UNITED NATIONS ENVIRONMENT PROGRAMME

ENVIRONMENT ASSESSMENT PROGRAMME

MEETING REPORTS

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First International Expert Meeting on the Global Environment Outlook Process

27 February - 2 March, 1995, Cali, Colombia

UNEP

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1. INTRODUCTION

1.1 The Environment Assessment Programme of UNEP

In response to UNCED and Agenda 21, the Environment Assessment Programme (EAP) of the United Nations Environment Programme (UNEP) has been revised and expanded to include socio-economic considerations in environmental assessments, and to address better the needs of international environmental policy setting and the identification of emerging issues that require international attention. Accordingly, the EAP programme will produce both traditional State of the Environment (SOE) reports (status and trends) and publications directed to international policy setting fora, such as the UNEP Governing Council and the Commission on Sustainable Development (CSD).

The overall objectives of EAP are to keep under review the state of the environment, to enhance understanding of the critical linkages between environment and human activities, to identify priorities for international action, to flag emerging issues, and to strengthen national, regional and global information handling capacities for sustainable development.

To meet these objectives, the Environment Assessment Programme is now restructured around a set of interrelated and mutually supportive activities including (a) sectoral assessments such as those dealing with freshwater, urban areas etc; (b) regional reports, such as the Sustainability report for the Latin American region, the Asian-Pacific State of the Environment reports and national SOE reports; (c) indicator reports; and (d) global reports. All these reports and assessments will feed into the 2002 State of the Environment report, the major mandated report of UNEP.

To achieve these objectives and results, the four divisions that traditionally made up the EAP programme, GEMS, GRID, SOE unit and UN system-wide Earthwatch, have been integrated into a coherent and mutually supportive programme. Information derived through the Environment and Natural Resources Information Networks and the GRID centres can now be channelled to the EAP assessments. Similarly, the assessment process can now draw upon established regional mechanisms to ensure both relevant regional inputs and the distribution of assessment findings to relevant regional bodies.

Within these overall objectives, the GEO process specifically aims, at both international and regional levels, to (i) provide insight into the interactions between environment and development; (ii) assess progress towards the achievement of sustainable development; (iii) identify strategic and emerging issues that require attention; and (iv) support policy setting and implementation.

1.2 The first International Expert Meeting on the GEO Process

Since late 1994, the Global Environment Outlook (GEO) project of the EAP has both evolved and focussed itself through four major activities. First, the development of a conceptual framework for integrated environment-development assessment and reporting; second, the development of proposals for the content and structure for the GEO reports; third, the identification of many potential contributors to the GEO process and the further growth of an international network of collaborating centres; and fourth, the creation of working linkages with other global and regional assessment programmes, and with research programmes into scenario building, policy analysis and forecasting.

An international expert meeting on the GEO process was therefore called to review recent progress with GEO and advise on future activities and timetables. The specific objectives of the meeting were to discuss:-

(i) the Objectives, Users and Guiding Principles for the GEO report;
(ii) the Structure of the GEO Report;

(iii) the General Approaches to Analytical Procedures; and
(iv) the Implementation of the GEO Reporting Process

A framework document for the GEO process (Annex 1) was provided to participants before the meeting to guide their discussions.

1.3 The Meeting

The first International Expert Meeting on the GEO Process took place at CIAT, Cali, Columbia - a collaborating centre for the UNEP-EAP and for GEO - from February 27th to March 2nd 1995 (Annex 2). The following topics were discussed:

Day 1: Introduction to the UNEP Environment Assessment Programme and GEO
Day 2: The Structure of the GEO Report
Day 3: General Approaches to Analytical Procedures
Day 4: The Implementation of the GEO Process

The meeting was attended by 12 experts (Annex 3) from Australia (1), England (1), Jordan (1), the Netherlands (3), the People's Republic of China (1), Russia (1), Senegal (1), Tanzania (1) and the United States of America (2); by two experts from CIAT; and by three representatives from the UNEP-EAP. Other invited experts and institutions who were unable to participate (Annex 4) nonetheless expressed strong support for the GEO process and expressed their willingness to participate in the project at a later date.

2. THE OBJECTIVES AND GUIDING PRINCIPLES FOR GEO

2.1 The Aims and Objectives of GEO

After presenting an account of the Environment Assessment Programme of UNEP (Sections 1.1 - 1.4 of the Framework Document, Annex 1) discussion turned to Section 1.5, the overall objectives of GEO. Discussions centered on:-

The Users of GEO, and of Other UNEP EAP Reports

GEO will be a companion volume to three other major environment-development reports, namely the IBRD World Development Report, the UNDP Human Development Report, and the UNEP/UNDP/WRI World Resources Report. The comparative advantage and added value from UNEP is to enter the environment-development debate through the environment window - the UNEP window of opportunity.

The **major** impact of GEO should be on international and regional policy development so the primary users of the GEO reports will be the international fora (such as the CSD), the international agencies (IBRD, Regional Development Banks and Agencies, UN agencies) and international policy makers and institutions. However, UNEP itself "reports" to its governing council of (mainly) environment ministers who set the international environment agenda. It is the aim that they respond positively to the GEO reports, though it was recognised that only in co-operation with other ministries they can exert the leverage to directly influence change. The GEO reports should also be of use to the NGO community.

Regional Participation in the GEO Process, and Capacity Building

Participants strongly endorsed the concept of strong regional participation in the GEO process and the GEO reports. Regions have very different priorities and perspectives on the environment, especially with respect to resource use and conservation, and these views can be expressed only through full participation. The regional collaborating centres will also be a source of regional and national datasets.

Operationally, it is the regional collaborating centres which must implement the GEO process and participate fully in the transfer and exchange of integrated assessment methodologies. GEO will thus enhance regional capacities in policy analysis, definition and implementation, thereby enabling more informed decision making at a regional level and the more equitable participation of the regions in international negotiations and fora.

Issues of Sustainability

Participants felt that GEO should address sustainable development from the comparative advantage of UNEP, namely from the environment perspective. Participants recognised clearly that development - as opposed to unconstrained growth - generally means the modernisation of agriculture and the extractive industries, further industrialisation, the adoption of new technologies, and marked changes in livelihood patterns and in patterns of consumption. UNEP must therefore include the social and economic dimensions (basic human needs, equity, poverty, quality of life) in their analysis of sustainable development, since (i) they strongly affect environmental sustainability, and (ii) they are at the core of the concept of development.

Participants also discussed the distinction between sustainable management, namely the shorter term, practical adaptations and responses to contemporary socio-economic and policy environments, and the longer term processes associated with achieving sustainable development. Iterative processes are needed to identify and analyse the critical indicators of sustainable development - and the risks to it - over the longer term.

In response to these comments and discussions among participants, the overall objectives of GEO (Section 1.5) were rephrased as follows.

BOX 1: Revised Specific Objectives for GEO

Within the overall mandate of the UNEP Environment Assessment Programme, namely to keep under review the state of the environment, enhance understanding of the critical linkages between environment and human activities, identify priorities for international action, flag emerging issues and strengthen national, regional and global information handling capabilities for sustainable development, the **Specific Objectives** of the GEO report series are **at international and regional levels** to:-

- o provide insight into the interaction between environment and socio-economic and institutional factors [*using new methods and tools for the analysis of these interactions*];
- o assess, through iterative processes, progress made towards the achievement of sustainable development;
- o identify strategic and emerging issues that require attention [*by, among others, projections, forecasts and scenarios*];
- o support the full policy cycle of analysis, setting, implementation and enforcement on priority issues; and
- o strengthen capacities of Collaborating Centres and relevant national and regional institutes for integrated assessments, for informed decision making, for policy analysis, implementation and enforcement, and for the more equitable participation in international negotiations and fora.

2.2 Guiding Principles for GEO

The Guiding Principles for GEO (Annex 1, Section 2) were introduced and illustrated through two worked examples of major environmental concerns, fresh water and biodiversity (Annex 5). Both presentations illustrated mainly the principles 2.1 - 2.4 by emphasising the GEO approach to global and regional perspectives and priorities. Following the presentations, discussion centered around the reinterpretation of the guiding principles (Box 2) and their implication for the GEO process.

BOX 2: Revised Guiding Principles for the GEO Report

The GEO report series will:-

1 - report at both regional and global scales;

2 - emphasise regional priorities, and regional perspectives to global themes;

3 - synthesise, where appropriate, global assessments from these regional priorities and perspectives, [*taking into account the different dimensions sustainability has in different regions*];

4 - address [*from an environmental perspective]* social, environmental and economic themes, their interlinkages and interactions, and their cross sectoral linkages, [*including the social and economic impacts of environmental changes*];

5 - be forward looking and pro-active in evaluating policy options [*by exploring at both regional and global scales the future implications of contrasting possibilities for social and economic development paths*];

6 - achieve relevance for international policy setting by:-
-promoting international consensus on priority issues, [through providing a global forum for integrated assessment production]
- identifying 'cost-effective' and environmentally sound measures for action, and
- [*identifying the effective points in the policy cycle for interventions*];

7 - employ a range of qualitative and quantitative approaches to:-
- address individual themes and issues, [*concentrating on interlinkages and overviews*]
- identify information and knowledge gaps, and
- address the issues of uncertainty and irreversibility;

8 - maintain continuity throughout the report series to accumulate knowledge and depth of perception.

Comments on the Regional - Global Approach of GEO (Box 2: Sections 1, 2 and 3)

While participants gave a strong and broad endorsement to the concept of a region-to-global assessment (where appropriate) rather than to a top-down approach, they identified specific areas for further consideration and discussion.

1. While the regional approach is fine in principle, specific regional problems, issues or themes may need specific regional groupings to illustrate them most effectively (see discussion in Section 3.6).

2. Scale of effects are important. For example, the effects of people *on* water cycles occur at both global scales (climate change) and at local scales (polluted rivers). Often it will simply not be possible to extrapolate global effects to local scales, or to aggregate local effects to global scales (see discussion in Section 3.2).

3. It is essential to ensure that regional inputs can be harmonised and integrated within a global report. Lessons can be learned here from the experience of the 2050 project which, like GEO, had ambitious objectives and goals. The individual institutions involved in 2050 pursued their own agendas rather than common goals, so while regional studies *were* produced they could not be synthesised. GEO faces a significant management task here to ensure compatibility within the different study sectors (see discussions in Sections 3.1 and 5).

Comments on Themes, Issues and Scenarios (Box 2: Sections 4, 5 and 7)

Participants felt that GEO must clearly address individual *themes* in a multi-dimensional way, and must include environmental, economic and policy dimensions in all analyses and projections. Critical *issues* would form the interlinkages between themes, and between themes and the policy environment. Participants recognised that scenarios must be an integral part of the GEO process; to guide policy initiatives, to explore alternative development paths, and to assess the policy implications of environmental change.

Comments on Cost Effectiveness (Box 2: Section 6)

The implication of identifying "the most cost-effective" measures (Section 2.5 of the Framework Document - Annex 1) is that economic analyses will need to be made of potential policy initiatives - which is certainly beyond the capabilities of GEO. Participants also felt that cost effectiveness may not necessarily be the most important issue, and in some cases it does not even enter into the discussions at all (eg, wetlands *need* water - there is nothing "cost-effective" about it). Furthermore, there is probably no single "most cost-effective solution" for all cases and situations. Problems are different in different regions, and so are costs: what is cost-effective in one region may not be in another. It is the *criteria* for selecting cost-effectiveness which is of more importance.

2.3 Some Conditions Necessary to Achieve Policy Change

Some of the processes and conditions necessary to convince a policy maker to alter established policies were discussed, specifically with a view to understanding how GEO can assist and enable the process. The links between any specific change in the environment and people's perceptions of a change to their personal wellbeing are not clear cut, neither are the links to eventual political action. The final decisions to change policy are as much political as environmental, and GEO may effectively influence this process by focussing on strategies for development and change (e.g via the use of scenarios).

Change seems to require four conditions:-

. **dissatisfaction:**	- provides the motivation for change
. **a vision of a better way:**	- that change will make things better not worse
. **a viable pathway:**	- without which change will not occur
. **commitment from the main actors:**	- be they individuals, corporations, agencies, governments or international institutions

Change may be achieved - independently or in combination - by regulation (law or treaty requires change through force of law); by economic instruments (which provide economic incentives for change); or by "education" (which alters attitudes and motivations). Of these, the third (education) is possibly the most important, because (a) neither economic incentives nor legislation will change behaviour if there is no social support for change; (b) economic incentives and legislation may be reinforced through social support and (c) social attitudes often initiate regulatory or economic measures.

3. THE STRUCTURE OF THE GEO REPORT

3.1 The Concept of Themes and Issues

The initial concept for the GEO Report, as set out in Section 3 of the Framework Document (Annex 1), was to structure the report around regions, themes, and critical issues. The **regions** would provide the different perspectives from which the global assessments could be synthesised; the **themes** would echo the concerns of the regions, Agenda 21, and the Conventions; while the **critical issues** would form the interlinkages between themes and the links to the policy environment. Uniformity would be maintained by selecting a consistent set of themes and issues.

These basic concepts were explored in a delphic process focussed on the 1990/91 South American Model "Our Own Agenda". From a Latin American (regional) viewpoint, this model had identified and prioritised (a) regional themes (land use, environment and human settlement, water resources, ecosystems and ecological patrimony, forest resources, coastal zones, energy, mining, renewable resources, industry); (b) international themes (shared river basins and ecosystems, acid rain, destruction of toxic residues, covert wars, ecological security); and (c) global themes (nuclear risk, global warming, drugs, biodiversity, ozone, use of arctic resources, use of outer space).

Through a critical examination of these key themes and of the ways in which they had been addressed and developed within the South American Model, participants were able to clarify and reformulate these basic concepts into a general framework for GEO. Discussions concentrated on maintaining regional perspectives while ensuring a degree of uniformity to allow global aggregation of results.

1. It was clear that while the Themes should reflect the traditional areas, concerns and interests of UNEP - and therefore the concerns of Agenda 21 and the Conventions as well - the themes must also address the new critical concerns of UNEP for the forthcoming biennium (1996/97) as set out in UNEP's new programme document; namely (i) the sustainable management and use of natural resources, (ii) the sustainable patterns of production and consumption, (iii) a better environment for human health and well-being, (iv) globalisation and the environment, and (v) global and regional servicing and support.

   At a more operational level, participants thought that the selected themes would not necessarily be "chapters" in the GEO report. A single GEO cannot possibly cover all the potential themes, so significant thought must be given over their selection: water, air, soil, environmental degradation, poverty, patterns of consumption, world trade are all

important, and a case can be made for all or any of them. To achieve regional perspectives, participants felt that it might be possible to ask each region to select their most important themes and proceed from there. For example, Latin America might identify urbanisation and deforestation as the most critical themes, while Africa might select land degradation and loss of habitat.

2. It will, however, be important to ensure that all themes are handled in a similar way so the results can be integrated into a coherent world view. While there are many different ways in which themes could be addressed and developed in GEO, participants agreed that the environmental, socio-economic and policy dimensions are the key ones to reflect the interests and concerns of UNEP. Uniformity will be achieved by developing all themes along these three key dimensions.

3. In turn, each of these three dimensions should be addressed through a number of *critical issues* (see further for examples) which will provide both the interlinkages between themes, especially the links to the development process, and the dynamic links to policy. While participants felt that an iterative approach would be needed to define a satisfactory set of critical issues and interlinkages, uniformity would again be achieved by selecting a consistent set of critical issues for each of the dimensions. Participants noted that regional concerns would be further reflected in the priorities and emphasis directed to these critical issues.

4. Participants also stressed that it was essential to move beyond the traditional UNEP global and regional assessments of status and trends and instead concentrate on the *processes* and *mechanisms* which underlie the relationship between environment and development. These can be analysed through the interlinkages between the critical issues, to identify and assess the social, institutional and economic driving forces of the pressures on the environment. **UNEP should move swiftly towards this type of analysis, for the value added by GEO will be to address such processes and mechanisms from a strictly environmental perspective.**

3.2 Global versus Universal Themes

Participants made a clear distinction between GLOBAL and UNIVERSAL themes (BOX 3), and considered that this distinction had clear implications for the GEO reporting process in terms of top-down versus bottom-up aggregation and synthesis.

In general terms, the mandate for a Global Environment Outlook is clearly global and international in nature which would suggest the top-down approach is more appropriate, just so long as it does not miss or hide important regional differences. However, since GEO wishes to influence the policy arena it must use the most appropriate approach, which will be top-down for some themes and bottom-up for others.

A global scale can be used only for the top-down analysis of truly global scale processes. In contrast, processes which occur at regional or more local scales should be aggregated from the regional level up (bottom-up). With these processes the top down analysis is dangerous and could lead to misleading results and may miss important regional linkages to development issues. Naturally, compatibility between regional analyses is essential otherwise it will simply not be possible to aggregate from this level. One approach is to carry out the analyses at the regional level and then look for interactions and interlinkages between regions.

BOX 3: GLOBAL versus UNIVERSAL Themes

GLOBAL THEMES

A Global Theme is one in which the **process** unfolds at a truly global scale and where **global cooperation between states** is an absolute pre-requisite for the successful resolution of the problem. Typical examples of global themes are ozone depletion, or global warming. The processes are truly global, and individual states on their own can do little to redress matters.

UNIVERSAL THEMES

A universal theme is one which applies to most (or all) countries in the world, but where the processes involved are functions of **national (or perhaps regional) socio-economic factors**. In general, the rates, causes, impacts and policy prescriptions will be both qualitatively and quantitatively different at national and regional scales. Furthermore, sovereign states will redress matters **primarily** through their individual national or regional policy frameworks, and success in one sovereign state is not necessarily dependent upon cooperation from others. Land Degradation and Urbanisation are typical examples of universal themes.

However, such universal themes may well have **global implications**, in that externalities associated with the phenomena may themselves have global impacts. Furthermore, **global processes** such as trade liberalisation may independently have major impacts on the relevant processes at the local scale.

An alternative and possibly complementary approach is that GEO should aggregate across all process scales and address household, national, regional and global interactions, using the PSIR approach as the common analytical framework. In which case that GEO should start, for reason of feasibility, first at the global level and then work downwards.

Data aggregation and disaggregation issues will also need to be considered when quantification of regional priorities and perceptions will be addressed in the GEO report series.

3.3 The Environmental, Socio-Economic and Policy Dimensions to Themes

Three dimensions were identified by which individual themes should be analysed and described. First, the environmental dimension reflected problems, opportunities and processes; second, the socio-economic dimension which is concerned more with strategies, proximate and ultimate drivers; and third the policy dimension which included institutions, evaluation and responses. Each dimension was in turn "defined" by a number of critical issues.

3.3.1 The Environmental Dimension

Critical issues along the **Environmental Dimension** included land use (change, deforestation, erosion, degradation, desertification); human settlements and urbanisation; water resources; wilderness areas (completely undeveloped areas, and natural sinks); ecosystems and biodiversity (at individual, species and ecosystem levels); element cycling; seas and coastal zones (contamination and exploitation); atmosphere (climate change, ozone depletion); waste, toxic chemicals and radiation; the antarctic; and outer space.

3.3.2 The Socio-Economic Dimension

Critical issues along the **Socio-Economic Dimension** included poverty; liberty, civic life and social cohesion; globalisation of world economy; population pressure; strategies for sustainable development; technology dynamics (resource use intensity); economic dynamics; ecological dynamics; institutional development; equity; health; food security; ecosystem integrity and services; employment and income policies; evaluation of policy implementation; human resources; pollution management; waste management (industrial ecology) and recycling; property rights; belief systems; and international agreements and Conventions. **Proximate drivers** include energy; transport; industry; minerals; resource extraction and use; agriculture, forestry and fisheries; tourism and recreation; and trade. Finally, the **Ultimate Drivers** include population; policy issues; governance; patterns of consumption and production; and quality of life.

3.3.3 The Policy Dimension

When discussing the Policy Dimension, participants felt that (1) the policy dimension section should reflect first institutions through which policy might be addressed and implemented, second the evaluation of existing policy structures, and third the responses or tools through which policy might be effected; (2) a number of socio-economic and cross cutting issues should appear as well in the Policy Dimension section; (3) the NGOs must be included as they have important roles both for promoting policy (pressure groups, research) and from implementing policy; and that (4) 'trans-national' institutions were better expressed in terms of the NGO and Private sectors.

Institutions should include international organisations, national governments, NGOs (international, regional and national) and the private sector (international and national); **Policy Evaluation** should cover multi-dimensionality, environmental economics and policy links, the integration of policy with development paths, compatibility and harmonisation between international, national and local policy initiatives and target setting. Finally, **Policy Responses** include international and regional agreements and conventions, self governance and civil life (collective action and participatory processes), regulation and economic instruments, economy wide policies (eg SAPs), green income accounting, global environmental transfers and joint implementation, social dynamics (changing community attitudes, population dynamics, education, integration and enabling of majority and minority groups), and achieving change.

3.3.4 Overlap Between Themes and Critical Issues

Participants recognised that there was potential for overlap between themes and the critical issues by which the three dimensions were defined, but viewed this is an expression of the emphasis of GEO on processes and interlinkages. Issues such as *population pressure, poverty* and *trade* can at the same time be both a theme addressed by GEO *and* a critical issue by which other themes such as land degradation and urbanisation are addressed.

3.4 The Identification of Global Themes

Given the clear consensus (3.2) that a GLOBAL theme or issue is one where the **process** unfolds at a truly global level and where **global cooperation between states** is an absolute pre-requisite for successful resolution of the problem, and using the same three dimensions of environmental, socio-economic and policy, participants identified global themes during a similar delphic process, differentiating these global themes from those with universal incidence but with global implications.

Global Environmental Themes included climate change (and impacts), element cycling (human activities are interfering in the processes), ozone (stratospheric depletion and tropospheric

accretion), degradation and pollution of marine ecosystems, and security of global resources. There was no clear agreement whether poverty, land use and cover change, desertification, and biodiversity loss were truly global themes in terms of the adopted definition. **Global Socio-Economic Issues** included globalisation of the world economy and financial markets, multi-national organisations, geopolitical realignments, cultural homogeneity and fragmentation, and technological change and diffusion. Finally, **Global Policy Issues** included global conventions, global governance, global environmental transfers, and joint implementation.

3.5 Prioritisation of Universal Themes and Critical Issues

Universal themes and critical issues to be addressed in GEO can be prioritised on the basis of some form of multiple ranking assessment. In no specific order of importance, themes and issues can be ranked on the geographic extent of the environmental process; on the size of the affected population; on the volume of economic activity affected; on the relative effect on both population and the economy (this takes in small islands and indigenous peoples); on the seriousness of threat to natural systems, ecosystem integrity and life support systems; on cultural impacts; on the urgency of necessary remedial action; on the nature of the environmental externalities (domestic, regional, global); on the irreversibility of the impacts; on the defiance of existing international instruments or conventions; and on the relevance to international and regional policy setting and action.

However, to achieve uniformity within GEO it is ultimately necessary to select a consistent set of critical issues by which the themes will be addressed and developed. Regional concerns and priorities can still be reflected, however, for different regions will emphasise different sub-sets of critical issues.

3.6 Definition of Regions

Participants discussed the *pros* and *cons* of using the existing (or adapted) UN regions; the existing sub-regional groupings (eg in Africa AGATE, SADCC, CILS, ECOWAS, MAHGREB); ecological regions (eg, watersheds, vegetation zones, landscapes); groupings of countries with similar environmental problems or socio-economic conditions; groupings of countries by political affiliation (eg NAFTA, EU, CET's); or even specific groupings of countries to best reflect specific environmental issues. Participants also noted that groupings of spatially contiguous countries produce less *angst* than did discontinuous groupings, and that the reporting framework (eg UN regions) could be independent from the analytical framework (eg, grid cells, sub-regions, ecological regions). It was recognised as well that more regions created more combinations and therefore even more difficulties in ensuring homogeneity in approach, analysis and report compilation.

A consensus therefore emerged that the first best solution (specific regional groupings to address specific environment issues) was impracticable, so the second best solution was to use **the existing UN regions, opening up to the existing and recognised sub-regional groupings.**

4. GENERAL APPROACHES TO ANALYTICAL PROCEDURES

4.1 The Use of Models

4.1.1 Presentations

Presentations from RIVM demonstrated the use of models at different levels using different tools and different methods. The Pressure - State - Impact - Response (PSIR) concept was explained, along with three case studies of Water, Land Degradation and

Human Health[1]. At the Global Level, models could be used for general screening purposes and to identify areas of high priority or high risk. In contrast, at the Regional Level models can provide the framework for more detailed case studies.

4.1.2 General Discussion

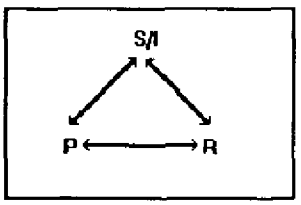
The applications to Global Screening were widely endorsed by all participants, specifically the concept of using models to identify both hot spots *and* areas with emerging problems which could then be followed up with more detailed regional studies. Nonetheless, while global screening is clearly vital, global models will only apply to those problems and processes which occur at a truly global scale. Furthermore, the processes for global to regional to national integration needs further amplification.

Participants identified the potential danger in all top-down approaches of missing local and regional processes and interlinkages. As an example it was noted that the causes of processes like land degradation are very unlikely to be the same over all regions of the globe. Global data sets may therefore be of too high resolution for some regions, and this lead to concerns about the sensitivity of the analysis and the accuracy of the input data. If input data are wrong, or are at an inappropriate scale, then the analysis will *undermine* and *obscure* regional and national problems and critical regional environment-development linkages. After all, even *national* reports on land degradation have proved to be inaccurate when applied to local scale problems.

Similar concerns also arose over the health model. Participants commented that the report discussed only one health system - a modern health system based on western medicine - yet there are many alternative systems, each needing different sets of process indicators and each requiring quite different approaches at the regional level.

4.1.3 Discussion of the P-S-I-R Model

Participants commented that the P-S-I-R concept is basically a simple linear feedback model adapted for easy computer programming which misses many very important feedback loops and relationships. A better representation (see diagram) illustrates the importance of feedbacks and non linear interactions.



It was noted that the requirements of simple mathematical modeling should not be allowed to determine how the world is analysed. While the PSIR concept is certainly useful for indicator analysis once policies are in place, in real life there is often no causal relationship between the different elements of the PSIR cycle. Human factors such as perceptions, beliefs, societal structure and behaviour often influence responses to a greater degree.

Pressures even tend to truncate the analysis: for example, in an urban pollution context one of the important pressures may be the absolute number of cars but the

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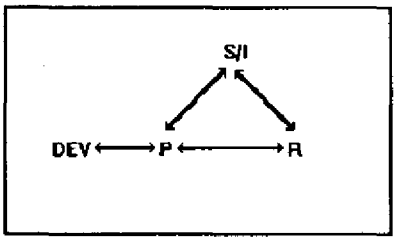
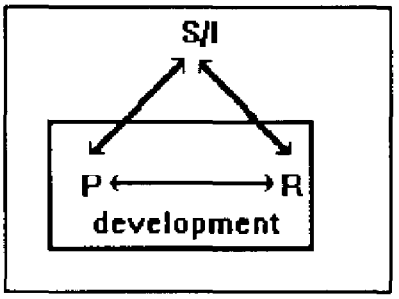
[1] RIVM (1995) Towards a Global Environmental Outlook: Integrated Global and Regional Environment Assessments. Draft report prepared for the GEO International Expert Meeting, Cali, Columbia.

Response may be buried under many layers of policy action on settlements, transport and infrastructure investments. A new dimension, **Development**, is needed which may even drive the Pressure.



It might even be more appropriate to enclose the Pressure and Response within a single Development orbit. For example, in some countries the development associated with continuing rural-urban migration completely overwhelms any sensible response to urban air pollution and traffic congestion.



4.2 Use of Scenarios

"Forecasting is particularly difficult, especially with respect to the future"

4.2.1 Presentations

SEI, Boston: (Annex 6)

The **current state** (this is where we are) is affected by **driving forces** (non-negotiable in the short term, eg rate of population growth), **attracting forces** (this is where we want to be) and **wild cards** (unforeseen events), and is changed to **new (future) states** (see Annes VI.3).

Driving forces can include population dynamics, economic globalisation, cultural homogenization, technological change, and resource and environmental pressures. In turn, the **attracting forces** can include social vision, governance, ecological values, resource conservation, and technology development, while the **wild cards** can include pandemics, world war, "miracle" technology, or even space colonization.

The Latin American View:

Clear definitions were presented (Annex 7) of the key terms in the debates:-

Projections are extensions into the future of past developments and current trends;
Forecasts are statistical assessments at some future point of existing trends - all else being equal;
Backcasts involve working back from where we wish to be to where we are today; and
Scenarios are a hypothetical sequence of events constructed for the purpose of focussing attention on causal processes and decision points.

Given that we are in a time of deep and rapid structural change and globalisation of the world economy, in which the detection of change is becoming more sophisticated, the unpredictability of forecasts is increasing as well. GEO must avoid "predicting" the future but instead explore the outer envelope of the possibilities.

Conflicting trends, such as the weakening power of nation states and the strengthening of international organisations (private and transnational), can be clearly detected. GEO must look at desirable **and** undesirable scenarios since moving **away** from a bad trajectory is as important as moving **towards** a better one.

Both ultimate (indirect impact) and proximate (direct impact) driving forces must be included in all scenario work. It is also necessary to map alternative scenarios through time, and to integrate scenarios into world views.

4.2.2 General Discussion

Integration of Scenarios into GEO

Scenarios use the analysis of causal processes to explore the policy environment needed to achieve desired goals and to identify the critical decision points and branching points after which policies cannot be easily reversed or changed (see Box 4).

In GEO, selected themes will be addressed on three key dimensions (environmental, socio-economic and policy) each of which are defined by a *consistent* set of critical issues. This will (i) lead to a focussed and consistent treatment of themes; (ii) create interlinkages between themes and policy issues; (iii) highlight regional perspectives and priorities through the emphasis placed on critical issues; and (iv) identify the *processes* and *mechanisms* which underlie the specific social, institutional and economic driving forces.

Through this treatment of themes and critical issues, (i), (ii) and (iii) define where we are and why; while from (iv) it is possible to forecast where we are going. It is (iv) therefore, which provides the starting point for developing scenarios. More specifically, it should be possible to compare the forecasts from (iv) with visions of the future to give a sense of where we would like to be, and then use the scenarios to explore what we must do - in policy terms - to get there.

The Importance of Indicators and Models

While scenarios themselves are not world models in the grand sense (for example, the early IPCC scenarios were far too simplistic in that they had no social dynamics and land uses were ignored), nevertheless the assumptions of any models and indicators used in the scenarios greatly affects the outcome. GEO will therefore require a very broad and consistent set of models and indicators to incorporate into much wider based scenarios, and a good mix of both quantitative and qualitative approaches. Analysis and synthesis are complimentary here and GEO must from the outset carry a strong flavour of analysis.

Regional Inputs to Scenarios

It is not possible to develop a scenario in a vacuum, especially if the objective is to change socio-economic structures. While some scenarios change - such as Ozone depletion scenarios - can refer to global processes and responses (eg, the world agrees to change industrial processes *because* of environmental concerns) other scenarios will by necessity be based on regional concerns and values.

Thus future Latin American scenarios will need better regional numerical models and indicators to give them wider credibility. Similarly, after Rio the African governments have clearly indicated they wish to use their natural resources for development. Scenarios

Box 4: SCENARIOS

Scenarios are descriptions of alternative futures and describe different possible futures based on different logics of how the world works. In this way scenarios are images of the future created from mental maps of perspectives of the past and the present. They are not deterministic predictions of what is likely to occur, nor stories about the future akin to science fiction: nor are they probalistic deviations around a central trend. They are projections of current perspectives which are as important in interpreting present events as future developments.

Scenarios cover:-

- those things that matter most to decision makers;
- those elements in the environment which are largely predetermined or unchanging;
- those key elements which are uncertain but whose dynamics can be understood; and
- potential developments that would be of major significance.

Scenarios serve as tools to gain an understanding of possible future environments. They encourage systematic thinking in a disciplined way about the future and are designed to aid decision making. They are not, however, concerned with future decisions but with the future implications of present decisions. A critical role of scenarios is to examine different perspectives, to challenge conventional thinking and to encourage debate. Scenarios should be plausible, internally consistent and challenging in their views of the future.

Scenarios may be used at several levels. There are some issues that require a global perspective while others are best treated at a highly focussed, regional level. Global and focussed (regional scenarios) are often closely linked together.

specific to African Development priorities are therefore needed which meet the hopes and aspirations of the continent. Specific indicators must also be developed to match African economic activities, for Africa is more dynamic and is changing faster and in different ways than most models allow. European scenario work already demonstrates these principles. For example, RIVM addresses a range of scenarios at different scales, including a Global Shift Scenario - in which economic activity shifts to the Pacific rim; a Eurosclerosis Scenario - in which Europe gets bogged down; and a Larger Europe Scenario - in which CET's become part of EC and growth accelerates.

Resource Requirements

Participants were warned that the scenario process requires significant resources. It is not a trivial exercise: it is very labour intensive and requires significant time and human inputs. For example, the Shell company might devote some 10 man years to develop one single scenario. The Shell approach may be of interest of GEO. Basic scenarios are worked out by a central team as a guide to investment strategies under different sets of circumstances. These scenarios are then rigorously checked out and modified at a regional level using regional inputs.

Scenario building is a very difficult kind of activity which requires many resources and those managing GEO must decide carefully before they go too far into scenario building.

Influence of Policy Makers

The GEO scenarios should be challenging to policy analysts and policy makers alike. The IPCC scenario was compromised by becoming too involved with *forecasts*, so the GEO scenarios must avoid such rigid approaches and should instead challenge conventional wisdoms and conventional thinking on the environment. GEO needs future visions of driving forces to 'shock' policy makers, and their scenarios should be repeated at intervals of 4-6 years to *challenge* conventional views and thought processes.

The GEO scenarios should also address policy at the scale of the contemporary policy environment and immediate policy responses, and at the scale of longer term strategic policy planning. These two time scales address sustainable management and structural *continuity* on the one hand and sustainable development and structural *change* on the other.

4.2.3 The Dimensions to Scenarios

Participants agreed that an important first step is to define the main dimensions of the scenarios. It was noted that the Human Development Index group of UNDP used thirteen dimensions, three world views and three 'management' views, and that the social science and climate change group of the IPCC are reporting soon on their new multidimensional approach.

GEO must not be overambitious here and should not become involved in an ideological classification of "World Views" or in the complex task of building environmental feedbacks into scenarios. The key is to stick with the three dimensions already identified, and use the critical issues to get the dynamics of the scenarios right.

In a second delphic session, each participant selected from the three key dimensions between four and six critical issues which they considered to be essential for successful scenario development. The selections are ranked below, divided along a north (developed) and south (developing) axis (see next page).

Even though participants were quite unaware of this classification procedure, very clear north-south or developed-developing perspectives emerged. For example, poverty is ranked as #1 by the developing/south but is ignored by the developed/north. Similarly, the developed/north ranks population as the most important critical issue for scenarios while the developing south see it only as the third most important; and energy and resource use are ignored by the developing south but are ranked #4 by the developed/north.

The priorities expressed by participants from the developed/north lean more towards conservation and sustainable development, while those of the developing/south lean clearly towards contemporary development. Clearly, many selected issues can be lumped together but nonetheless the differences remain clear.

Some General Conclusions

Participants endorsed that GEO *must* become involved within available resources in scenario building and that its scenario work *must* echo regional views and perspectives. While GEO may be able to use some existing scenarios, especially those dealing with truly

global issues, new scenarios will be needed specifically to echo the regional aspirations of GEO.

Participants noted that there are two important phases to the scenario building process which GEO must embrace. First, the GEO process should analyse where the world is heading and why, what the possible outcomes might be, and what the desired images of the future are - especially from regional world views. Second, GEO must determine how to achieve these desired images of the future, what the strategies should be, what the real trajectories will look like, what the policy environment will be like, and where the branching conditions will be beyond which trajectories become effectively irreversible.

Some critical issues essential for successful scenario development	
Ranked Selections by Participants from the North (developed world)	**Ranked Selections by Participants from the South (developing world)**
1. Population and demography	1. Poverty Land Use
2. Technology development	2. Technology Consumption and life style Governance Policy responses
3. Governance, Citizenship and Institutions	3. Population and demography
4. Economic development Intensity of Resource Use Energy	4. Conflict and wars
5. Agriculture, Food, Nutrition Consumption and life styles	5. Economic growth Health Capacity building Globalisation Sustainable development
6. Land use Conflicts and wars	
7. Urban conditions Environmental degradation Health Capacity building Globaisation of the economy	
Not Classified: Economic growth, poverty, policy responses	Not Classified: Urban services, energy, intensity of resource use, environment degradation

4.3 Case Studies

Participants were next divided into four working groups and were tasked to drive selected themes through the theme/issue dimensions framework set out above, also taking into account the discussions on scenarios and world views. The objective of the exercise was to see to whether these first ideas of a GEO process were sufficient to generate both interesting and consistent analyses and regional perspectives.

The themes processed by the groups were land use, water resources, settlement and urbanisation, and regional (developing world) requirements for sustainable development. In the event, each working group came up with quite radically different approaches and outputs, but which together gave the promise of a possible GEO framework.

GROUP 1: SETTLEMENT and URBANISATION

The first Group adopted the guiding principles of GEO to achieve a global assessment from regional perspectives and analyses. The Group focussed down onto the *Urbanisation Process* which they categorised as a **universal theme with global implications** on the basis that (i) all countries "have" urbanisation processes but (ii) rates, causes, impacts and policy prescriptions are qualitatively and quantitatively different at regional and national scales. Therefore, in terms of the previous definitions urbanisation was **NOT** a global theme.

The Group then proposed a six-stage procedure which was to (1) drive the theme through the cross cutting and interlinking issues by identifying driving forces, impacts and processes which were (2) assessed at regional levels while (3) identifying and quantifying interlinkages with other themes and issues. They next (4) projected contemporary trends and processes forward through time to obtain baseline perspectives which were (5) compared against selected images of the future (which should themselves be based upon regional world views). Finally, the group (6) used the policy dimensions to create scenarios of the policy environment required to achieve the desired world views.

In terms of the Guiding Principles of GEO, it would clearly be possible to:-

1. define interactions between environment and development (specifically at regional and global levels) - in the original driving forces/impacts/regional analysis;
2. assess long-term sustainability - in the projections;
3. support international and regional decision making - from the scenario development, though mainly for regions;
4. identify priority and emerging issues [for international attention] - in the scenario development; and
5. to achieve a global assessment from regional perspectives and analyses - from the regional analyses and scenarios.

GROUP 2: REGIONAL GEO EXERCISE SPECIFIC TO WATER

This Group took a completely different approach and looked at the **water component** of every theme identified as important (eg, land use, human settlement, water ..... etc). They developed a common conceptual framework to all themes and assessed the current status of the "water component" in each theme elicited at a regional level, but formalised in all cases to include....

- quantity of water resources (annual by type, seasonal, historical trends)
- requirements (by sector, in-river services)
- water sufficiency evaluation (current and historical)

- water quality
- impacts on... (health, economic activity, ecosystem health, unmet human needs)

The Group addressed future regional problems and possibilities in terms of a summary of global scenarios (macro issues), a summary of regional scenarios (regional issues) and scenarios for specific themes (land use, human settlement, ...). The Group also addressed an integrated regional implementation strategy (policy) by major themes (land use, human settlement .... etc).

GROUP 3: LAND USE

In yet another different approach, the Group considered Land Use from the viewpoint of a modified P-S-I-R model and through scenarios. They first identified contemporary pressures, state/impacts and responses in terms of:-.

Pressures: population, food consumption patterns, bio-fuel production, urbanisation, trade, financial inducements, climate change
State/Impacts: loss of agricultural land, land degradation, loss of biodiversity, deforestation, release of greenhouse gasses, changes to water cycle, pollution effects
Responses: education (extension), development of infrastructure and land reclamation, financial inducements, land use regulation

The Group next considered the state/impacts of two scenarios (next page), designated "paradise" [a la the Californian Dream] and "barbarisation" [a la Mad Max]. While most participants clearly demonstrated close empathy with the Mad Max scenario, they recognised the validity of taking contrasting holistic views rather than issue-specific ones. The approach could certainly accommodate regional p-s/i-r assessments, scenarios, forecasting and "backcasting", and interlinkages with other items. Inter-scenario feedback loops were clearly needed, and once the image / scenario links are understood then wild cards can be used to induce perturbations and assess policy implications. Policy branching points also need to be highlighted in the scenario work as they are important for policy issues.

Parameter	**Scenario: Paradise (Californian Dream)**	**Scenario: Barbarisation (Mad Max)**
Population	stable, 12 billion	variable, may be stable
Economic Growth	high, non material	low
Poverty	alleviated totally	increased dramatically
Technological Change	rapid and universal	slow innovation produces luxury goods in rich, protected "bubbles"
Consumption	stable: 1995 Latin America	increasing in "bubbles", low elsewhere
Conflict		high levels of conflict

GROUP 4: SUSTAINABLE DEVELOPMENT IN AFRICA

This Group looked at sustainable development requirements to improve livelihoods in the poor countries, to maintain quality of life in the rich countries, and to maintain functioning of

natural systems. These objectives must be seen to be closely integrated to engender global cooperation.

The Group addressed two principle areas that serve as foci for activities governing livelihood and quality of life in both rich and poor countries, namely agriculture/land use and industry/urban issues. Although decisions affecting these foci are taken primarily at local and national levels, global policies have the potential to profoundly affect them and thus well-being in all countries. Furthermore, inappropriate outcomes are directly linked to truly global problems such as climate change, [debt], [migration] and conflict. The Group then developed an outline of the dynamic processes which linked food security, population, land pressure, cropping patterns, technologies, land use changes and carbon sinks, and demonstrated how global policies could assist in mitigating some of the worst impacts.

On the basis of this exercise, the Group recommended in very strong terms that any global scenarios in GEO should be built from a synthesis of detailed and highly structured work of regional teams rather than as an exclusive top-down exercise. Each regional team could be given a structured framework within which to (i) describe their agricultural / land use and industry / urban issues for their region; to (ii) describe links to global problems; and (iii) to propose global policies to help alleviate these problems.

5. IMPLEMENTATION OF THE GEO PROCESS

5.1 Perspectives of the Next Steps for GEO

Participants were in turn requested to summarise their ideas on what the next steps should be in the GEO process. While many opinions were expressed, a consensus emerged in terms of the three most important actions which participants recommended that UNEP should take in the near future.

BOX 4
OPINIONS ON THE NEXT CRITICAL STEPS FOR GEO

1. A 2-3 person core group should be formed within UNEP to consolidate progress, but the group should seek outside voices to enrich the UNEP viewpoint.

2. The core group should formalise a consistent framework for analysis, synthesis and scenario making at global and regional levels.

3. This framework must be taken to the regions for brainstorming inputs and fine tuning: this will allow GEO to create global scenarios [and assessments] from regional perspectives and inputs, and retain a genuinely regional level of input and involvement in the GEO process.

5.2 An Overview of the GEO Process

Given that the GEO Report should stand as a sister volume alongside the IBRD World Development Report, the UNDP Human Development Index Report, and the WRI World Resources Report, then an important niche left open by these reports is an assessment of the circumstances

and policies that lead us to where we are now, and the policy changes *necessary* to go where we would wish to be.

To fill this niche the GEO process and report should:-

1. Base its approach on the use of scenarios to explore the policy dimensions required to achieve desired environmental goals;

2. Include both global **and** universal themes, but emphasise universal themes in order to highlight regional differences in the priorities, perspectives and interlinkages between the environment and development; and

3. Treat the selected themes in a consistent way to identify the *processes* and *mechanisms* which underlie specific social, institutional and economic driving forces.

Specifically, GEO will pose the following sets of interlinked questions:-

WHERE are we today, and why?	From a strictly contemporary perspective, assess and analyse status and trends (from regional data sets); the underlying processes and driving forces; and the interlinkages to the policy environment.
WHERE are we going?	Develop projections and forecasts (business as usual) under these current trends, processes and policies.
WHERE do we want to be?	Develop desired images of the future based on regional World Views and perspectives.
WHAT must we do to get there?	Develop regional and global scenarios of the trajectories required to achieve the desired images of the future, and evaluate the changes necessary to the policy environment.

It is further proposed that GEO should address these questions at three complimentary scales:-

Contrasting World Views:-

There is real dissention among global World Views as to the reality, impact and seriousness of contemporary global environmental trends. GEO could address the key differences between these world views, analyse the fundamental causes which underlie them, and assess their policy implications.

Regional Issues and Scenarios:-

Existing regional assessments, State of Environment reports and similar studies all show that the different regions have genuinely different perspectives and priorities to environmental issues, driving forces and visions of the future state of the environment. GEO could identify the critical divergences between these regional perspectives, analyse their underlying causes, assess the policy implications for both the regions and for the globe, and develop - with regional participation - both regional and global policy scenarios.

Regional Perspectives to Selected Themes:-

It is equally clear that there are striking regional differences to individual environmental themes, associated mainly with regional socio-economic and development status. GEO could therefore select a "Grand Issue" from each of the current major programme elements of UNEP and, from a regional perspective, analyse and assess them through the process outlined above, namely:-

1. Sustainable management and use of natural resources
   - land degradation
   - water resources
   - processes leading to the loss of biodiversity
2. Sustainable production and consumption.
   - equitable patterns of consumption
3. A better environment for human health and well-being
   - urbanisation processes
   - population
4. Globalisation and the environment.
   - world trade patterns

5. **Global and regional servicing and support.**

Global themes might also include element cycling, material fluxes and throughputs, energy fluxes, financial markets and multinational organisations, and the impact of the Global Conventions.

LIST OF ANNEXES TO THE REPORT

ANNEX 1

Framework Document for the GEO Reporting Process

1. The Objectives of the UNEP Environment Assessment Programme (EAP)

1.1 In response to UNCED and Agenda 21, the Environment Assessment Programme (EAP) of UNEP has been revised and expanded to include socio-economic considerations in their environmental assessments, and to address better the needs of international environmental policy setting and the identification of emerging issues that require international attention. The EAP programme will therefore produce both traditional State of the Environment (SOE) reports (status and trends) and publications directed to international policy setting fora, such as the UNEP Governing Council and the CSD.

1.2 The overall objectives of EAP are:

"To keep under review the state of the environment, enhance understanding of the critical linkages between environment and human activities, identify priorities for international action, flag emerging issues and strengthen national, regional and global information handling capacities for sustainable development."

1.3 The Environment Assessment Programme is now restructured around a set of interrelated and mutually supportive reports and assessments including (a) sectoral assessments such as those dealing with freshwater, urban areas etc; (b) regional reports, such as the Sustainability report for the Latin American region, the Asian-Pacific State of the Environment reports and national SOE reports; (c) indicator reports and (d) global reports. All these reports and assessments will feed into the 2002 State of the Environment report, the major mandated report of UNEP.

1.4 To achieve these objectives and results, the four divisions that traditionally made up the EAP programme, GEMS, GRID, SOE unit and UN system-wide Earthwatch, have been integrated into a coherent and mutually supportive programme. Information derived through the Environment and Natural Resources Information Networks and the GRID centres can now be channelled to the EAP assessments. Similarly, the assessment process can now draw upon established regional mechanisms to ensure both relevant regional inputs and the distribution of assessment findings to relevant regional bodies.

1.5 Within these overall objectives, the GEO process specifically aims to (i) provide insight into the interactions between environment and development, particularly at the international level, using new methods and tools for the analysis of these interactions; (ii) assess long term sustainability through, amongst others, forecasting and projections; (iii) support international policy setting and action; and (iv) identify priority and emerging issues that require international attention.

2. The Guiding Principles for the GEO Report

The GEO report series will:-

- report at the regional and global scales;
- emphasise regional priorities, and regional perspectives to global themes;
- synthesise global assessments from these regional priorities and perspectives;

- address social, environmental and economic issues, their interlinkages and interactions, and cross sectoral linkages;
- achieve relevance for international policy setting by:-
- promoting international consensus on priority issues,
- identifying the most effective points of the policy cycle for intervention,
- identifying the most cost-effective measures for intervention, and
- being forward looking and pro-active in evaluating policy options
- employ a range of qualitative (descriptive) and quantitative approaches to:-
- address individual themes and issues,
- identify information and knowledge gaps,
- address the issues of uncertainty and irreversibility, and
- examine future possibilities.
- maintain continuity throughout the report series to accumulate knowledge and depth of perception.

3. Proposed Structure for the Geo Report

The GEO report series will be structured around regions and themes, the regions providing the different perspectives from which the global assessments will be synthesised and the themes echoing the concerns of Agenda 21 and the conventions. In turn, the themes will be addressed on the basis of critical issues.

Significant discussions are needed to conceptualise the criteria underlying the regions, themes, and critical issues.

3.1 Regions

It is the firm intention of the GEO reports specifically to emphasise regional priorities and regional perspectives, and to synthesise global assessments from these regional priorities and perspectives. Individual countries can be grouped into regions on the basis of:-

- geographical associations
- similar socio-economic conditions
- political groupings

The basis of regionalisation needs careful thought as it will flavour the global assessments produced by the GEO process, for different regional groupings will create different regional perspectives and priorities.

3.2 Themes

The GEO reports will address "themes" which must reflect to a greater or lesser extent the concerns of Agenda 21 and the concerns of the conventions. It is proposed that the themes should be consistent between GEO reports, thus leading to a gradual accumulation of knowledge and depth of perception about each.

Within the framework of Agenda 21 and the conventions, themes will range from "environmental" (eg, biodiversity, deforestation, land degradation ..... etc) to "policy" (economic instruments, recycling, n/s patterns of consumption .... etc). Themes could also be selected on the basis of topicality. Themes must be selected and prioritised for the GEO reporting process.

3.3 Critical Issues

Each theme will be addressed on the basis of critical issues and a wide range of potential issues are set out below for detailed evaluation and discussion. However, two important factors will determine which issues are specifically relevant to any specific theme in any specific GEO report: these are (i) the regional priorities and (ii) the maturity of the knowledge base.

3.3.1 Regional Priorities

Regional priorities and perspectives will guide the selection of relevant issues by which a theme should be addressed on a regional basis, and this selection will itself change in response to evolving socio-economic and institutional conditions. It is essential that the GEO process remains adaptive and responsive to these evolving situations.

3.3.2 The Maturity of the Knowledge Base

The maturity of the knowledge base about a theme, in terms of status and trends, processes, driving forces, interlinkages, feedbacks, and development of management and policy interventions, will greatly influence the selection of the relevant issues by which a specific theme will be addressed in a GEO report.

For example, the knowledge base on ozone depletion is very mature and discussions will revolve mainly around appropriate policy interventions, policy implementation strategies, and policy enforcement. In contrast, the knowledge base for some themes - such as the loss biodiversity - are at a much earlier stage of development. Less is known about them, status and trends are poorly defined, interlinkages are not at all clear, and there is little global consensus at the policy level. Such themes will be addressed in a quite different way.

The GEO reporting process must remain sensitive to the evolving knowledge base of the themes, so it will address them in the most appropriate way throughout the GEO series.

3.4 Identification and Characterisation of Critical Issues

3.4.1 Critical Issues

Themes should be addressed through critical issues, but not all issues will be relevant to all themes, or to the same theme in different regions. Possible critical issues include:-

Social Forces:-
- poverty
- equity
- population

Economic Forces:-
- processes (production functions, consumption patterns and damage functions)
- trade
- economic values, costs and benefits

Institutional Forces:-
- institutional efficiency
- policy formulation and implementation
- technology

Status and Trends

Interlinkages

Impacts:-
- health, food security

- clean air, clean water
- ecosystem integrity and services
- quality of life
- human development index

4. General Approaches to Analytical Procedures

- qualitative (descriptive) analyses
- quantitative analyses and modelling
- historical analysis and backcasting

5. Implementation of the GEO Process

- identification of regional participating institutions
- creation of regional networks
- resources
- timetable

ANNEX 2

TIMETABLE

Date	Session	Time	Subject
Mon Feb 27	Session 1	0900-1000	Welcome by CIAT, opening statements and introductions
	Session 2	1100-1230	Objectives of UNEP Environment Assessment Programme
	Session 3	1300-1430	Section 1.5 - overall objectives of GEO
	Session 4	1500-1630	Section 2 - guiding principles of GEO
Tue Feb 28	Session 1	0845-1000	Presentation from R. Swart RIVM
	Session 2	1030-1230	Structure of GEO - Section 3 of framework paper
	Session 3	1400-1530	Themes and cross-cutting issues
	Session 4	1600-1715	Global Themes, Guiding Principle for selecting regional priorities, definition of regions
Wed Mar 01	Session 1	0830-1000	Policy dimension
	Session 2	1030-1230	Presentation P. Raskin, Scenarios
	Session 3	1430-1545	Presentation by G. Gallopin, Scenarios
	Session 4	1600-1645	Presentation by G. Golubev "Learning from the past"
Thu Mar 02	Session 1	0830-1030	PSIR model, selection of key themes for scenarios
	Session 2	1045-1300	working groups
	Session 3	1400-1630	Presentation by Working Groups
	Session 4	1645-1745	Next steps for GEO

ANNEX 3

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ANNEX 5

Presentations on Fresh Water and Biodiversity to Illustrate the Guiding Principles of GEO

Fresh Water

Fresh water is intimately interwoven throughout all aspects of society; it is used for domestic purposes, for agricultural and industrial production, for transport, and for leisure and recreation. In general terms, GEO will address only truly global patterns which have strong regional differentiation, so with respect to fresh water GEO would only report on generic issues with wide applications at regional and global scales, such as the relationship between specific water quality problems and the patterns of socio-economic development, or the linkages between potential regional water conflicts and the demands for water for agricultural, industrial or transport development. GEO would not address specific political issues such as the multi-national use of the River Nile, or issues concerned with individual water catchments in specific countries.

GEO will highlight regional priorities. For example, priorities in Western countries are mainly concerned with damage control and abatement through pollution control and regulations on use: the harm has been done, and standards have been set and are being enforced. The policy cycle is well advanced with both command and control and economic incentives in place.

In contrast, priorities in sub-Saharan Africa are mainly concerned with supplying unmet needs for water, especially for basic agricultural and industrial development. The control of water born diseases is of major importance, as well as the economic and social costs of supplying water to rapidly expanding urban areas.

In terms of regional perspectives to global themes, GEO might explore whether the regions perceive there to be a global water crisis, and in what sense; if water rights, pricing and transfers are truly globally accepted- and if indeed, as some predict, water conflicts will be *the* emerging environmental issue for the 21st century. While pre-preemptive action is required now, regional perspectives and priorities will determine the course of such action.

Biodiversity

GEO could also focus on the *processes* associated with a global and regional phenomenon such as the loss of biodiversity, and the implications for action and policy intervention. At a global scale, the four major processes leading to biodiversity loss are:-

A: the exploitation of economically important species (rhinoceroses) or species associations (forests, fisheries) to extinction;

B: the conversion of essentially wild and natural habitats (wetlands, savannas, forests etc.) for agricultural and livestock production, settlement and industry;

C: the pernicious degradation and change to habitats and environments (natural and man-made) from pollution, acid rain, ozone depletion and climate change; and

D: the conversion of diverse agricultural and livestock production systems through poor land management (eg, overgrazing and overcultivation) and through the spread of more intensive and monocultural production systems.

From a global perspective, the *relative importance* of these four processes in species loss is probably:-

D - C - B - A

while public perception (based on a mainly protectionist and preservationist viewpoint) would probably rank the processes

A - B - [C - D]

In terms of actual species loss, in the developed world the relative importance of the processes is possibly

D - C - [B - A]

while in the developing world, where the use and conversion of biodiversity is still very much part of the development process, the relative importances are perhaps:-

B - D - [C - A]

Regional policy prescriptions and interventions will clearly be quite different between the developed and developing world, and neither will necessarily reflect the concerns and priorities of the Commissions on Biodiversity or Sustainable Development. Policies in the developed world might concentrate on "demodernising" farming systems and on pollution reduction, while in the developing world policies should perhaps concentrate of intensifying land use rather than extensifying it, and making sure that the efficiency of biodiversity use (ie, the amount of production per unit of biodiversity consumed) is maximised.

ANNEX 6

Presentations from SEI:Boston

ANNEX VI.1

Idealized World Development Scenarios

Scenario	Development Paradigm	Population	Economy	Technology
Conventional Development	Conventional industrial model; gradual economic globalization; nation states remain primary with rise in representational democracy; market and consumerist driven	Mid-range; aging population in industrialized countries; rapid urbanization in DCs	Gradual growth; shift to service sector; slow reduction in North-South gap	Gradual adjustment
Technology Push	Conventional with strong policies to stimulate clean technologies			Best available technology
Rapid Growth With Equity	Accelerated globalization; convergence of international economies; emergence of multiple regional blocs; rapid expansion of industrial culture; markets, technology and values	Low-range; converging demographic structures	Rapid expansion; rapid reduction of North-South gap; led by multi-national corporations	Rapid development; technology transfer
New Sustainability Paradigm	New governance structures with reduced role for nation state; combined markets with planning constraints; rapid rise of community, quality and equity values	Low-range; more dispersed settlement patterns	Low growth; approach to steady state and equity; more local reliance within global system; reduced consumerism, voluntary simplicity	Mixed small and large scale; global infrastructure; clean technology
Breakdown	Severe economic-environmental-social crises; collapse of world economy; social disorder; extreme localism; deindustrialization	Decreasing	Formal economy shrinks as informal production and barter expand	Increasing use of manual implements; simple technologies in informal economy
Authoritarian	Corporatist response to breakdown; centralized command & control; enforced environmentalism	Low-range enforced	Controlled growth; enforced simplicity; distributional inequity	Large scale high-tech in elite fortresses; devolution elsewhere
Bombshells	Extreme perturbations, e.g., due to pandemic, "miracle" technology, dominance of world fundamentalist religion; World War III, colonization of space, runaway climate change, etc.			

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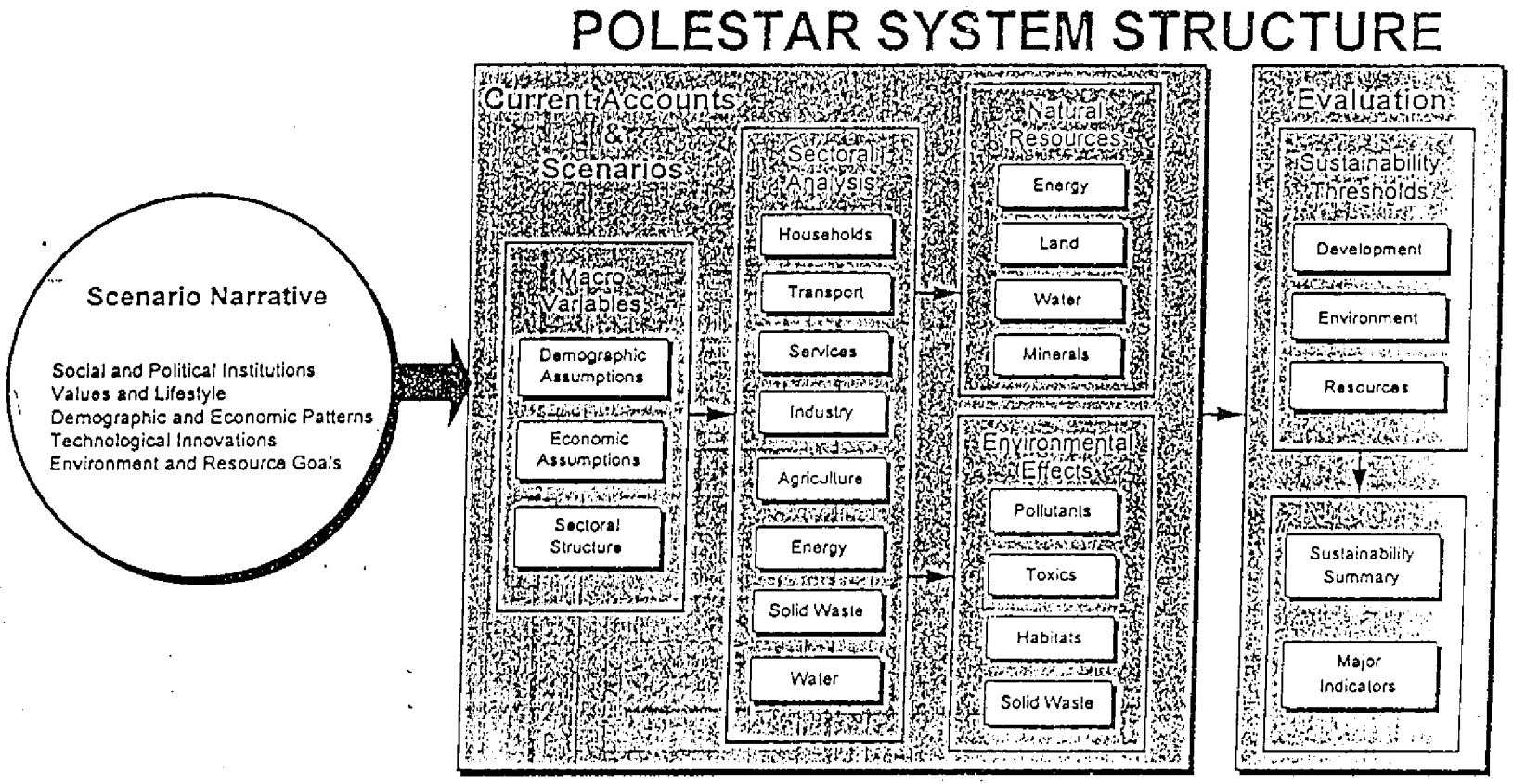
Scenario Analysis: The PoleStar Approach



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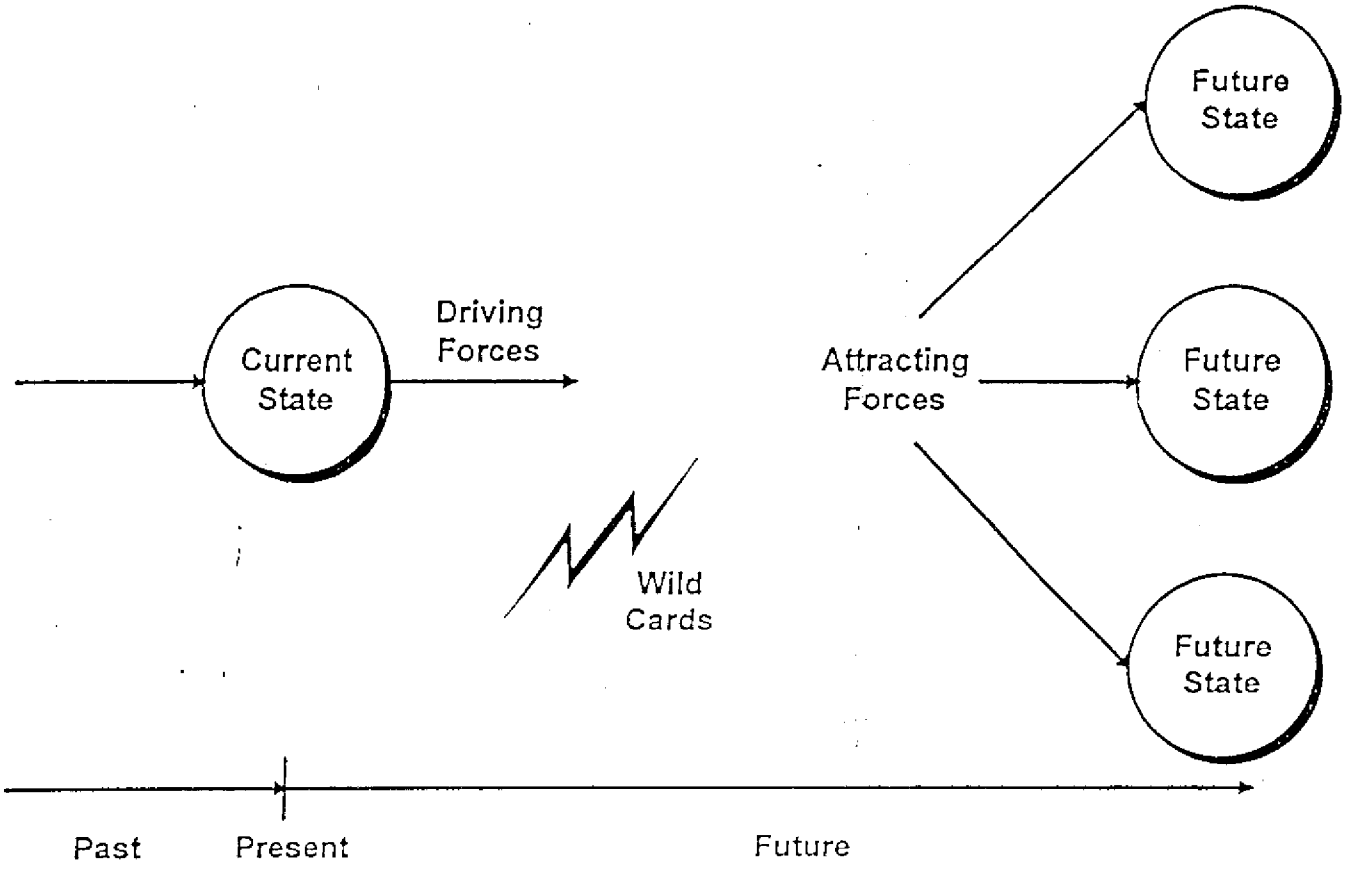
Driving Forces, Attracting Forces, Sideswipes



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ANNEX 7

DEFINITIONS OF TERMS USED IN SCENARIO BUILDING

Some Useful Definitions I
(Compiled by G. Gallopin)

Conjecture: A probable hypothesis (Godet, p.8)
Prediction: Statement of fact before the event (Godet, p.8)
Prophesy: Prediction of divine inspiration

Projection:

The extension into the future of past developments using certain assumptions for the extrapolation of variation of trends. A projection constitutes a forecast only if it is based on probability (Godet, p.6). Techniques may vary from straight forward single variable projection to regression analysis and computer simulation models (Cole, p.20).

Forecasting:

The assessment, with a degree of confidence (probability) of a trend ones a given period. The assessment will generally be expressed numerically and based on past data and a number of assumptions (Godet, p.7). Basic methods include deterministic and quantitative models (econometric, mathematical). The variables are supposed to be quantitative, objective and known; the relationships, states the structures fixed. Viewpoint is "everything else being equal" (Godet, p.7).

Prospective Analysis:

Is a Panorama of possible futures, or scenarios, which are not improbable in the light of past causalities, and the interaction between the interaction of interested parties. Each such scenario may be the subject of an assessment expressed numerically, i.e., a forecast. The variables may be quantitative or qualitative, subjective or objective, known or hidden. The relationships are dynamic, structures evolving. It involves taking a view which is global qualitative and voluntorist (Godet, p.7).

SOME USEFUL DEFINITIONS II
(Compiled by G. Gallopin)

Scenario: A hypothetical sequence of events constructed for the purpose of focusing attention on causal processes and decision points (Kahn, H. and Wiener, A. 1967). Here the focus is not solely on trends and their interactions, but, so it seems, on underlying structure and discontinuities (Miles, 1981).

A scenario is a possible course of events, leading to a resulting state of the world (the image of the future/Miles 1981).

For Godet, M. (1987) a scenario is the description of a future situation together with the progression of events leading from the base situation to the future situation. This definition covers two categories of scenarios: situational scenarios or images, i.e. the description of future situations, and developmental scenarios; i.e. different trains of events that lead these scenarios:

(a) The trend-based scenario: corresponds to the most likely course of events at all the decision points, taking into account of the tendencies implicit in a starting situation. Therefore, it does not necessarily correspond to a pure and simple extrapolation of trends.

(b) The contrasted scenario is for some, the exploration of a purposely extreme theme, the priority determination of a future situation. However, here is defined so as to reflect, like the trend-based scenario, an exploratory attitude, leading via development into a situation.

(c) The horizon scenario or normative scenario starts by establishing a desirable future whose feasibility and conditions for realization are studied by working backwards.

World View: In this context, it represents the set of beliefs and theoretical assumptions determining the perception of reality, the explanations provided, and the kind of actions proposed; e.g., conservative, reformist, and radical (Miles p.37; fatalist, hierarchist, individualist (Thompson et al 1989 in H.J.M. de Vries 1992); technological optimist, technological skeptic (Arispe, Constanza & Lutz p. 71), Northern, Southern.

A Strategic invariant is a phenomenon assumed to be permanent up to the horizon studied. Here, it is defined as situations, processes or issues that remain critical (as major opportunities or constraints) across different scenarios, even if they could be addressed or resolved differently in different scenarios.

Germ: A sign which is slight in terms of present dimensions by huge in terms of its virtual consequences.