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DEVELOPMENT AND ENVIRONMENT

(Subject Area V)

Report by the Secretary-General

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INTRODUCTION

1. The environment has only recently become an issue of public concern on a global scale. Environmental concerns first arose in the industrialized countries as these countries became more conscious of the adverse effects of some forms of development and technological change on the environment. Many in the developing countries questioned the relevance of this new concern for the environment to their own compellingly urgent development priorities. It was in an attempt to define the relationship of development to environment that a panel of twenty-seven senior experts from all parts of the world was convened by the Secretary-General of the United Nations Conference on the Human Environment, at Founex, near Geneva, from 4 to 12 June 1971. The panel's deliberations resulted in a Report on Development and Environment (the "Founex Report").
2. The Founex Report attempted to place the growing environmental concern in its proper developmental perspective in the context of the urgent and pressing needs of the developing countries. It also aimed at creating a better understanding of the problems of the poorer parts of the world in order to develop the framework for a reconciliation of perspectives, and at focusing attention on the opportunities for a beneficial and growing partnership between the less industrialized countries and the industrialized world.
3. The basic ideas expressed in the Founex Report were tested in a series of regional seminars: ECAFE, at Bangkok (17-23 August 1971); ECA, at Addis Ababa (23-27 August 1971); ECLA, at Mexico City (6-11 September 1971) and UNESOB, at Beirut (27 September - 2 October 1971). The report received a strong endorsement at these seminars becoming, in fact, the focal point for the concerns of the less industrialized countries.
4. The recommendations for action included in this paper were conceived within the framework of the Founex Report. A brief summary of the Founex Report is given in chapter one of this paper while the Report itself is attached as annex I. Annex II contains the basic issues of the report on environmental problems of developing countries of the Working Party convened by SCOPE with the support of the secretariat of the Conference in Canberra from 24 August to 3 September 1971. A summary of the recommendations of the regional seminars is also annexed.

5. This paper is principally concerned with the environmental problems of the less industrialized countries. It would be wrong, however, to regard its conclusions as inapplicable or irrelevant to the industrialized countries. The industrialized countries also have their own pockets of poverty and face similar decisions in the management of resources in yet underdeveloped areas. While all countries share environmental problems resulting both from underdevelopment and from the process of development itself, differences may exist in the nature and magnitude of these problems at different stages of development. The Founex report showed that although conflicts between development and environment may arise, they are not necessarily inevitable or inescapable and that through proper planning developmental and environmental measures can be harmonized in such a way that they become mutually supporting. The interest of developing countries in the environmental issue derives from three basic factors: that their interests will be affected by actions taken by industrialized countries to deal with their environmental problems; they have their own environmental problems arising primarily from poverty and underdevelopment; and they share the concern of all mankind for the preservation and care of the common resources of the oceans and the atmosphere. In the final analysis, the purpose of the paper is to demonstrate the close relationship between development and environment, and to underline the universality and indivisibility of these two concerns as well as the international responsibility for both.

Chapter I

STATEMENT OF ISSUES

6. The concern for environment is, for the less industrialized countries of the world, essentially an aspect of the concern for development. Although these countries are experiencing, in varying degrees, the environmental problems that emerge in the course of growth and transformation, they are for the greater part beset by the problems of inadequate development. These are essentially the environmental problems of poverty - problems of unsafe water, malnutrition, inadequate housing and sanitation, ill-health, and natural disasters. Moreover, these problems are not of a static kind. Recent history suggests that in many countries they are likely to worsen as populations grow rapidly and impose increasing pressures on urban and rural areas. In fact, the environmental problems in some urban areas of the developing countries are becoming as severe as those in the industrialized countries, in addition to being compounded by the existence of mass poverty.
7. The solution to the environmental problems of poor societies is to be found in the process of development itself: development is a cure for most of these problems, rather than their cause. Only the process of development can remove many of the factors which at present endanger not merely the quality of life but threaten life itself in many parts of the developing world.
8. While development is a necessary precondition for overcoming many of the environmental problems of poor societies, this is not to say that such problems could be automatically and spontaneously resolved, by the mere acceleration of economic growth. There is, on the contrary, ample evidence to suggest that certain patterns of economic growth could bring in their wake not the solution but the aggravation of acute social and environmental problems. Historically, economic growth has in many cases been accompanied by rising unemployment, greater inequality, and increasing poverty and ill-health for large sections of the populations of the developing countries.
9. There is thus an increasing awareness of the limitations evident in the narrowly-focused pursuit of the goal of raising GNP. This is reflected in the efforts now being made in the United Nations to formulate a comprehensive approach to development. The International Development Strategy for the Second Development Decade has already emphasized the need for greater sensitivity to social and other objectives in the

development process. It is appropriate, therefore, that attention should also be called at this time to environmental factors. Environmental goals should also become an integral part of the multiple dimensions of development strategy.

10. This raises a number of difficult conceptual and practical issues, however. In each of the subject areas of the Conference - human settlements, natural resource management, pollution control and social and cultural factors - a host of problems were identified and a number of recommendations were proposed. These are of varying importance and would make claims of different magnitude on the limited financial and human resources of the less industrialized countries. It would clearly not be valid to argue that environmental problems, whatever their character, should merit a prior claim on resources, irrespective of other urgent and compelling needs. There is need for establishing priorities in the choice of programmes and policies in a manner that reinforces or complements the development process.

11. The establishment of such priorities is perhaps the major conceptual and practical issue of relevance to the development planning process. It is an issue that can be resolved in specific terms by each individual country, in the light of its own conditions and objectives. But whatever the individual situation of countries may be, the problem should not be viewed as one which involves a simple trade-off between environmental goals, on the one hand, and economic goals, on the other. The need for such trade-offs will undoubtedly arise in specific instances, but the problem is basically one of devising a pattern of development in which environmental objectives go hand in hand with economic, social and cultural goals, of identifying and acting upon the complementarities rather than the conflicts between multiple objectives.

12. There are essentially two major aspects to a more integrated and unified development strategy that incorporates environmental objectives. The first of these would involve an attack on the environmental problems that beset poor societies - an attack, in other words, on mass poverty and ill-health. A pattern of development which is oriented towards employment creation, better income distribution and the provision of essential necessities especially environmental sanitation and minimum consumption levels to the vast mass of the population will be more consistent with environmental objectives than a pattern which neglects these factors.

13. The other aspect of an integrated development strategy relates to the need for an awareness of the environmental problems that can arise - and have in the past arisen - in the process of growth itself. These problems frequently can be mitigated if not avoided by sound planning and policies based on better knowledge of the underlying facts and processes. Agricultural growth and transformation, for example, involves the construction of reservoirs and irrigation systems, the clearing of forests, the use of fertilizers and pesticides and the establishment of new communities, activities that, however necessary for development, can have adverse environmental implications. Similarly, by-products of industrialization often occur as wastes which foul the water, air and land when their disposal is unplanned or unregulated. Again, the growth of transport and communications systems and the process of urbanization has consequences for the ecological system. Some of these environmental problems may be even more pronounced in the less industrialized than in the industrialized countries which lack the resource base necessary to provide even basic environmental safeguards.
14. At the same time, development invariably involves the increased and intensified exploitation of natural resources and the expansion and creation of human settlements, which can have deleterious environmental side-effects. The less industrialized countries cannot forego growth and transformation in the name of conservation of natural resources or for the sake of preserving an unaltered natural habitat. Actions taken to protect the environment by diverting resources from development might in the long run prove to be self-defeating, since they might reduce development thereby limiting the magnitude of resources ultimately available for improving the human environment. Development strategy can be so designed as to ensure that unfavourable impacts on the environment are avoided or, at least, minimized. This is where the less industrialized countries can benefit by studying the experience of the industrialized countries and particularly, their mistakes.
15. Most of the issues concerning development and environment are of a national character. But some have important international implications. In fact, environmental issues are likely to play a growing role in international relations, both political and economic. Actions designed to deal with these issues are not only competing strongly for the resources of industrialized countries, but may increasingly influence the pattern of world trade, the international distribution of industry, the competitive

position of different groups of countries, their comparative costs of production, and transfers of technology. The less industrialized countries are vitally concerned that the net result of all these developments be positive and beneficial rather than negative and harmful. Growing national concern over the effects of air and water pollution, coupled with the fact that they can transcend national boundaries, creates the potential for new areas of conflict among nations. It is therefore essential that all countries recognize the possible effects of their activities on the environment of other nations and take steps to control them - in order to avoid harmful effects on third countries.

16. Not enough information is available at present to say with any degree of certainty what the net impact of environmental concerns is likely to be on international economic relations. There are both areas of concern and prospects for new opportunities. For example, environmental standards adopted by industrialized countries could have an adverse impact on exports of other nations. Concern has been expressed that tariff or non-tariff barriers may be erected in some industrialized countries to protect their industries against competition from countries whose industries may not have to bear the same burden of anti-pollution costs. The development of low-pollution technologies and the resulting increased recycling of materials and products may reduce the demand for certain primary products from the less industrialized countries. New technologies designed to mitigate pollution may turn out to be significantly more expensive than the present technologies and the less industrialized countries may have no alternative than to buy them whether or not they require them. In addition, there is concern among the developing nations that resources otherwise available for development assistance may be diverted to environmental programmes within the industrialized world.

17. Some of these apprehensions may be legitimate. Others may reflect no more than the inherent fears of the weak in any confrontation with the stronger members of the international community. It is important, however, that the issues involved be widely discussed and studied to ensure that international understanding and agreements be reached to deal with these concerns.

18. It is equally important that consideration be given to the new opportunities which may be offered to the developing countries. It is possible for example that the current concern with pollution associated with some synthetics may encourage a

return to certain natural products. Or that the less industrialized countries may acquire a comparative advantage in certain industries whose costs of production in the industrialized countries may rise significantly because of pollution controls. Or that low pollution technologies based on reuse of traditional wastes may actually lower costs of production for some products.

19. A sensible international strategy would be to minimize the adverse implications and maximize the opportunities of environmental concerns so as to achieve a net beneficial impact on the economic relations between the less industrialized countries and the industrialized world.

20. One of the principal questions that arises from the increased concern with the human environment is what the cost to achieve various higher levels of environmental quality will be - since our knowledge of the magnitude of those costs is still limited at present - and how the costs should be distributed among the nations of the world. Developing countries are understandably concerned that, because of their inherently weak position in international trade and control of technology, they may be forced to bear an unfairly heavy share of these costs. Will the growing awareness of the concepts of "one earth" and "one environment" in fact lead - as it should - to the nobler concept of "one humanity", and to a more equitable sharing of environmental costs and a greater international interest in, and responsibility for, the accelerated development of the less industrialized world? Or will it become a narrow concern of the industrialized world, leading to many awkward confrontations with the developing countries rather than to a new era of international co-operation?

Chapter II

RECOMMENDATIONS FOR ACTION

21. Most action designed to preserve and improve the environment are necessarily national in character. This is particularly true in the management of human settlements and natural resources. On the other hand, action in other areas, such as marine pollution, can only be taken effectively through international co-operation at the regional or global level. This paper includes only those recommendations for action which are closely related to national development planning and to international economic relations, since other subjects cover recommendations regarding the major sources of national and international environmental degradation.

A. Recommendations for national action

(i) Formulation of a new dimension to development strategy

22. The concern for an improved human environment has emerged at a time when the less industrialized countries are already feeling disillusioned with the pursuit of narrowly conceived economic growth. This affords an opportunity to treat environmental concerns as an added dimension of planning, and not merely as a further claim on limited resources, and to formulate a new strategy of development centred on the elimination of mass poverty and on the creation of a decent human environment. While each country must define its strategy in the light of its own particular problems and stage of development, some of the main elements of such a strategy can be identified.

23. It is recommended that in formulating strategies for development, the attention of governments be drawn to the need to take account of the following elements:

- development policies should include a selective attack on the worst manifestations of poverty. Development goals and targets should be expressed in terms of a progressive reduction and eventual elimination of malnutrition, disease, illiteracy, squalor, unemployment and inequalities. While the GNP may serve as a convenient summation of all other targets, greater attention must be paid to its content and elements;

- consumption targets which could be reached in a reasonable period of time should be set. Those targets should be expressed in terms clearly directed to achieving environmental conditions basic to human health and well being by eliminating the worst manifestations of poverty, such as nutritional, educational, health and

housing deficiencies. Environmental criteria should also be established for various sectors, such as health, nutrition, water supply, sanitation, soil conservation, land management, rural-urban interaction patterns, and the location and planning of new urban settlements;

- appropriate machinery should be set up to deal with environmental problems and should be integrated, or closely linked with the machinery for overall development planning and implementation;

- specific environmental goals should be incorporated in the process of regional and physical planning.

(ii) Formulation of guidelines for project appraisal

24. The integration of environmental goals with development policies will also involve a revision of guidelines for project appraisal, to take account of environmental considerations. More particularly, decisions will be required on what social costs or benefits should be considered, how they should be measured, and at what rate future costs or benefits should be discounted.

25. It is important to ensure that such new guidelines are appropriate to conditions prevailing in the countries concerned and formulated at the national level. They should not be established in abstract or general terms. Their relevance or applicability should not be assumed but should be demonstrated on a case by case basis. The formulation of appropriate appraisal and evaluation criteria will take time, and care must be taken that the flows of international aid and investments are not slowed down in the interval through the application of criteria established by multilateral or bilateral donors without adequate consultations with the less industrialized countries.

26. The establishment of adequate procedures for project design and appraisal presupposes a better knowledge of the environmental impact of development projects. Environmental pre- and post-audits of such projects are, therefore, often necessary to feed those in charge of projects with adequate data so that preventive and remedial action can be taken. Post audits should be supported, when necessary, by financial and technical assistance from international agencies.

27. It is recommended that the attention of governments be drawn to the need for action to ensure that:

- Governments take the initiative in establishing environmental guidelines and criteria for project appraisals;
- Governments in formulating these guidelines, seek the assistance, if necessary, of outside agencies concerned with development;
- the guidelines be discussed at a later stage at the regional and international levels to achieve a broad consensus.

(iii) Collection of basic information

28. The successful integration of environmental and developmental concerns will require a good deal of additional information which is not presently available to development planners.

29. It is therefore recommended that the attention of governments of the developing countries be drawn to the need to give priority to:

- conducting surveys of the present state of the environment and of the major hazards to which it is likely to be exposed in the process of development, to help determine environmental policies within the framework of economic and social planning;
- conducting studies and surveys to determine the extent to which the environment is affected by mass poverty, malnutrition, housing shortage, inadequate water supply, disease and illiteracy. These studies and surveys should be used in the formulation of social and economic plans;
- reviewing existing legislation available to implement national environmental policies and objectives, and determining what new legislative actions are necessary in light of this review;
- analysing studies and experiences of other countries which are developing environmental programmes and policies and are applying new administrative and technological approaches to pollution control.

B. Recommendations for international action

(i) Regional co-operation

30. The major role that United Nations and other regional organizations can play in helping Governments to establish an appropriate balance between the concerns of environment and development lies in organizing research, in training personnel, in arranging for the exchange of information and in providing technical and financial assistance above the levels indicated in the International Development Strategy.

31. Accordingly, it is recommended that regional organizations give full consideration to each of the following steps:

- preparing detailed plans for the study of major environmental problems faced by the countries of the region concerned as well as of the special problems of sub-regional and regional interest of the land locked and least developed countries of the region and of countries with coast lines particularly exposed to the risk of marine pollution;
- examining possible administrative, legal and technical solutions, to such problems in terms of both preventive and remedial actions, including alternative approaches to development projects;
- increasing and facilitating the flow of information and experience to member countries through global and regional co-operation with particular emphasis on an international information referral centre approach;
- 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;
- encouraging 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;
- establishing criteria, concepts and a terminology of the human environment through interdisciplinary efforts;
- establishing and disseminating information on the significant environmental problems of each region and the nature and result of steps taken to cope with them;
- providing and co-ordinating technical assistance activities directed at establishing systems of environmental research, information and analysis at the national level;
- assisting developing countries in co-operation with appropriate international agencies, in developing and applying low cost methods for improving health, housing, sanitation and water supply. Emphasis should be devoted to labour intensive measures and methods utilizing local materials.

(ii) International trade relations

32. In order to ensure that the growing concern with the environment does not lead to major disruptions in international trade, it is recommended that governments take the necessary steps to ensure that:

- all countries present at 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;

- 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;

- the GATT 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;

- whenever possible (i.e. 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. Assistance in meeting consequences of stricter environmental standards ought to be given in the form of financial or technical assistance for research with the aim to remove the obstacles that the products of developing countries have encountered;

- 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. Environmental standards should be established at whatever levels are necessary, to safeguard the environment and should not be aimed at gaining trade advantages.

33. It is also recommended that the Secretary-General ensure that:

- appropriate steps be taken by the existing UN organizations to identify the major threats to exports that stem from environmental concerns, their character and severity, and the remedial action that may be envisaged;

- the United Nations system assist governments in negotiating, in as many areas as possible, mutually acceptable international environmental standards on products so as to reduce the scope for arbitrary or discriminatory actions.

34. It is further recommended that:

- GATT and UNCTAD should consider undertaking to monitor, assess and regularly report the emergence of tariff and non tariff barriers to trade as a result of environmental policies. ✕

(iii) International distribution of industry

35. The need of developing countries to establish certain basic industries (petroleum and chemicals, metal extracting and processing, pulp and paper and others) coincides with a growing concern of industrialized countries for the environmental degradation which rises from heavy concentration of such industries in their countries. These provide a new reason for re-examining the factors which determine the location of industries internationally, and, in turn, opens up new opportunities and new risks for developing countries. The capacity of the natural environment to absorb and dissipate waste without suffering intolerable damage must now be regarded as an economic resource. Since the less industrialized countries have by and large put lighter burdens on their environment resources than the industrialized countries and may therefore be able to afford less stringent environmental standards, this could give them a comparative advantage in the establishment of certain new industries. Such new activities could have a significant impact on development through increasing income, productivity and employment which would subsequently increase the ability of the countries concerned to improve the environment. However, countries in considering such opportunities should also take full account of the potential risk of environmental damage which might affect development gains. In many cases it should be possible to avoid or mitigate such risks by adequate planning, locations and use of proper technologies. In order to avoid the indiscriminate import of pollution, developing countries could enforce environmental standards to achieve minimal levels of industrial pollution in the light of their stages of development and of their cultural and social objectives.

36. In the light of the above, it is recommended that:

- Governments of the developing countries consider fully the new opportunities which may be offered to them to establish industries in which they may have comparative advantages due to environmental considerations, and that special care be taken in all such instances to avoid the creation of pollution problems in developing countries;

- 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.

(iv) International financing for environmental action

37. Environmental policies pursued nationally and internationally are likely to have repercussions on flows of resources and other factors affecting development. It is important that the Conference endorse the concept of international responsibility for the international aspects of environmental action.

38. Accordingly, 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 the General Assembly resolution 2849 (XXVI).

39. Recognizing that it is in the interest of all mankind that technologies for protecting and improving the environment be employed as universally as possible it is recommended that the Secretary-General be asked to undertake studies in consultation with governments and appropriate international agencies to study means by which governmental technologies may be made available to developing countries under conditions which encourage their wide distribution.

(v) International development strategy

40. It is recommended that the Secretary-General (in collaboration with appropriate international agencies) take steps to ensure that the environmental considerations set out here be taken into account during the review and appraisal of the International Development Strategy for the Second Development Decade.

Annex I

Development and Environment

Report of a panel of experts
convened by the Secretary-General of
the United Nations Conference on the
Human Environment 1/

(Founex, Switzerland, 4-12 June 1971)

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1/ The list of participants in the Panel appears on next page.

The participants in the panel were:

M. Adamovic,	Senior Research Officer, Institute for International Economy and Politics, Belgrade.
M.F. Alexander,	Professor, New York State College of Agriculture, Cornell University, Ithaca.
Samir Amin,	Directeur, Institut Africain de Développement économique et de planification, Dakar.
S. Antoine,	Ministère de l'Environnement, Paris
W. Beckerman,	Professor, Department of Political Economy, University College, London.
Belai Abbai,	State Commissioner of Planning, Planning Commission, Addis Ababa.
N. Castañeda,	Colegio de Economistas, Mexico City.
Gamani Corea,	Senior Deputy Governor, Central Bank of Ceylon, Colombo, Chairman of the Panel.
F. Van Dam,	Professor, Ministry of Foreign Affairs, The Hague.
M. Haq,	Programming Adviser, International Bank for Reconstruction and Development, Washington, Rapporteur of the Panel.
F. Herrera,	Former President of the Inter-American Development Bank, Santiago de Chile.
U. Himmelstrand,	Professor, University of Uppsala.
E. Iglesias	Comité de Expertos del CIAP, Washington.
Cheikh Hamidou Kane,	Regional Director, UNICEF, Abidjan.
W. Kapp,	Professor of Economics, Institut für Sozialwissenschaften, Basel.
J. Kulig,	Planning Institute, Warsaw.
H.H. Landsberg,	Resources for the Future, Inc., Washington.
J. Mayobre,	Central Bank of Venezuela, Caracas.
H.M.A. Onitiri,	Director, Nigerian Institute for Social and Economic Research, University of Ibadan.
M. Ozorio de Almeida,	Ambassador, Ministry for Foreign Affairs, Brazilia.
P. Pant,	Planning Commission, New Delhi.
I. Sachs,	Directeur d'Etudes Associé, Ecole Pratique des Hautes Etudes, Paris.
M.Z. Shafei,	Professor of Economics, Arab University in Beirut.
H. Singer,	Professor, The Institute of Development Studies, University of Sussex.
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P. Ungphakorn,	Governor, Bank of Thailand, Bangkok.

DEVELOPMENT AND ENVIRONMENT

A. Overall perspective

1. 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.
2. 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.
3. 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 industrialized 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.
4. However, the major environmental 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.

5. 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 industrialized countries, it is appropriate to view development as 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.

6. 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 of unified approach to the development objective.

7. 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 are 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.

8. 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.

9. 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.

10. 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 industrialized 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.

11. 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 work trade, the international distribution of industry, the competitive position of different groups of countries, their comparative costs of production, etc. Environmental actions by industrialized countries may have a profound and many-fold impact on the growth and external economic relations of developing countries.

12. Some environmental actions by industrialized 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 industrialized countries.

13. In some fields, environment 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 consideration, 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 reopening 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 industrialized and developing countries in the fields of international trade and investment, as well as in the control of private foreign enterprises.
14. 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 industrialized 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 capita 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 industrialized and developing countries. It certainly should not provide fresh argument for even greater protection.

15. 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 industrialized 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.

B. Environmental issues in the development process

16. 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.
17. 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 overall 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.
18. The present Report will not attempt to elaborate upon the environmental issues of the kind referred to above or 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 an 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.

19. 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 industrialized 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 industrialized countries.

20. 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.

21. 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:

- (a) resource deterioration: the deterioration, for example, of mineral, soil or forest resources;
- (b) biological pollution: the pollution represented by agents of human disease, and by animal and plant pests;
- (c) chemical pollution: arising out of air pollutants, industrial effluents, pesticides, metal, and detergent components and similar agents;
- (d) Physical disruption: as reflected, for example, by thermal pollution, silting and noise; and
- (e) 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.

22. 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 expenditures, 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 manufacturing 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.

23. 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.

(i) Agriculture

24. 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 infra-structure of facilities and services for agricultural production is expanded, and new lands 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

25. 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.

26. 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 are so costly to correct as to be effectively irreversible. The fragility of tropical eco-systems 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 over-grazing 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 under-employed 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

27. The environmental hazards in the case of modern agriculture rise mainly from the chemical control of weeds and pests and from irrigation works. Fertilizers, on the other hand, would not appear to pose a threat at the present even at 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 larger 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 inter-breeding. 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.

(ii) River basin development

28. 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 the river basin development projects include the spawning of water born 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 frustrate the very 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.

(iii) Industry

29. 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 industrialized nations. By taking sensible decisions on 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.

(iv) Transport

30. 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 industrialized societies.

(v) Human settlements

Rural areas

31. The development process will have its inevitable impact on human settlements. The predominant part of the population in most developing countries still live 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 infra-structure 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.

32. In such situations, there is often a drift of population to the towns which causes a further worsening of urban conditions. A pre-occupation 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 extended families without the provision of suitable substitutes.

33. 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 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 the 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

34. 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 over-extended, and the economies of size are displaced by the dis-economies of inadequate infra-structure. 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.

35. 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 infra-structure, 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.

36. 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 underway 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.

37. 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.

C. Some considerations for environmental policy formulation

38. 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.

39. It is important that environmental policies are integrated with development planning and regarded as a part of the overall 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 environmental 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.

40. As we have pointed out before, 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.

41. 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 formulation 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 pre-occupation 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.

42. 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 overall 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.

43. 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 micro 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 régime 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.

44. 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.

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

- the quantity and quality of known and required natural resources;
- the possible effects and probable date of their exhaustion;
- the availability or possible development of alternative technologies, including their relative costs;
- the suitability of alternative sites;
- the existing level of air and water pollution;
- the opportunities for waste disposal and for the re-cycling of raw materials;
- 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.

46. There is a considerable debate at present 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 underway 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 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.

47. 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 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.

48. 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 clear perspective of their environmental problems and 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.

49. 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 industrialized 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 compensations 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 industrialized countries than to the developing societies though the latter can study the experience of the industrialized 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 they emerge in the course of development.

50. 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 overall 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.

D. Implications for international economic relations

51. 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 industrialized 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.

52. Even if the developing countries were to regard the present environmental concern of the industrialized 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 industrialized and developing countries is to be avoided.

53. There are growing fears in the developing world that the current environmental concern in the industrialized 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.

54. There is a fear that the insistence of the industrialized countries on rigorous environmental standards of products exchanged in international trade may well give rise to a "neo-protectionism". Many of the industrialized countries will be loath to see their production and employment suffer if their export 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.

55. 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 industrialized 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 industrialized 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 industrialized countries of environmental actions contemplated by them. In certain cases, the possibility of channelling additional aid toward adapting export industries in developing countries to the new requirements in industrialized countries or towards a diversification of their exports should also be studied. The real danger is if the environmental standards

enforced by the industrialized 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 industrialized 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.

56. 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.

57. 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, the FAO 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. Third, the 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.

58. 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 industrialized countries. Since there is an increasing concern in the industrialized world

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 1960's and take away resources badly needed for other purposes. Since there has been a progressive weakening of the will in a part of the industrialized world for giving foreign assistance to the developing countries, anxiety on this score is not entirely unfounded.

59. Aid priorities and project appraisal may also, it is feared, be distorted by an excessive tendency by the industrialized 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 industrialized 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 project appraisal are industrialized by the donors, as seems to have happened in the case of some recent hydroelectric projects. These projects may also become more expansive 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 view of the growing environmental concern in the industrialized 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.

60. Besides the flow and direction of aid, the kind of technology that is transferred from the industrialized to the developing world may be seriously affected. It is quite likely that future technological developments in the industrialized 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 industrialized 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 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.

61. 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 industrialized countries to their own advantage or at least neutralize its adverse implications.

62. 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 industrialized 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 industrialized 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 industrialized 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.

63. 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 industrialized 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.

64. 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 saving 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

industrialized 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.

65. 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 for the developing world. Our deliberations on these two issues are set down below.

66. The enforcement of higher environmental standards in the industrialized 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 industrialized 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 view points. 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 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 industrialized world because of their growing concern with environmental standards.

67. 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 industrialized 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 industrialized 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.

68. 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.

69. 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 this strategy.

Annex II

Environmental problems in the developing countries:
basic issues

Summary of the report prepared by the
Working Party convened by SCOPE in
co-operation with the secretariat of
the Conference 1/

(Canberra, Australia,
24 August - 3 September 1971)

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1/ The list of participants in the Working Party appears on next page

The participants in the Working Party were:

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The following members of U.N. Advisory Committee on
Science and Technology (ACAST) also attended:

Dr. S. Peters,	Canada.
Prof. Sarwono Prawirohardjo,	Indonesia.

ENVIRONMENTAL PROBLEMS IN THE DEVELOPING COUNTRIES:

BASIC ISSUES

INTRODUCTION

1. This annex presents the general views of a Working Party of natural scientists from the developing countries of Asia, Africa and Latin America on the main environmental problems of these regions.
2. Development is the prime objective of the less industrialized nations. Developing countries are doing all they can to build up their industries and systems of transportation and are, as a result, experiencing pollution problems that are similar to, though less extensive than, those experienced in highly industrialized countries.
3. Although the process of development is intensifying the environmental problems in developing countries, the concern with environmental issues emanates from a wide range of hazards present in these countries. These hazards include:
 - uncontrolled increase of urban population;
 - increases in the number and variety of endemic and epidemic pathogens and pests;
 - nutritional deficiencies;
 - exhaustion of natural resources;
 - continuation of traditional land-use practices which prevent the accommodation of higher population pressures;
 - degradation of the environment stemming from widespread use of chemicals that are alien to natural processes.
4. Many of these hazards are also present in the more industrialized countries and, in some cases, steps to overcome them have been successful. However, the direct transfer to developing countries of knowledge and technologies generated in industrialized countries is seldom successful because of ecological, cultural and socio-economic differences. This is especially true in the domain of management of natural resources but is also true in the case of introduction of new industries. What is needed is new techniques that are ecologically oriented to local needs. To this end, national and regional knowledge generating centres should be created (or strengthened if they exist) and charged with the responsibility of finding ecologically sound solutions to environmental problems.

5. An ecological approach has not been widely adopted in developing countries. This is partly due to lack of knowledge about many fundamental aspects of the functioning of the ecosystems. In many instances, the knowledge is present but not effectively utilized because of poor communication between the knowledge generating centres and the decision makers. Responsibility for this failure is shared by the scientific communities and the administrators.

6. The meeting agreed that the following are areas of major concern to developing countries:

- the development and management of natural resources;
- the improvement of human settlements;
- the control of pollution and environmental hazards;
- education;
- institutional arrangements for the solution of environmental problems.

7. There are obvious differences in national and regional priorities for dealing with specific environmental problems, but the meeting was unanimous in emphasizing the common character of problems and approaches and the necessity for a common strategy and joint action to face the environmental challenge.

8. Though the need for a common strategy was emphasized, there was a consensus that scientists in developing countries should be inspired by their national heritage and historical values in their approach to the solution of these problems. It was agreed that the preservation of cultural and social diversities is the very essence of the stability and survival of mankind.

A. Development and management of natural resources

9. Development of natural resources implies the interference of man in elements of his environment. The quantity and quality of the resources available to man will depend on his skill and resourcefulness in making use of them. Sound management of the environment can provide for sustained flow of resources and for maintenance of quality of the human habitat. No conflict need arise between these two equally important objectives if ecological factors are considered along with socio-economic factors when decisions are made regarding the use of natural resources - in short, an ecological approach to the management of natural resources. The adoption of such an approach rests on knowledge of the environmental implications of contemplated actions.

(i) Ecological approach

10. The "carrying capacity of environment" varies according to the plant and animal species of the area, and also in relation to the socio-economic values of the society. At a low level of subsistence, environmental resources can provide for minimum needs of a large population, with no security against hazards such as years of drought. At a quality level, environmental resources are made to provide for needs of an optimum population with security against hazards.
11. Developing countries are faced with the responsibility of evolving and executing development plans at a rate that will meet the aspirations of their masses and bridge the economic disparity between the rich and the poor. To effectively achieve this goal, development should be planned as an integral and coherent enterprise incorporating environmental considerations. The concept of quality level of subsistence need not be synonymous with "high rate of consumption of materials". An ecological approach can maximize the positive output of development and minimize the negative effect of man's interference with the environment.
12. Lack of an ecological approach is obvious in many practices of exploitation of natural resources. The wide-spread but often unnecessary utilization of fire in land-use practices in extensive areas of Africa, Latin America and Asia; the over-exploitation of natural forests for short-term financial gains in many parts of the tropics; the over-grazing of grass-lands all over the world; and the over-fishing of coastal, estuarine and inland waters are some of the examples of exhaustion of environmental resources. These practices are sometimes badly conceived even from an economic point of view. In addition, the excessive use of agricultural chemicals has, in many instances, caused ecological problems.

13. The process of reversing an ecosystem disturbance (e.g. eutrophication of rivers or lakes or desertification) and restoring it to its natural state is prohibitively expensive and slow. What is more, the adverse effects of bad management practices may extend beyond the limits of national boundaries. For these reasons, if for no other, careful management of natural resources is a matter of urgent concern to developing countries.

14. To be effective, natural resources management should take the following into account:

- development plans and policies should include a diversity of projects and cater for alternate projects even at the planning stages. This is to safeguard against the hazards of monoculture and dependence on a single product or highly limited range of products;
- in the process of development, certain areas representing the principal natural ecosystems should be reserved for continual monitoring so that the functioning of natural systems can be compared with man-made replacements. The information provided by this comparison will help in evolving the proper management procedures for the establishment of stable and productive agricultural systems. A network of natural reserves will also have the added value of maintaining sources of biological diversity and of providing sites that can be used for educational or outdoor recreational purposes;
- social, cultural and historical factors should be considered as a part of the ecosystem in the formulation of development plans.

(ii) Information and knowledge

15. Every country needs a body of knowledge about the local environment as a basis for planning in connexion with natural resources development.

- surveys and inventories are needed in most developing countries to fill basic gaps of information about soil, water, mineral, plant and animal resources. These programmes will, of course, be on a national level. In certain fields, however, regional co-operation could be advantageous, e.g. surveys of Flora of East Tropical Africa, Flora Neotropica, etc;
- surveys of natural resources should be associated with programmes of research for further identification of ecosystems and analysis of their functioning;

not enough is known about the functioning of certain ecosystems, especially tropical forests and savannas. Multinational programmes of research will be needed to fill these gaps, aiming at exploring ecologically sound alternative plans for development.

16. Developing countries should take advantage of the projected global interdisciplinary schemes of systems analysis for principal biomes such as deserts, grasslands and forests. They should, in addition, consider inter-biome studies in planning development projects that involve a diversity of ecosystems within a natural area such as a river basin.

17. There should be a two-way flow of information between the research workers and the planners and decision makers so that all relevant knowledge will be utilized in the process of decision-making. Research is an expensive and time-consuming enterprise, and developing countries cannot afford to ignore locally available research information in all their development programmes.

B. Improvement of human settlements

18. Many developing countries are finding it difficult to improve the standard of living of their citizens because their population is increasing more rapidly than their productive capacity. They therefore are attempting to hasten the development process and are exploiting their natural resources without taking into consideration the effect such exploitation is likely to have on the environment.

19. The growth of industry is proceeding in an unplanned fashion. Industrial developments are often concentrated in a few selected areas. People from less developed areas move to these urban centres in the hope of finding employment and better living conditions. Soon the facilities of these areas become overburdened and over-crowding, poor sanitation and adverse social conditions result.

20. To minimize the adverse effects of this rapid increase in urban population, developing countries should include four elements in their development planning.

- national policies on population planning;
- careful siting of new industries to avoid overconcentrations of population in a few centres;
- improvement of the facilities in rural areas surrounding an area in the process of industrialization, e.g.
 - . opportunities for education
 - . training in integrated agricultural practices;
- efforts to preserve a sense of community among groups that have moved from rural to urban areas.

21. Certain development projects, such as hydro-electric plants, have often entailed large-scale displacement and re-location of people. This has, in many instances, had serious repercussions on the health and social vigour of the re-located population, primarily because not enough was known about their inherent social attitudes and about the environmental conditions and resources of their new habitat. It is therefore suggested that comprehensive socio-ecological studies should be part of the feasibility studies of such large-scale projects and also of the attendant programme of re-settlement and rehabilitation.

22. In several parts of the developing world, aboriginal populations still exist in isolated regions. These populations are in danger of rapid extinction. This process, if left unchecked, will destroy a genetic heritage and will prevent us from understanding the characteristics and cultural values that have permitted the survival of these populations. Such knowledge may prove to be useful for the management of these regions.

C. Control of pollution and environmental hazards

23. Awareness of pollution as an environmental hazard is becoming world-wide.

Pollution problems are not peculiar to industrialized countries; developing countries face problems somewhat similar in nature. The difference lies in the relative seriousness of various types of pollution, the degree of priority attached to them, and the level of perception and awareness of the public.

24. The following are among the most important sources of pollution in developing countries:

- (a) unsatisfactory methods for disposal and treatment of sewage and household and industrial wastes. These materials are often discharged without treatment into inland or coastal waters causing serious problems of pollution and consequent decrease of exploitable resources;
- (b) land utilization practices that lead to extensive soil erosion, increase the concentration of dust in the air, cause the discharge of considerable amounts of silt into river systems, and cause floods. These practices include reckless deforestation, over-grazing, and uncontrolled use of fire. The adverse effects of these processes often extend beyond national boundaries;
- (c) excessive utilization of chemical fertilizers, herbicides and pesticides. This is causing pollution through the leaching of these chemicals into the soil and water, accumulation of some chemicals in agricultural products, and methods of application, such as aerial spraying, which may produce direct harmful effects on humans and animals. Excessive utilization of chemical biocides is causing biological imbalances and, in many cases, has given rise to the appearance of new or resistant pests;
- (d) use of chemical biocides in campaigns against diseases (DDT in anti-malarial campaigns is an outstanding example). The residues of these biocides are important sources of environmental pollution;

- (e) industrial and motor vehicle emissions. Although this form of pollution is at present less intensive in developing countries, it is accentuated by lack of constraints in the form of public awareness and anti-pollution legislation;
- (f) the discharge of oil and its by-products into oceans. These discharges result from international trade and transportation of oil, the development of off-shore oil fields and the coastal location of oil refineries. Apart from polluting oceanic waters and thereby affecting fisheries, these materials are often washed back to the shores, polluting beach areas. This adversely affects local and international tourism which provides substantial sources of income in many developing countries.

25. Developing countries are hampered in their attempts to combat these forms of pollution by the lack of an infrastructure. Before any degree of control can be achieved, legislation must be developed, enforcement machinery must be put in place, research aimed at discovering less harmful practices must be carried out, and public awareness of the need for control must be generated.

D. Education

26. In many developing countries, not only are the opportunities for education available to the average citizen insufficient, but also the quality of education needs basic reform. These countries have been intent on providing a classical type of education and have given little thought to its social relevance.
27. Developing countries are constantly building up and improving their national patterns of education, training and research. Educators in these countries should now attempt to adapt educational programmes to the national conditions, with the aim of increasing students' knowledge of the world in which they live, helping them to improve the quality of life, and stimulating their thinking.
28. The major problem in most developing countries is the lack of understanding among the population of the role of man in modifying his environment, for better or worse. These countries also suffer from an acute shortage of middle-level technicians skilled in the management of natural resources. To overcome this, modifications should be made at all levels of education.
29. High priority should be given to the reform of primary and secondary school curricula to include basic ecological concepts. As far as possible, examples available locally or nationally should be used and increased emphasis should be placed on field work. The use of national nature reserves for field studies should be encouraged. In order to stimulate the interest of the younger generation, national regional and international competitions related to national and global environmental problems could be organized.
30. Due attention should be given to updating the knowledge of teachers, and to the preparation of teaching materials. Concise and cheaply produced monographs including textbooks should be made available.
31. At the university level, all students, including those in engineering, architecture, economics, social sciences and medicine should be trained to be aware of the effects of development on the environment and of the need for appropriate siting of industrial complexes, roads, dams, and new towns. Environmental scientists should, on the other hand, be made equally aware of the social implications of the application of environmental techniques.

32. Action should be taken to remove departmental barriers in the study of environmental problems so as to obtain an interdisciplinary approach with participation of representatives from different departments, and even from different institutions.

33. The training of research workers in the environmental sciences should be carried out nationally and/or regionally as far as possible. This is the best way to avoid frustration brought about by differences between home conditions and those of the places of training and to ensure that the training is relevant to national problems. To this end, local institutions should be strengthened by:

- (a) creation of co-operative links between institutions in developing countries dealing with similar problems;
- (b) exchange of scientific personnel and students among developing countries and between developing and industrialized countries;
- (c) establishment of regional and inter-regional training courses;
- (d) organization of seminars and advanced short courses, with the participation of scientists from industrialized countries;
- (e) financial support and scientific assistance from national and international agencies.

34. Transnational centres should be established to provide training and research on local and regional problems, and to synthesize available knowledge into a co-ordinated whole. Every effort should be made to raise the standard of excellence in these institutions so that they become effective centres for training.

35. Continuing education on environmental subjects should also be provided for scientists and decision makers.

36. Scientists from developing countries should develop avenues for communication and exchange of experiences, perhaps by joint meetings and seminars and the publication of learned journals or news-letters of regional interest. Seminars attended by both scientists and decision makers should also be encouraged as a means of ensuring closer contact between the two groups and of stimulating awareness among decision makers of local environmental problems.

37. Finally, to improve public awareness of the importance of environmental control, short courses should be given to journalists and other mass media workers to ensure that newspapers, radio and television give effective coverage to events of environmental importance.

E. Institutional arrangements

38. There is increasing recognition among the scientific community that an interdisciplinary approach is necessary for the solution of environmental problems. Institutional arrangements, at national regional or local levels, must therefore be made to permit such an approach.
39. Local environmental problems are best handled on a national basis, so that the results of research can be effectively incorporated into government policy. Thus, every country needs to set up organizations to study environmental problems, and to promote the activities already going on. National efforts may be concentrated in one central institute or carried out in several institutions co-ordinated by a national environmental council. National environmental organizations should concentrate on
- identifying environmental problems that need immediate solution and promoting research to solve them;
 - co-ordinating the activities of the different institutions involved in research on environmental problems;
 - promoting the training of research workers and scientific personnel at all levels;
 - obtaining funds from national and international sources to support environmental research and training programmes;
 - serving as a liaison body between the scientists and the decision makers, and opening channels of communication not only with the government of the country, but also with regional and global organizations.
40. The scope of some environmental problems extends beyond national borders and yet may not be of global significance. They may for example, concern a biome, a watershed, or an estuary in more than one country. Such problems should be handled through transnational institutional networks. A transnational network would bring together scientists and institutions interested in common or related problems from the different nations. Such regional networks would enable developing countries to pool their expertise and resources. Some of these networks could be target oriented; others might focus on a particular region, serving as centres of excellence in a particular field of environmental study for both training and research.

41. The exact organizational pattern of these networks may vary in different areas and for different problems. The functions of a transnational network would be essentially to supply the problem solving needs, training requirements and liaison functions of the participating countries.

42. It is increasingly evident that there are environmental problems of a global nature, such as pending climatic changes and ocean pollution, which can best be solved through international co-operation. Governmental and non-governmental international organizations are tackling some of these problems, but there is still a need for greater and more effective co-ordination, increased funding, and general acceleration of these scientific activities.

Annex IIIRegional seminars on development and environment

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REGIONAL SEMINARS ON DEVELOPMENT AND ENVIRONMENT

A. Introduction

1. To encourage the effective participation of the less industrialized countries in the preparations for the Conference on the Human Environment and to examine particular environmental problems affecting the different regions of the developing world, the United Nations Regional Commissions and the United Nations Economic and Social Office in Beirut convened four seminars - in Bangkok, Addis Ababa, Mexico City and Beirut - during the months of August and September 1971 in co-operation with the secretariat of the Conference.
2. Representatives of seventy-two less industrialized countries attended these seminars. Their discussions were centred on the basic issues contained in the Founex Report^{1/} and in other documents prepared by the regional economic commissions.
3. The major environmental problems of the less industrialized countries were identified during the discussions as common to all regions. It was evident to the participants that they were predominantly problems that reflect the common denominator of inadequate development. It was pointed out that some problems were more acute in certain regions and sub-regions of the developing world and would need to be dealt with at those levels.
4. Participants of the ECAFE regions expressed concern about the problems of human settlements in the developing countries, particularly in the context of the pressure of population growth. Problems related to the exploitation of natural resources including land degradation and soil erosion, received special attention at the ECA seminar. The Latin American seminar stressed the importance of including environmental considerations in the planning process for economic and social development. Countries of the Middle East region were concerned with the environmental implications of natural resources management, especially those affecting agricultural, water and mineral resources.
5. The seminars should be viewed as a first but very important step in the direction of regional co-operation in the environmental field, not only between countries sharing similar problems but also between intergovernmental agencies dealing with global and regional problems. It is clear that the United Nations regional commissions have an important role to play in the protection of the human environment.

^{1/} See annex I.

B. Development and environment - General principles

6. The following conclusions could be drawn from the results of the seminars.

- there was general endorsement of the spirit and recommendations of the Founex report which was considered to constitute a positive and balanced approach to the relationship between development and environment;
- it was agreed that the environmental problem was only one aspect of the general problem of development. The ultimate objective of both environmental control and economic development was the physical, mental and social well-being of man. Thus there was no conflict between development and environment so long as environmental policies did not hinder the development process;
- solutions to environmental problems in the less industrialized countries could only be found through a dynamic process of economic and social development. However, high rates of economic growth could often go hand in hand with neglect and even deterioration of environmental conditions. Accordingly, there was a consensus in all regions on the need for a multi-sectoral and inter-disciplinary approach through the integration of environmental considerations in planning machinery at the national and local levels. It was recommended that each country consider establishing adequate institutions for environmental planning, management, and control, to be integrated with the machinery for development planning;
- the relationship between development and environment varied with different levels of economic and social development. Each country had to formulate its environmental policies in the light of its special characteristics and values and through the exercise of its sovereign rights;
- while there was confidence that the progress of science and technology would contribute to the solution of environmental problems, it was recognized that the present level of knowledge of some aspects of the environment, particularly the ecology of tropical, subtropical and arid zones, was still inadequate;

- there was a fundamental difference between the environmental problems of the less industrialized countries and those of the industrialized countries. The less industrialized countries faced two distinct environmental problems:
 - those arising out of poverty and inadequacy of development
 - those generated by the very process of development.
- the less industrialized countries could profit from the experience of the industrialized countries. They could attain a better pattern of development by paying attention to environmental needs;
- more specifically, it was recognized that the concern for the environment could provide the less industrialized countries with new economic opportunities which might include: an improvement in the value of natural commodities in relation to synthetic products; the relocation of industries to developing regions; an increase in resources available for social development programmes aimed at improving the quality of life in less industrialized countries; and a better understanding of the nature of development problems and of the need for international co-operation to solve them;
- efforts to protect the environment in the industrialized countries should not lead to new forms of protectionism which could affect exports of the less industrialized countries. Nor should the environmental concerns of the industrialized countries lead to reduced flows of development assistance or to changes in aid criteria, transfers of technology, and industrial location policies which could adversely affect the less industrialized countries;
- while the less industrialized countries recognized the need to participate in efforts to solve certain global environmental problems, such as marine and air pollution, they did not consider themselves responsible for these problems;
- the importance of regional co-operation to deal with environmental problems was stressed in the seminars, with particular reference to co-operation in research and exchange of information and also in the formulation of environmental policies for natural areas covering the territory of more than one country (e.g. river basins);

- the seminars demonstrated that the less industrialized countries were fully prepared to contribute constructively to the success of the Stockholm Conference. While believing that existing international institutions should be used as far as possible to undertake new tasks in the field of the environment, these countries were prepared to support a strengthening of international co-operation in this field, including the provision of new financial resources for the protection of the global environment.

C. Environmental problems of the regions

7. Four major areas of environmental concern were identified and discussed and the following conclusions were reached.

(i) Human settlements:

- human settlements, particularly in the urban areas, had not been planned and designed for orderly future development taking account of particular regional conditions (climate, values);
- the pressure of rapid population growth and of accelerated migration to urban centres led to the further development of unplanned and uncontrolled urban settlements;
- the vital elements contributing to the human environment of urban areas, such as water, air, and the physical environment, had thus been affected. The deteriorated physical environment appeared in the form of slums and transitional settlements;
- socio-economic factors, such as lack of employment opportunities, inadequate resources for the provision of community facilities, social services, transport, etc., were at the root of the problem of urban settlements;
- rural settlements faced acute problems of poor housing and sanitation, malnutrition, lack or shortage of services and other facilities, and health hazards.

(ii) Natural resources

- a number of problems arose from the exploitation and mismanagement of natural resources;
- this necessitated making effective structural provision for the protection conservation and management of natural resources;

- the inadequacy of natural resources inventories was recognized;
- existing means and techniques for the management of natural resources were found to be insufficient;
- the importance of the ecosystem in managing natural resources and in development planning was stressed;
- the following more specific environmental problems of natural resources were discussed: soil degradation; deforestation; ecologically destructive agricultural and grazing practices; water pollution; depletion of sea resources (particularly fisheries); loss of the potential offered by renewable natural resources (particularly flora and fauna); problems arising from the exploitation of non-renewable mineral resources; problems of oil production and refining.

(iii) Industrialization

- industrial development was more a potential than an actual threat in many less industrialized countries;
- since many of the industries in these countries were of small or medium size, their financial resources were limited and they were unable to install anti-pollution equipment or plants;
- the importance of planned land use and location of industries and control of waste disposal were stressed;
- the environmental problems resulting from industrial activity were due to the use of techniques originating in industrialized countries;
- countries should adopt an inter-disciplinary approach to the planning of new or the expansion of existing industries;
- in addition, a number of more specific problems arising out of industrial development were discussed. These included: industrial pollution (source and extent); location of industries; size of industrial units; technologies of pollution; industrial transport services; adaptation of industrial workers to industrial processes and machines; industrial hazards; wastes and effluents discharge; financial problems facing small and medium scale industries in preventing pollution.

(iv) Education and training of environmental manpower

8. The basic principle underlying the discussion of this subject was the importance of better knowledge of environmental problems and the necessity to communicate this knowledge through educational and training systems.

- in this connexion the need to make an inventory of manpower requirements and to establish training and educational infrastructure in rural areas was established;
- particular stress was laid on training in natural resources management;
- the need to educate the public so as to improve the general attitude towards maintaining a better environment was also singled out.

b. The environmental strategy of the developing countries.

9. The regional seminars adopted a dynamic and positive attitude to actions they could promote to face the new concern about the environment. Actions in three major areas were considered.

(i) The incorporation of environmental considerations in development planning

10. The participants agreed that environmental concerns should be integrated in overall planning and development strategies.

11. More specifically, the integration of environmental concerns in development planning implied that:

- project appraisals should include assessments of the environmental impact of the projects;
- alternative investment projects should specify the differences in their effects on the environment;
- direct controls or fiscal measures should be used to prevent the demand or supply of products which were not considered essential and had harmful effects on the environment;
- adequate physical planning should be made, taking spatial and locational aspects into account;
- planning should be strengthened and competence created at the regional and local levels to undertake overall planning and environmental management and control;
- the allocation of resources should be based on a careful analysis and comparison of costs and benefits.

12. It was agreed that environmental problems should be dealt with as an integral aspect of development. For that purpose steps should be taken to establish appropriate machinery for environmental planning, management and control, which should work closely with the machinery of planning for economic and social development.

(ii) Regional co-operation

13. The seminars stressed the importance of regional co-operation to achieve common environmental goals: regional co-operation to support national environmental policies could be conducted through; institutional arrangements to deal with common environmental problems.

- regional institutions could serve as a forum through which research, training, and exchange of information on environmental problems of the region could be stimulated and organized;
- they could also undertake studies on environmental problems in border areas and on the high seas;
- they could attempt to reach common criteria and concepts in the environment field;
- to accomplish these tasks regional institutions should include in their staff environmentalists and natural as well as social scientists;
- their activities should be in harmony with any global system set up within the United Nations system.

14. The organization of technical seminars and other meetings on environmental issues so as to enable countries in each region to exchange views on problems of common concern.

15. The participation of United Nations regional organizations, particularly the regional commissions and the planning institutes, in all activities related to environment.

(iii) International co-operation

16. It was recognized that the basic principle underlying international co-operation was that all international efforts for environmental protection and improvement should be based on the sovereign rights of each nation.

17. The seminars agreed that the less industrialized countries should be prepared to deal with the possible impact of measures being taken by industrialized countries in dealing with their environmental problems.

- detailed commodity studies and a careful monitoring of possible increases in trade barriers on grounds of environmental concern, would be needed. The need for additional international funds to finance environmental projects and programmes was recognized;
- to this end, the establishment of a special fund was recommended.

18. The seminars gave support to all measures tending to improve, at the international level, knowledge of environmental problems and to disseminate such knowledge to all nations.

19. They stressed that the less industrialized countries should be able to select, adapt and develop technologies suitable to their conditions.

20. Since environmental considerations were likely to affect the patterns of international investment, the seminars recommended that the less industrialized countries explore the possibilities of increased participation in certain industrial sectors which were becoming more costly for developed countries because of the higher cost of environmental protection.

- as recipients of foreign investments the developing countries should, however, lay down specific environmental standards to avoid or minimize the possible indiscriminate export of pollution.