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EXECUTIVE STATMENT

ACTION REQUIRED: For discussion and decision

December 11, 1986

World Commission

on

Environment and Development

EXECUTIVE STATEMENT

EXECUTIVE SUMMARY

V. A COMMON FUTURE

I. THE IMPERATIVES OF THE GLOBAL TRANSITION

The Hope

Humans have thrived as a species and come to dominate this planet largely due to their abilities to plan ahead and to work together for common goals. As technology shrinks the planet by lengthening human reach and as human numbers, needs and wants increase, humankind's survival will depend on ever more effective anticipation and co-operation.

This Commission believes that people have the power to prevail - to build a future that is more prosperous, more just and more secure. New technologies to improve and increase our powers to communicate, forecast and plan are available. The Commission's Report is not a prediction of ever increasing poverty, hunger and hardship in an ever dirtier world among ever decreasing resources. It sees instead the possibility of and the need for economic growth based on policies which sustain and expand the environmental resource base.

But the Commission's hope is conditional on political action now to begin managing environmental resources to ensure the survival of human life on earth. There is no such thing as a 'long-term decision'; all decisions are taken in the present, though they may have impacts over the long term. Instead of forecasting a

future, the Commission is serving a notice - an urgent notice based on the latest and best scientific evidence - that the time has come to take the decisions needed to secure the resources to sustain this and coming generations.

BOX

The World Commission on Environment and Development first met in October, 1984, and published its Report 900 days later in April, 1986. Over those few days:

* The environmental crisis in Africa peaked, putting 30 million people at risk, killing perhaps a million.

* A leak from a pesticides factory in Bhopal, India, killed 2,000 people and blinded and injured thousands more.

* Liquid gas tanks exploded in Mexico City, killing 1,000 and leaving thousands more homeless.

* The Chernobyl nuclear reactor explosion sent nuclear fallout across Europe, damaging agricultural produce and threatening future human cancers.

* Agricultural chemicals, solvents and mercury flowed into the Rhine River during a warehouse fire in Switzerland, killing millions of fish and threatening drinking water in West Germany and the Netherlands.

* A company based in the United States tested a genetically-altered, living viral rabies vaccine in Argentina without notifying the government there.

* An estimated 60 million people died of diarrhoeal diseases related to unsafe drinking water and malnutrition; most of the victims were children.

The Failures

We have largely failed in our efforts to manage our environment and its resources. The already rapid loss of productive drylands - six million hectares per year - is accelerating. Now almost 30 per cent of the earth's land

area is suffering some form of this man-made 'desertification'. Every decade floods and droughts connected with cleared and misused land take more lives and bring suffering to greater numbers of people. Forests are cut at the rate of 11 million hectares per year, mostly in the tropics; and this cutting accelerates the loss of plant and animal species which might have offered humanity new crop species, medicines and industrial chemicals. Acid rain has already damaged 5-6 per cent of all European forest land, and its rate of destruction is accelerating. Carbon dioxide and other gases put into the atmosphere by human activities threaten to raise the global temperature, radically shift agricultural areas and inundate coastal towns and plains within the lifetimes of children in school today. Industrial gases also threaten to damage our planet's protective ozone shield, allowing in more ultra-violent rays which can cause cancer in humans and which threaten the life forms at the base of the marine food chain.

We have also largely failed in our ill-defined efforts to 'develop'. There has been progress, impressive progress in places. But any pride in such achievements is overwhelmed by the realization that there are more poor and hungry people in the world today than ever before in human history. The numbers ill-housed in slums and shanty towns are rising, not falling. More than two billion people still burn wood, dung and straw for most of their energy needs, and by the year 2000 the three billion people who will then rely on those resources will be short of fuel. Efforts linked to a special 'UN Decade' have brought safe water and adequate sanitation to many, but population growth is overwhelming these efforts, and increasing the numbers of those coping without these necessities and thus coping with the diseases which accompany their lack.

The two failures are one. Much of our effort to develop has squandered environmental resources; a ravaged environment provides an unstable platform from which to launch development.

In the 15 years following the 1972 UN Conference on the Human Environment in Stockholm, only a few countries managed to improve the quality of their environments and the ecological basis of their development. They are all rich, industrialized nations, and even in these nations the improvements have been spread unevenly. All industrialized nations still suffer the huge economic burdens of air and water pollution, overuse of groundwater, and old and new hazardous chemicals and hazardous wastes.

But over those 15 years the crucial environmental and development issues have shifted into the developing countries. Many of these have undergone rapid industrialization and rapid urbanisation, while continuing to cope with the environmental degradation associated with poverty, and their environmental resource bases have deteriorated quickly. The ecological capital with which many were blessed is vanishing at an accelerating rate. In parts of Africa, the sustaining links between people, economy and ecology have eroded to the point where environmental deterioration has become a major cause of economic decline and social and political unrest; it has become a major threat to national and regional security.

In many developing nations, the pollution of poverty is the principal source of environmental degradation, while such degradation is itself part of the poverty trap. Poverty-induced environmental destruction is growing in countries throughout Africa, Asia and Latin America, especially in the least developed rural areas,

where to escape the disaster of hunger today the poor must sow the seeds of tomorrow's disasters by over-drawing on forests, soil and water.

The downward spiral of poverty and pollution wastes opportunities as well as resources. Science and technology offer environmentally sound development paths; food production can be expanded by means reflecting ecological realities; and more resources can be recycled within our energy, industrial and transport systems, rather than being allowed to escape as pollution. Few of the problems are technical.

BOX:

The Commission has sought ways by which global development can be put on a sustainable path into the 21st Century. Some 5,000 days will elapse between the publication of its report and the first day of the 21st Century. What environmental crises lie in store over those 5,000 days?

During the 1970s, twice as many people suffered each year from 'natural' disasters as during the 1960s. The disasters most directly associated with environment/development mismanagement - droughts and floods - affected the most people and increased most in terms of numbers affected. There were 18.5 million drought victims annually in the 1960s, 24.4 million in the 1970s. There were 5.2 million flood victims yearly in the 1960s, 15.4 in the 1970s. Numbers of victims of cyclones and earthquakes also shot up as growing numbers of poor people built unsafe houses on dangerous ground.

The results are not in for the 1980s. But we have seen 30 million afflicted by drought in Africa alone and tens of millions affected by the better managed and thus less-publicized Indian drought. Floods have swept off the deforested Andes and Himalayas with increasing force. The 1980s seem destined to sweep this dire trend on into a crisis-filled 1990s.

The Global Transition

Pressure upon the planet's environment and upon the environmental resource base already threatens to overwhelm national and international institutions. But the world is passing through several growth spurts and primal changes which will intensify those pressures and much more sorely test those over-stretched institutions.

Our human world must make room for perhaps one more human world just as big in a finite environment. The present population of some five billion will stabilize at between 8 and 13 billion people sometime next century, according to UN projections. The populations of the poorer developing world will increase from 3.7 billion to at least 6.8 billion by the year 2025. Nearly 90 per cent of the developing world's population growth will be in its already bursting cities. (Yet 'over-population' is not a charge reserved for the developing world, as residents of developed countries consume perhaps four-fifths or more of the world's non-renewable resources of minerals and fossil fuels.)

Economic activity has already undergone a spectacular transition to a $15 trillion economy. Industrial production has grown has grown more than fiftyfold over the past century, but, more significantly, four-fifths of this growth has taken place since 1950. The world economy could grow five or ten-fold in the coming half century. These figures both reflect and presage profound impacts upon the biosphere, as the world, mainly the richer world, invests in houses, transport, farms and industries in

We are making the transition to higher risk technologies, including the introduction to the planet of new forms of life. Forestry, agriculture and industry are all undergoing equally radical transitions, with many of the most resource consumptive and polluting industries moving into the developing world.

A doubled population creating a perhaps ten-fold bigger economy based on new industries, agricultural policies and even life-forms: superimposing these transitions one atop another and compressing them in time onto our inelastic planet creates one vast 'Global Transition' far bigger than the sum of its parts. It is marked by a pace of change, a scale of impacts and degrees of uncertainty and irreversibility unknown to human experience.

This transition is global in that it is marked by an inescapably global inter-locking of ecology and economy. We have in the past been concerned about the impacts of economic development upon the environment. We are now forced to concern ourselves with the impacts of the state of our ecological resources - soils, water regimes, atmosphere, forests - upon our economic ambitions. We have in the recent past become accustomed to a sharp increase in economic interdependence among nations. We are now forced to accustom ourselves to an accelerating ecological interdependence among nations. Ecology is becoming ever more interwoven - locally, regionally and globally - into a seamless net of causes and effects.

Individuals and communities understand too well how impoverishing their resource base impoverishes themselves: a community which has run out of water has run out of economic potential. This grim cycle now

operates nationally and regionally. Dryland degradation may be changing the climate across broad reaches of Africa; it is certainly sending environmental refugees in their millions across national borders. Deforestation in Latin America and Asia is causing more, and more destructive, floods in downhill, downstream nations. Acid rain and nuclear fallout have reached across the borders of Europe to disrupt economic activity. Similar syndromes are emerging on the global scale, as forest loss in a few nations denies the entire world genetic material for improved crop varieties and future medicines, as 'greenhouse gases' threaten to disrupt the world's climate and nations' agricultural systems, and as internationally-traded hazardous chemicals enter foods which are themselves internationally traded.

This transition and the accompanying deepening and widening environmental crisis present a greater threat to national security - and even survival - than well-armed, ill-disposed neighbours and unfriendly alliances. Already in parts of Central and South America, Asia, the Middle East and Africa, environmental decline is a major source of economic decline, social crises and political unrest. The recent destruction of much of Africa's dryland agricultural production - with its associated famines and environmental refugees - was more severe than if an invading army had pursued a scorched-earth policy; yet most of the affected governments still spend far more to protect their people from invading armies than invading desert.

Globally, military expenditures total over $1 trillion a year and continue to grow. Our greatest development failure may be our development of potentially planet-destroying nuclear weapons systems in the name of security, as 'nuclear winter' studies suggest that the cold and dark following even a limited nuclear war would

destroy plant and animal ecosystems and leave any human survivors occupying a very different planet.

Yet governments and international agency do not assess the cost effectiveness, in terms of achieving security, of money spent on nuclear and other forms of military hardware compared to money spent on restoring a ravaged environment. Few if any foreign ministries and, to the Commission's knowledge, no defence ministries have evaluated environmental threats to peace and security and compared them with military threats. Such assessments are within neither the institutional mandates nor the personnel capacities of these institutions..

Sustainable Development

Most of our current development efforts are simply unsustainable. Most draw too heavily, too quickly, on already overdrawn environmental resource accounts to be affordable far into the future without bankrupting those accounts. They may show profits on the balance sheets of our generation, but they make such profits impossible for our children. We borrow environmental capital from future generations with no intention of repaying. They may damn us for our spendthrift ways, but they can never collect on our debt to them. We act as we do because we can get away with it: future generations do not vote; they have no political or financial power; they cannot challenge our decisions.

This is changing as the results of the present profligacy close in rapidly. Most of today's decision makers will be dead before the planet feels the heavier effects of acid rain, global warming or ozone depletion. Most of the young voters of today will still be alive. In the Commission's hearings it was the young, those who have the most to lose, who were the harshest critics of

The negative effects of unsustainable development have focused growing attention on the relatively new concept of 'sustainable development'. The concept is new only to our modern institutions; it has always informed the actions of those most closely reliant on natural resources, and it has allowed many indigenous peoples to live in relative plenty in the drylands and forest habitats which modern Man cannot seem to manage without destroying.

The concept of sustainable development can never be a blueprint by which to build development programmes, as definitions of sustainability will vary. Building a dam and reservoir which silts up after 50 years may be folly in one situation, sound practice in another. Instead the concept provides a rod by which to test our development efforts: development is both sound and sustainable if it serves the needs of the present without compromising the ability of future generations to meet their own needs.

While the realities of sustainable development will vary from situation to situation, its attainment has common requirements. It implies and is based upon the efficient protection and sound management of the environment and its resources. It requires that renewable resources such as forests and fisheries be used within the limits of their capacity to regenerate; thus it sets limits - limits in keeping with those set by the laws of nature. But it also requires the conservation and enhancement of the resource base to provide more resources for more people in the future. 'Conservation' thus becomes not a process whereby the environment is removed from development, but whereby it is most effectively used to fuel sustainable development.

Enhancing the resource base will require accurate accounting of the stock of environmental resources. For example, calculations of profits from forestry operations which do not take account of the loss of forest wealth or of the costs of regenerating the forest - whether or not the forest is actually regenerated - are not accurate bookkeeping operations and do not accurately represent the role of a given logging operation in national development. Calculations of a dam's production of electricity and irrigation production which leave out siltation of the reservoir, loss of upstream forests and downstream fisheries, disturbances in the livelihoods of local people and destruction of the local environment do not give an accurate view of that dam's place in development.

Sustainable development implies limits to resource use but not necessarily limits to economic growth; quite the opposite. In that poverty degrades the environment and impedes development, the attainment of sustainable development requires the elimination of the mass poverty which exists in many regions and the assurance of equitable opportunities for all. A necessary but not sufficient condition for meeting such needs is a rapid rise in per capita incomes in developing countries. This will require the revival of economic growth, a reversal of the stagnant and declining growth trends of the 1980s. This is possible, without savaging the environment; industry has shown its ability to produce more using less energy and smaller inputs of raw materials. Political decisions can encourage and accelerate these trends.

If the benefits of growth are equitably distributed - which they are not now, anywhere on earth - then the minimum growth rate in per capita incomes needed to eliminate a high percentage of absolute poverty is about

3 per cent. Given current population growth rates, achieving this target would require overall national income growth rates of around 5 per cent in the developing economies of Asia, 5.5 per cent in Latin America and 6 per cent in Africa and West Asia. Such rates seem possible for South and East Asia. In Latin America, success will depend on a resolution of the debt crisis. In Africa, where for two-thirds of the nations per capita income declined during the 1980s, success will be more difficult and require more outside help. A recent report from the UN Committee for Development Planning estimated that if developing countries are to grow at around 5-5.5 per cent over the next decade, a doubling of the official and private aid and lending increases expected in 1986 will be needed. If this additional capital is not forthcoming, the chances are that economic growth will not be revived, particularly in Africa and Latin America.

Economic growth is necessary for but does not guarantee sustainable development. The concept of development must be widened to take in the goal of improving the distribution of income. Rapid growth coupled with increasingly skewed and inequitable income distribution may be less sustainable than slower growth and more equitable distribution. For example, commercial agriculture may produce wealth but impoverish a large number of small farmers by pushing them onto marginal land. Slower wealth creation through raising the incomes of the small farmers may be more sustainable.

The goal of meeting basic human needswill remain a key imperative informing all attempts to move toward sustainable development. Just as economic growth does not assure the elimination of absolute poverty, neither does the availability of goods and services assure that the essential needs of a majority of people are being

and energy, housing, safe water, sanitation and health. Often left off the basic needs lists is employment. Between 1985 and 2000, the labour force in the developing world will increase by nearly 900 million; 60 million more people will need new livelihoods every year. But new jobs and opportunities must be provided in ways which recognise resource constraints.

Given such numbers - as well as the millions hungry, homeless, landless and unhealthy - poor nations cannot approach sustainable development by manipulating their own national policies. A more just and sustainable international economy is needed, one based on a set of policies by which rich, industrialized nations do not compete destructively with poorer, agricultural nations, but instead work together for the development of both. These policies will, almost by definition, be more sensitive to environmental realities.

Given such requirements as equity, meeting basic needs, conserving and enhancing the resource base, it becomes obvious that sustainable development must be based on the ambitions and activities of many people. It will never be decreed by governments. Thus the road to sustainable development must wind through democratic political systems and be paved with popular participation of a sort which allows people an effective part in the decision-making processes. This will allow development to benefit from diversity - the mainstay of both ecological systems and of sustainable development. Within these democratic systems, the decision-making powers of women must expand to reflect the huge burdens and reponsibilites they already bear in agriculture, in urban development and in keeping population growth in tune with available resources. Sustainable development will not only include cultural and social development, it will be founded upon the cultures and societies of those

The Growing Gap

The issues raised by the Global Transition reveal growing gaps both between the ideal of sustainable development and the realities of present development, and between the competence of national and international institutions and the realities of the changes with which they must cope.

Our capacity to change the biosphere is increasing at unprecedented rates, while our institutions' abilities to manage those changes are at a comparative standstill. The general response to the speed and scale of the transition has been one of fear and of retrenchment around old institutional forms. The challenges facing us are interdependent and integrated, requiring comprehensive approaches and popular participation. The institutions facing those challenges tend to be independent, fragmented, working to narrow mandates in secrecy and with closed decision processes.

Part of the retrenchment has shown itself in a dangerous paradox: the rising need for effective international organizations has been matched recently by a steady erosion of support for such organizations. We must return to multilateralism. Achieving sustainable growth during the transition will require an unprecedented common effort to reorient many policies that underlie development. Yet instead of pulling together, the key nations appear to be competing in a tug-of-war in all critical policy areas: trade, agricultural subsidies, energy, aid and industrial protection. Their disputes usually concern how to maintain national advantage in the very agricultural,

energy and trade policies which already hamper development globally, rather than how to devise new policies that would speed development along a sustainable course.

Funds for most intergovernmental organizations have declined, both in relative and absolute terms, as critics of such organizations accuse them both of proposing to do too much and of doing too little. The distrust in and lack of funding for the multilateral bodies have resulted in lost opportunities and have hamstrung efforts to develop international energy, trade and development agreements and to respond effectively to such crises as the African famines.

Recently spokesmen for developed governments have been vociferously maintaining that there is no need for new agencies, especially for new international agencies. This reflects a bias on the part of the developed world, for it is indeed blessed with international agencies in most fields, from the multi-faceted regional agencies to treaties bringing together perhaps only two states to manage a shared river. But the developing nations suffer a dearth of international agencies, whether to manage shared rivers or to confront shared problems such as desertification, deforestation and the emerging threat of acid rain.

II. THE NEW MANDATE

Given the gap between the ideal of sustainable development and our present, largely environmentally destructive forms of development, it is clear that our decision-making institutions require new mandates. But we first require broader concepts of 'environmental policies', 'environmental agencies' and 'environmental budgets'.

The first generation of environmental action and concern began in the late 1960s as a response to the effects of 20 years of unrestricted growth following the Second World War. The perceived need, not unreasonably, was to clean up the mess. Environment agencies, ministries or departments were tacked on to existing government bureaucracies to do that job. As little was known about the true nature of the 'mess', these agencies were given largely scientific staff and asked to study and recommend. This pattern was copied in the developing world, where today there are over 100 environmental agencies. The studies of such agencies have been valuable and many of their recommendations have led in places to improvements in air and water quality, to a regeneration of urban environments and to an increase in the areas of parks and natural reserves.

But most such agencies remain today small and weak in terms of staff, budgets and political clout. Their budgets are the first to be cut in times of economic belt-tightening. Most have evolved within a very narrow concept of environmental policy. Their role remains separate and distinct from development. They deal with symptoms, not causes.

Thus they have little or no role in the formulation or assessment of economic, trade, energy, agriculture or industrial policies. Yet these are the real 'environmental policies'. The agencies which conceive and implement these policies are the real environmental agencies, and their budgets are the real environmental budgets. It is these agencies which most influence the form, character and distribution of the impacts of economic activity on the environmental resource base. It

is they, their policies and budgets which determine whether the environmental resource base is enhanced or destroyed and whether the planet will be able to support human and economic growth and change beyond the year 2000.

In most developing and in some developed nations, effective decision-making power tends to be concentrated at the top of central agencies such as the Finance Ministry, National Planning Commission, Bureau of the Budget and Department of Trade, followed by the 'sectoral agencies' such as the Ministries or Departments of Energy, Agriculture, Transport and Industry. These agencies have responsibilities for economic and social policies and for the deployment of economic incentives and national resources.

Yet these agencies normally have no responsibilities to consider the impacts of their policies on the national environmental capital and resources. Decision makers in these agencies normally have other priorities; knowledge of such impacts is not normally a part of their job qualifications or specifications. Those who do know are in a separate ministry, the environment ministry, the minister of which usually learns of new initiatives in trade, energy or agriculture or of new tax measures which will have deep impacts on the environment long after the policy has been framed. In some nations a growing number of projects undergo after-the-decision 'environmental impact assessments', but few governments subject their policies to prior environmental impact assessments. When governments or their citizens turn to environmental agencies to protect the environment, they are pulling on levers unconnected to the policies that must be changed to limit future damage.

The Symptoms Mandate

The strange decision to put environmental concerns into agencies which by their very natures and mandates can have little influence on the real environmental policies has meant that for the past two decades the environmental agenda has been symptoms oriented.

The standard or **Symptoms Mandate** of the 'environmental' and conservation agencies - and thus of almost all organizations, public and private, concerned with the environment - has focused on the symptoms of mismanaged development: damage to health, property, resources, wildlife and wild lands. It tends to examine these symptoms as if they were the real issues, when the real issues are the sources of the symptoms: the development polices which generate them. Moreover, it tends to examine the symptoms as separate and isolated issues, rather than grouping them around common sources found in development policies and practices. It is rather like treating the fever, headache and sore muscles associated with influenza not only as diseases in themselves, but as three completely separate and unrelated diseases.

Thus the Symptoms Mandate of environmental agencies and organizations forces us to focus on ways to cure the negative effects and repair the damage. It has produced a long list of after-the-fact 'environmental' activities: reforestation, reclaiming desert land, rebuilding the urban environment, restoring natural habitats and rehabilitating wild lands..

The Sources Mandate

The world must move quickly towards a new mandate reflecting a broader concept of environmental agencies, a mandate addressing the sources of environmental and economic decline.

Today most central and sectoral ministries and private bodies operate under a mandate to secure short-term gains. They tend to be less concerned with quality of development than with quantity of development. This must change. The agencies must be made responsible for ensuring that their policies, programmes and budgets all support activities which are economically and ecologically sustainable both in the short term over which political and financial considerations all too often operate and the longer term over which planetary considerations operate. They must be given a new mandate to deal with the sources of environmental degradation and economic decline associated with their policies.

The challenge then is to institutionalise a **Sources Mandate** in the central economic and planning agencies and in the sectoral agencies. These agencies - and through laws, incentives and education the industries, companies and even private citizens - would thus be encouraged to focus their attention on the quality of development: its sustainability, its ability to maximize benefits for those alive today and those yet to be born.

By focusing on the quality of development, the Sources Mandate would move away from the react-and-cure approach of the Symptoms Mandate toward an **anticipate-and-prevent** approach. Many today see environmental degradation as a side-effect of

development; the Sources Mandate could help to make environmental quality a side-effect of sustainable development.

However, the Symptoms Mandate, which has the benefit of having already found a place in our institutions, remains an absolute necessity, as do the ministries and environmental agencies who base their work upon it. They must be strengthened in terms of staff, budgets and access to the decision-making processes. First, the speed and scale of the Global Transition will cause much new environmental destruction before anticipate-and-prevent mandates can be built into our institutions. Second, there are and will remain for some time to come myriad symptoms which need cures. Third, these institutions possess the environmental data and knowledge to guide the change from Symptoms Mandate to Sources Mandate in governments and international organizations.

But the Sources Mandate must begin to take precedence. The Symptoms Mandate's react-and-cure approach is not only less efficient and far more expensive in terms both of cash and resources, it has the effect of delaying reaction and thus delaying cure, perhaps until too late. The Symptoms Mandate produces acrimonious and sterile disputes about these symptoms and about whether enough research data and information areavailable to justify any reaction other than more research. Those nations who feel least affected by a phenomenon often demand the highest degrees of certainty before agreeing on reaction.

But the tremendous speed of the Global Transition will not allow this leisurely approach. In areas such as acid precipitation, greenhouse climate change and ozone depletion, certainty as to degrees of damage may come

only after damage is so extensive that cure is either technically or economically impossible. By definition, preventive responses require action in anticipation and hence agreement to act on lower degrees of certainty.

The other great drawback to the Symptoms Mandate's 'destroy first, repair later' approach is that developing nations simply cannot afford it. The massive ongoing and in some cases accelerating destruction of some nations' environmental resource bases makes development virtually impossible and renders their governments unable ever to afford repair.

III. THE CHALLENGES OF THE NEW MANDATE

The abilities both to anticipate-and-prevent and to choose policy paths that are sustainable will require that the ecological dimensions of policy be considered at the same time as the economic, trade, energy, agricultural and other dimensions. They must be considered on the same agendas and in the same national and international institutions. Those making such policy decisions must be responsible for the impact of those decisions upon the sustainability of development and thus upon the environment.

Every national, multilateral and private body whose work influences the nature of development must be made responsible for ensuring that the development it fosters is sustainable, both economically and ecologically. This is the chief institutional challenge of the 1990s and the most important overriding recommendation of this Commission.

Meeting it will require enormous efforts of national leadership and of international co-operation. It will require new political and economic priorities, new ways of costing development, and fresh analyses of the relationships between sustainable development and environmental resources. Most difficult of all, it will require a shift in the entrenched positions and mind sets of venerable and powerful institutions.

Enormous though the challenge is, economic goals must be institutionally meshed with ecological realities - and very quickly in terms of the traditional speeds of the change of human institutions. If economy and ecology remain in competition, opportunities to achieve more sustainable development will be lost. The syndromes of ecological and economic collapse, development crises and human disasters will continue to accelerate and spread.

A closer look at the major international environment/development issues of energy and of agriculture and trade demonstrates the difficulties which the Symptoms Mandate offers the institutions which serve it and the challenges of implementing the Sources Mandate.

Energy

Energy use is intimately linked to population growth, to environmental resources and to all aspects of development: industry, transport, agriculture , trade, etc. It gives us great scope for anticipating, planning, guiding and preventing. Its use is associated with several 'environmental' issues: 'old-fashioned' urban air pollution, acid precipitation and the build-up of carbon dioxide (CO_2) in the atmosphere.

Urban air pollution was one of the first environmental effects to be tackled by the environmental agencies of developed nations. Some of the pollutants involved - sulphur dioxide, nitrogen oxides and ozone - are also associated with acid rain, and they were removed from the air of some cities by the building of higher smoke stacks to send them further away, perhaps the best environmental example of the symptoms as opposed to the sources approach. Other pollutants include carbon monoxide, various volatile organic compounds, and fly ash and other suspended particles. Sulphur dioxide concentrations and particle pollution exceed World Health Organization guidelines in many major cities in the developing world. The few studies available indicate that in most of the world such exposure is worsening. These pollutants may damage living tissue and cause and complicate respiratory complaints. They also corrode buildings and vehicles and cause billions of dollars of damage annually. Yet only a few developed nations have studied and acted upon the social and economic costs of this pollution.

There is growing concern among scientists studying acid rain that the cause of forest death lies more in acidified soil than in acidified air or water. Thus Europe may have passed a trip-over point and be in the midst of a vast, irreversible, regional acidification of the soil, of which tree damage is only one symptom. The forests are acting as environmental litmus paper, giving notice of irreversible acidification, the cure of which is beyond economic reach. And the widespread loss of forests would be trivial compared to the erosion, landslides, siltation, local climate change and flooding of farms and towns caused by their loss. Evidence is emerging of acid damage spreading to newly industrialized nations, but little is known about the abilities of fragile tropical soils to 'buffer' the effects of acid.

CO_2, much of it released by the burning of fossil fuels, threatens to warm the earth by containing solar radiation near the earth's surface - the 'greenhouse effect'. Before the Industrial Revolution, there were 280 parts of CO_2 in the atmosphere per million parts of air (by volume). By 1980 this concentration had risen to 340, and it is expected to double to 560 -compared to pre-industrial levels - between the middle and end of the next century. But, as other gases are involved in the 'greenhouse effect', the equivalent of a doubling could be reached as early as 2030. A 1985 meeting of experts from 29 nations concluded that climate change must be considered a 'plausible and serious possibility'. The doubling could increase globally averaged surface temperature by 1.5°C to 4.5°C, with greater warming nearer the Poles. Such increases, 'greater than any in Man's history', could cause droughts in the grain belts of the Northern hemisphere and disrupt the world's agricultural production and trade systems. They could also play havoc with current irrigation schemes, dams, energy planning and coastal engineering projects, as the meeting also concluded that the expected warming 'would lead the sea level to rise from 25 - 140 cm'. A rise in the upper part of this range would inundate low-lying coastal cities and many crowded, agriculturally rich floodplains.

Urban pollution, acid rain and CO_2 - three urgent threats to human plans, property and life itself, and all are associated with the burning of fossil fuels. Yet we in our institutions treat them as three separate problems. We derive three separate strategies to deal with them. These strategies are managed by separate agencies, inevitably add-on agencies. For example, most national governments deal with acid rain through environment ministries, while most study CO_2 build-up in

ministries or agencies which have responsibility for weather. Internationally, the secretariat for the transboundary air pollution treaty meant to limit acid precipitation in Europe is housed in the environmental section of the Economic Commission for Europe (ECE), while the World Meteorological Organization (WMO) is the lead agency for CO_2. Neither the ECE nor the WMO have been charged with guiding the energy policies of nations.

The challenge is to include responsibility for these three survival threats in the mandates of the source agencies: the ministries of energy, industry, trade and economic planning. These source agencies would then be required to come up with management strategies to deal with the three threats - strategies which would be mutually reinforcing because all the threats stem from the same source.

The key to any such strategies would be the more efficient use of energy. This so-called 'low energy path' would cut urban pollution, reduce acid precipitation and buy time before atmospheric CO_2 reaches levels at which it begins to increase temperatures sharply. Rising oil prices had forced energy efficiencies upon us and demonstrated what was possible; recent oil price cuts threaten those gains. If past increases in energy efficiency of almost 2 per cent per year could be sustained over the next 30 years, there is evidence that we could, without any reduction in growth, halve the output of carbon dioxide globally.

There are many cases where energy consumption per unit of output from 'best practice' technologies is less than half that of typically available equipment; this is true of equipment for lighting, refrigeration, space cooling, cooking, cultivation, irrigation, industrial processes and transport. The incentives to use such

technologies and to take other steps towards a low-energy future will come not from environmental agencies, but from those central and source agencies able to put into effect legal measures, subsidies, tax credits and loans to encourage efficiency.

Similar measures are needed to cope with the **wood fuel crisis.** Half the world's population relies on wood for energy, mainly for cooking. These numbers are growing, not shrinking: as populations grow, tens of millions more people come to rely on this energy source every year. In 1980, some 1.3 billion wood fuel users lived in areas of the developing world where they could only satisfy their needs by **over-cutting** - that is, by cutting faster than wood could regrow and thus by turning a renewable resource into a non-renewable resource. Some 110 million lived in areas where they could not get enough wood even by over-cutting, according to a UN study. By the year 2000, about three billion people will be in one of those two binds, according to the same study.

Obviously a partial solution to the crisis is to **plant more trees.** Organizations from the smallest non-governmental organizations to the largest multilateral agencies have been getting involved in tree-planting projects; governments have been working to include in the mandates of the their forestry departments a concern for the production of wood fuel as well as of industrial timber. Despite such efforts, more people have less fuel to cook with every day. Neither governments nor institutions can plant the necessary trees; the people who need the trees must do that, and they need motivation, encouragement and education.

Governments will have to put wood fuels in the centre of their economic and energy planning. In the cities, where users buy their wood and charcoal, they have a motive to save fuel. Inexpensive, improved stoves can save 30-50 per cent on fuel consumption. But credits and even outright grants may be necessary to induce people to try them. Energy plantations of fast-growing trees producing charcoal in high efficiency kilns or producing more practical wood fuels through the chipping or briquetting of wood may be profitable, but they also may need fiscal and tax incentives in their initial stages.

The supply of affordable gas, kerosene and electricity in many wood deficit areas may be only a distant prospect. But decisions taken today will bring that prospect nearer. Cooking in an earthern pot over an open fire uses perhaps eight times more fuel than cooking the same meal over a gas stove in aluminium pots. Governments have yet to compare the cost of that gas to the real costs of wood fuel use. Wood fuel use directly affects agricultural productivity in that over-cutting can destroy watersheds, increase erosion and decrease the productivity of farmers as they travel further and work harder to meet their fuel needs. The wood fuel crisis needs the attention of governments in proportion to the number of people in a given nation affected. In some nations, this approach would make it a top government priority.

The increased use of nuclear energy could also decrease the burning of fossil fuels, but...

Agricultural Production and Trade

Grain production has been increasing faster than population growth; yet every year there are greater numbers of hungry people on earth. Today almost 20 per cent of the world population is hungry and malnourished. Our policies governing agricultural production and the trade in such produce - the policies which produce these statistics - are obviously unsustainable.

They are unsustainable not only because they do not feed enough people, but also because of the widespread environmental destruction with which they are associated. Almost 30 per cent of the earth, land in 100 nations, suffers some form of **desertification**: the process whereby productive dryland becomes worthless because people over-cultivate it, deforest it, allow their animals to over-graze it or irrigate it badly. Agricultural production lost due to desertification was costing $26 billion per year in the early 1980s, but rates of desertification have since accelerated.

The loss of **tropical forests**, which cover only 6 per cent of the earth's surface but contain at least 50 per cent of its plant and animal species, is spurred more by the desire for the potential farmland under the trees than for the timber in the trees. These forests cover nine million sq km, and are being destroyed at the rate of 76,000 to 100,000 sq km per year, with another 100,000 sq km and the species therein being disrupted each year.

In developed nations and increasingly in the developing world, **pesticides and fertilisers** are over-used and pollute rivers, seas, groundwater and food products which are traded nationally and internationally. These chemicals disrupt ecosystems and kill birds, fish and predatory insects. They also kill

people; a 1983 study estimated that pesticides kill 10,000 people each year in developing nations and injure 400,000 more.

These three 'environmental issues' have become the concern of many agencies and non-governmental organizations, few of which have any thing to do with agricultural and trade policies. For example, the UN Environment Programme organized a much-praised Conference on Desertification in 1977 which agreed a plan of action. Reviewing progress in 1984, it found that desertification was accelerating around the world, and almost every aspect of the plan of action had been ignored by almost every nation which agreed to it.

It is not the 'environmental' policies which pollute and destroy. The incentive-driven surpluses in the developed world play their part in threatening sustainable agriculture both there and in the developing nations. Incentive policies meant to secure social, economic and even environmental benefits have lost their way and are encouraging the farming of fragile lands, the clearing of wild lands, the overuse of pesticides and fertilisers and the misuse and wasting of both underground and surface waters. The result has been lowered agricultural productivity per unit area in many areas. A Canadian Senate committee, which described the national agricultural system as clearly not sustainable, reported that 'soil degradation is costing Canadian farmers $1 billion per year in lost farm income'. Similar reports have been received from Europe and the United States.

The other result has been expensive unwanted surpluses, much of these shipped to the developing world free or at subsidised prices. (Only about 10 per cent of the world's food aid goes to relieve crises.) These

shipments discourage recipient governments from developing their own agriculture; they offer unfair competition to local farmers, making it impossible for them to earn the money to farm sustainably, to conserve soil, water and tree cover.

Developed countries' agricultural subsidies, quotas, trade barriers and substitution of raw materials, along with rising production in the developing nations, all help to keep developing countries from earning a reasonable return on the commodities for which they depend for much of their income. Commodity prices in 1985 were 30 per cent below the 1980 average. The low prices and the need to service large debts encourage the growing of more commodities, the export of more timber. Marginal lands come under commodities; marginal subsistence farmers are pushed onto ever more marginal lands. Developing nations thus subsidise their sales of commodities to the developed nations through paying themselves the high costs of the destruction of their environmental resources.

There are many methods, none of them 'environmental' in nature, by which these agriculture- and trade-linked forms of degradation can be decreased and food production increased. All of them centre around a shift in the focus of food production to developing countries where more is needed, thus easing pressure on agricultural resources in developed nations and enabling these to move toward more sustainable agricultural policies:

* changing developed nations' agricultural incentive systems so that incentives both eliminate costly surpluses and encourage sustainable farming practices;

* providing aid to developing countries in ways which will allow them to give their own farmers incentives to produce more, more sustainably and to take a more considered, less desperate approach in planning commodities production policies;

* eliminating or decreasing trade barriers;

* widening trade options available to developing country commodity exporters.

Such policies can be put in place only by legislative bodies and ministries of agriculture, trade, foreign affairs, planning and finance and by agencies for international development. They would have the effects of focussing agricultural policy attention as much on people as on technology, as much on resources as on production, and as much on the future as on the present. The environmental protection resulting from such policies will be a 'side effect' of those policies, once environmental concerns are built firmly into the agricultural, economic and trade agendas of national and international bodies.

IV. FROM COMMON CONCERNS TO COMMON ACTIONS: Institutions under the New Mandate

(to be written)