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ENVIRONMENTAL PERSPECTIVE TO THE YEAR 2000 AND BEYOND */

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I. INTRODUCTION

1. Awareness of environmental issues has been growing during the past decade. This awareness has emerged among and within the Governments as they have addressed environmental problems singly, bilaterally, regionally and globally. The establishment of ministries for environmental conservation and enhancement is but one sign of this growth of common concern. Much of this concern has been crystallized in the decisions of the Governing Council of the United Nations Environment Programme (UNEP). Despite these noteworthy developments, and the appearance in the world community of many shared perceptions regarding environmental problems and actions, environmental degradation has continued unabated, threatening human well-being and, in some instances, the very survival of life on our planet.

2. To meet this challenge, the overall aspirational goal must be sustainable development on the basis of: (a) prudent management of available global resources and environmental capacities; and (b) the rehabilitation of the environment previously subjected to degradation and misuse. Development is sustainable when it meets the needs of the present without compromising the ability of future generations to meet theirs.

3. The following are some shared perceptions of Governments of the nature of environmental issues and their interrelations with other international problems and the efforts to deal with them:

(a) An international atmosphere of peace, security and co-operation, free from the presence and the threat of wars of all types, especially nuclear war, and the waste of intellectual and natural resources on armaments by any nation, would greatly enhance environmentally sound development;

(b) The imbalance of present world economic conditions makes it extremely difficult to bring about sustained improvement in the world's environmental situation. Accelerated and balanced world development and lasting improvements in the global environment require improved world economic conditions, especially in the developing countries;

(c) Since mass poverty is often at the root of environmental degradation, its elimination and ensuring equitable access of people to environmental resources are essential for sustained environmental improvements;

(d) The environment provides constraints as well as opportunities for economic growth and social well-being. Environmental degradation, in its various forms, has assumed such proportions as can cause irreversible changes in ecosystems that threaten to undermine human well-being. Environmental constraints, however, are generally relative to the state of technology and socio-economic conditions which can and should be improved and managed to achieve sustained world economic growth;

(e) Environmental issues are closely intertwined with development policies and practices; consequently, environmental goals and actions need to be defined in relation to development objectives and policies;

(f) Although it is important to tackle immediate environmental problems, anticipatory and preventive policies are the most effective and economical in achieving environmentally sound development;

(g) Environmental impact of actions in one sector are often felt in other sectors; thus, internalization of environmental considerations in sectoral policies and programmes and their co-ordination are essential to achieve sustainable development;

(h) Since conflicts of interest among population groups, or among countries, are often inherent in the nature of environmental problems, participation of the concerned parties is essential to determine effective environmental management practices;

(i) Environmental degradation can be controlled and reversed only by ensuring that the parties causing the damage will be accountable for their action, and that they will participate, on the basis of full access to available knowledge, in improving environmental conditions;

(j) Renewable resources, as part of complex and interlinked ecosystems, can have sustainable yields only if used taking into account system-wide effects of exploitation;

(k) Safeguarding of species is a moral obligation of humankind, and should improve and sustain human well-being;

(l) Building awareness at various levels of environmental conditions and management through the provision of information, education and training is essential for environmental protection and improvement;

(m) Strategies to deal with environmental challenges have to be flexible and should allow for adjustments to emerging problems and evolving environmental management technology;

(n) The growing number and variety of international environmental disputes need to be resolved by peaceful means.

4. Environmental problems cut across a range of policy issues and are mostly rooted in inappropriate development patterns. Consequently, environmental issues, goals and actions cannot be framed in isolation from the development and policy sectors in which they emanate. Against this background, and in the light of General Assembly resolution 38/161 of 19 December 1983, this document reflects an intergovernmental consensus on growing environmental challenges to the year 2000 and beyond, in respect of six main sectors. In addition, the document discusses briefly other issues of global concern which do not fit easily under the sectoral headings and considers instruments for environmental action, including the role of institutions for dealing with environmental issues. Throughout the Environmental Perspective, an attempt has been made to reflect consistently the interdependent and integrated nature of environmental issues. Under each sectoral heading, this document covers: the issue; the outlook; the goal to be aspired to in dealing with the issue; and recommended action. While drawing upon the report of the World Commission on Environment and Development, the Environmental Perspective has sought to delineate, in an organized manner, the elements of shared perceptions, environmental issues, aspirational goals and agenda for action envisaged for the Environmental Perspective by the Governing Council and the General Assembly.

II. SECTORAL ISSUES

A. Population

1. Issue and outlook

5. Issue: The optimum contribution of human resources to achieve sustainable development has not been realized. Yet, population levels, growth and distribution will continue to overload the capacities of the environment in many countries. Rapid population growth, among other factors, has exacerbated poverty. The negative interaction between population and environment has tended to create social tensions.

6. Outlook: People are the most valuable asset anywhere for the betterment of economic and social conditions and the quality of life. Yet, in a number of countries, the momentum of population growth today, coupled with poverty, environmental degradation and an unfavourable economic situation, has tended to create serious disequilibria between population and environment and to aggravate the problem of "environmental refugees". Traditions and social attitudes, especially in rural areas, have been a major impediment to population planning.

7. World population may exceed 6 billion by the year 2000. Several countries have achieved population equilibrium as defined by low birth and death rates and high life expectancies. But, for a large part of the developing world, this has not happened because of unfavourable economic conditions. Over 90 per cent of the net addition to the world's population between now and the year 2025, when the world population might exceed 8 billion, will occur in the developing countries. Many of them already suffer from desertification, fuelwood deficits and loss of forests. Population planning would assist, but is not sufficient to achieve equilibrium between population and environmental capacities. Countries have not yet related population planning to development planning, nor have they linked population and environmental action for mutually reinforcing improvements. Equally, there is the need for more concern for human progress and social justice as factors influencing human resources development and environmental improvement.

2. Goal and recommended action

8. Goal: Achievement over time of such a balance between population and environmental capacities as would make possible sustainable development, keeping in view the links among population levels, consumption patterns, poverty and the natural resource base.

9. Recommended action:

(a) Development planning which takes into account environmental considerations should be an important instrument in achieving population goals. Countries should identify the rural and urban areas with acute population pressures on the environment. Environmental problems of large cities in developing countries should receive special attention. Since poverty increases, economic development decreases and population rates grow, development plans should give special attention to population-related programmes aimed at improving environmental conditions at local levels;

(b) Significant changes in natural resources should be monitored and anticipated. This information should be fed back into sub-national and national development plans and related to the planning of spatial distribution of population;

(c) Land and water use and spatial planning should bring about a balanced distribution of population through, for example, incentives for industrial location, for resettlement and development of intermediate-sized towns, keeping in view the capacities of the environment;

(d) Public works, including food-for-work programmes, should be designed and implemented in areas of environmental stress and population pressures, with a view to providing employment and simultaneously improving the environment;

(e) Governments and voluntary organizations should increase public understanding, through formal and non-formal education, of the significance of population planning for environmental improvement and the important role of local action. The role of women in improving the environment and in population planning should receive special attention, as social changes that raise the status of women can have a profound effect in bringing down population growth rates;

(f) Private enterprise, and industry in particular, should participate actively in governmental and non-governmental organization work aimed at ameliorating population and environmental stress;

(g) Education should be geared towards making people more capable of dealing with problems of excessive population densities. Such education should help people acquire practical and vocational skills to enable them to become more self-reliant and enhance their participation in improvement of the environment at the local level;

(h) International agencies, notably, the United Nations Fund for Population Activities (UNFPA), the United Nations Children's Fund (UNICEF), the International Labour Organisation (ILO), the World Health Organization (WHO) and the World Food Programme (WFP), should give priority attention to the geographical areas experiencing acute population pressures on the environment. They should reflect sensitivity to environmental improvement in the design and implementation of their population-related programmes. Multilateral and bilateral development assistance should be increased to finance innovative projects to make population programmes more effective by relating them to environmental improvement;

(i) Population policies must have a broader focus than controlling numbers. Governments should work on several fronts: to achieve and maintain population equilibrium; to expand the carrying capacity of the environment and improve health and sanitation at local levels; to develop human resources through education and training; and to ensure equitable distribution of the benefits of economic growth.

B. Food and agriculture

1. Issue and outlook

10. Issue: Shortage of food in many developing countries creates insecurity and environmental threats. The quest to meet rapidly growing food needs, combined with insufficient attention to the environmental impact of agricultural policies and practices, has been causing great environmental damage. This includes: degradation and depletion in the form of loss of soil and forests; drought and desertification; loss and deterioration of quality of surface and ground water; reduction in genetic diversity and of fish stocks; damage to the sea floor, waterlogging, salinization and siltation; and soil, water and air pollution and eutrophication caused by improper use of fertilizers and pesticides and by industrial effluents.

11. Outlook: While food production capabilities have increased greatly over the last three decades, self-reliance in food production has not been achieved in many countries. In the absence of proper environmental management, conversion of forests and grassland into cropland will increase land degradation. For example, in sub-Saharan Africa a major issue is desertification and frequent droughts causing large-scale migration from rural areas. In most developing countries the pressure on the natural resources, including those in the public domain, is a serious concern. In some developed countries loss of land productivity from excessive use of chemicals and loss of prime quality land to urbanization are major concerns.

12. Soil erosion has increased in all regions: increased intensity of land use has resulted in reducing fallowing which, in turn, has undermined soil conservation, management of moisture and control of weeds and diseases in small-holder agriculture. The main causes have been deforestation, overgrazing and overworking of farmland. Inappropriate patterns of land use and inadequate access to land have been other factors at work. Some off-site impacts have been flooding, reduction in hydro-electric capacity, reduced life of irrigation systems and declines in fish catches. The world's rivers may be carrying 24 billion tons of sediment to the seas annually. Technologies which make optimal use of natural resources, minimum tillage, fallowing and drought-pest and disease-resistant varieties, combined with mixed cropping, crop rotation, terracing and agro-forestry, have kept erosion under control in some places.

13. Nearly one third of all land is at risk from desertification. Over the last quarter century population in arid lands increased by more than 80 per cent. Since the adoption in 1977 of the Plan of Action to Combat Desertification, ^{1/} awareness of the problem has grown and so have organizational efforts to deal with it. But the basic elements of the action needed, namely, to stop the process, to rehabilitate degraded lands and to ensure their effective management, do not yet receive the attention they urgently need. Although long-term economic returns to investments in controlling dryland degradation are high, insufficient resources are being devoted to that end.

14. Forests cover approximately one third of all land. Tropical forests occupy over 1.9 billion hectares, of which 1.2 billion hectares are closed forests, and the remaining open tree formations. Although the rate of tree plantations in the tropics has accelerated recently (about 1.1 million hectares annually), it amounts to only about one tenth of the rate of deforestation. Use of forest land for agriculture through shifting or sedentary cultivation, increasing demand for fuelwood, unmanaged clearance and logging, burning and conversion for pastoral purposes, are the main factors behind tropical deforestation. In semi-humid and dry climates fire can be a significant cause as well. Widespread deforestation has brought about far-reaching changes in tropical forest ecosystems which no longer can perform well their essential functions of water retention, climate control, soil conservation and provision of livelihood.

15. Timber, an increasingly scarce commodity, has become the subject of extensive international negotiations. The International Tropical Timber Agreement (ITTA) ratified in 1985 aims at promoting international trade in industrial wood and the environmental management of tropical forests. The Tropical Forests Action Plan, prepared under the auspices of the Food and Agriculture Organization of the United Nations (FAO), puts forward five priority areas aimed at: forestry land-use planning, forestry-based industrial development, fuelwood and energy planning, conservation of tropical forest ecosystems and institutional support for better forestry management.

^{1/} Report of the United Nations Conference on Desertification, Nairobi, 29-7 September 1977 (A/CONF.74/36), chap. 1.

16. There have been significant changes in weather patterns partly as a result of loss of forests and vegetation cover. This has reduced river flows and lake levels and also lowered agricultural productivity. Irrigation has greatly improved arability in many areas of uncertain, or inadequate, rainfall. It has also been playing a vital role in the Green Revolution. Inappropriate irrigation, however, has wasted water, washed out nutrients and, through salinization and alkalinization, damaged the productivity of millions of hectares. Globally, salinization alone may be removing as much land from production as the land being irrigated, and about half of the land under surface irrigation may be saline or waterlogged. Excessive use of ground water for irrigation has resulted in lower water tables and semi-arid conditions.

17. Fisheries potential has not yet been tapped sufficiently, and in such ways as to ensure sustainable yields, particularly in the developing coastal States, which do not possess the necessary infrastructure, technology or trained manpower to develop and manage fisheries in their exclusive economic zones (EEZ). Excessive fishing activities have led to overexploitation of several important fish stocks and the collapse of some. By the year 2000, annual fish supplies may fall short of demand by about 10-15 million tons. Regional agreements on co-ordination of national fishing policies for licensing procedures, catch reporting, monitoring and surveillance have begun to consider sustainability of yields and use of appropriate technology. The World Conference on Fisheries Management and Development (1984) established a framework and action programmes for fisheries management. ^{2/}

18. Freshwater fish farming and aquaculture now produce annually about 8 million tons of fish. In Europe and South and South-East Asia, aquaculture has made important strides. Whether as part of a traditional way of supplementing farm incomes and protein intake, or as an industry, carefully practised aquaculture holds great promise for integrated environmental management and rural development in many countries.

19. The use of high-yielding seed varieties has multiplied agricultural output but has led to a reduction in genetic diversity of crops and an increase in their vulnerability to diseases and pests. The emerging technology of direct gene transfer, or transfer of the symbiotic nitrogen-fixing capacity of leguminous crops to cereals, can greatly increase production and reduce costs. Also the spread of gene banks through the International Board for Plant Genetic Resources, and the work of the International Centre for Genetic Engineering and Biotechnology should improve the prospects for genetic diversity, and thereby enhance agricultural productivity.

20. Overuse of pesticides has polluted water and soil, damaging the ecology of agriculture and creating hazards for human health and animals. Pesticides have to be used to increase agricultural production. But their indiscriminate use has destroyed natural predators and other non-target species and increased resistance in target pests. More than 400 insect species are believed to be resistant to pesticides and their number is increasing.

21. Use of chemical fertilizers per capita has increased fivefold between 1950 and 1983. In some countries excessive use of fertilizers, along with household and industrial effluents, has caused eutrophication of lakes, canals and irrigation reservoirs, and even coastal seas through run-offs of nitrogen compounds and phosphates. Ground water has also been polluted by nitrates in many places, and nitrate levels in rivers have risen steadily over the last two decades. Degradation of the quality of surface and ground water, caused by chemicals including nitrates, has been a significant problem in developed and developing countries alike.

22. In North America, Western Europe and some other areas, food surpluses have accumulated partly as a result of farm price subsidization. The push to produce more in response to incentives coupled with excessive use of fertilizers and pesticides have led to degradation and soil erosion in some countries. Similarly, export subsidization of food grains by some countries has undermined agricultural exports of some others and also led to environmental neglect of farmland. In some countries, however, there is a trend towards reducing the scale of farming, encouraging organic farming, restoring the natural beauty of the countryside and diversifying the rural economy.

^{2/} See Food and Agriculture Organization of the United Nations, Report of the FAO World Conference on Fisheries Management and Development, Rome, 27 June-6 July 1984 (Rome, 1984).

23. In the developing countries, farmers receive too little for their produce and production is thereby discouraged. City dwellers often buy food at subsidized prices and peasants may receive only a fraction of the market price. In countries where farmers have begun to receive better prices for their produce, agricultural production has increased and soil and water management has improved. When equitable agricultural prices are accompanied by technical assistance for environmental management of farming, they can help improve the quality of life in the countryside as well as in cities, partly by stemming the flow of rural-urban migration. Upward adjustment of food prices is, however, a politically sensitive issue, especially in situations of low resource productivity, low incomes, large-scale unemployment and slow economic growth.

2. Goal and recommended action

24. Goal: Achievement of food security without resource depletion or environmental degradation, and restoration of the resources base where environmental damage has been occurring.

25. Recommended action:

(a) Policies of Governments for using agricultural land, forests and water resources should keep in view degradation trends as well as evaluation of potentials. Agricultural policies should vary from region to region to reflect different regional needs, encouraging farmers to adopt practices that are ecologically sustainable in their own areas and promote national food security. Local communities should be involved in the design and implementation of such policies;

(b) Policy distortions that have caused undue pressures on marginal lands, or taken away prime farmland for urbanization, or led to environmental neglect of natural resources, have to be identified and eliminated;

(c) Governments should design and implement regulatory measures as well as taxation and price policies and incentives aimed at ensuring that the right of owning agricultural land carries an obligation to sustain its productivity. Long-term agricultural credits should require farmers to undertake soil conservation practices, including keeping a portion of land fallow, where appropriate;

(d) Governments should promote equity in means for food production and in distribution. Governments should design and implement comprehensive agrarian reforms to improve the levels of living of farm workers who lack land. Governments should take decisive action to turn the "terms of trade" in favour of farmers through pricing policy and government expenditure reallocation;

(e) Governments should ascertain direct and indirect environmental impacts of alternative crop, forestry and land use patterns. Fiscal and trade policies should be based on such environmental assessments. Governments should give priority to establishing a national policy and to creating or strengthening institutions to restore areas where natural factors and land-use practices have reduced productivity;

(f) In the national development plans and agricultural programmes of countries experiencing desertification, dryland rehabilitation and management have to figure prominently. Better systems of early warning against droughts and other dryland disasters have to be developed with the World Meteorological Organization (WMO), FAO, UNEP and the relevant regional organizations playing appropriate roles;

(g) Sound forest policies should be based on an analysis of the capacity of the forests and the land under them to perform various functions. Programmes to conserve forest resources should start with the local people. Contracts covering forest use will have to be negotiated or renegotiated to ensure sustainability. Clear-cutting of large forest areas should be avoided and replanting of logged forestry areas should be required. Portions of forests should be designated as protected areas to conserve soil, water, wildlife and genetic resources in their natural habitat;

(h) Social and economic costs of deforestation, including clear-cutting, have to be estimated and reported on in relation to the periodic national reporting on the economic performance of forestry. Similarly, the damage costs of waterlogging and salinization have to be reported in conjunction with the reporting on irrigation and agricultural production. Loss of land to deserts, and its consequences for food production, trade, employment and incomes have to be made part of the annual reporting on economic growth. Economic policies and planning have to reflect such environmental accounting;

(i) Economic and other incentives should be introduced in areas experiencing deforestation and lack of forest resources to manage forests and woody vegetation, from an environmental standpoint, and to promote tree nurseries, tree farming and fuelwood plantations. Local communities should be encouraged to take major responsibility for such undertakings;

(j) Projects should be designed and implemented to promote afforestation, agro-forestry systems, water management, soil conservation measures, (e.g. land contour-levelling and terracing) in areas of environmental stress. Such projects should respond to the needs of the local people for food, fodder and fuel, while increasing the long-term productivity of natural resources. Environmental improvement schemes should become a regular part of national relief, rural employment and income-support schemes to sustain development in drought-prone or other stressful regions;

(k) Within the framework of a national water policy which should facilitate an intersectoral and integrated approach to water development and use, technical, economic and organizational means have to be geared to improving efficiency of water use in farming and animal husbandry. Emphasis on ground-water storage in drylands should improve assurance of water availability. Improvements in water application techniques to minimize wastage, co-ordination of farming patterns with water supply, and such pricing of water as would cover the cost of its collection, storage and supply, should be introduced to conserve water in scarcity areas;

(l) Choice of technology and the scale of irrigation should take into account environmental costs and benefits. Decentralized and small-scale irrigation have to receive special attention. Proper drainage to prevent salinization and waterlogging has to accompany irrigation. Development assistance has to play a vital role in improving productivity of existing irrigation, reducing its environmental damage, and adapting it to the needs of small-scale, diversified agriculture;

(m) The traditional rights of subsistence farmers, particularly shifting cultivators, pastoralists and nomads must be protected from encroachment. Provision of infrastructure, services and information should help modernize nomadic life-styles without damaging their traditionally harmonious relationships with ecosystems. Programmes of land clearance and resettlement should be based on an assessment of their environmental, along with their social and economic, impacts. Agro-industry, mining and schemes of geographical dispersal of settlements should also aim at improving environmental conditions in rural areas;

(n) Public education, information campaigns, technical assistance, training, legislation, standards setting and incentives should be oriented to encourage the use of organic matter in agriculture. The use of fertilizers and pesticides has to be guided, inter alia, through training, awareness building and appropriate price policies, so as to establish integrated nutrient supply systems responsive to environmental impacts. Similarly, subsidies, which have led to the overuse or abuse of chemical fertilizers and pesticides, have to be phased out;

(o) Decentralized storage facilities, with the upgrading of traditional methods to ensure protection of stored grains, should receive attention in the planning of support services for rural and agricultural development;

(p) Where the agricultural frontier has extended in an uncontrolled manner, Governments should make special efforts to expand the area under woodland and nature reserves;

(q) Satellite imagery, aerial photography and geographical information systems of assessing and monitoring should be deployed to establish natural resource data bases. Such data should be made available, freely or with a nominal charge, to the countries in need. The UNEP should co-ordinate international programmes in this field. Such data collection and their socio-economic analyses should facilitate the design and implementation of land use and natural resource development plans, and improve international co-operation in the environmental management of transboundary natural resources;

(r) International co-operation should give priority to schemes aimed at strengthening skills and institutional capabilities in the developing countries in fields such as applied genetics, agro-forestry, organic recycling, integrated pest management, crop rotation, drainage, soil-conserving ploughing, sand-dune stabilization, small-scale irrigation and environmentally sound management of fresh-water systems;

(s) Biotechnology, including tissue culture, conversion of biomass into useful produce, micro-electronics and information technology should be deployed after assessing carefully their environmental impacts and cost effectiveness with a view to promoting environmental management of agriculture. Governments should enhance the access of farmers to such technologies through national policies and international co-operation. Research should be intensified on new technologies urgently needed in regions which have unreliable rainfall, uneven topography, and poor soils. Governments should also set up targets to develop cadres of professionals specializing in environmental management of soil, water and forests and in biotechnology with a multidisciplinary and integrated outlook;

(t) Aquaculture should be developed to the fullest, where possible in conjunction with farming, using low-cost, simple, labour-intensive technology. Co-operation for environmental management of marine living resources and fisheries should be intensified, through technical assistance as well as conventions and agreements;

(u) Because of women's important role in agriculture in many developing countries, they should be provided with adequate education and training opportunities. They should also have the necessary power to take decisions regarding agriculture and forestry programmes;

(v) Distortions in the structure of the world food market should be minimized and the focus of production should be shifted to food deficit countries. In developed countries incentive systems should be changed to discourage overproduction and foster improved soil and water management. Governments must recognize that all parties lose through protectionist barriers, and redesign trade and tax policies using environmental and economic criteria;

(w) International agreements should be concluded in respect of agricultural price policies with a view to minimizing waste and mismanagement of food and natural resources in agriculture. Such agreements should aim at bringing about an international division of labour in agriculture in conformity with the long-term capabilities of countries in agricultural production. In this context, consideration should be given to strengthening the work of the World Food Programme through the establishment of a World Food Bank from which countries could draw food supplies in emergency situations;

(x) Special attention should be given to protection and careful development of wetlands, particularly in view of their long-term economic value;

(y) Sustainable exploitation of living wild resources should receive special consideration in the light of its contribution to achieving food security.

C. Energy

1. Issue and outlook

26. Issue: There are vast disparities in the patterns of energy consumption. The needs of accelerated economic growth and growing populations require a rapid expansion in energy production and consumption. Major problems in this regard include: depleting supplies of, and inadequate access to, fuelwood; environmental impacts of fossil energy production, transmission and use, for example, acidification of the environment, accumulation of greenhouse gases and consequent climatic change. Although energy is crucial to the development process, there has been little concerted action for balancing environmental imperatives and energy demands.

27. Outlook: About three fourths of the world's energy consumption is in the form of fossil fuels (oil, coal and natural gas). The remainder is supplied mainly by biomass, hydropower and nuclear power. The main problems caused by fossil fuel use are: air pollution, acidification of soil, fresh water and forests, and climatic change, especially warming of the atmosphere. The costs of controlling these problems and of dealing with their environmental and health impacts have been enormous. New and renewable sources of energy, including solar, wind, ocean and geothermal, are being developed but are unlikely to make a significant contribution during the rest of this century.

28. International oil prices are fluctuating. The immediate economic impact of lower prices has been significant. Yet, the momentum of efforts to improve energy efficiency and to develop alternatives for fossil fuels, which began in the wake of high oil prices, may decline.

29. Though developing countries account for about one third of the world's energy consumption, many of them do not have adequate access to energy. Most of them depend on oil imports and on biomass and animal energy. Wood, which provides energy to about half of the world's people, is becoming scarce, and overcutting has devastated the environment. Some countries have made progress in developing biogas while improving the environment, but the potential of biogas remains largely untapped. Given the needs of industrialization and the trends of population growth, energy needs will increase tremendously during the coming decades. If energy efficiency measures are not put in place, it will not be possible to meet those needs.

30. Many countries have made efforts to control air pollution by setting standards and introducing appropriate equipment in factories as well as automobiles, and developing clean technologies for cooking, space heating, industrial processes and power generation. But attempts to deal with urban and industrial air pollution have often effectively transported the problem, for example, in the form of acid deposition, to other areas and countries. At least 5 to 6 per cent of the European forests may have already died because of acidification. As a first step, some European countries have agreed on a technical co-operation programme to monitor and control long-range transmission of some air pollutants. Reducing emissions of sulphur dioxide and nitrogen oxides, however, is rather costly, although effective reduction technologies have been introduced in some countries. On the other hand, no effective technologies exist to control carbon dioxide accumulation which can markedly change climate. Moreover, available technology is not being fully utilized. The difficulty is to determine up to what level the damage costs of polluting fossil fuels should be accepted and how much to invest in scientific research to develop clean technologies.

31. Energy is often used in wasteful ways. Costs of this waste are being borne by all, but most severely by the poor. Moreover, part of these costs are being transferred to children, future generations and other countries. Several countries have experimented successfully over the last decade with conservation of energy for domestic use, improved efficiency of energy in industry and agriculture, and adoption of energy mixes to minimize environmental damage. In some countries the nature of industrial growth has been changing in ways which economize energy use, for example, rapid growth of electronic, recreation and service industries. Consequently, there has been a noticeable delinking of economic growth from increase in energy consumption. Energy savings, renewable sources and new technologies can reduce energy consumption while maintaining the momentum of economic growth.

32. While oil exploration and coal mining have received great attention, the potential of natural gas has not been realized. Considerable quantities are being wasted in the absence of necessary infrastructure and investment. The world also has a relatively untapped capacity to develop hydropower. In the past environmental planning has not received adequate attention in hydropower development. Decentralized small-scale hydropower schemes are not yet used on a significant scale, although they may be capable of providing economical, efficient and environmentally sound sources of energy.

33. Nuclear energy is widely used as a source of electricity and the International Atomic Energy Agency (IAEA) has formulated guidelines to ensure that it is developed and used safely. The problems associated with it include risk of accidental contamination, which can spread quickly over long distances, and the safe handling and disposal of radioactive wastes, including decommissioned nuclear reactors.

2. Goal and recommended action

34. Goal: Provision of sufficient energy at reasonable cost, notably increasing access to energy substantially in the developing countries, to meet current and expanding needs in ways that minimize environmental degradation and risks, conserve non-renewables and realize the full potential of renewable energy sources.

35. Recommended action:

(a) Governments' energy plans should systematically encompass environmental requirements. Energy efficiency policies coupled with environmentally sound energy production and appropriate energy mixes should be pursued to achieve sustainable energy consumption patterns. National efforts should be supported by international co-operation, especially scientific research, establishment of standards, transfer of technology and information;

(b) Energy pricing, taxation, trade and other policies should take account of the environmental costs of all forms of energy. Subsidies for fossil fuels should be progressively phased out. Private enterprise, consumers and government institutions should be provided with economic incentives to make greater use of renewable sources of energy. Where needed, international co-operation should facilitate the exploration and environmentally sound production of energy;

(c) Information should be made available on the harmful environmental impacts of intensive use of fossil fuels. Urban and industrial air pollution, accumulation of greenhouse gases and the attendant climatic change and transfrontier transport of air pollutants in all regions must receive urgent attention, including monitoring by appropriate methods. Standards must be set and enforced within and among countries, and conventions and agreements should be concluded to deal with these problems. In this context, "The Polluter Pays Principle" should be accepted. Governments should ensure that clean technologies are put into practice on a wider scale than in the past at the local level. The United Nations system, in conjunction with other intergovernmental bodies, should improve access to information on renewables and on efficient energy use;

(d) In view of the significance of fuelwood, national programmes of afforestation and of environmental management of woodlands should receive increased resources. Agro-forestry programmes, tree plantations and village wood-lots should receive special encouragement in countries experiencing fuelwood deficit. Commercial cutting of fuelwood should be subjected to rigorous scrutiny and control, in view of its environmental costs. Application of fuel-efficient stoves and charcoal should be encouraged. Pricing of fuelwood should be guided by the consideration of sustaining supplies consistent with needs;

(e) As biogas can be an important source of energy, the existing technology for the use of agriculture, animal and human wastes should be applied more widely by means of incentives and guidance. Technical co-operation among developing countries should play a vital part in this process, bearing in mind its sanitation and agricultural benefits;

(f) Decisions on large-scale hydropower projects should be guided by analysis of social costs and benefits in the light of likely environmental impacts. Small-scale hydropower schemes should receive particular attention since they could facilitate simultaneous attainment of environmental, economic and social objectives;

(g) Renewable energy sources should receive high priority and should be applied on a wider scale than in the past, giving full consideration to their environmental impacts. Technologies to develop renewable sources of energy such as wind, geo-thermal and especially solar, should receive particular attention. International co-operation should facilitate this process;

(h) International co-operation should aim at the creation of a régime for the safe production and use of nuclear energy, as well as the safe handling of radioactive waste, taking into account - through appropriate mechanisms including prior consultations - the interests and concerns of countries that have decided not to produce nuclear energy, in particular, concerns regarding the siting of nuclear plants close to their borders. This régime should extend globally to encompass observance of comparable standards and procedures on management of reactors and the sharing of information and technology for nuclear safety. The Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency ^{3/} should be complemented by bilateral and subregional agreements and also lead to technical co-operation among countries on environmental management of nuclear energy.

D. Industry

1. Issue and outlook

36. Issue: Industrial development brings obvious benefits, but it frequently entails damage to the environment and to human health. The main negative impacts are: wasteful use and depletion of scarce natural resources; air, water and soil pollution; congestion, noise and squalor; accumulation of hazardous wastes; and accidents with significant environmental consequences. Industrialization patterns and the consequent exploitation of natural resources and environmental degradation have been markedly unbalanced. The prospect for accelerated, yet environmentally sound world industrial development, are slim in the absence of concerted international action.

37. Outlook: Although some efforts to deal with environmental problems of industry have been made, negative impacts will grow in magnitude if not addressed methodically now. A promising trend is the steadily growing awareness of industrial environmental risks throughout the world. While this awareness increasingly informs and influences public policy, environmental knowledge remains as yet markedly uneven. In the absence of mechanisms for its unhindered sharing, Governments and industry may import hazardous materials and allow establishment of processes discarded elsewhere. Inadequate knowledge at the grassroots level of changes in the environment, and of their causes as well as economic implications, impedes participation of the concerned people in decision-making on siting of industrial plants and choice of industrial technology.

38. Natural resources have been used wastefully in industry. Recently, a number of countries have made significant progress in developing and adopting low-waste and clean industrial technologies and in recovering as well as recycling scarce industrial raw materials. New materials and processing technologies have been able to save raw materials and energy resources and to reduce environmental stress. Nevertheless, in many countries resource-intensive processes persist in the absence of suitable policies and access to proper technology.

39. Uncontrolled industrial practices have led to unacceptably high levels of harmful or toxic substances in the air, pollution of rivers, lakes, coastal waters and soil, destruction of forests, and accumulation of carbon dioxide and other greenhouse gases which threaten to cause climatic changes, including a global warming of the atmosphere. Sea levels may rise considerably as a result. Industrial production and emission of chlorofluorocarbons threaten a significant depletion of the ozone layer, leading to increased ultraviolet radiation.

^{3/} For the texts of the two Conventions, see IAEA documents INFCIRC/335 and 336.

40. Recently, there has been an increase in the seriousness of industrial accidents, particularly in the chemicals industry. Even in the developed countries, the preparedness to meet such contingencies has been inadequate. Also, frameworks for international co-operation in such situations have been lacking. A crucial problem has been the lack of timely warning and of full sharing of information on the nature and magnitude of the hazards at local and regional levels.

41. With industrial growth and spread, the transport, storage and disposal of chemical, toxic and radioactive wastes will pose an increasingly serious challenge. The "Polluter Pays Principle" has been applied with good results in some countries; but in many others it is still not applied at all, so that the source of environmental damage is often unaccountable for the harm caused. In the pursuit of rapid industrialization, some polluting industries may be relocated from other countries. As many developing countries do not possess technical or institutional capability to analyse or monitor environmental implications of industrial processes, products or wastes, they are vulnerable to industrial environmental damage.

42. Many developed countries have successfully applied technology, policies and institutional and legislative frameworks to deal with industrial pollution. Several have succeeded in innovating or applying low-waste or clean technologies. The UNEP Industry and Environment Office has produced publications with extensive and detailed information on environmentally sound technologies in specific industries. Thus, although environmental hazards of industrial processes, products and wastes persist, there is available considerable experience, expertise and technology to prevent industrial accidents and to implement environmentally responsible practices.

43. Technical innovation has opened up promising opportunities for achieving mutually supportive economic and environmental objectives. Properly-guided technology can transform patterns of industrialization and improve the international division of labour. Innovation in micro-electronics and opto-electronics has revolutionized information and communications industries and can lead to geographical dispersal of industry. These innovations hold promise for developing countries suffering from the twin problems of excessive industrial concentration in urban areas and relative neglect of rural areas.

44. In the decades ahead, the developing countries will depend considerably more on industry, including processing of their own raw materials, for incomes and employment. In contrast, in some developed countries, the pattern of industry is changing in the direction of knowledge-intensive, energy-saving and materials-saving activities. Moreover, leisure and service industries have begun to play a significant part in this change.

45. Countries have been coming together to forge agreements on preventive measures to contain global, regional and transfrontier environmental impacts of industrial products and processes. Examples of this encouraging trend include: conventions and protocols for the control of land-based sources of marine pollution in frameworks of various regional seas programmes; the Vienna Convention to Protect the Ozone Layer and the evolving international consensus on the control of emission of chlorofluorocarbons; the 1979 Convention on Long-Range Transboundary Air Pollution and its Co-operative Programme for the Monitoring and Evaluation of Long-Range Transmission of Air Pollutants in Europe (EMEP); and the UNEP-sponsored 1985 Cairo Guidelines and Principles for the Environmentally Sound Management of Hazardous Wastes. ^{4/} Such international co-operation can extend in many areas of industrial environmental management and geographical regions. Moreover, industry itself, following the 1985 World Industry Conference on Environmental Management convened by UNEP, is becoming increasingly ready to undertake environmental responsibilities.

2. Goal and recommended action

46. Goal: Sustained improvements in levels of living in all countries, especially the developing ones, through industrial development which prevents or minimizes environmental damage and risks.

^{4/} UNEP/GC.14/17, annex II.

47. Recommended action

(a) Governments should implement policies to assist the transition of economies from wasteful use of natural resources and raw materials, and dependence on their exports, to environmentally sound industrial development. National efforts in planning and implementing environmentally sound industrial policies should be intensified. Governments should introduce incentive schemes to help establish facilities for recovery and recycling of scarce raw materials. The transfer of industrial technology and skills from developed to developing countries to arrest environmental degradation associated with industry should be internationally supported. The UNDP, UNEP, the Economic Commission for Europe (ECE) and the United Nations Industrial Development Organization (UNIDO) should intensify efforts in this direction;

(b) Governments should introduce programmes to monitor air, soil, fresh water and coastal pollution from industrial emissions and effluents, and hazardous industrial activities, where such programmes do not already exist;

(c) Governments should provide for environmental standards, and their enforcement, and fiscal and other incentives to industry for the retro-fitting of equipment for pollution control. They should also ensure penalties for non-compliance, in conformity with the "Polluter Pays Principle". International organizations should co-operate with Governments in establishing global or regional standards;

(d) Governments should require periodic reports by industries on measures implemented to protect and improve the environment, especially those industries involving high environmental and health risks;

(e) Industrial enterprises should carry out environmental impact and social cost-benefit analyses prior to the siting and design of industrial plants. Governments should ensure that such analyses are carried out and made public. Governmental policies should facilitate location of industries to relieve urban congestion and encourage rural development. Industries which use 'each others' products and wastes should be located near each other;

(f) Governments and industrial enterprises should be receptive to the views of citizen groups, community associations, labour organizations and professional and scientific bodies in arriving at, and implementing, the decisions on industrial siting, design and technologies to meet the environmental, economic and social needs of the people;

(g) Chambers of commerce and federations of industry should collaborate actively in implementing emission standards and pollution control measures. They should establish mechanisms to bridge the gap in environmental management knowledge and capabilities among their members. Such co-operation should also be encouraged among small-scale producers;

(h) Transnational corporations (TNCs) should comply with the host country's environmental legislation, while respecting similar legislation of the home country. Legislation could include requirements for public environmental audits of the activities of TNCs and local enterprises. In accordance with proposed international codes of conduct, the TNCs should establish progressively in the host countries the skills and technological capabilities needed for environmentally sound management of industry, even in the absence of legislation on desirable environmental standards;

(i) International industrial collaboration should be subjected to environmental impact assessments just like national industry;

(j) Countries, especially developing countries, should, as a matter of urgency, design and implement research, training and manpower-planning programmes to strengthen the management of hazardous industrial processes and wastes;

(k) International organizations, including UNDP, UNIDO, WHO, FAO, WMO and the ILO, and intergovernmental organizations, such as the Organisation for Economic Co-operation and Development (OECD) and the Council for Mutual Economic Assistance (CMEA), should ensure that their programmes will progressively strengthen the capacities of the developing countries in designing and implementing industrial operations along environmentally sound lines. They should also assist in establishing or strengthening information services on environmental and health implications of industrial processes, products and wastes. In addition, access of the developing countries to information and data on environmentally benign technologies should be promoted, including risk management techniques;

(l) International co-operation for the monitoring of the accumulation of carbon dioxide and other "greenhouse" gases and of their impacts on climate and sea levels must be strengthened to encompass both the conclusion of international agreements and the formulation of industrial strategies to mitigate the environmental, economic and social impacts of potential changes. Intergovernmental negotiations, following upon the Framework Convention on the Ozone Layer, should lead to agreements on the reduction of ozone-depleting substances;

(m) Existing legal and technical activities of United Nations organizations, especially UNEP, in closer co-operation with regional organizations, should progressively establish international agreements and monitoring mechanisms: (i) to deal with spills and other industrial accidents, particularly chemical; (ii) to control the transportation, storage, management and disposal of hazardous industrial wastes; and (iii) to settle disputes involving damages and claims for compensation. United Nations and regional organizations should encourage Governments to extend the "Polluter Pays Principle" to transboundary problems;

(n) The UNEP's International Register for Potentially Toxic Chemicals (IRPTC) programme should maintain and improve its assistance to Governments in assessing whether producing, marketing, distributing or disposing of any industrial substances, including chemicals and wastes, are potentially damaging to health and environment.

E. Health and human settlements

1. Issue and outlook

48. Issue: Despite considerable advances in dealing with problems of health and human settlements, the environmental basis for further improving the situation is deteriorating. Inadequate shelter and basic amenities, rural underdevelopment, over-crowded cities and urban decay, lack of access to clean water, poor sanitation and other environmental deficiencies continue to cause widespread disease and death, ill-health and intolerable living conditions in many parts of the world. Poverty, malnutrition and ignorance compound these problems.

49. Outlook: Human ability to prevent disease has grown greatly over the last few decades, mainly owing to scientific achievements and better access to sanitation, clean water and safe waste disposal. In many developed countries better living conditions have helped prevent disease and have enhanced average life expectations. In the developing countries, however, achievements have lagged behind what is technically feasible.

50. More than 4 million children under five die of diarrhoea in the developing countries. Even when it does not cause death, diarrhoea saps vitality and stops physical and mental growth. Malaria is another water-borne disease which infects about 100 million annually. Typhoid and cholera are similarly endemic in the developing countries. Bilharzia and river blindness are other common diseases caused by mismanagement of water. Sleeping sickness caused by the tsetse fly effectively denies the use of vast tracts of land in Africa for pastoral or settlements development. The burning of coal, oil, wood, dung and agricultural wastes build up dangerous concentrations of toxic gases in houses and factories: chronic heart and lung diseases, bronchitis, emphysema and asthma are the result.

51. In warm, humid countries where storage is inadequate, aflatoxins in food cause liver cancer. On the other hand, over-use of fertilizer has caused excessive nitrate levels in ground water, endangering children's health, and nitrate run-offs have led to eutrophication of surface waters and contamination of shellfish. Phosphates in fertilizer have caused high intakes of cadmium in food. Further, pesticides, herbicides and fungicides pose a direct threat to health in the rural areas when their use is not properly guided. Over-use of pesticides has also led to their high residues in food.

52. About a billion people do not have adequate shelter and millions practically live on the streets. By the year 2000, about 2 billion people, or 40 per cent of the developing countries' populations, will live in cities and towns, thereby putting pressure on city planners and Governments. Most developing countries already do not have the resources required to provide housing and services to the people who need them. The influx of refugees in some developing countries has exacerbated health, shelter and environmental conditions. Also, where rural settlements are widely dispersed, health, housing and infrastructural services become practically unattainable.

53. About one third of all city and town dwellers in the developing countries live in slums and shanties, with no help or infrastructural support whatever, and often under adverse conditions. The inexorable trend towards urbanization will ensure that by the year 2000, 15 of the world's largest 20 urban metropolitan areas will be in the developing countries. Simultaneously, rural environmental degradation reinforces migration to urban areas even when people are unable to earn incomes high enough to ensure decent housing and there is no prospect of meeting their infrastructural needs.

54. There are three main environmental aspects of urbanization, including: characteristics of the dwelling (living space, ventilation, sanitation, water supply, waste disposal, recreation space, domestic energy); ambient environmental situation (air pollution, water pollution, environmental risks and hazards, noise, stress and crime); and environment of the area surrounding the urban centres (deforestation, soil erosion, changes in micro-climate). Between a quarter and a half of all urban residents in the developing countries live in unhealthy and degraded dwellings. Consequently, diarrhoea, dysentery and typhoid are common, and there are periodic outbreaks of cholera and hepatitis. Tuberculosis and other respiratory diseases spread easily in ill-ventilated, damp and crowded surroundings.

55. Excessive concentrations of industry and commerce in a few urban centres often reflect a dualistic development pattern, implying a relative neglect of rural and agricultural development. Concentrations of people, settlements and income and employment opportunities often become mutually reinforcing in such a situation. People continue to migrate to the urban areas even if their expected incomes are not high enough to ensure decent housing, or there is no prospect of their infrastructural needs being met. Thus, the problems of safe disposal of toxic and hazardous wastes, control of air and water pollution, collection and disposal of domestic wastes and provision of clean drinking water assume gigantic proportions, requiring enormous finance and great organizational and technical capabilities. Photochemical smog, oxides of nitrogen and sulphur, hydrocarbons, lead, mercury, cadmium poisoning, carbon monoxide, polychlorinated biphenyls, asbestos and other particulate matter along with the respiratory and gastroenteric diseases and malnutrition, cause serious damage to public health. The consequent stress of living in such conditions contributes to social tensions and outbreaks of violence and unrest. When industrial accidents or natural disasters occur, loss of life and human suffering follow on a large scale because of the congestion, lack of organizational and technical capacities and vulnerability.

56. Heavy urban concentrations have also placed excessive demands on natural resources and polluted and degraded surrounding areas. High land prices have caused good agricultural land to be used for construction and speculation. Urban firewood demand has led to widespread deforestation, soil erosion and even changes in micro-climate.

57. Congestion of settlements near factories multiplies the health risks of chemicals production in the developing countries. Toxic wastes accumulation and their inappropriate disposal similarly endanger the health of millions. Awareness of the risks to human health posed by environmental contamination has increased greatly. Such risks arise partly through an absence of environmental regulation and management capability. Most developed countries have succeeded in reducing environmental pollution, risks and impacts. International co-operation has also progressed on several fronts: national programmes launched under the International Drinking Water Supply and Sanitation Decade, the WHO/UNICEF Programme on Primary Health Care, the Onchocerciasis Control Programme in Africa in the Volta River basin, the UNEP/WHO/ILO International Programme on Chemical Safety, the dissemination of information on chemicals of environmental concern through UNEP's International Register on Potentially Toxic Chemicals, the FAO International Code of Conduct on the Distribution and Use of Pesticides and its accompanying technical guidelines, the FAO/UNEP Panel of Experts on Integrated Pest Control, the UNDP/World Bank/WHO Special Programme on Research and Training in Tropical Diseases, the WHO/FAO/UNEP Panel of Experts on Environmental Management of Vector Control (PEEM), the specification of radiation dose limits by the International Commission on Radiological Protection and the two recent international conventions adopted under IAEA auspices on exchange of information and assistance in the event of a nuclear accident, are some examples.

2. Goal and recommended action

58. Goal: Provision of improved shelter with access to essential amenities in a clean and secure setting conducive to health and to the prevention of environment-related diseases while alleviating serious environmental degradation.

59. Recommended action:

(a) Governments should make health and settlements development an integral part of environmental management of natural resources and geographically balanced development. They should address systematically the issue of equity in development to ensure provision of basic health, housing and amenities for their people;

(b) International co-operation should intensify scientific research to deal with the environmental conditions underlying tropical diseases;

(c) Rural development, including natural resources management and provision of drinking water and sanitation, should receive systematic attention in public policies. Governments should design and implement, with the participation of the communities concerned, integrated programmes to improve water supply and management, sanitation and waste disposal;

(d) Governments should set targets at national, provincial and district levels for such priority areas as housing, access to clean water and sanitation, and control of air pollution in urban areas;

(e) To reduce adverse environmental impacts of transportation, especially in highly populated areas, Governments should give priority to facilitating commuting of people between residential and working areas, enforcing emission standards for vehicles, encouraging fuel efficiency, and improving traffic management policies and urban planning;

(f) Intermediate-sized towns should receive particular attention in programmes of industrial and settlement development;

(g) Governments should create an "enabling environment", in which the creativity and resources of people are mobilized to improve the health conditions, shelter and environmental information at local levels. This should include, collection and disposal of domestic, agricultural and human wastes, land-use planning, area development and self-help construction. Efforts should be made to encourage the participation of the private sector and non-governmental organizations;

(h) Industrial, agricultural, energy, irrigation and land development and resettlement projects should include a component of environmental and health impacts, including risk assessment, which, in turn, should be influential in guiding the projects' location, scale and choice of technology. Regulations should be established to prevent settlements development in high environmental-risk areas, such as those proximate to chemical or nuclear plants. Responsibility for enforcing such regulations should be shared with the private sector;

(i) Primary and occupational education should encompass information on the environment. The mass media should regularly make available information and know-how to enable people to improve sanitation, waste disposal and drinking water quality. Deterrents and incentives should be introduced at local levels to encourage people to keep their immediate environment healthy;

(j) Scientific research should address the immediate improvement of the health and environmental situation of degraded settlements. Technologies for the safe disposal of wastes with minimum use of water in arid and semi-arid areas, improving water quality, reuse of waste water and harvesting of rain should be developed. The United Nations Centre for Human Settlements (Habitat) (UNCHS), WHO and UNICEF should intensify efforts to promote application of such technologies in the developing countries;

(k) Urban planning should receive priority attention, together with the rational management of natural resources. Staffing, finance and organizational effort should reflect such high priority. Urban centres should systematically provide areas to meet the needs of various income categories, for industry, business, recreation and open spaces. Technical co-operation in this field has to expand greatly under the leadership of UNCHS;

(l) Countries hosting large number of refugees should receive more international assistance through the Office of the United Nations High Commissioner for Refugees (UNHCR) and other bodies to improve environmental conditions of refugee settlements.

F. International economic relations

1. Issue and outlook

60. Issue: Inequalities in international economic relations, coupled with inappropriate economic policies in many developed and developing countries alike, continue to affect adversely sustainable development and cause environmental degradation. Deteriorating terms of trade, chronic trade deficits which are partly caused by growing protectionism, heavy debt-service payments and inadequate financial flows have made it very difficult to allocate resources to environmental protection and improvement particularly in developing countries. Specific problems include: insufficient consideration of environmental impacts in development co-operation, insufficient control of trade in scarce natural resources and hazardous substances; and transnational investment and transfer of technology without adequate observance of environmental standards, or information on environmental management.

61. Outlook: Awareness of the environmental aspects of international economic relations has increased, but it has not yet found adequate expression in institutional practices and national policies.

62. Development co-operation projects have not helped build significantly national capabilities to avert environmental disasters. The environmental damage entailed by some large projects is now better understood than in the past. There is also a growing awareness of the need for additional resources to rehabilitate degraded environments.

63. Long-term declines in commodity prices, coupled with their inequity and instability, have adversely affected environmental management of natural resources. Neither do these prices fully reflect the environmental costs of depletion of the resource base. Good quality land, fish and other natural resources are being overworked and tropical forests are being encroached upon in order to achieve additional income. Substitution of export crops in place of subsistence crops has displaced small farmers and pastoralists from good quality land and has led to excessive pressures on marginal land and natural resources.

64. There is a growing awareness of the hazards associated with trade in chemicals, pesticides and some other products, but international practices in controlling the transport of hazardous chemical goods do not yet provide for a systematic consideration of the environment.

65. Mounting debt burdens, repayment obligations, austerity measures and reduction in financial flows to developing countries have endangered and, in some cases, blocked sustainable development, entailing negative economic, environmental and social impacts.

66. Recent years have seen a sharp worsening of the international economic situation. Its impact has been particularly severe on developing countries. Lack of economic growth in developing countries could have devastating consequences.

7. Goal and recommended action

67. Goal: Establishment of an equitable system of international economic relations aimed at achieving continuing economic advancement for all States, based on principles recognized by the international community, in order to stimulate and sustain environmentally sound development, especially in developing countries.

68. Recommended action:

(a) In the ongoing search for concerted action to deal with international economic problems, the urgent need to improve the world environmental situation, and to ensure a solid environmental foundation for sustainable development, has to be recognized. Correcting the deteriorating terms of trade and stabilizing international commodity prices at equitable levels, through international commodity agreements (for example, the Integrated Programme on Commodities), in conjunction with appropriate environmental management practices in the producing countries, should play an important role in this regard;

(b) Especially in situations of environmental stress, development co-operation should aim at long-term improvement of natural resource productivity and environmental health. Poverty-focused projects that improve the environment should receive greater attention in development co-operation. Such co-operation has to increase substantially keeping in view the growing need for environmental rehabilitation;

(c) Development co-operation institutions should increase significantly their assistance to the developing countries for purposes of environmental restoration, protection and improvement;

(d) Country programmes and policy papers prepared by multilateral and bilateral development co-operation institutions, for allocation of aid resources, should provide for analyses of the environmental needs of recipient countries, with particular focus on major problems (for example desertification, deforestation and pollution). Developing countries should be assisted where necessary in preparing environmental accounting and relating it to the reporting on national economic well-being;

(e) The system of appraising development co-operation projects should provide for assessments of environmental and socio-economic impacts of alternative designs and locations. Area development programmes, in particular, should seek to establish mutual support between environmental and socio-economic objectives. Development co-operation institutions should train their staff according to these objectives;

(f) Trade in hazardous industrial products, such as toxic chemicals and pesticides and in some other products such as pharmaceuticals, should be subjected to regulations to ensure sharing, by the contracting parties, Governments and consumers, of information on their environmental and health implications, and on methods for their safe use and disposal. Labelling of products should be in local languages. Governments of the exporting as well as the importing countries should collaborate in this regard. They should also agree on the selection of chemicals for priority testing;

(g) International trade and commodity agreements should provide for environmental safeguards, where applicable. They should also encourage producers to take a long-term view and provide for assistance for diversification programmes, where appropriate. Governments should study the environmental impacts of their trade practices and make the findings available to their agencies responsible for the trade negotiations, which should take them into account. The United Nations Conference on Trade and Development (UNCTAD) and the General Agreement on Tariffs and Trade (GATT) should develop and apply effective policies and instruments to integrate environment and development considerations in international trade;

(h) Environmentally related regulations and standards should not be used for protectionist purposes. The International Trade Centre (ITC) should assist countries to meet such requirements. The UNCTAD should make available information on such regulations and standards as they apply to commodities and manufactured products;

(i) Host Governments should institute policies and regulations to ensure sound environmental management of transnational investments. In agreements on transnational, including corporate, investments, Governments through appropriate controls should ensure that information and technology of environmental management will be provided, specifying the responsibilities of the parties concerned. In accordance with proposed Code of Conduct of the United Nations Centre on Transnational Corporations (UNCTC), the TNCs should implement in the host countries programmes to minimize environmental hazards of their activities, including training of personnel. The UNCTC should play a role to facilitate this;

(j) Transfer of clean, low-waste and pollution control technologies should be promoted through international co-operation. The scope to make available such technologies at concessional prices to the countries in need should be explored. Governments of recipient countries should establish procedures to ascertain the environmental implications of imported technologies;

(k) International financial institutions, while dealing with questions of structural adjustment in developing countries and world economic reform, should link short-term financial stabilization to sustainable development.

III. OTHER ISSUES OF GLOBAL CONCERN

69. This section discusses briefly the major environmental issues of global concern that have not adequately been dealt with in previous sections.

A. Oceans and seas

70. Oceans and seas are being polluted extensively. The rising pollution levels and degradation of coastal ecosystems threaten the life-support capacities of oceans and seas and undermine their role in the food chain. Efforts which are being made to monitor the state of oceans and seas, including those of UNEP and other international organizations, confirm that there is cause for concern. This problem is particularly serious for coastal waters and semi-enclosed seas that border highly populated and industrialized zones. The situation will get much worse unless concerted action is undertaken now. The ongoing monitoring effort is far from comprehensive and, where it has advanced, it has not yet led to adequate change in the practices causing environmental damage.

71. The challenge is to control and decrease marine pollution, and establish or strengthen régimes of environmental management of oceans and seas through international co-operation and national action.

72. A comprehensive data base should be established over time on which action programmes to restore and preserve the environmental balance in the world's oceans and seas can be based. Among others, the Global Environmental Monitoring System (GEMS), Global Resources Information Data Base (GRID) and the oceans and coastal areas programmes of UNEP should intensify efforts towards this end.

73. Conventions and agreements to monitor and manage human activities with a view to ensuring environmental protection of the seas and oceans should be ratified and implemented by all concerned countries. Where such legal instruments do not exist, they should be negotiated. Governments should strengthen or introduce policies and measures with a view to preventing practices harmful to marine ecosystems and ensuring environmentally sound development of inland areas. Such policies and measures should include control of the discharge of industrial effluents and sewage, dumping of wastes, including hazardous and radioactive materials, disposal of hazardous residues and operational wastes from ships, incineration at sea and oil spills from tankers and off-shore platforms. Environmentally sound land-based technology for the disposal of hazardous wastes should be developed and promoted. The UNEP should continue to collaborate in this work with the Intergovernmental Oceanographic Commission (IOC), the International Maritime Organization (IMO) and other appropriate international organizations.

B. Outer space

74. Outer space has now become a recognized area of human activity. As activity in this area develops over the coming decades, sound management of outer space will become increasingly important. To this end, international co-operation exclusively for the peaceful use of outer space is essential, especially on the part of those countries that now have the capacity to undertake outer space activities.

75. All countries, in particular those with a major capacity to exploit the benefits of outer space, should create conditions, including specifically the maintenance of its non-militarization, for broad international co-operation in the exploration and use of outer space for peaceful purposes. This should include the use of space technology to monitor the Earth's environment. The benefits of peaceful use of outer space, including weather forecasting, and remote sensing and medicine, should be made readily available to the world community, particularly through assistance to the developing countries.

C. Biological diversity

76. Traditional crop and livestock species are giving way to high-yielding varieties and breeds. As the genetic base of plants, animals and micro-organisms becomes narrower, some genetic material is being irretrievably lost at such a rate that the world could lose one fifth or one tenth of its 5 to 10 million species by the year 2000.

77. Over 100 countries are collaborating in the global programme co-ordinated by the International Board of Plant Genetic Resources (IBPGR) for conserving crop genetic resources, and the global gene banks network contains over 1 million samples of crop germ plasma. Yet, in many countries, national efforts for conservation are still ill-organized and under-financed, and often do not attend systematically to the components of planning, training, education and research. International co-operation and technical assistance in this field should be further developed.

78. An international network of protected areas for conserving animal and plant genetic resources, encompassing about 10 per cent of the world's land area, should be established to reverse the trend towards depletion of species. Management plans for conserving ecosystems as reservoirs of species diversity have to be prepared.

79. Efforts to conserve crop genetic resources and the global data banks network have to be extended to cover adequately germ plasma with economic potential for providing food, fodder, fibres, waxes, oils, gums, medicines, energy and insecticides. In situ and ex situ components of conservation have to develop in a complementary manner in the light of the interdependence of nature conservation and genetic diversity.

80. Mechanisms should be established to provide information on rates of exploitation of genetic resources to facilitate selection of those to be conserved.

81. The gap between conservation of species and economic access to them should be bridged through maximum international co-operation. Agreements involving rights of possession of and access to genetic material, including research results, should facilitate such co-operation. Conserved genetic resources should be regarded as being a common interest to mankind.

D. Security and environment

82. Accumulation and deployment of weapons of war and destruction present very grave risks to the environment. The use of weapons of mass destruction, including nuclear, chemical and biological weapons, could bring about far-reaching, even irreversible, changes in the global environment.

83. Development and stockpiling of nuclear arms and delivery systems at current levels have made the human race technically capable of putting an end to its own existence. In addition, the growing capacity of some States to undertake deliberate manipulation of the environment represents an immense potential danger. If the material, financial and intellectual resources devoted to armaments were to be used to solve problems such as those of the human environment, food security and shelter, prospects for sustainable development would be considerably enhanced.

84. The World Charter of Nature proclaims that "Nature shall be secured against degradation caused by warfare or other hostile activities". ^{5/} A comprehensive system of international security is essential in order to ensure that this declaration is implemented.

85. Progressive disarmament through détente, negotiation, and avoidance of the use of force as a means of resolving conflicts should be pursued to minimize the environmental risks associated with armed conflicts. Governments should continue to pursue, in relevant negotiating forums, efforts to ban weapons that have the effect of modifying the environment.

86. One of the roles of UNEP is to promote environmentally sound development in harmony with peace and security, and towards this end, issues of disarmament and security, in so far as they relate to the environment, should continue to receive appropriate attention.

IV. INSTRUMENTS OF ENVIRONMENTAL ACTION

87. Sections I, II and III above largely sought to indicate how environmental problems should be dealt with effectively by addressing their policy sources. However, such actions need to be reinforced by the performance of certain over-arching functions. This section deals with those functions.

A. Assessment

88. Environmental rehabilitation and management depend upon availability of organized information on the state of the environment, its trends and their relationship to social and economic factors. Decisions, however, continue to be made in ignorance of the changing state of the environment and its implications for human well-being. It is essential, therefore, that reliable environmental information, obtained and analysed using modern technology, is made available to planners and managers in a usable form. Most developing countries face the constraint of lack of access to modern technology and to the necessary expertise to collect and interpret environmental data.

89. Environmental and resource data are being collected at global and regional levels by the United Nations and international organizations working with Governments. Additional data also exist at the national level, although often in a fragmented form. Institutional mechanisms are often lacking to relate such data sets to each other and to analyse them in the context of existing practices and policies. Governments and intergovernmental organizations at the regional level should intensify efforts to collect and analyse data especially relating to common environmental problems.

^{5/} Resolution 37/7, annex.

90. The UNEP, working through the United Nations system, co-ordinates the collection, monitoring and assessment of selected environmental variables and distributes this information world-wide through: the Global Environmental Monitoring System (GENS), encompassing the monitoring and assessment systems relating to climate, health and natural resources and the Global Resource Information Data Base (GRID); data bases and systems for the conservation and management of genetic resources; the International Register of Potentially Toxic Chemicals (IRPTC), which operates a global information exchange network to provide information and data on chemicals and their effects on health and environment through a query-response service and evaluations of the effects of chemicals on the environment, INFOTERRA, the International Environmental Information System and UNEP's state of the environment reports, which address major issues of topical environmental concern.

91. Through improved collection and analysis of data and its wide distribution to potential users, which should be a service to countries as well as international organizations, UNEP should become, and come to be accepted as, a leading authority in environmental assessment.

92. International co-operation on environmental assessment, with the participation of the United Nations system and with UNEP playing a leading role, should assist countries, particularly developing countries, in establishing effective national monitoring systems, geographic information systems and assessment capabilities, and improving data compatibility. For this, technical co-operation among countries regionally and globally has to increase significantly.

93. Notable environmental assessments have been carried out recently and related to socio-economic factors by non-governmental organizations in some countries. These have helped expand awareness and stimulate action to protect and improve the environment. Governments should encourage such efforts.

B. Planning

94. Environmental planning should provide a conceptual, methodological and institutional framework within which to internalize progressively the consideration of the environment in development decision-making. Every country should define its national environmental objectives and make them part of its plans for socio-economic development. Just as each country sets targets for sectoral growth, it should set time-bound targets in respect of environmental resources and indicators of major concern. Plans and policies at sub-national levels should also provide for the pursuit of the specified environmental and development objectives in tandem.

95. Governments should establish mechanisms and procedures to facilitate interdepartmental co-ordination of policies and unified direction for integrating environmental concerns in development planning. Use of analytical methods to ascertain the environmental and socio-economic implications of alternative courses of action should inform decisions on projects and programmes. It should also help resolve conflicts of interest among departments, among population groups and among regions.

96. Allocation of investment resources of a national plan among regions and sectors has to reflect a sensitivity to environmental constraints and objectives. This should be facilitated by periodic analyses of the socio-economic significance of the changing state of natural resources and the environment at national and provincial levels. Effort should also be made to prepare an accounting of the use of scarce natural resources, particularly focusing on the country's major environmental problems (for example, desertification), and to relate it to the periodic reporting on national income and well-being.

97. Sectoral ministries should be encouraged to apply environmental impact assessments and social cost-benefit analyses in decision-making on development projects and programmes. Taxation and economic policies should encourage sectoral decisions in favour of environmentally benign technologies and locations, recycling and safe disposal of wastes, conservation of natural resources and establish mutual support between environmental and economic objectives. Land and water use plans should be prepared, and their implementation monitored. Already some countries have made progress in planning at district levels to reflect environmental needs.

98. There have been advances in the analytical methods of environmental impact and risk assessment, social benefit-cost analyses of environmental measures, physical planning and environmental accounting. Theoretical work on decision models with multiple objectives and constraints has also progressed. The UNEP, the Scientific Committee on the Problems of the Environment (SCOPE) and OECD have played a useful role. This work should be strengthened in order that it will have a greater impact on decision-making.

99. Environmental action and economic planning still remain insufficiently related to each other in most countries. Efforts must be intensified at national and international levels to promote application of suitable methods, procedures and institutional arrangements to make economic planning fully responsive to environmental constraints and opportunities. UNEP's guiding role in this field should include technical assistance to the developing countries. Collaborative arrangements should be made at the working level between UNEP and UNDP, the Department of Technical Co-operation for Development of the United Nations Secretariat and the World Bank. They should set up, or strengthen, units to conduct environmental analyses of their projects and programmes and, in collaboration with UNEP, assist Governments in systematically considering the environment in development planning.

C. Legislation and environmental law

100. Increasingly, environmental legislation has been providing practical frameworks at the national level to implement environmental standards and to regulate activities of enterprises and people in the light of environmental objectives. At the international level, conventions, protocols and agreements have been providing a basis for co-operation among countries at bilateral, regional and global levels for the management of environmental risks, control of pollution and conservation of natural resources.

101. There is a need to expand the accession to and ratification of these conventions and institute mechanisms at the national level to ensure their application. The present momentum should be maintained of concluding conventions in fields such as hazards relating to chemicals, treatment and international transport of hazardous wastes, industrial accidents, climate change, protection of the ozone layer, protection of the marine environment from pollution from land-based sources and protection of biological diversity, in which UNEP has been playing an active part.

102. Groundwork has been prepared over the last 15 years under the aegis of UNEP to establish legal frameworks to manage regional seas. Governments should intensify their efforts to implement legislative measures and other policies at national levels so that the policy sources of the environmental problems of the regional seas are effectively tackled. Increasingly, environmental management of rivers, lakes, and forests has been posing a challenge to international co-operation. Governments, with the collaboration of UNEP and concerned international organizations, should accelerate action to establish legal régimes at international and national levels to improve significantly environmental management of rivers, lakes and forests. The UNEP-sponsored new programme for environmental management of freshwater systems is a promising start.

103. The Montevideo Programme for the Development and Periodic Review of Environmental Law, prepared under the auspices of UNEP, should be implemented fully. Development of international environmental law should continue, with a view to providing a strong basis for fostering co-operation among countries. The progressive emergence of general environmental norms and principles and the codification of existing agreements could lead to a global convention on protection and enhancement of the environment.

104. Governments should settle their environmental disputes by peaceful means, making use of existing and emerging agreements and conventions. The International Court of Justice, the International Court of Arbitration and regional mechanisms should facilitate peaceful settlement of environmental disputes.

D. Awareness building and training

105. Participation of people in environmental protection and improvement depends upon their being aware of the environmental problems and possibilities, of how the changing state of the environment affects their well-being, and how their life-styles affect the environment. People's effectiveness in dealing with environmental problems depends upon their technical and organizational capabilities to design and implement the needed measures.

106. Since the Stockholm Conference on the Human Environment (1972), awareness of the interrelationship between human activities and the environment has steadily grown. ^{6/} Voluntary action groups at the community level, national and global non-governmental organizations, scientific bodies, schools and universities, mass media and Governments all have played a part in this process. Also UNEP, through its Programme and through its Information activities, has helped build environmental awareness.

107. In a large number of developing countries, knowledge of proper environmental management practices still does not reach millions who suffer from environmental degradation. People are the most valuable resource in development, but in order that they participate constructively in accelerating and sustaining development, it is necessary that environmental information is made available in languages they understand, and in a form that can easily help them relate it to their own situation. Governments should intensify efforts to make this possible. Non-governmental organizations, with appropriate support from UNEP, should play an increasingly active role in this field, especially by way of provision of requisite materials.

108. The United Nations Educational, Scientific and Cultural Organization (UNESCO), in collaboration with UNEP, should ensure a systematic coverage of environmental education needs at all levels of schooling, especially in the developing countries. They should also prepare and promote course materials which would include environmental components in professional training given to selected occupational groups, for example, engineers, builders, foresters, farm extension workers and managers. Training in analysing environmental considerations in relation to economic and other goals also has to receive growing attention. Governments should make environmental education and training an integral part of their education and communication policies and programmes.

109. International support to training personnel in environmental assessment and management, especially in the developing countries, has grown steadily. It is essential, however, to ensure that the content and modality of such instruction is relevant to the needs of the countries where the skills are intended to be applied. International co-operation and governmental efforts should also help ensure a progressive strengthening of institutional capabilities within the developing countries themselves to make available such training.

E. Institutions

110. Consideration of the environment needs to be internalized in sectoral policies and practices to ensure that environmental objectives are met and sustainable development is achieved. Sectoral bodies should be made accountable for such internalization. Existing environmental problems also have to be dealt with through concerted action and allocation of resources. This is true at both national and international levels.

111. At the national level, the mandates of sectoral ministries and other governmental institutions should explicitly state their responsibility and accountability for sustainable development and environmental protection within their sectors. Their policies, functions, structures and budgetary allocations should be made consistent with this. As appropriate, the same should apply at provincial and local levels. Authoritative mechanisms and procedures are needed to oversee and ensure that national environmental objectives are met across government. Governments should establish or strengthen environmental ministries to stimulate, guide, support and monitor actions to achieve these objectives. To this end, essential functions should include: environmental assessment, planning and incentives, legislative and regulatory advice, awareness-building and training, stimulation of research and application of its results. Environmental ministries should also provide leadership and co-ordination for direct action to deal with environmental problems, including rehabilitation. Bilateral and multilateral institutions and international organizations should assist developing countries in this regard.

^{6/} See Report of the United Nations Conference on the Human Environment (United Nations publication, Sales No. E.73.II.A.14 and corrigendum).

112. International institutions, both inside and outside of the United Nations system, dealing with such areas as food and agriculture, health, industry, energy, science, trade, finance and development assistance, should reorient their policies and programmes to make steady progress towards environmentally sound development.

113. These institutions should be accountable for integrating the objectives of sustainable development into their policies, budgets and staffing strategies. Governments should ensure, through consistent policy guidance to these institutions, that their mandates and programmes meet this objective.

114. The governing bodies of all United Nations organizations should report regularly to the General Assembly on the progress made in achieving the objectives of sustainable development. Such reports should also be submitted to the Governing Council of UNEP for that body to provide comments on matters within its mandate to the General Assembly. The Administrative Committee on Co-ordination, under the chairmanship of the Secretary-General, should oversee effectively the implementation of sustainable development in all programmes of the United Nations system, by reviewing and co-ordinating the efforts of all organs, organizations and bodies of the United Nations system in this field, and by including this in its reports to the General Assembly and the Governing Council of UNEP.

115. The inter-agency mechanism of Designated Officials on Environmental Matters (DOEM) should guide, support and monitor more effectively activities within the United Nations system to ensure consistent policy.

116. In parallel with the institutional arrangements at the national level, UNEP should promote, guide, support and monitor actions to achieve environmentally sound development and stimulate and co-ordinate action to deal with environmental problems.

117. The major priorities and functions of UNEP should be:

(a) To provide leadership, advice and guidance in the United Nations system on restoring, protecting and improving the environmental basis for, and in general be a catalyst in the promotion of, sustainable development;

(b) To monitor, assess and report regularly on the state of the environment and natural resources and emerging environmental issues;

(c) To support priority scientific and technological research on major environmental and natural resource protection issues;

(d) To make available, in co-operation with other agencies where appropriate, guidance for environmental management, including the development of management techniques, criteria and indicators for environmental quality standards and guidelines for the sustainable use and management of natural resources;

(e) To initiate and support the programmes and activities worked out by the developing countries for dealing with their serious environmental problems;

(f) To initiate and facilitate the development and, upon request, the co-ordination of implementation of action plans in the developing countries for the management of ecosystems and critical environmental problems. Such plans should be implemented and financed by the Governments concerned with appropriate external assistance;

(g) To encourage and promote international agreements on critical environmental issues and to support and facilitate the development of international law, conventions and co-operative arrangements for environmental and natural resource conservation and protection;

(h) In co-operation with other concerned institutions, to establish and strengthen the institutional and professional capacity of developing countries with a view to integrating environmental considerations into their development policy and planning;

(i) To promote awareness of environmental matters through education and mass media;

(j) To co-operate with the United Nations Development Programme and other United Nations agencies, the World Bank and regional development banks to strengthen the environmental dimensions of their programmes and technical assistance projects, inter alia, through training and personnel secondments.

118. Specialized agencies, organizations and bodies of the United Nations system should more speedily assume full operational and financial responsibility for UNEP-supported environmental programmes in their sectors included in the System-wide Medium-Term Environment Programme and the Environment Fund. The human and financial resources which will become available to UNEP as a result, should be concentrated on the priority areas listed above.

119. Environmentally sound development cannot be assured solely by actions of governmental, intergovernmental or international organizations. It requires participation of other entities, particularly industry, non-governmental environmental and development organizations and the scientific community. Non-governmental organizations have important contributions to make in various areas, including environmental education and awareness, design and implementation of programmes at the grass-roots levels. The scientific community should continue to play an important role in environmental research and risk assessment and international scientific co-operation.

120. Regional and continental co-operative arrangements are being established to deal with common environmental problems. For example, the Cairo Ministerial Conference on the African Environment in 1985 agreed on a Programme of Action and modalities to implement it. 113/ Governments and development co-operation agencies should support such institutional arrangements and programmes.