, in particular from FAO, is also required;
- c) The assistance of bilateral and international funding agencies will be needed to ensure the full participation of the developing countries in these activities.

51. *It is recommended* that Governments concerned consider the creation of river-basin commissions or other appropriate machinery for co-operation between interested States for water resources common to more than one jurisdiction.

- a) In accordance with the Charter of the UN and the principles of international law, full consideration must be given to the right of permanent sovereignty of each country concerned to develop its own resources;
- b) The following principles should be considered by the States concerned when appropriate:
 - i Nations agree that when major water resource activities are contemplated that may have a significant environmental effect on another country, the other country should be notified well in advance of the activity envisaged;
 - ii The basic objective of all water resource use and development activities from the environmental point of view is to ensure the best use of water and to avoid its pollution in each country;
 - iii The net benefits of hydrologic regions common to more than one national jurisdiction are to be shared equitably by the nations affected;

- c) Such arrangements, when deemed appropriate by the States concerned, will permit undertaking on a regional basis:
 - i Collection, analysis, and exchanges of hydrologic data through some international mechanism agreed upon by the States concerned;
 - ii Joint data-collection programmes to serve planning needs;
 - iii Assessment of environmental effects of existing water uses;
 - iv Joint study of the causes and symptoms of problems related to water resources, taking into account the technical, economic, and social considerations of water quality control;
 - v Rational use, including a programme of quality control, of the water resource as an environmental asset;
 - vi Provision for the judicial and administrative protection of water rights and claims;
 - vii Prevention and settlement of disputes with reference to the management and conservation of water resources;
 - viii Financial and technical co-operation of a shared resource;
- d) Regional conferences should be organized to promote the above considerations.

52. *It is recommended* that the Secretary-General take steps to ensure that appropriate UN bodies support government action with regard to water resources where required:

1. Reference is made to FAO, WHO, WMO, ESA—RTD, UNESCO/IHD, the regional economic commissions and UNESOB. For example:

- a) FAO has established a Commission on Land and Water Use for the Middle East which promotes regional co-operation in research, training and formation, *inter alia*, on water management problems;
- b) WHO has available the International Reference Centre for Waste Disposal located at Dübendorf, Switzerland, and the International Reference Centre on Community Water Supply in the Netherlands;
- c) WMO has a Commission on Hydrology which provides guidance on data collection and on the establishment of hydrological networks;
- d) Resources and Transport Division of ESA has the UN Water Resources Development Centre;

- e) UNESCO is sponsoring the International Hydrological Decade programme of co-ordinated research on the quality and quantity of world water resources.

2. Similar specialized centres should be established at the regional level in developing countries for training, research and information exchange on:

- a) Inland water pollution and waste disposal in co-operation with WHO, FAO, the UN regional economic commissions and UNESOB;
- b) Water management for rain-fed and irrigated agriculture, by FAO in co-operation with the regional economic commissions and UNESOB;
- c) Integrated water resources planning and management in co-operation with ESA—RTD, the regional economic commissions, and UNESOB.

53. *It is recommended* that the Secretary-General take steps to ensure that the United Nations system is prepared to provide technical and financial assistance to Governments when requested in the different functions of water resources management:

- a) Surveys and inventories;
- b) Water resources administration and policies, including:
 - i The establishment of institutional frameworks;
 - ii Economic structures of water resources management and development;
 - iii Water resources law and legislation;
- c) Planning and management techniques, including:
 - i The assignment of water quality standards;
 - ii The implementation of appropriate technology;
 - iii More efficient use and re-use of limited water supplies;
- d) Basic and applied studies and research;
- e) Transfer of existing knowledge;
- f) Continuing support of the programme of the International Hydrological Decade.

54. *It is recommended* that the Secretary-General take steps to establish a roster of experts who would be available to assist Governments, upon request, to anticipate and evaluate the environmental effects of major water development projects. Governments would have the opportunity of consulting teams of experts drawn from this roster

in the first stages of project planning. Guidelines could be prepared to assist in the review and choices of alternatives.

55. *It is recommended* that the Secretary-General take steps to conduct an exploratory programme to assess the actual and potential environmental effects of water management upon the oceans, define terms and estimate the costs for a comprehensive programme of action, and establish and maintain as far as possible:

- a) A world registry of major or otherwise important rivers arranged regionally and classified according to their discharge of water and pollutants;
- b) A world registry of clean rivers which would be defined in accordance with internationally agreed quality criteria and to which nations would contribute on a voluntary basis:
 - i The oceans are the ultimate recipient for the natural and man-made wastes discharged into the river systems of the continents;
 - ii Changes in the amount of river-flow into the oceans, as well as in its distribution in space and time, may considerably affect the physical, chemical and biological regime of the estuary regions and influence the oceanic water systems;
 - iii It would be desirable for nations to declare their intention to have admitted to the world registry of clean rivers those rivers within their jurisdiction that meet the quality criteria as defined and to declare their further intention to ensure certain other rivers shall meet those quality criteria by some target date.

56. *It is recommended* that the Secretary-General provide the appropriate vehicle for the exchange of information on mining and mineral processing.

- a) Improved accessibility and dissemination of existing information is required; the body of literature and experience is already larger than one would think.
- b) Possibilities include the accumulation of information on: (i) the environmental conditions of mine sites; (ii) the action taken in respect of the environment; and (iii) the positive and negative environmental repercussions.
- c) Such a body of information could be used for prediction. Criteria for the planning and management of mineral production would emerge and would indicate where certain

kinds of mining should be limited, where reclamation costs would be particularly high, or where other problems would arise.

- d) The appropriate United Nations bodies should make efforts to assist the developing countries by, *inter alia*, providing adequate information for each country on the technology for preventing present or future environmentally adverse effects of mining and the adverse health and safety effects associated with the mineral industry, and by accepting technical trainees and sending experts.

57. *It is recommended* that the Secretary-General take steps to ensure proper collection, measurement and analysis of data relating to the environmental effects of energy use and production within appropriate monitoring systems.

- a) The design and operation of such networks should include, in particular, monitoring the environmental levels resulting from emission of carbon dioxide, sulphur dioxide, oxidants, nitrogen oxides (NO_x), heat and particulates, as well as those from releases of oil and radioactivity;
- b) In each case the objective is to learn more about the relationships between such levels and the effect on weather, human health, plant and animal life, and amenity values.

58. *It is recommended* that the Secretary-General take steps to give special attention to providing a mechanism for the exchange of information on energy:

- a) The rationalization and integration of resource management for energy will clearly require a solid understanding of the complexity of the problem and of the multiplicity of alternative solutions;
- b) Access to the large body of existing information should be facilitated:
 - i Data on the environmental consequences of different energy systems should be provided through an exchange of national experiences, studies, seminars, and other appropriate meetings;
 - ii A continually updated register of research involving both entire systems and each of their stages should be maintained.

59. *It is recommended* that the Secretary-General take steps to ensure that a comprehensive study be promptly undertaken with the aim of

submitting a first report, at the latest in 1975, on available energy sources, new technology, and consumption trends in order to assist in providing a basis for the most effective development of the world's energy resources, with due regard to the environmental effects of energy production and use: such a study to be carried out in collaboration with appropriate international bodies such as IAEA and OECD.

60. *It is recommended* that the Secretary-General, in co-operation with Governments concerned and the appropriate international agencies, arrange for systematic audits of natural resource development projects in representative ecosystems of international significance to be undertaken jointly with the Governments concerned after, and where feasible before, the implementation of such projects.

61. *It is recommended* that the Secretary-General, in co-operation with Governments concerned and the appropriate international agencies, provide that pilot studies be conducted in representative ecosystems of international significance to assess the environmental impact of alternative approaches to the survey, planning and development of resource projects.

62. *It is recommended* that the Secretary-General, in co-operation with Governments concerned and the appropriate international agencies, provide that studies be conducted to find out the connexion between the distribution of natural resources and people's welfare and the reasons for possible discrepancies.

63. *It is recommended* that the Secretary-General take steps to ensure that international development assistance agencies, in co-operation with recipient Governments, intensify efforts to revise and broaden the criteria of development project analysis to incorporate environmental impact considerations.

64. *It is recommended* that the Secretary-General take steps to ensure that the United Nations agencies concerned undertake studies on the relative costs and benefits of synthetic *versus* natural products serving identical uses.

65. *It is recommended* that the Man and the Biosphere Programme be vigorously pursued by UNESCO in co-operation with other UN organizations and other international scientific organizations.

66. *It is recommended* that WMO initiate or intensify studies on the interrelationships of resource development and meteorology.

67. *It is recommended* that the Secretary-General, in co-operation with interested Governments and UN specialized agencies, take the necessary steps to encourage the further development of remote-sensing techniques for resources surveys and the utilization of these techniques on the basis of proper international arrangements.

68. *It is recommended* that the Secretary-General, in co-operation with the appropriate agencies of the UN and other international organizations, promote jointly with interested Governments the development of methods for the integrated planning and management of natural resources, and provide, when requested, advice to Governments on such methods, in accordance with the particular environmental circumstances of each country.

69. *It is recommended* that FAO expand its present programme on the stabilization of marginal lands.

POLLUTION GENERALLY

70. *It is recommended* that Governments be mindful of activities in which there is an appreciable risk of effects on climate, and to this end:

- a) Carefully evaluate the likelihood and magnitude of climatic effects and disseminate their findings to the maximum extent feasible before embarking on such activities;
- b) Consult fully other interested States when activities carrying risk of such effects are being contemplated or implemented.

71. *It is recommended* that Governments use the best practicable means available to minimize the release to the environment of toxic or dangerous substances, especially if they are persistent substances such as heavy metals and organochlorine compounds, until it has been demonstrated that their release will not give rise to unacceptable risks or unless their use is essential to human health or food production, in which case appropriate control measures should be applied.

72. *It is recommended* that in establishing standards for pollutants of international significance, Governments take into account the relevant standards proposed by competent international organizations, and concert with other concerned Governments and the competent international organizations in planning and carrying out control programmes for pollutants distributed beyond the national jurisdiction from which they are released.

73. *It is recommended* that Governments actively support, and contribute to, international programmes to acquire knowledge for the assessment of pollutant sources, pathways, exposures and risks and that those Governments in a position to do so provide educational, technical and other forms of assistance to facilitate broad participation by countries regardless of their economic or technical advancement.

74. *It is recommended* that the Secretary-General, drawing on the resources of the entire UN system, and with the active support of Governments and appropriate scientific and other international bodies:

- a) Increase the capability of the UN system to provide awareness and advance warning of deleterious effects to human health and well-being from man-made pollutants;
- b) Provide this information in a form which is useful to policy-makers at the national level;
- c) Assist those Governments which desire to incorporate these and other environmental factors into national planning processes;
- d) Improve the international acceptability of procedures for testing pollutants and contaminants by:
 - i) International division of labour in carrying out the large-scale testing programmes needed;
 - ii) Development of international schedules of tests for evaluation of the environmental impact potential of specific contaminants or products. Such a schedule of tests should include consideration of both short-term and long-term effects of all kinds, and should be reviewed and brought up to date from time to time to take into account new knowledge and techniques;
 - iii) Development and implementation of an international inter-calibration programme for sampling and analytical techniques to permit more meaningful comparisons of national data;
- e) Develop plans for an International Registry of Data on Chemicals in the Environment based on a collection of available scientific data on the environmental behaviour of the most important man-made chemicals and containing production figures of the potentially most harmful chemicals,

together with their pathways from factory *via* utilization to ultimate disposal or recirculation:

75. *It is recommended* that, without reducing in any way their attention to non-radioactive pollutants, Governments should:

- a) Explore with IAEA and WHO the feasibility of developing a registry of releases to the biosphere of significant quantities of radioactive materials;
- b) Support and expand, under IAEA and appropriate international organizations, international co-operation on radioactive waste problems, including problems of mining and tailings and also including co-ordination of plans for the siting of fuel-reprocessing plants in relation to the siting of the ultimate storage areas, considering also the transportation problems.

76. *It is recommended*:

- a) That a major effort be undertaken to develop monitoring and both epidemiological and experimental research programmes providing data for early warning and prevention of the deleterious effects of the various environmental agents, singly or in combination, to which man is increasingly exposed, directly or indirectly, and for the assessment of their potential risks to human health, with particular regard to the risks of mutagenicity, teratogenicity and carcinogenicity. Such programmes should be guided and co-ordinated by WHO;
- b) That WHO co-ordinate the development and implementation of an appropriate international collection and dissemination system to correlate medical, environmental and family-history data;
- c) That Governments actively support and contribute to international programmes for research and development of guidelines concerning environmental factors in the work environment.

77. *It is recommended* that WHO, in collaboration with the relevant agencies, in the context of an approved programme, and with a view to suggesting necessary action, assist Governments, particularly those of developing countries, in undertaking co-ordinated programmes of monitoring of air and water and in establishing moni-

toring systems in areas where there may be a risk to health from pollution.

78. *It is recommended* that internationally co-ordinated programmes of research and monitoring of food contamination by chemical and biological agents be established and developed jointly by FAO and WHO, taking into account national programmes, and that the results of monitoring be expeditiously assembled, evaluated and made available so as to provide early information on rising trends of contamination and on levels that may be considered undesirable or may lead to unsafe human intakes.

79. *It is recommended:*

- a) That approximately 10 baseline stations be set up, with the consent of the States involved, in areas remote from all sources of pollution in order to monitor long-term global trends in atmospheric constituents and properties which may cause changes in meteorological properties, including climatic changes;
- b) That a much larger network of not less than 100 stations be set up, with the consent of the States involved, for monitoring properties and constituents of the atmosphere on a regional basis and especially changes in the distribution and concentration of contaminants;
- c) That these programmes be guided and co-ordinated by WMO;
- d) That WMO, in co-operation with ICSU, continue to carry out the Global Atmospheric Research Programme (GARP), better and if necessary establish new programmes to understand the general circulation of the atmosphere and the causes of climatic changes whether these causes are natural or the result of man's activities.

80. *It is recommended* that the Secretary-General ensure:

- a) That research activities in terrestrial ecology be encouraged, supported and co-ordinated through the appropriate agencies, so as to provide adequate knowledge of the inputs, movements, residence times and ecological effects of pollutants identified as critical;
- b) That regional and global networks of existing and, where necessary, new research stations, research centres, and biological reserves be designated or established within the frame-

work of the Man and the Biosphere Programme (MAB) in all major ecological regions, to facilitate intensive analysis of the structure and functioning of ecosystems under natural or managed conditions;

- c) That the feasibility of using stations participating in this programme for surveillance of the effects of pollutants on ecosystems be investigated;
- d) That programmes such as the Man and the Biosphere Programme be used to the extent possible to monitor: (i) the accumulation of hazardous compounds in biological and abiotic material at representative sites; (ii) the effect of such accumulation on the reproductive success and population size of selected species.

81. *It is recommended* that WHO, together with the international organizations concerned, continue to study, and establish, primary standards for the protection of the human organism, especially from pollutants that are common to air, water and food, as a basis for the establishment of derived working limits.

82. *It is recommended* that increased support be given to the Codex Alimentarius Commission to develop international standards for pollutants in food and a code of ethics for international food trade, and that the capabilities of FAO and WHO to assist materially and to guide developing countries in the field of food control be increased.

83. *It is recommended* that the appropriate UN agencies develop agreed procedures for setting derived working limits for common air and water contaminants.

84. *It is recommended* that Governments make available, through the International Referral System established in pursuance of recommendation 101 of the Conference, such information as may be requested on their pollution research and pollution control activities, including legislative and administrative arrangements, research on more efficient pollution control technology, and cost-benefit methodology.

85. *It is recommended* that any mechanism for co-ordinating and stimulating the actions of the different UN organs in connexion with environmental problems include among its functions:

- a) Development of an internationally accepted procedure for the identification of pollutants of international significance

and for the definition of the degree and scope of international concern;

- b) Consideration of the appointment of appropriate inter-governmental expert bodies to assess quantitatively the exposures, risks, pathways and sources of pollutants of international significance;
- c) Review and co-ordination of international co-operation for pollution control, ensuring in particular that needed measures shall be taken and that measures taken in regard to various media and sources shall be consistent with one another;
- d) Examination of the needs for technical assistance to Governments in the study of pollution problems, in particular those involving international distribution of pollutants;
- e) Encouragement of the establishment of consultation mechanisms for speedy implementation of concerted abatement programmes with particular emphasis on regional activities.

MARINE POLLUTION

86. *It is recommended* that Governments, with the assistance and guidance of appropriate UN bodies, in particular the Joint Group of Experts on the Scientific Aspects of Marine Pollution:

- a) Accept and implement available instruments on the control of the maritime sources of marine pollution;
- b) Ensure that the provisions of such instruments are complied with by ships flying their flags and by ships operating in areas under their jurisdiction and that adequate provisions are made for reviewing the effectiveness of, and revising, existing and proposed international measures for control of marine pollution;
- c) Ensure that ocean dumping by their nationals anywhere, or by any person in areas under their jurisdiction, is controlled and that Governments shall continue to work towards the completion of, and bringing into force as soon as possible of an over-all instrument for the control of ocean dumping as well as needed regional agreements within the framework of this instrument, in particular for enclosed and semi-enclosed seas, which are more at risk from pollution;

- d) Refer the draft articles and annexes contained in the reports of the intergovernmental meetings at Reykjavik, Iceland, in April 1972 and in London in May 1972 to the UN Committee on the Peaceful Uses of the Seabed and the Ocean Floor beyond the Limits of National Jurisdiction at its session in July/August 1972 for information and comments and to a conference of Governments to be convened by the Government of the United Kingdom of Great Britain and Northern Ireland in consultation with the Secretary-General before November 1972 for further consideration, with a view to opening the proposed convention for signature at a place to be decided by that Conference, preferably before the end of 1972;
 - e) Participate fully in the 1973 IMCO Conference on Marine Pollution and the UN Conference on the Law of the Sea scheduled to begin in 1973, as well as in regional efforts, with a view to bringing all significant sources of pollution within the marine environment, including radioactive pollution from nuclear surface ships and submarines, and in particular in enclosed and semi-enclosed seas, under appropriate controls and particularly to complete elimination of deliberate pollution by oil from ships, with the goal of achieving this by the middle of the present decade;
 - f) Strengthen national controls over land-based sources of marine pollution, in particular in enclosed and semi-enclosed seas, and recognize that, in some circumstances, the discharge of residual heat from nuclear and other power-stations may constitute a potential hazard to marine ecosystems.
87. *It is recommended* that Governments:
- a) Support national research and monitoring efforts that contribute to agreed international programmes for research and monitoring in the marine environment, in particular, the Global Investigation of Pollution in the Marine Environment (GIPME) and the Integrated Global Ocean Station System (IGOSS);
 - b) Provide to the UN, FAO and UNCTAD, as appropriate to the data-gathering activities of each, statistics on the production and use of toxic or dangerous substances that are potential marine pollutants, especially if they are persistent;
 - c) Expand their support to components of the UN system

concerned with research and monitoring in the marine environment and adopt the measures required to improve the constitutional, financial and operational basis under which IOC is at present operating so as to make it an effective joint mechanism for the Governments and UN organizations concerned (UNESCO, FAO, WMO, IMCO, ESA) and in order that it may be able to take on additional responsibilities and co-ordination of scientific programmes and services.

88. *It is recommended* that the Secretary-General, together with the sponsoring agencies, make it possible for the Joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP):

- a) To re-examine annually, and revise as required, its "Review of Harmful Chemical Substances", with a view to elaborating further its assessment of sources, pathways and resulting risks of marine pollutants;
- b) To assemble, having regard to other work in progress, scientific data and to provide advice on scientific aspects of marine pollution, especially those of an interdisciplinary nature.

89. *It is recommended* that the Secretary-General ensure:

- a) That mechanisms for combining world statistics on mining, production, processing, transport and use of potential marine pollutants shall be developed along with methods for identifying high-priority marine pollutants based in part on such data;
- b) That GESAMP, in consultation with other expert groups, propose guidelines for test programmes to evaluate toxicity of potential marine pollutants;
- c) That FAO, WHO, IOC and IAEA encourage studies of the effects of high-priority marine pollutants on man and other organisms, with appropriate emphasis on chronic, low-level exposures;
- d) That IOC, with FAO and WHO, explore the possibility of establishing an international institute for tropical marine studies, which would undertake training as well as research.

90. *It is recommended* that IOC, jointly with WMO and, as appropriate, in co-operation with other interested intergovernmental bodies,

promote the monitoring of marine pollution, preferably within the framework of IGOSS, as well as the development of methods for monitoring high-priority marine pollutants in the water, sediments and organisms, with advice from the Joint Group of Experts on the Scientific Aspects of Marine Pollution on intercomparability of methodologies.

91. *It is recommended* that IOC:

- a) Ensure that provision shall be made in international marine research, monitoring and related activities for the exchange, dissemination, and referral to sources of data and information on baselines and on marine pollution and that attention shall be paid to the special needs of developing countries;
- b) Give full consideration, with FAO, WMO, IMCO, WHO, IAEA, IHO and ICES and other interested and relevant organizations, to the strengthening of on-going marine and related data and information exchange and dissemination activities;
- c) Support the concept of development of an interdisciplinary and interorganizational system primarily involving centres already in existence;
- d) Initiate an interdisciplinary marine pollution data and scientific information referral capability.

92. *It is recommended*:

- a) That Governments collectively endorse the principles set forth in paragraph 197 of Conference document A/CONF. 48/8 as guiding concepts for the UN Conference on the Law of the Sea and the IMCO Marine Pollution Conference scheduled to be held in 1973 and also the statement of objectives agreed on at the second session of the Intergovernmental Working Group on Marine Pollution, which reads as follows: "The marine environment and all the living organisms which it supports are of vital importance to humanity, and all people have an interest in assuring that this environment is to be managed that its quality and resources are not impaired. This applies especially to coastal nations, which have particular interest in management of coastal area resources. The capacity of the sea to assimilate wastes and render them harmless and its ability to regenerate natural resources are not unlimited. Proper management is required

and measures to prevent and control marine pollution must be regarded as an essential element in this management of the oceans and seas and their natural resources”;

and that, in respect of the particular interest of coastal States in the marine environment and recognizing that the resolution of this question is a matter for consideration at the Conference on the Law of the Sea, they take note of the principles on the rights of coastal States discussed but neither endorsed nor rejected at the second session of the Intergovernmental Working Group on Marine Pollution and refer those principles to the 1973 IMCO Conference for information and to the 1973 Conference on the Law of the Sea for such action as may be appropriate;

- b) That Governments take early action to adopt effective national measures for the control of all significant sources of marine pollution, including land-based sources, and concert and co-ordinate their actions regionally and where appropriate on a wider international basis;
- c) That the Secretary-General, in co-operation with appropriate international organizations, endeavour to provide guidelines which Governments might wish to take into account when developing such measures.

93. *It is recommended* that any mechanism for co-ordinating and stimulating the actions of the different UN organs in connexion with environmental problems include among its functions over-all responsibility for ensuring that needed advice on marine pollution problems shall be provided to Governments.

94. *It is recommended* that the Secretary-General, with the co-operation of UN bodies, take steps to secure additional financial support to those training and other programmes of assistance that contribute to increasing the capacity of developing countries to participate in international research, monitoring and pollution-control programmes.

EDUCATIONAL, INFORMATIONAL, SOCIAL AND CULTURAL ASPECTS

95. *It is recommended* that the Secretary-General make arrangements for the UN system:

- a) To provide countries on request with the necessary technical and financial assistance in preparing national reports on the

environment, in setting up machinery for monitoring environmental developments from the social and cultural standpoint and, in particular, in drawing up national social, educational and cultural programmes;

- b) To support and encourage projects for continuing co-operation among national social, educational and cultural programmes, including their economic aspects, in an international network. The organizations of the UN system, including the regional economic commissions and UNESOB, will be called upon to participate in this activity, as will other international governmental and non-governmental agencies;
- c) To organize the exchange of information on experience, methods and work in progress in connexion with continuous social diagnosis, particularly at the regional level and between regions with common problems;
- d) To facilitate the development of social and cultural indicators for the environment, in order to establish a common methodology for assessing environmental developments and preparing reports on the subjects;
- e) To prepare, on the basis of the national reports on the state of, and outlook for, the environment, periodic reports on regional or subregional situations and on the international situation in this matter.

The activities described above could be co-ordinated by the new bodies for environmental co-ordination, taking into account the priorities agreed upon according to the resources available. International bodies responsible for technical and financial co-operation and assistance could also help in carrying out these tasks.

96. 1. *It is recommended* that the Secretary-General, the organizations of the UN system, especially UNESCO, and the other international agencies concerned, should, after consultation and agreement, take the necessary steps to establish an international programme in environmental education, interdisciplinary in approach, in school and out of school, encompassing all levels of education and directed towards the general public, in particular the ordinary citizen living in rural and urban areas, youth and adult alike, with a view to educating him as to the simple steps he might take, within his means, to manage and control his environment. A programme of technical and financial co-operation and assistance will be needed to support this programme,

taking into account the priorities agreed upon according to the resources available. This programme should include, among other things:

- a) The preparation of an inventory of existing systems of education which include environmental education;
- b) The exchange of information on such systems and, in particular, dissemination of the results of experiments in teaching;
- c) The training and retraining of professional workers in various disciplines at various levels (including teacher training);
- d) Consideration of the formation of groups of experts in environmental disciplines and activities, including those concerning the economic, sociological, tourist and other sectors, in order to facilitate the exchange of experience between countries which have similar environmental conditions and comparable levels of development;
- e) The development and testing of new materials and methods for all types and levels of environmental education.

2. *It is further recommended* that UNESCO, under the Man and the Biosphere Programme, WHO, FAO, UNIDO, WMO and all the organizations concerned, including the scientific unions co-ordinated by ICSU, should develop their activities in studying desirable innovations in the training of specialists and technicians and, in collaboration with UNDP, should encourage the institution, at the regional and the international level, of courses and training periods devoted to the environment.

3. *It is further recommended* that international organizations for voluntary service, and, in particular, the International Secretariat for Volunteer Service, should include environmental skills in the services they provide, in consultation with UNDP through the United Nations Volunteer Programme.

97. 1. *It is recommended* that the Secretary-General make arrangements:

- a) To establish an information programme designed to create the awareness which individuals should have of environmental issues and to associate the public with environmental management and control. This programme will use traditional and contemporary mass media of communication, taking distinctive national conditions into account. In addition, the

programme must provide means of stimulating active participation by the citizens, and of eliciting interest and contributions from non-governmental organizations for the preservation and development of the environment;

- b) To institute the observance of World Environment Day;
- c) For the preparatory documents and official documents of the Conference to be translated into the widest possible range of languages and circulated as widely as possible;
- d) To integrate relevant information on the environment in all its various aspects into the activities of the information organs of the United Nations systems;
- e) To develop technical co-operation, particularly through and between the UN regional economic commissions and UNESOB.

2. *It is also recommended* that the Secretary-General and the development agencies make arrangements to use and adopt certain international development programmes—provided that this can be done without delaying their execution—so as to improve the dissemination of information and to strengthen community action on environment problems, especially among the oppressed and underprivileged peoples of the earth.

98. *It is recommended* that Governments, with the assistance of the Secretary-General, FAO, UNESCO and the other international and regional intergovernmental and non-governmental agencies concerned, should continue the preparation of the present and future conventions required for the conservation of the world's natural resources and cultural heritage. In the course of this preparatory work, Governments should consider the possibility of putting into operation systems of protection for elements of the world heritage, under which those Governments that wish to save elements of their national heritage of universal value would be able to obtain from the international community, on request, the technical and financial assistance required to bring their efforts to fruition.

99. 1. *It is recommended* that Governments should:

- a) Noting that the draft convention prepared by UNESCO concerning the protection of the world natural and cultural heritage marks a significant step towards the protection, on an international scale, of the environment, examine this draft

convention with a view to its adoption at the next General Conference of UNESCO;

- b) Whenever appropriate, sign the Convention on Conservation of Wetlands of International Importance;

2. *It is recommended* that the Secretary-General, in consultation with the competent agencies of the UN system and the non-governmental organizations concerned, make arrangements for a detailed study of all possible procedures for protecting certain islands for science;

3. *It is recommended* that a plenipotentiary conference be convened as soon as possible, under appropriate governmental or intergovernmental auspices, to prepare and adopt a convention on export, import and transit of certain species of wild animals and plants.

100. *It is recommended* that the Secretary-General make arrangements:

- a) To be kept informed of national pilot schemes for new forms of environmental management;
- b) To assist countries, on request, with their research and experiments;
- c) To organize the international exchange of information collected on this subject.

101. *It is recommended* that the Secretary-General take the appropriate steps, including the convening of an expert meeting, to organize an International Referral Services for sources of environmental information, taking into account the model described in paragraphs 129 to 136 of the report on educational, informational, social and cultural aspects of environmental issues (A/CONF.48/9), in order to assist in the successful implementation of all the recommendations made in respect of those aspects of environmental issues and of most of the recommendations envisaged in the other substantive subject areas covered in the Conference agenda.

DEVELOPMENT AND ENVIRONMENT

102. *It is recommended* that the appropriate regional organizations give full consideration to the following steps:

- a) Preparing short-term and long-term plans at regional, subregional and sectoral levels for the study and identification of the major environmental problems faced by the countries of the region concerned as well as the special problems of

- the least developed countries of the region and of countries with coastlines and inland lakes and rivers exposed to the risk of marine and other forms of pollution;
- b)* Evaluating the administrative, technical and legal solutions to various environmental problems in terms of both preventive and remedial measures, taking into account possible alternative and/or multidisciplinary approaches to development;
 - c)* Preparation, within the framework of international agreements, of legislative measures designed to protect marine (and fresh-water) fisheries resources within the limits of their national jurisdiction;
 - d)* Increasing and facilitating, in the context of development and as proposed in the World Plan of Action for the Application of Science and Technology to Development, the acquisition and distribution of information and experience to member countries through global and regional co-operation, with particular emphasis on an international information referral networks approach and on a regular exchange of information and observation among the regional organizations;
 - e)* Establishing facilities for the exchange of information and experience between less industrialized countries which, although situated in different regions, share similar problems as a result of common physical, climatic and other factors;
 - f)* Encouraging the training of personnel in the techniques of incorporating environmental considerations into developmental planning, and of identifying and analysing the economic and social cost-benefit relationships of alternative approaches;
 - g)* Establishing criteria, concepts and a terminology of the human environment through interdisciplinary efforts;
 - h)* Establishing and disseminating information on the significant environmental problems of each region and the nature and result of steps taken to cope with them;
 - i)* Providing and co-ordinating technical assistance activities directed towards establishing systems of environmental research, information and analysis at the national level;
 - j)* Assisting developing countries, in co-operation with appropriate international agencies, in promoting elementary

education, with emphasis on hygiene, and in developing and applying suitable methods for improving health, housing, sanitation and water supply and controlling soil erosion. Emphasis should be placed on techniques promoting the use of local labour and utilizing local materials and local expertise in environmental management;

- k) Encouraging the appropriate agencies and bodies within the United Nations to assist the developing countries, at their request, in establishing national science, technology and research policies to enable the developing countries to acquire the capacity to identify and combat environmental problems in the early planning and development stages. In this respect, special priority should be accorded to the type of research, technology and science which would help developing countries speed up, without adverse environment effects, the exploration, exploitation, processing and marketing of their natural resources.

103. *It is recommended* that Governments take the necessary steps to ensure:

- a) That all States participating in the Conference agree not to invoke environmental concerns as a pretext for discriminatory trade policies or for reduced access to markets and recognize further that the burdens of the environmental policies of the industrialized countries should not be transferred, either directly or indirectly, to the developing countries. As a general rule, no country should solve or disregard its environmental problems at the expense of other countries;
- b) That where environmental concerns lead to restrictions on trade, or to stricter environmental standards with negative effects on exports, particularly from developing countries, appropriate measures for compensation should be worked out within the framework of existing contractual and institutional arrangements and any such new arrangements that can be worked out in the future;
- c) That GATT, among other international organizations, could be used for the examination of the problems, specifically through the recently established Group on Environmental Measures and International Trade and through its general procedures for bilateral and multilateral adjustment of differences;

- d) That whenever possible (that is, in cases which do not require immediate discontinuation of imports), countries should inform their trading partners in advance about the intended action in order that there might be an opportunity to consult within the GATT Group on Environmental Measures and International Trade, among other international organizations. Assistance in meeting the consequences of stricter environmental standards ought to be given in the form of financial or technical assistance for research with a view to removing the obstacles that the products of developing countries have encountered;
 - e) That all countries agree that uniform environmental standards should not be expected to be applied universally by all countries with respect to given industrial processes or products except in those cases where environmental disruption may constitute a concern to other countries. In addition, in order to avoid an impairment of the access of the developing countries to the markets of the industrialized countries because of differential product standards, Governments should aim at world-wide harmonization of such standards. Environmental standards should be established, at whatever levels are necessary, to safeguard the environment, and should not be directed towards gaining trade advantages;
 - f) That the Governments and the competent international organizations keep a close watch on medium- and long-term trends in international trade and take measures with a view to promoting:
 - i) The exchange of environmental protection technologies;
 - ii) International trade in natural products and commodities which compete with synthetic products that have a greater capacity for pollution.
104. *It is recommended* that the Secretary-General ensure:
- a) That appropriate steps shall be taken by the existing United Nations organizations to identify the major threats to exports, particularly those of developing countries, that arise from environmental concerns, their character and severity, and the remedial action that may be envisaged;

- b) That the UN system, in co-operation with other governmental and non-governmental agencies working in this field, should assist Governments to develop mutually acceptable common international environmental standards on products which are considered by Governments to be of significance in foreign trade. Testing and certification procedures designed to ensure that the products conform to these standards should be such as to avoid arbitrary and discriminatory actions that might affect the trade of developing countries.

105. *It is recommended* that GATT, UNCTAD and other international bodies, as appropriate, should, within their respective fields of competence, consider undertaking to monitor, assess, and regularly report the emergence of tariff and non-tariff barriers to trade as a result of environmental policies.

106. *It is recommended:*

- a) That the Secretary-General, in co-operation with other international bodies as appropriate, should examine the extent to which the problems of pollution could be ameliorated by a reduction in the current levels of production and in the future rate of growth of the production of synthetic products and substitutes which, in their natural form, could be produced by developing countries; and make recommendations for national and international action;
- b) That Governments of the developing countries consider fully the new opportunities that may be offered to them to establish industries and/or expand existing industries in which they may have comparative advantages because of environmental considerations, and that special care be taken to apply the appropriate international standards on environment in order to avoid the creation of pollution problems in developing countries;
- c) That the Secretary-General, in consultation with appropriate international agencies, undertake a full review of the practical implications of environmental concerns in relation to distribution of future industrial capacity and, in particular, to ways in which the developing countries may be assisted to take advantage of opportunities and to minimize risks in this area.

107. *It is recommended* that the Secretary-General, in collaboration with appropriate international agencies, ensure that a study be conducted of appropriate mechanisms for financing international environmental action, taking into account General Assembly resolution 2849 (XXVI).

108. It being recognized that it is in the interest of mankind that the technologies for protecting and improving the environment be employed universally, *it is recommended* that the Secretary-General be asked to undertake studies, in consultation with Governments and appropriate international agencies, to find means by which environmental technologies may be made available for adoption by developing countries under terms and conditions that encourage their wide distribution without constituting an unacceptable burden to developing countries.

109. *It is recommended* that the Secretary-General, in collaboration with appropriate international agencies, take steps to ensure that the environmental considerations of an international nature related to the foregoing recommendations be integrated into the review and appraisal of the International Development Strategy for UNDD II in such a way that the flow of international aid to developing countries is not hampered. Recommendations for national action, proposed by the Secretary-General of the Conference, shall be referred to Governments for their considerations and, when deemed appropriate, should be taken into account in the review and appraisal process during the consideration of matters for national action as included in the International Development Strategy. It should further be ensured that the preoccupation of developed countries with their own environmental problems should not affect the flow of assistance to developing countries, and that this flow should be adequate to meet the additional environmental requirements of such countries.

The Action Plan

All of the recommendations approved by the Conference for action at the international level are rearranged in the following Action Plan for the Human Environment within the approved framework. The recommendations which, before and during the Conference, had been dealt with sectorally, by subject area, are redistributed below, according to function, into the three components of the Action Plan: the global environmental assessment programme (Earthwatch), the environmental management activities, and the supporting measures.

ENVIRONMENTAL ASSESSMENT (EARTHWATCH)

This category includes the functions listed below:

Evaluation and review: to provide the basis for identification of the knowledge needed and to determine that the necessary steps be taken:

Recommendations: 4, 11, 14, 18, 21, 30, 41, 44, 46 (*c, d*), 48, 49, 54, 55, 60, 61, 63, 70, 74, 75, 81, 85, 88, 91 (*a*), 92 (*c*), 93, 94, 95 (*d, e*), 106, 109.

Research: to create new knowledge of the kinds specifically needed to provide guidance in the making of decisions:

Recommendations: 4, 12, 13, 16 (*b*), 18 (*c*), 20 (*b, c*), 21, 23, 24 (*a, b*), 26, 28, 41, 42, 43, (*5. b, c*), 45 (*2. b*), 48, 49, 51 (*c*), 52, 53 (*d*), 59, 62, 64, 65, 66, 68, 73, 74 (*d*), 76, 78, 79 (*d*), 80 (*a-c*), 84, 85, 87, 88, 89, 94, 95 (*d*), 102 (*a.i*), 106 (*c*), 108.

Monitoring: to gather certain data on specific environmental variables and to evaluate such data in order to determine and predict important environmental conditions and trends:

Recommendations: 18 (*1. a-e*), 20 (*a. iv*), 25, 29, 30, 40, 45, 46 (*a-c*), 49, 51 (*c. i, ii*), 52 (*1. c*), 55, 57, 67, 73, 74, 76, 77, 78, 80, 87, 90, 91, 94, 95, 102, 104, 105, 108.

Information exchange: to disseminate knowledge within the scientific and technological communities and to ensure that decision-makers at all levels shall have the benefit of the best knowledge that can be made available in the forms and at the times in which it can be useful:

Recommendations: 2, 4, 5, 16 (c), 19 (a), 20 (a, c), 21 (a), 26, 27, 35, 37, 39, 41, 45, 46 (b), 49, 51 (c), 52, 53 (c), 54, 55, 56, 57, 58, 59, 73, 74 (b), 84, 91, 95 (c), 96 (b), 97, 100 (c), 101, 102 (d, e, h, i), 108.

ENVIRONMENTAL MANAGEMENT

This category covers functions designed to facilitate comprehensive planning that takes into account the side effects of man's activities and thereby to protect and enhance the human environment for present and future generations.

Recommendations: 1, 2, 3, 9, 10, 12, 13, 14, 15, 17, 18 (3, 4), 19, 20 (d), 21, 22, 23, 27, 32, 33, 36, 37, 38, 39, 42, 43, 44, 45, 46, 47, 48, 50, 51, 52, 53, 54, 55, 61, 63, 68, 69, 70, 71, 72, 75 (b), 81, 82, 83, 84, 85, 86, 88, 92, 93, 94, 96 (b), 98, 99, 100 (a), 102, 103, 104, 105, 106, 107, 108, 109.

SUPPORTING MEASURES

This category relates to measures required for the activities in the other two categories (environmental assessment and environmental management).

Education, training and public information: to supply needed specialists, multidisciplinary professionals and technical personnel and to facilitate the use of knowledge in decision-making at every level.

Recommendations: 6, 7, 8, 13, 16, 18 (4), 19 (b), 31, 34, 73, 89 (d), 93, 94, 95 (e), 96, 97, 102 (f).

Organizational arrangements:

Recommendations: 4 (1), 7 (b), 16, 18, 20 (b. iii), 21 (a. vi), 23, 26, 31 (b), 33, 34 (b), 41, 43 (2,6,7), 45, 49, 50, 51, 52 (2), 79, 85, 87 (c), 89 (d), 91, 93, 94, 101, 102 (e).

Financial and other forms of assistance:

Recommendations: 1, 2 (1. c), 10, 12, 13, 15, 16 (d), 18 (2, 4), 19 (b), 21 (a), 34 (b), 36, 43 (b), 45, 46 (d), 49, 50, 51 (c. viii), 53, 73, 74, 77, 85 (d), 93, 94, 95, 96, 97 (1. e, 2), 98, 100 (b), 102 (i, j, k), 107, 108.

CHAPTER THREE

Resolutions on Institutional and Financial Arrangements

The United Nations Conference on the Human Environment:

Convinced of the need for prompt and effective implementation by Governments and the international community of measures designed to safeguard and enhance the human environment for benefit of present and future generations of Man;

Recognizing that responsibility for action to protect and enhance the human environment rests primarily with Governments and, in the first instance, can be exercised more effectively at the national and regional levels;

Recognizing that environmental problems of broad international significance fall within the competence of the United Nations system;

Bearing in mind that international co-operation programmes in the environment field must be undertaken with due respect to the sovereign right of States and in conformity with the Charter of the United Nations and principles of international law;

Mindful of the sectoral responsibilities of the organizations of the United Nations system;

Conscious of the significance of regional and subregional co-operation in the field of the human environment and of the important role of the regional economic commissions and other regional inter-governmental organizations;

Emphasizing that problems of the human environment constitute a new and important area for international co-operation and that the complexity and interdependence of such problems require new approaches;

Recognizing that the relevant international scientific and other professional communities can make an important contribution to international co-operation in the field of the human environment.

Conscious of the need for processes within the United Nations system which would effectively assist developing countries to implement environmental policies and programmes compatible with their development plans, and to participate meaningfully in international environmental programmes;

Convinced that, in order to be effective, international co-operation in the field of the human environment requires additional financial and technical resources;

Aware of the urgent need for a permanent institutional arrangement within the United Nations for the protection and improvement of the human environment;

GOVERNING COUNCIL FOR ENVIRONMENTAL PROGRAMMES

1. *Recommends* that the General Assembly establish the Governing Council for Environmental Programmes composed of 54 members, elected for three-year terms on the basis of equitable geographical distributions;

2. *Recommends further* that the Governing Council have the following main functions and responsibilities:

- a) To promote international co-operation in the environment field and to recommend, as appropriate, policies to this end;
- b) To provide general policy guidance for the directions and co-ordination of environmental programmes within the United Nations system;
- c) To receive and review the periodic reports of the Executive Director on the implementation of environmental programmes within the United Nations system;
- d) To keep under review the world environmental situation in order to ensure that emerging environmental problems of wide international significance should receive appropriate and adequate consideration by Governments;
- e) To promote the contribution of the relevant international scientific and other professional communities to the acquisition, assessment and exchange of environmental knowledge and information and, as appropriate, to the technical aspects of the formulation and implementation of environmental programmes within the United Nations system;

- f) To maintain under continuing review the impact of national and international environmental policies and measures on developing countries, as well as the problem of additional costs that might be incurred by developing countries in the implementation of environmental programmes and projects, to ensure that such programmes and projects shall be compatible with the development plans and priorities of those countries;
 - g) To review and approve annually the programme of utilization of resources of the Environment Fund referred to below.
- 3. *Recommends further* that the Governing Council report annually to the General Assembly through the Economic and Social Council, which would transmit to the General Assembly such comments on the report as it may deem necessary, particularly with regard to questions of co-ordination and to the relationship of environment policies and programmes within the United Nations system to over-all economic and social and priorities;

ENVIRONMENT SECRETARIAT

- 4. *Recommends* that a small secretariat be established in the United Nations to serve as a focal point for environmental action and co-ordination within the United Nations system in such a way as to ensure a high degree of effective management;
- 5. *Recommends further* that the environment secretariat be headed by the Executive Director, who shall be elected by the General Assembly on the nomination of the Secretary-General, and who shall be entrusted, *inter alia*, with the following responsibilities:
 - a) To provide substantive support to the Governing Council;
 - b) Under the guidance of the Governing Council, to co-ordinate environmental programmes within the United Nations System, to keep under review their implementation and assess their effectiveness;
 - c) To advise, as appropriate and under the guidance of the Governing Council, intergovernmental bodies of the United Nations system on the formulation and implementation of environmental programmes;
 - d) To secure the effective co-operation of, and contribution from, the relevant scientific and other professional communities from all parts of the world;

- e) To provide, at the request of all parties concerned, advisory services for the promotion of international co-operation in the field of the environment;
- f) To submit to the Governing Council, on his own initiative or upon request, proposals embodying medium- and long-range planning for United Nations programmes in the environment field;
- g) To bring to the attention of the Governing Council any matter which he deems to require consideration by it;
- h) To administer, under the authority and policy guidance of the Governing Council, the Environment Fund;
- i) To report on environment matters to the Governing Council;
- j) To perform such other functions as may be entrusted to him by the Governing Council;

THE ENVIRONMENT FUND

6. *Recommends* that, in order to provide for additional financing for environmental programmes, a voluntary fund be established in accordance with existing United Nations financial procedures;

7. *Recommends further* that, in order to enable the Governing Council to fulfil its policy guidance role for the direction and co-ordination of environmental activities, the Environment Fund finance wholly or partly the costs of the new environmental initiatives undertaken within the United Nations system. These will include the initiatives envisaged in the Action Plan adopted by the United Nations Conference on the Human Environment, with particular attention to integrated projects, and such other environmental activities as may be decided upon by the Governing Council. The Governing Council shall review these initiatives with a view to taking appropriate decisions as to their continued financing;

8. *Recommends* that the Fund be used for financing such programmes of general interest as regional and global monitoring, assessment and data-collecting systems, including, as appropriate, costs for national counterparts; improvement of environmental quality management; environmental research; information exchange and dissemination; public education and training; assistance for national, regional and global environmental institutions; promotion of environmental research and studies for the development of industrial and other

technologies best suited to a policy of economic growth compatible with adequate environmental safeguards; and such other programmes as the Governing Council may decide upon. In the implementation of such programmes due account should be taken of the special needs of the developing countries;

9. *Recommends* that the costs of servicing the Governing Council and providing the small core secretariat be borne by the regular budget of the United Nations. Operational programme costs, programme support and administrative costs of the Fund shall be borne by the Fund;

10. *Recommends* that, in order to ensure that the development priorities of developing countries shall not be adversely affected, adequate measures should be taken to provide additional financial resources on terms compatible with the economic situation of the recipient developing country. To this end, the Executive Director, in co-operation with competent organizations, will keep this problem under continuing review;

11. *Recommends* that the Fund, in pursuance of the objectives stated in paragraphs 7 and 8 above, be directed to the need for effective co-ordination in the implementation of international environmental programmes of the organizations of the United Nations system and other international organizations;

12. *Recommends* that, in the implementation of programmes to be financed by the Fund, organizations outside the United Nations system, particularly those in the countries and regions concerned, also be utilized as appropriate, in accordance with the procedures established by the Governing Council; such organizations are invited to support the United Nations environmental programmes by complementary initiatives and contributions;

13. *Recommends* that the Governing Council formulate such general procedures as are necessary to govern the operations of the Fund;

CO-ORDINATION

14. *Recommends* that in order to provide for the maximum efficient co-ordination of United Nations environmental programmes, an Environmental Co-ordinating Board, chaired by the Executive Director, be established under the auspices and within the framework of the Administrative Committee on Co-ordination;

15. *Recommends further* that the Environmental Co-ordinating Board meet periodically for the purpose of ensuring co-operation and co-ordination among all bodies concerned in the implementation of environmental programmes and that it report annually to the Governing Council;
16. *Invites* the organizations of the United Nations system to adopt the measures that may be required to undertake concerted and co-ordinated programmes with regard to international environmental problems, taking into account existing procedures for prior consultation, particularly on programme and budgetary matters;
17. *Invites* the regional economic commissions and the Economic and Social Office in Beirut, in co-operation where necessary with other appropriate regional bodies, to intensify further their efforts directed towards contributing to the implementation of environmental programmes in view of the particular need for rapid development of regional co-operation in this field;
18. *Invites also* other intergovernmental and those non-governmental organizations which have an interest in the field of the environment to lend their full support and collaboration to the United Nations with a view to achieving the largest possible degree of co-operation and co-ordination;
19. *Calls upon* Governments to ensure that appropriate national institutions shall be entrusted with the task of co-ordination of environmental action, both national and international;
20. *Recommends* that the General Assembly review, as appropriate, at its thirty-first session, the institutional arrangements which it may decide upon in pursuance of this recommendation, bearing in mind, *inter alia*, the responsibilities of the Economic and Social Council under the Charter of the United Nations.

Abbreviations

CHBP	Centre for Housing, Building and Planning of ESA
ECE	Economic Commission for Europe
ECOSOC	Economic and Social Council of the United Nations
ESA	Department of Economic and Social Affairs of the United Nations
FAO	Food and Agriculture Organization of the United Nations
GATT	General Agreement on Tariffs and Trade
GIPME	Global Investigation of Pollution in the Marine Environment
IAEA	International Atomic Energy Agency
IBP	International Biological Programme
IBRD	International Bank for Reconstruction and Development
ICES	International Council for the Exploration of the Sea
ICSU	International Council of Scientific Unions
IHD	International Hydrological Decade
IHO	International Hydrographic Organization
ILO	International Labour Organisation
IMCO	Intergovernmental Maritime Consultative Organization
IOC	Intergovernmental Oceanographic Commission
ISSS	International Society of Soil Science
IUFRO	International Union of Forestry Research Organization
LEPOR	Long-term and Expanded Programme of Oceanic Exploration and Research
MAB	Man and the Biosphere Programme (UNESCO)
OECD	Organization for Economic Co-operation and Development
RTD	Resources and Transport Division of ESA
UNCTAD	United Nations Conference on Trade and Development
UNDD II	United Nations Second Development Decade
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNESOB	United Nations Economic and Social Office in Beirut
UNIDO	United Nations Industrial Development Organization
WHO	World Health Organization
WMO	World Meteorological Organization
WWW	World Weather Watch

THE COCOYOC DECLARATION

Cocoyoc, Mexico, 8-12 October 1974

The Cocoyoc Declaration

Thirty years have passed since the signing of the United Nations Charter launched the effort to establish a new international order. Today, that order has reached a critical turning point. Its hopes of creating a better life for the whole human family have been largely frustrated. It has proved impossible to meet the "inner limit" of satisfying fundamental human needs. On the contrary, more people are hungry, sick, shelterless and illiterate today than when the United Nations was first set up.

At the same time, new and unforeseen concerns have begun to darken the international prospects. Environmental degradation and the rising pressure on resources raise the question whether the "outer limits" of the planet's physical integrity may not be at risk.

And to these preoccupations must be added the realization that the next 30 years will bring a doubling of world population. Another world on top of this, equal in numbers, demands and hopes.

But these critical pressures give no reason to despair of the human enterprise, provided we undertake the necessary changes. The first point to be underlined is that the failure of world society to provide "a safe and happy life" for all is not caused by any present lack of physical resources. The problem today is not primarily one of absolute physical shortage but of economic and social maldistribution and misuse; mankind's predicament is rooted primarily in economic and social structures and behaviour within and between countries.

Much of the world has not yet emerged from the historical consequences of almost five centuries of colonial control which concentrated economic power so overwhelmingly in the hands of a small group of nations. To this day, at least three quarters of the world's income, investment, services and almost all of the world's research are in the hands of one quarter of its people.

The solution of these problems cannot be left to the automatic operation of market mechanisms. The traditional market makes resources available to those who can buy them rather than those who need them, it stimulates artificial demands and builds waste into the production process, and even under-utilizes resources. In the international system the powerful nations have secured the poor countries' raw materials at low prices—for example, the price of petroleum fell decisively between 1950 and 1970—have engrossed all the value-added from processing the materials and sold the manufactures back, often at monopoly prices.

At the same time, the very cheapness of the materials was one element in encouraging the industrialized nations to indulge in careless and extravagant use of the imported materials. Once again, energy is the best example. Oil at just over a dollar a barrel stimulated a growth in energy use of between 6 and 11 per cent a year. In Europe, the annual increase in car registrations reached 20 per cent.

Indeed, pre-emption by the rich of a disproportionate share of key resources conflicts directly with the longer-term interests of the poor by impairing their ultimate access to resources necessary to their development and by increasing their cost. All the more reason for creating a new system of evaluating resources which takes into account the benefits and the burdens for the developing countries.

The over-all effect of such biased economic relationships can best be seen in the contrast in consumption. A North American or a European child, on average, consumes outrageously more than his Indian or African counterpart—a fact which makes it specious to attribute pressure on world resources entirely to the growth of third world population.

Population growth is, of course, one element in the growing pressures on world supplies. The planet is finite and an indefinite multiplication of both numbers and claims cannot be endlessly sustained. Moreover, shortages can occur locally long before there is any prospect of a general exhaustion of particular resources. A policy for sane resource conservation and for some forms of management of ultimately scarce resources within the framework of new economic order must soon replace today's careless rapacity. But the point in the existing world situation is that the huge contrasts in *per capita* consumption between the rich minority and the poor majority have far more effect than their relative numbers on resource use and depletion. We can go further.

Since a lack of resources for full human development is, as the Bucharest Conference on Population clearly recognized, one of the continuing causes of explosive population growth, to deprive nations of the means of development directly exacerbates their demographic problems.

These unequal economic relationships contribute directly to environmental pressures. The cheapness of materials has been one factor in increasing pollution and encouraging waste and throwaway economy among the rich. And continued poverty in many developing lands has often compelled the people to cultivate marginal lands at great risk of soil erosion or to migrate to the physically degraded and overcrowded cities.

Nor are the evils which flow from excessive reliance on the market system confined to international relationships. The experience of the last 30 years is that the exclusive pursuit of economic growth, guided by the market and undertaken by and for the powerful elites, has the same destructive effects inside developing countries. The richest 5 per cent engross all the gain while the poorest 20 per cent can actually grow poorer still. And at the local as at the international level the evils of material poverty are compounded by the people's lack of participation and human dignity, by their lack of any power to determine their own fate.

Nothing more clearly illustrates both the need to reform the present economic order and the possibility of doing so than the crisis that has arisen in world markets during the last two years. The trebling of the price of food, fertilizers and manufactures in the wake of world inflation has most severely hit the world's poorest peoples. Indeed, this winter the risk of a complete shortfall in supplies threatens the lives of millions in the third world. But it cannot be called absolute shortage. The grain exists, but it is being eaten elsewhere by very well-fed people. Grain consumption in North America has grown *per capita* by 350 pounds, largely in meat products, since 1965—to reach 1,900 pounds today. Yet this extra 350 pounds is almost equal to an Indian's total annual consumption. North Americans were hardly starving in 1965. The increase since then has contributed to super-consumption which even threatens health. Thus, in physical terms, there need be no shortage this winter. It requires only a small release from the "surplus" of the rich to meet the entire Asian shortfall. There could hardly be a more vivid example of what one might call the overconsumption of the wealthy nations

contributing directly to the underconsumption of the world's poor.

The quadrupling of oil prices through the combined action of the oil producers sharply alters the balance of power in world markets and redistributes resources massively to some third world countries. Its effect has been to reverse decisively the balance of advantage in the oil trade and to place close to 100 billions a year at the disposal of some third world nations. Moreover, in an area critical to the economies of industrialized States, a profound reversal of power exposes them to the condition long familiar in the third world—a lack of control over vital economic decisions.

Nothing could illustrate more clearly the degree to which the world market system which has continuously operated to increase the power and wealth of the rich and maintain the relative deprivation of the poor is rooted not in unchangeable physical circumstance but in political relationships which can, of their very nature, undergo profound reversals and transformations. In a sense, a new economic order is already struggling to be born. The crisis of the old system can also be the opportunity of the new.

It is true that, at present, the outlook seems to hold little but confrontation, misunderstanding, threats and angry dispute. But again, we repeat, there is no reason to despair. The crisis can also be a moment of truth from which the nations learn to acknowledge the bankruptcy of the old system and to seek the framework of a new economic order.

The task of a statesmanship is thus to attempt to guide the nations, with all their differences in interest, power and fortune, towards a new system more capable of meeting the "inner limits" of basic human needs for all the world's people and of doing so without violating the "outer limits" of the planet's resources and environment. It is because we believe this enterprise to be both vital and possible that we set down a number of changes, in the conduct of economic policy, in the direction of development and in planetary conservation, which appear to us to be essential components of the new system.

THE PURPOSE OF DEVELOPMENT

Our first concern is to redefine the whole purpose of development. This should not be to develop things but to develop man. Human beings have basic needs: food, shelter, clothing, health, education.

Any process of growth that does not lead to their fulfilment—or, even worse, disrupts them—is a travesty of the idea of development. We are still in a stage where the most important concern of development is the level of satisfaction of basic needs for the poorest sections in each society which can be as high as 40 per cent of the population. The primary purpose of economic growth should be to ensure the improvement of conditions for these groups. A growth process that benefits only the wealthiest minority and maintains or even increases the disparities between and within countries is not development. It is exploitation. And the time for starting the type of true economic growth that leads to better distribution and to the satisfaction of the basic needs for all is today. We believe that 30 years of experience with the hope that rapid economic growth benefiting the few will “trickle down” to the mass of the people has proved to be illusory. We therefore reject the idea of “growth first, justice in the distribution of benefits later”.

Development should not be limited to the satisfaction of basic needs. There are other needs, other goals, and other values. Development includes freedom of expression and impression, the right to give and to receive ideas and stimulus. There is a deep social need to participate in shaping the basis of one's own existence, and to make some contribution to the fashioning of the world's future. Above all, development includes the right to work, by which we mean not simply having a job but finding self-realization in work, the right not to be alienated through production processes that use human beings simply as tools.

THE DIVERSITY OF DEVELOPMENT

Many of these more than material needs, goals and values, depend on the satisfaction of the basic needs which are our primary concern. There is no consensus today what strategies to pursue in order to arrive at the satisfaction of basic needs. But there are some good examples even among poor countries. They make clear that the point of departure for the development process varies considerably from one country to another, for historical, cultural and other reasons. Consequently, we emphasize the need for pursuing many different roads of development. We reject the unilinear view which sees development essentially and inevitably as the effort to imitate the historical model of the countries that for various reasons happen to

be rich today. For this reason, we reject the concept of "gaps" in development. The goal is not to "catch up", but to ensure the quality of life for all with a productive base compatible with the needs of future generations.

We have spoken of the minimum satisfaction of basic needs. But there is also a maximum level, there are ceilings as well as floors. Man must eat to live. But he can also overeat. It does not help us much to produce and consume more and more if the result is an ever-increasing need for tranquilizers and mental hospitals. And just as man has a limited capacity to absorb material goods, we know that the biosphere has a finite carrying capacity. Some countries tax it in a way that is far out of proportion with their share in world population. Thus they create environment problems for others as well as for themselves.

Consequently, the world is today not only faced with the anomaly of underdevelopment. We may also talk about overconsumptive types of development that violate the inner limits of man and the outer limits of nature. Seen in this perspective, we are all in need of a redefinition of our goals, of new development strategies, of new, life styles, including more modest patterns of consumption among the rich. Even though the first priority goes to securing the minima we shall be looking for those development strategies that also may help the affluent countries, in their enlightened self-interest, in finding more human patterns of life, less exploitative of nature, of others, of oneself.

SELF-RELIANCE

We believe that one basic strategy of development will have to be increased national self-reliance. It does not mean autarky. It implies mutual benefits from trade and co-operation and a fairer redistribution of resources satisfying the basic needs. It does mean self-confidence, reliance primarily on one's own resources, human and natural, and the capacity for autonomous goal-setting and decision-making. It excludes dependence on outside influences and power that can be converted into political pressure. It excludes exploitative trade patterns depriving countries of their natural resources for their own development. There is obviously a scope for transfer of technology, but the thrust should be on adaptation and the generation of local technology. It implies decentralization of the world economy, and

sometimes also of the national economy to enhance the sense of personal participation. But it also implies increased international co-operation for collective self-reliance. Above all, it means trust in people and nations, reliance on the capacity of people themselves to invent and generate new resources and techniques to increase their capacity to absorb them, to put them to socially beneficial use, to take a measure of command over the economy, and to generate their own way of life.

In this process education for full social awareness and participation will play a fundamental role and the extent to which this is compatible with present patterns of schooling will have to be explored.

To arrive at this condition of self-reliance, fundamental, economic, social and political changes of the structure of society will often be necessary. Equally necessary is the development of an international system compatible with and capable of supporting moves towards self-reliance.

Self-reliance at national levels may also imply a temporary detachment from the present economic system, it is impossible to develop self-reliance through full participation in a system that perpetuates economic dependence. Large parts of the world of today consist of a centre exploiting a vast periphery and also our common heritage, the biosphere. The ideal we need is a harmonized co-operative world in which each part is a centre, living at the expense of nobody else, in partnership with nature and in solidarity with future generations.

There is an international power structure that will resist moves in this direction. Its methods are well known: the purposive maintenance of the built-in bias of the existing international market mechanisms, other forms of economic manipulation, withdrawing or withholding credits, embargoes, economic sanctions, subversive use of intelligence agencies, repression including torture, counter-insurgency operations, even full-scale intervention. To those contemplating the use of such methods we say: "Hands-off. Leave countries to find their own road to a fuller life for their citizens." To those who are the—sometimes unwilling—tools of such designs—scholars, businessmen, police, soldiers and many others—we would say: "Refuse to be used for purposes of denying another nation the right to develop itself." To the natural and social scientists, who help design the instruments of oppression we would say: "the world needs your talents for constructive purposes, to develop new

technologies that benefit man and do not harm the environment.”

SUGGESTIONS FOR ACTION

We call on political leaders, Governments, international organizations and the scientific community to use their imagination and resources to elaborate and start implementing, as soon as possible, programmes aimed at satisfying the basic needs of the poorest peoples all over the world, including, wherever appropriate, the distribution of goods in kind. These programmes should be designed in such a way as to ensure adequate conservation of resources and protection of the environment.

We consider that the above task could be made easier by instituting a new more co-operative and equitable international economic order.

We are aware that the world system and the national policies cannot be changed overnight. The major changes which are required to answer the critical challenges facing mankind at this turning point of history need some time to mature. But they have to be started immediately, and acquire a growing impetus. The Special Session of the General Assembly of the United Nations on a New Economic Order has given the process a right start and we fully endorse it. This, however, is a very preliminary step which should develop into a great tide of international activities.

The Charter of Economic Rights and Duties of States, proposed by the President of Mexico, Lic. Luis Echevarria, and now under discussion at the United Nations, would be a further important step in the right direction. We urge that it be adopted as early as possible.

In a framework of national sovereignty over natural resources, governments and international institutions should further the management of resources and environment on a global scale. The first aim would be to benefit those who need these resources most and to do so in accordance with the principle of solidarity with future generations.

We support the setting up of strong international regimes for the exploitation of common property resources that do not fall under any national jurisdiction. We especially emphasize the importance of the ocean floor and its subsoil, possibly also the water column above it. An oceans regime has to be established with all countries

of the world represented, favouring none and discriminating against none, with jurisdiction over a maximum area of the oceans. Such a regime would gradually develop the type of resource-conserving and environmentally sound technology required to explore, develop, process and distribute ocean resources for the benefit of those who need them most.

The uses of international commons should be taxed for the benefit of the poorest strata of the poor countries. This would be a first step towards the establishment of an international taxation system aimed at providing automatic transfers of resources to development assistance. Together with the release of funds through disarmament, international taxation should eventually replace traditional assistance programmes. Pending the establishment of these new mechanisms, we strongly recommend that the flow of international resources to third world countries should be greatly increased and rigorously dedicated to basic needs for the poorest strata of society.

Science and technology must be responsive to the goals we are pursuing. Present research and development patterns do not effectively contribute to them. We call on universities, other institutions of higher learning, research organizations and scientific associations all over the world to reconsider their priorities. Mindful of the benefits deriving from free and basic research, we underline the fact that there is a reservoir of under-utilized creative energy in the whole scientific community of the world, and that it should be more focused on research for the satisfaction of fundamental needs. This research should be done as far as possible in the poor countries and thus help to reverse the brain-drain.

A rejuvenated United Nations system should be used to strengthen the local capabilities for research and technology assessment in the developing countries, to promote co-operation between them in these areas and to support research in a better and more imaginative utilization of potentially abundant resources for the satisfaction of the fundamental needs of mankind.

At the same time, new approaches to development styles ought to be introduced at the national level. They call for imaginative research into alternative consumption patterns, technological styles, land-use strategies as well as the institutional framework and the educational requirements to sustain them. Resource-absorbing and waste-creating overconsumption should be restrained while production of essentials for the poorest sections of the population is

stepped up. Low waste and clean technologies should replace the environmentally disruptive ones. More harmonious networks of human settlements could be evolved to avoid further congestion of metropolitan areas and marginalization of the countryside.

In many developing countries the new development styles would imply a much more rational use of the available labour force to implement programmes aimed at the conservation of natural resources, *enhancement of environment, creation of the necessary infrastructure and services to grow more food as well as the strengthening of domestic industrial capacity to turn out commodities satisfying basic needs.*

On the assumption of a more equitable international economic order, some of the problems of resource maldistribution and space use could be taken care of by changing the industrial geography of the world. Energy, resource and environmental considerations add new strength to the legitimate aspirations of the poor countries to see their share in world industrial production considerably increased.

Concrete experiments in the field are also necessary. We consider that the present efforts of the United Nations Environment Programme to design strategies and assist projects for ecologically sound socio-economic development (eco-development) at the local and regional level constitute an important contribution to this task. Conditions should be created for people to learn by themselves through practice how to make the best possible use of the specific resources of the ecosystem in which they live, how to design appropriate technologies, how to organize and educate themselves to this end.

We call on leaders of public opinion, on educators, on all interested bodies to contribute to an increased public awareness of both the origins and the severity of the critical situation facing mankind today. Each person has the right to understand fully the nature of the system of which he is a part, as a producer, as a consumer, as one among the billions populating the earth. He has a right to know who benefits from the fruits of his work, who benefits from what he buys and sells, and the degree to which he enhances or degrades his planetary inheritance.

We call on Governments to prepare themselves for action at the 1975 Special Session of the United Nations General Assembly so that the dimension and concepts of development are expanded, that

the goals of development be given their rightful place in the United Nations system and the necessary structural changes initiated. We affirm our belief that since the issues of development, environment and resource use are essentially global and concern the well-being of all mankind, Governments should fully use the mechanisms of the United Nations for their resolution and that the United Nations system should be renewed and strengthened to be capable of its new responsibilities.

EPILOGUE

We recognize the threats to both the "inner limits" of basic human needs and the "outer limits" of the planet's physical resources. But we also believe that a new sense of respect for fundamental human rights and for the preservation of our planet is growing up behind the angry divisions and confrontations of our day.

We have faith in the future of mankind on this planet. We believe that ways of life and social systems can be evolved that are more just, less arrogant in their material demands, more respectful of the whole planetary environment. The road forward does not lie through the despair of doom-watching or through the easy optimism of successive technological fixes. It lies through a careful and dispassionate assessment of the "outer limits", through co-operative search for ways to achieve the "inner limits" of fundamental human rights, through the building of social structures to express those rights, and through all the patient work of devising techniques and styles of development which enhance and preserve our planetary inheritance.

**THIS VOLUME BRINGS TOGETHER THREE REPORTS WHICH
FORM THE BASIS OF THE ENVIRONMENT-DEVELOPMENT
RELATIONSHIP**

In the Founex Report, the concept of development was broadened and given an integrated and long-term character. The report prepared the groundwork for integration of environmental considerations into the formulation of development policies and planning. It reflected a critical perception, namely, that for developing countries the process of development (as defined by a movement away from aggregative quantitative targets based on the gross domestic product to the "quality of life" as such) was in itself an effective antidote to primary environmental concerns. It was not that the developing countries were not concerned with industrial pollution and damage to the human environment resulting from a high level of economic activity, but that their first concern was with poverty and the problems it engendered, to wit, poor water supplies, inadequate housing and sanitation, low nutritional standards and dangers to health and the like.

While for many developing countries remedial approaches to environmental problems were closely interwoven with policies for over-all development, the problems that came about from the process of development itself increased rapidly, in number and complexity, when that process gathered momentum. It then became essential that the consequential effects of development be adequately assessed, monitored if possible, and eventually managed in an environmentally sound manner.

At the Stockholm Conference, a Declaration of Principles consisting of 26 Principles was proclaimed "to inspire and guide the peoples of the world in the preservation and enhancement of the human environment".

In order to implement the Principles, a set of 109 Recommendations for Action dealing with specific subject areas were identified and adopted unanimously. The subject areas identified included such priority concerns as human settlements and natural resources management, pollution control generally and marine pollution in particular, educational, social and cultural aspects of environmental protection, and, finally, the development and environment relationship.

The Recommendations were, furthermore, structured by the Conference into an Action Plan for the Human Environment, according to functions, in terms of three basic components, namely, the global environmental assessment programme, the environmental management activities, and the supporting measures.

The Cocoyoc Symposium considered a series of interrelated development issues in terms, particularly, of wasteful patterns of resource use, misuse, and eventual exhaustion of critical threshold stock levels which resulted from conspicuous consumption and energy-intensive lifestyles in the industrialized countries and from subservience to imported and mimetic consumption and production patterns in the developing countries. The Symposium recommended that new approaches be introduced at the national level: "Such approaches call for imaginative research into alternative consumption patterns, technological styles, and land use strategies, as well as the institutional framework and the educational requirements to sustain them. Resource-absorbing and waste-creating overconsumption should be restrained, while production of essentials for the poorest sections of the population is stepped up. Low-waste and clean technologies should replace the environmentally disruptive ones."

YUSUF J. AHMAD
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