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Item 4 of the provisional agenda*

Emerging policy issues: environment and development

Background paper for the ministerial consultations

**Global environment outlook and emerging issues: setting effective global
environmental goals**

Discussion paper by the Executive Director

Summary

The increasing number of multilateral environmental agreements notwithstanding, the global environment continues to degrade at an alarming pace, exacerbating poverty and food insecurity, and the difficult question of why we have not attained most of the goals set still needs to be addressed.

It is difficult to assess progress in the attainment of many goals due to a lack of verifiable indicators, quantifiable targets and reliable data. Also missing are a reliable baseline against which to measure progress and robust monitoring systems for the collection of data at regular intervals. The task of assessing progress is further complicated by the fact that most goals should not be considered in isolation. As a result of conflicting aims between them, progress towards one goal must be viewed in the light of its implications for other goals, making an integrated perspective both necessary and complex.

Current policy actions and goals have been driven by direct causality and pressures. The fifth Global Environment Outlook assessment shows that there are compelling reasons to focus policy on underlying drivers.

Sustainable consumption and production policies are needed that address the drivers of environmental degradation and lead to a decoupling of economic growth from resource use and environmental impacts. Such holistic policies addressing the entire life cycle of products are part of the transition to a green economy and need to be supported by adequate economic instruments and enabling frameworks.

Where successful technology and policies exist, their effective transfer and the provision of capacity-building and financial support can lead to improved outcomes.

* UNEP/GCSS.XII/1.

Introduction

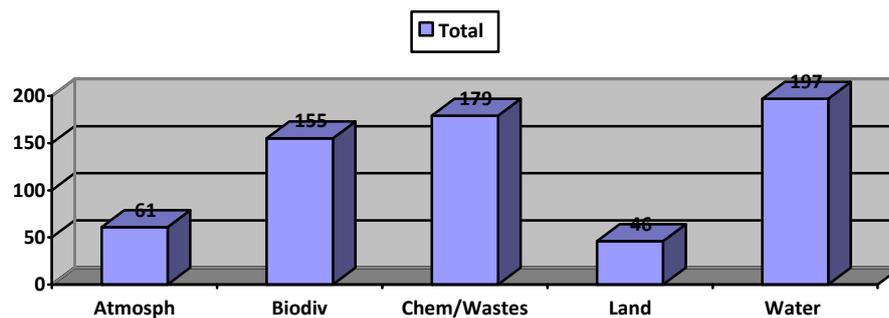
1. “Global environment outlook – internationally agreed goals: progress, gaps and response options” is the first theme to be discussed during the ministerial consultations that are to take place during the twelfth special session of the Governing Council/Global Ministerial Environment Forum of the United Nations Environment Programme (UNEP). During the consultations on this theme, ministers and other high-level representatives will discuss progress made towards the realization of global environmental goals and the elements underpinning successes and failures.
2. The consultations will set the scene for subsequent consultations on the themes of “green economy” and “international environmental governance”, with the aim of identifying how setting goals can contribute to responding to environmental and development challenges.

I. Background and historical context

3. In the 40 years since the United Nations Conference on the Human Environment took place in Stockholm in 1972, the international community has vastly improved its knowledge about the state of the environment and the extent to which environmental conditions are deteriorating. At the United Nations Conference on Environment and Development, or Earth Summit, which took place in Rio de Janeiro, Brazil, in 1992, representatives discussed how to combine economic growth and the protection of the planet to ensure a sustainable future. Since then, there has been a proliferation of environmental agreements (global, regional and bilateral) designed to achieve sustainable development. The United Nations has registered some 600 multilateral environmental agreements as depicted in figure I.

Figure I

Thematic distribution of multilateral environmental agreements registered with the United Nations



4. The increasing number of multilateral environmental agreements notwithstanding, the global environment continues to degrade at an alarming pace, exacerbating poverty and food insecurity. Some scientists are of the opinion that the Earth’s systems are being pushed to new biophysical limits and that there are undeniable signals that these limits are approaching and in some cases exceeding critical thresholds.

Although we know some of the underlying reasons for uncontrolled change, such as unsustainable behaviour patterns and environmental drivers, the difficult question of why we have not attained most of the goals set still needs to be addressed. While renewing political commitment at the United Nations Conference on Sustainable Development in June 2012, the international community should consider what innovative principles and measures will be needed to attain goals in the twenty-first century.

5. The Government of Switzerland in 2006 proposed that UNEP should undertake a comprehensive inventory of existing global environmental goals, including those defined in multilateral environmental agreements, to facilitate their evaluation. Subsequently the UNEP Governing Council in 2007 requested UNEP to monitor and evaluate existing global environmental objectives and actions in line with its mandate to keep the state of the global environment under review. The request provided the basis for the initiation of a fifth Global Environment Outlook assessment, focused on progress in the achievement of global environmental goals and selected policy options with the potential to speed up the implementation of those goals.

6. In June 2012, government, business and civil society leaders from all over the world will again gather in Rio de Janeiro for the United Nations Conference on Sustainable Development, also known as “Rio+20”. The aim of the Conference is to renew political commitments, assess developments since the Earth Summit in 1992 and reflect on challenges that continue to inhibit global sustainability from becoming a reality.

II. Critical thresholds

7. Currently observed changes in the Earth’s systems are unprecedented. Efforts to slow down the rate or extent of those changes – including by enhancing resource efficiency and preventing, reducing or mitigating the impact of pollution – have resulted in moderate successes but have not reversed them. Neither the scope of the changes nor their speed has abated over the past five years.

8. As human pressures on the Earth’s systems accelerate, several critical global, regional and local thresholds are approaching or have been exceeded. Once they have been passed, abrupt and possibly irreversible changes to the planet’s life-support functions are likely to occur, with significant implications for human well-being. These are evidenced by, for example, the collapse of freshwater lake and estuary ecosystems as a result of eutrophication and, at the regional level, accelerated melting of the Arctic ice sheet owing to the amplification of global warming.

9. The impacts of complex, non-linear changes in the Earth’s systems are already having serious consequences for human well-being. Multiple and interacting factors, such as droughts and social and economic pressures, affect human security; the crossing of thresholds, for example of average temperature levels, leads to significant human-health impacts; extreme climatic events such as floods affect both natural assets and human security; and accelerating changes in temperature or sea-level affect the social cohesion of indigenous communities.

III. International environmental goals only partially met: “You cannot control what you cannot measure”

10. Key internationally agreed goals and targets have been set in major multilateral environmental agreements and other instruments. The Millennium Development Goals constitute one set of such goals. Agreed to in September 2000 by leaders from 193 countries, the Goals aim for a future with less poverty, hunger and disease. While environment as a crosscutting theme is part of several of the Goals, its significance is most prominently highlighted in goal 7: “ensuring environmental sustainability”. Goal 7 is divided into four targets that emphasize sustainability principles and reversing natural resource degradation; reducing biodiversity loss; increasing access to safe drinking water and sanitation; and improving slums.

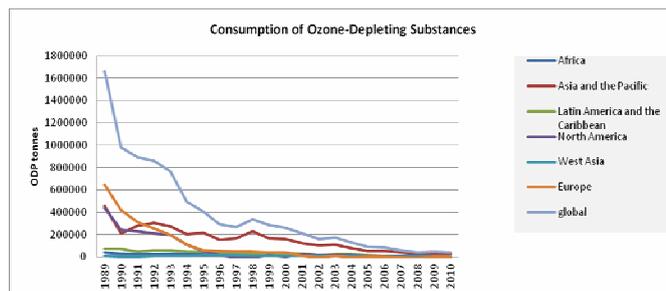
11. Analysis suggests that it is very difficult to assess progress in respect of many goals due to a lack of verifiable indicators, quantifiable targets and reliable data, especially regarding biodiversity, chemicals, hazardous wastes and some aspects of land use and conservation. Also missing is a reliable baseline against which to measure progress and, in turn, robust monitoring systems for the collection of data at regular intervals. The task of assessing progress is further complicated by the fact that most goals should not be considered in isolation. As a result of conflicting aims between them, progress towards one goal must be viewed in the light of its implications for other goals, making an integrated perspective on goal achievement both necessary and complex.

A. Atmosphere

12. Some issues have been solved effectively using a variety of mechanisms, and where successful action has been taken the benefits far exceed the costs.

13. The Montreal Protocol on Substances that Deplete the Ozone Layer has achieved a dramatic reduction in both the production and use of ozone-depleting substances (figure II), resulting in a reduction of 31 per cent in atmospheric concentrations of such substances since 1994. Just one of many resulting benefits is the avoidance of an estimated 22 million cases of cataracts in people born between 1985 and 2100 in the United States of America alone.

Figure II
Consumption of ozone-depleting substances



Source: UNEP Global Environment Outlook data portal

14. For other issues, such as the reduction of indoor and outdoor particulate matter and emissions of sulphur and nitrogen compounds, progress has been mixed. Urban particulate matter levels remain far in excess of levels recommended in international guidelines in parts of Africa, Asia and Latin America.

15. Tropospheric ozone remains a significant problem and is proving difficult to address. In addition, the dust-haze phenomenon is a matter of concern in the Middle East.

16. The internationally agreed goal of avoiding dangerous climate change is presenting the global community with one of its most serious challenges as climate change threatens the attainment of many development goals. As progress in reducing the carbon intensity of production and consumption is being outstripped by increased levels of consumption, reaching climate change targets will require profound changes in human behaviour in both domestic life and in the business sector so as to move to a low-carbon economy.

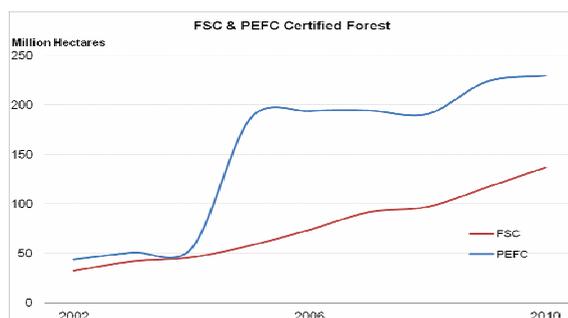
To increase the chance of reaching development targets in the near term carefully selected approaches need to be facilitated by global cooperation. Where technology and policy exist, their effective transfer and the provision of capacity-building and financial support can lead to improved outcomes. Integrated approaches, for example linking health and crop yield issues to climate change via short-lived climate forcers, can be employed to develop national impetus to reduce emissions and at the same time open up greater opportunity for international financing of national actions.

B. Land

17. Improving land-resource management has been increasingly recognized as an important goal, and there are many examples of effective progress in the area. Many countries have succeeded in protecting critical terrestrial habitats. Innovative policies have proven effective at curbing destructive processes. A moratorium on soy production in the Brazilian Amazon, for example, has dramatically reduced deforestation pressures stemming from a rising global demand for livestock feed.

18. An impressive annual 20 per cent growth in labelled forests indicates that both producers and consumers are actively influencing timber production (figure III). Nevertheless, in 2010 still only about 10 per cent of the total forest area was managed under Forest Stewardship Council and Programme for the Endorsement of Forest Certification practices.

Figure III
Forest Stewardship Council and Programme for the Endorsement of Forest Certification certified forest



Source: UNEP Global Environmental Outlook data portal

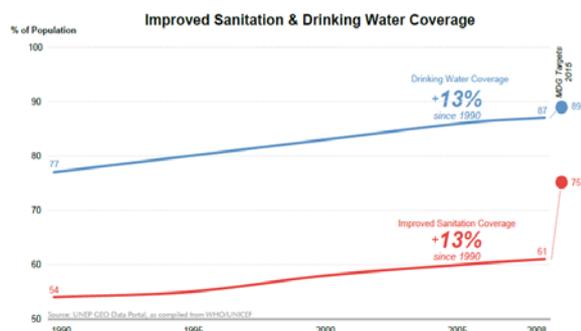
19. Some agroforestry systems result in the maintenance and enhancement of terrestrial carbon stocks and contribute to conservation and the sustainable use of biodiversity. Overall, however, the challenges are severe and successes relatively few in number.

New governance approaches to integrated land management can help incorporate adaptive management, capacity-building and more efficient valuation of ecosystem services and natural capital by combining market-based tools with a bigger role for community agencies and bottom-up approaches.

C. Freshwater

20. The world is on track to reach the Millennium Development Goal on drinking water supply (figure IV) and some progress has been made in meeting water efficiency goals. Global water withdrawals have, however, tripled over the past 50 years, aquifers are increasingly at risk yet often poorly monitored and the rate at which global groundwater stocks are decreasing has more than doubled between 1960 and 2000.

Figure IV
Improved sanitation and drinking water coverage



Source: UNEP Global Environmental Outlook data portal

21. Today, 80 per cent of the world’s population lives in areas with high levels of threat to water security, with 3.4 billion people, almost all in developing countries, severely affected. By 2015, some 800 million people are expected to lack access to improved water supply, even though improving drinking water supply and sanitation remains a cost-effective way of reducing water-related death and disease.

There is no global multilateral environmental agreement specifically directed to aquifer conservation, although it is implicit in goals such as that stated in paragraph 26 of the Plan of Implementation of the World Summit on Sustainable Development. There are a number of regional groundwater initiatives, such as the Africa Groundwater Commission, established in 2008 by the African Ministers’ Council on Water. Recognizing groundwater systems in national laws would be a first step toward improved groundwater governance, if supported by sustainable institutions and financing.

D. Oceans

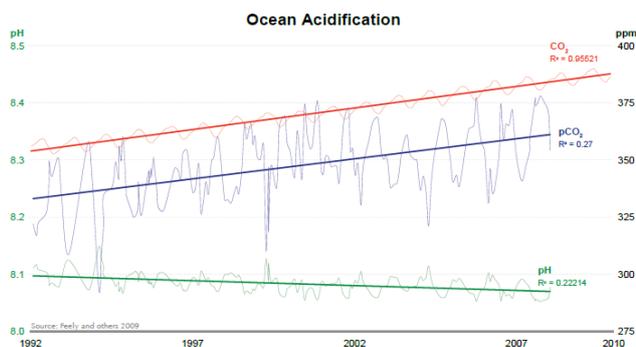
22. The International Convention on the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto and as further amended by the Protocol of 1997, and the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (1972) are generally viewed as positive frameworks for controlling and preventing marine pollution. The regional seas conventions adopted under the auspices of the UNEP Regional Seas Programme and the large marine ecosystem approach support integrated water management. A common limitation of international conventions is that their implementation is dependent on national legislation, which may reflect national interests and desire to control marine resources rather than the sustainability of the marine environment.

23. The existing agreements notwithstanding, there are continuing signs of degradation. The number of eutrophic coastal areas has increased dramatically since 1990. At least 415 coastal areas have exhibited serious eutrophication and only 13 are recovering.

24. Reported outbreaks of paralytic shellfish poisoning, which is caused by a toxin that develops owing to nutrient additions to ocean water, have increased from less than 20 in 1970 to more than 100 in 2009.

25. As a result of carbon dioxide emissions the mean surface ocean acidity, a major cause of the coral bleaching that is destroying coral reef ecosystems around the world, has increased, with pH decreasing from 8.2 to 8.1 (figure V).

Figure V
Ocean acidification



Source: Feely, R.A., and others, “Ocean acidification: present conditions and future changes in a high-CO₂ world”, *Oceanography*, vol. 22, No. 4, pp. 36–47.

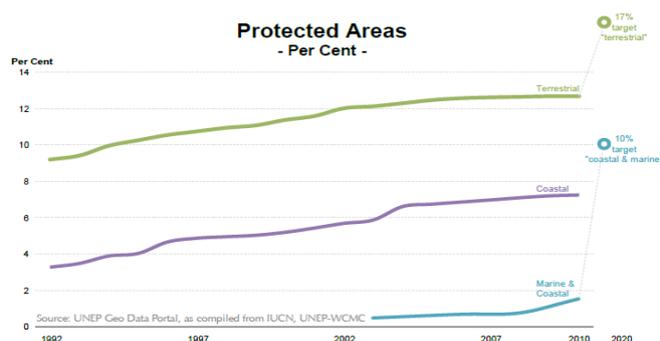
26. Governance of areas beyond national boundaries is weak and fragmented and needs strengthening. Sustainable utilization of coastal areas and ocean resources also requires effective coordination and cooperation at the regional and global levels.

The Global Programme of Action for the Protection of the Marine Environment from Land-based Activities was adopted by 108 Governments and the European Commission in 1995. Although it is not enforceable, it was designed to guide national and regional authorities in undertaking sustained actions to prevent, reduce and eliminate marine degradation caused by land-based activities. Many countries subscribe to its goals, and it provides a means for countries to develop collaborative strategies for addressing degradation of coastal and marine waters from influent freshwater.

E. Biodiversity

27. There have been increases in the designation of protected areas, which now cover almost 13 per cent of the global land area but less than 2 per cent of marine areas (figure VI), and an increasing recognition of indigenous and local community-managed areas. Policies and actions for managing invasive alien species and genetically modified organisms have been adopted together with regulations that support sustainable harvesting, reduce pollution and encourage species recoveries and habitat restoration.

Figure VI
Protected areas



Source: UNEP Global Environment Outlook data portal

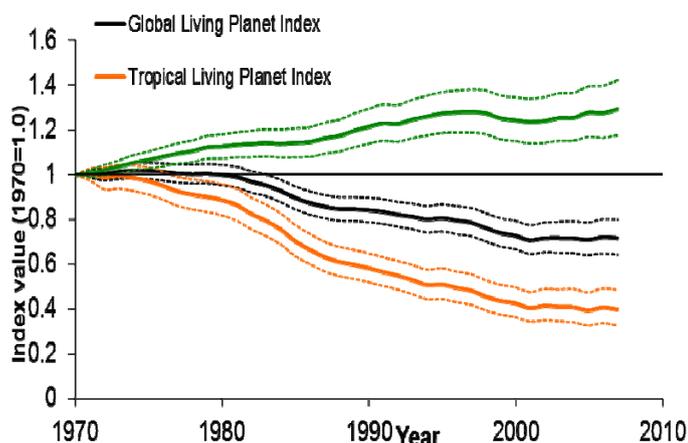
Protected areas by themselves have not been adequate to achieve the 2010 target of no significant loss of biodiversity by 2010. To help reduce biodiversity loss and negative changes in ecosystem services additional actions on development of policy and improved governance include:

- (a) Land must be used more efficiently to decrease the rate of habitat loss;
- (b) Mitigation of climate change is urgent in order to remain within the 2° C mean global surface temperature target agreed in Cancun in 2010;
- (c) Payments for ecosystem services and the greening of national accounts can help to protect biodiversity if carried out appropriately;

28. There are nevertheless substantial and continuing losses of species (figure VII), even in protected areas, with up to two thirds of species in some taxa threatened with extinction. Populations of vertebrate species have declined by 30 per cent since 1970, with 20 per cent of that loss attributable to the conversion and degradation of natural habitats.

The adoption of the Aichi Biodiversity Targets and the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization to the Convention on Biological Diversity afford an opportunity to develop a concerted global approach to halting and reversing the decline of biodiversity. Increasing awareness of the value of biodiversity and ecosystem services and greater integration of policies and institutional responses, including effective engagement of indigenous and local communities, is required to stop and reverse current trends.

Figure VII
Global Living Planet index - based on changes in the size of 7,953 populations of 2,544 species of birds, mammals, amphibians, reptiles and fish, relative to 1970, from around the globe (Dotted lines show 95 per cent confidence intervals)



Source: Loh and others (2010)

F. Chemicals and waste

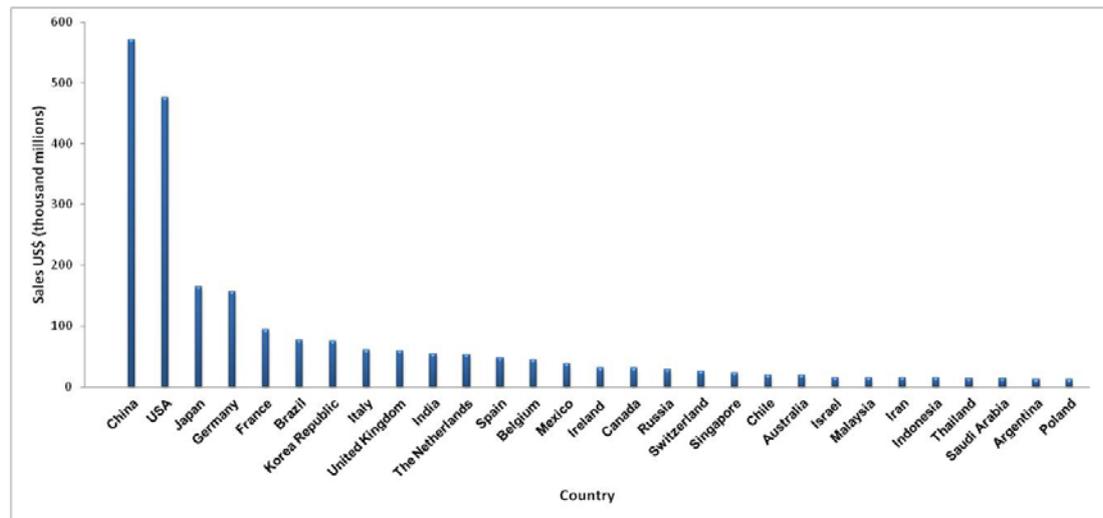
29. The development of the chemicals industry (figure VIII) has yielded many benefits, including advances in agriculture and food production, crop pest control and medicine. Around 248,000 chemicals are now commercially available. Some chemicals pose risks to the environment and human health because of their intrinsic hazardous properties.

30. Over the past decade chemicals production has shifted from member States of the Organization for Economic Cooperation and Development to newly emerging economic powers such as Brazil, China, India, Indonesia, the Russian Federation, South Africa and other developing countries. This shift has been accompanied by a doubling of chemicals sales and the development of many new types of chemicals. This presents a risk when adequate control and management systems, including cleaner production and environmentally sound waste management, are not in place.

31. Global chemical pollution poses a serious threat to sustainable development and livelihoods. The problem affects both people and ecosystems, including through adverse effects caused by long-term exposure to low or sub-lethal concentrations of single chemicals or mixtures of chemicals.

Figure VIII

Chemicals sales by country (data from 2009)



Source: Organization for Economic Cooperation and Development (2010)

32. Greater urbanization has given rise to the production of more waste in general and more hazardous waste from industrial activity in particular. The member States of the Organization for Economic Cooperation and Development produced approximately 650 million tonnes of municipal waste in 2007, an amount that is growing at around 0.5–0.7 per cent each year, with e-waste accounting for 5–15 per cent of it. There are indications that developing countries will generate twice as much e-waste as developed countries by 2016.

33. While policies and facilities for managing waste exist, their application has met with mixed success. Reporting of data on hazardous waste has been declining. Problems are set to grow as recycling alone will not be sufficient and the volume of waste will exceed the capacity of countries to deal with it. Waste prevention, minimization, recycling and resource recovery all require attention and it will be essential to assess chemical use and chemicals in products from a life-cycle perspective so as to reduce the use of hazardous chemicals and prevent risks.

The role of the life-cycle approach in sound chemicals and waste management needs to be recognized, together with the need to encourage the replacement of hazardous compounds with less hazardous alternatives where they are available.

Better integrated approaches to chemicals, radioactive materials and waste management should be supported by improved environmental governance.

Efforts such as the synergies process for the conventions related to chemicals and wastes (the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, and the Stockholm Convention on Persistent Organic Pollutants) provide opportunities to enhance awareness-raising, knowledge transfer, capacity-building and national implementation that should be further explored for other multilateral environmental agreements and governance efforts.

IV. Trends showing evidence of continued deterioration

34. Many subnational, national and international instruments are contributing to environmental improvements. There is evidence, however, of continuing deterioration in many places and for most global environmental issues examined in the fifth Global Environment Outlook assessment. For issues such as exposure pathways and effects of chemicals an improved understanding would support better responses. For others, such as reducing particulate matter concentrations in the atmosphere more consistent implementation of existing instruments is needed.

35. Evidence from the fifth Global Environment Outlook assessment shows that there are few examples where global environmental goals have been met or where progress towards goals has been good. The international community should reflect on the characteristics of successes in an effort to improve progress in attaining existing goals, and to develop new goals. In many cases the costs of inaction far outweigh the costs of action, a point that was proved with regard to greenhouse-gas emissions in the Stern review.¹

36. Current policy actions and goals have been driven by direct causality and pressures. The fifth Global Environment Outlook assessment shows compelling reasons to focus policy on underlying drivers rather than concentrate on reducing pressures or symptoms. Drivers that are exerting growing pressure on the Earth's systems include population growth, production and consumption processes, urbanization and globalization. Overall, progress will be scanty unless and until broader consideration of drivers of change are included in policy approaches.

37. Drivers of environmental change are growing, evolving and combining at an accelerating pace and on a large scale. For example, concerns about the effects of climate change, including crop vulnerability and food insecurity, gave rise to climate policies that included mandates to increase the production of biofuels such as ethanol and biodiesel. The resulting demand for fuel feedstock generated a cascading set of pressures that led to the diversion of land from the production of food crops to the production of species used to produce biofuels such as palm oil, which are already grown on nearly 3 per cent of the world's cropland. Consequently, food prices rose, peaking in 2008 and 2010, and, in turn, food insecurity increased. In addition, the dramatic increase in consumer electronics, including the production of 10 billion mobile phones since 1994, has generated major pressures on land through the excavation of specialized minerals in new locations, and has also substantially increased generation of e-waste.

38. Human well-being and its improvement, now and for a larger world population in the future, is based upon the availability of natural resources such as energy, materials, water and land. Demographic and economic developments have led to a rapid rise in the use of these resources. Many of them are becoming less abundant and some run the risk of critical scarcity in the near future, as indicated, for example, by the increased mining of declining grades of ores.

V. Emerging issues and challenges

39. Through the Global Environment Outlook process and a wide-ranging UNEP consultative process known as the Foresight Process, involving Governments, major groups and the scientific community, along with the peer-reviewed work of the International Resource Panel, various emerging

¹ Nicholas Stern, *The economics of climate change: the Stern review* (Cambridge, Cambridge University Press, 2007).

environmental issues and challenges have been identified. Emerging issues in this context are defined as issues that are:

- (a) Critical to the global environment, in a positive or negative way;
- (b) Either large-scale, i.e., affecting at least a continent, or universal in nature;
- (c) New, which is to say they arise because of new scientific knowledge, because they are occurring on a larger scale or at greater rate than previously, because there is a heightened level of awareness of them or because there are new ways to respond to them.

A. Food, land and biodiversity

40. The long-standing issue of food security and safety is being compounded by new challenges such as increasing population, climate change, competition for land from bioenergy production, heightened water scarcity, possible shortfalls of phosphorus for fertilizer and increasing disease transmission from animals and food contamination.

41. In addition, the increasing demand for food and other resources including energy has led to a new rush to acquire land in developing countries by both foreign and national investors.

B. Freshwater and marine issues

42. Water scarcity is set to intensify over the coming century as a result of accelerated desertification, increased world population, urban development and climate change. About one fourth of the world's population is projected to live in countries or regions with absolute water scarcity in the coming century. Furthermore, in many countries pollution, channel modifications and overfishing pose a growing threat to freshwater ecosystems and inland fisheries.

43. Understanding of the interaction between water and land and the links between water and energy, or the water-energy nexus, is improving, for example with regard to the effect of changes in land on downwind rainfall patterns. This improved understanding suggests that there is a need for a shift in the water management paradigm that brings water, land and energy management and policies closer together in a way that will boost water productivity, improve food production per litre of water and facilitate efficient and effective decision-making on water, land and energy.

44. Oceans and coastal ecosystems are being subjected to increased pressure. Current management approaches are inadequate to halt the degradation or potential collapse of the oceanic system. It is therefore necessary to adopt an adaptive governance approach (in particular for coastal ecosystems), in which management, rights and power are delegated in such a way that the participation of all stakeholders is encouraged, while an integrated ocean governance approach is required as a replacement for the current dispersed governance approach.

C. Climate change

45. Recent assessment results have shown that there are climate, air quality and human and ecosystem health benefits from mitigating short-lived climate forcers, including methane, black carbon and tropospheric ozone. The time is now ripe to set up institutional arrangements for initiating the widespread implementation of measures to reduce these substances. Furthermore, significant amounts of soil-derived dust and particles from wildfires, desert dust and drought-affected areas engulf major populated areas, with consequences for human health including, according to recent studies, nearly 300,000 premature deaths every year. Air quality standards and guidelines are therefore needed to control the health impacts of fine particles of natural origin.

46. Recent scientific studies show that a changing climate leads to changes in the frequency, intensity, spatial extent, duration and timing of extreme weather and climate events and can result in unprecedented extreme weather and climate events. Closer integration of disaster risk management and climate change adaptation, along with the incorporation of both into local, subnational, national and international development policies and practices, could provide benefits on all scales.

D. Energy, technology and waste

47. The significant potential of renewable energy as a solution to climate change worldwide has not yet been realized. It is important to identify the means to remove the economic, regulatory and institutional disadvantages that make renewable energy less competitive than other conventional sources in order to accelerate the implementation of renewable energy systems.

48. Nuclear energy is regarded by some as a potential replacement for greenhouse-gas-emitting energy sources. Many reactors are ageing and will need to be decommissioned in the near future.

Decommissioning will generate radioactive waste, which means that there will be a need for disposal facilities and trained professionals to operate them. International interventions, procedures, policies and cooperation are therefore needed to minimize the potential danger and environmental consequences of decommissioning nuclear reactors.

49. The development of novel technologies and chemicals may be an option for meeting the challenges faced by humanity. The current pattern, however, in which society first produces new technologies and chemicals and only then seeks to evaluate the impacts of what it has produced, suggests that society might be taking greater risks than necessary. Examples include applications of synthetic biology and nanotechnology. There is therefore a need to minimize the risks of novel technologies and chemicals by systematically and comprehensively assessing their implications before they reach the production phase.

50. The high demand for and production of much high-technology and renewable energy equipment is contributing to a depletion in strategic minerals, including rare earth metals, and exacerbating waste management problems, including in particular the build-up of e-waste. A promising option for solving the impending scarcity of strategic minerals and avoiding e-waste is to maximize the recovery of metals and other materials from waste electronic products and other waste streams and to change wasteful manufacturing habits.

E. Cross-cutting issues

51. There is need to align the current system of international environmental governance to the challenges of global sustainability. The current system, with its maze of interlocking multilateral environmental agreements, evolved during the twentieth century and is believed to lack the representativeness, accountability and effectiveness needed to achieve the transition to sustainability. There is an urgent need to establish the links between the policy and scientific communities necessary to ensure that strategies and policies for meeting current environmental challenges are underpinned by a strong science and knowledge base.

52. There is also need to transform human capabilities to enable people to meet the challenges of the twenty-first century and move towards a green economy. Moving to a green economy is one way to reduce environmental degradation. Such an economy, however, will require new capabilities, in particular new job skills, and changes in modes of learning, management approaches and research efforts. As highlighted in recent reports by the International Resource Panel, action is needed to promote the decoupling of economic growth from resource use and environmental impacts. Economic incentives, public information and bans are also considered important ways of catalysing rapid and transformative changes in human behaviour towards the environment, which has been shown by new research to be the major causative factor in environmental degradation.

53. Efforts must be made to improve the handling of migrations induced by environmental change and to boost the sustainability and resilience of cities and urban areas, as a growing body of studies suggests that environmental change (including rapid-onset events such as more frequent or intense coastal and river flooding and slow-onset processes such as land degradation and sea-level rise) will become an increasingly decisive factor in the displacement of people and, consequently, migration. Applying the concepts of “green cities” or “eco cities” in urban management can help to increase the resilience of cities and their residents in the face of these pressures.

VI. Essential requirements: more capacity and reliable data for evidence-based policymaking

54. The lack of reliable and consistent time-series data on the state of the environment is a major barrier to increasing the effectiveness of policies and programmes. Indeed, many of the most important drivers of environmental change are not subject to systematic monitoring, nor are their impacts. All countries should undertake to monitor and assess their own environments and to integrate social, economic and environmental information to inform decision-making processes. Data systems should be improved to include not only monitoring of the status of the environment and the impacts of environmental degradation but also a better understanding of the pressure on the environment resulting from economic activities. This could be done by the generation of statistical data by the United Nations System of Environmental-Economic Accounts. Standardized approaches to data collection are needed, and international cooperation and capacity-building for collecting data must therefore be strengthened.

55. Many human interactions with the natural environment cause a slow, incremental and cumulative degradation of the environment, such as stratospheric ozone depletion, acid rain, air

pollution, tropical deforestation, mangrove destruction and biodiversity loss. Ironically, such creeping changes are typically overlooked when they can be most easily addressed and become noticeable only when their consequences appear and are then more costly to mitigate. Effective early warning monitoring systems are therefore needed to identify such problems early on.

56. The development of indicators and collection of data through regular monitoring are required to redress the acute lack of data to indicate whether policies are effective, especially in relation to acute challenges and, perhaps more tellingly, challenges that are emerging but not yet detected. Robust methodologies such as strategic environmental assessment and integrated environmental assessment should be used to improve our knowledge of the state of and trends in the environment and the impact of policies, plans and programmes on all relevant scales, from the global level to the regional, subregional, national, city and project levels. In addition, to enable rapid progress, scientific knowledge needs to be properly packaged for policymakers to allow them to deal effectively with complex issues.

57. A lack of agreed indicators and supporting data makes it difficult to assess the effectiveness of policies. Without an accurate understanding of drivers, pressures, state and impact on the environment and human well-being, little can be said about how well the internationally agreed goals in this area are being met.

58. The prospect for improving human well-being hinges on the capacity of individuals, countries and the international community to respond to environmental changes that heighten risks and reduce opportunities for the advancement of human well-being, in particular for poor and vulnerable populations. Because of the complexities of the Earth's systems, responses to these changes need to focus on their root causes or underlying drivers rather than only on the symptoms or pressures that they induce. Further impetus should be encouraged to develop integrated policy responses.

VII. Scaling up promising policies and practices

59. Some tools exist that could help solve persistent problems, but solutions are relatively costly and the time that it will take to achieve targets will depend on the relative priority given to tackling this issue. The regional assessments conducted for fifth Global Environment Outlook report resulted in the identification of policy responses that could speed up achievement of previously agreed global goals. They include:

- (a) With regard to water resources, integrated water-resource management; promotion of water use efficiency; water metering and volumetric-based tariffs; equitable quotas for water allocation; recognition of safe drinking water as a basic human right and need; and effluent charges;
- (b) With regard to biodiversity, payment for ecosystem services; increasing protected areas and biodiversity (wildlife) corridors; community-based participation and management; and sustainable agricultural practices;
- (c) With regard to climate change, removing perverse subsidies, especially on fossil fuels; carbon taxes; forestry incentives for carbon sequestration; emissions trading schemes, with or without caps; climate insurance; and climate change adaptation such as climate-proofing of infrastructure;
- (d) With regard to soil, land and land use, integrated watershed (catchment) management; smart growth in cities, protecting prime agricultural land and green open space; no-till and integrated pest management and organic agriculture; and improved forest management, agroforestry and silvo-pastoral practices;
- (e) With regard to chemicals and waste, registration of chemicals; extended producer responsibility; product redesign (design for environment); reducing, reusing, recycling and cleaner production; and national and regional hazardous waste treatment systems;
- (f) With regard to energy, increased use of renewable energy; feed-in tariffs; removal of fossil fuel subsidies; and research and development, especially on batteries and other forms of energy storage;
- (g) With regard to oceans and seas, integrated coastal zone management (ridge-to-reef); marine protected areas; and economic instruments such as user fees;
- (h) With regard to environmental governance, multilevel/multi-stakeholder participation; increased introduction of the subsidiarity principle, governance at the lowest practicable level; policy synergy and removal of conflicts; strategic environmental assessment and upstream planning; accounting systems that value natural capital and ecosystem services; improved access to information, participation and environmental justice; and improved goal-setting and monitoring systems.

60. Although these policy responses were viewed positively, there is still concern that the current global environmentally adverse trends would not be reversed even if these policies were more widely implemented. Innovative approaches are undoubtedly needed. Furthermore, the wise choice of policies matters, but increasingly there is a need not only to deal with the impacts of environmental degradation using command and control policies but also to tackle underlying drivers.

61. Resource efficiency and economic outlooks prepared for the Asia and Pacific and Latin America and the Caribbean regions clearly demonstrate the power of linking resource use and economic considerations to drive the green economy and sustainability. The use and consumption of resources, metals, energy and water in particular can be reduced through existing and accessible technologies; scarcity challenges can thus be solved in part through consistent and responsible resource efficiency policies and practices. In that context, the work of the International Resource Panel has demonstrated the extent to which resource efficiency and productivity, through ambitious but realistic decoupling programmes, can support efforts to move to a green economy and global sustainability.

VIII. Innovative responses: an opportunity for cooperation

62. Existing sustainability-scenario studies show that both short-term policy solutions and long-term structural measures are needed to meet established targets.

63. Delivering results requires a combination of technology, investment, governance and management measures together with sustainable production and consumption patterns grounded in good environmental-economic accounting data and a mindset shift towards sustainability. New measures will succeed only if accompanied by a reversal or redirection of policies that have generated unsustainable outcomes. Transformations of such complexity require a gradual but steady transition towards the decoupling of economic growth from resource use and environmental impacts. During such a process the impact of responses needs to be properly monitored so that, if required, corrective measures can be taken to maintain progress.

64. The enormous challenges notwithstanding, moving on to a pathway that leads to meeting internationally agreed environmental goals and targets is possible and the transition is already under way. There are, today, significant opportunities to scale up policies that can begin to reverse negative environmental trends and mend the inequalities and inadequate institutional frameworks with which human society currently struggles. It is also imperative for the international community to invest in structural solutions, from fundamental shifts in the values, design and structure of institutions to innovative policy frameworks, which will help tackle the root causes, rather than merely the symptoms, of environmental degradation. Solutions are within reach, but early action is imperative if the international community is to meet goals and targets to avoid further, escalating economic, environmental and human well-being costs.

Resource efficiency

As our economies have grown, so too has the use of materials, land, water and resources for energy production. In an increasingly globalized economy, the challenge for policymakers is to streamline actions to ensure the more sustainable management of resources, both renewable and non-renewable. Sustainable consumption and production policies are needed that address the drivers of environmental degradation and lead to a decoupling of economic growth from resource use and environmental impacts. Such holistic policies addressing the entire life cycle of products are part of the transition to a green economy and need to be supported by adequate economic instruments and enabling frameworks.

IX. Challenges and opportunities

65. Action at the subglobal level could make use of the four strategic insights derived from recent scientific understanding of transition processes in complex social and ecological systems:

(a) There must be a compelling vision of sustainability: building on goals and targets and informed by science, society at all levels needs to be engaged in an effort to define visions of a sustainable future and what is required to get on the pathway to a successful transition;

(b) The unsustainable must be unlearned: the introduction of new innovative measures consistent with a vision of and pathway to sustainability must be accompanied by steps to identify and redirect or reverse policies that are unsustainable;

- (c) Leverage must be applied: a successful transition will require a diverse array of measures that:
 - (i) Strengthen a sustainability mindset in society through education and awareness-raising;
 - (ii) Change rules and incentives to advance sustainable practices;
 - (iii) Create feedback and make adjustments to keep environmental pressures in check;
- (d) Management and governance must be adaptive: Governments and other entities need improved capacity to manage complex transition processes through continuous monitoring, learning and course correction to reduce the costs of going off track.

X. Questions for discussion during the interactive discussions

66. During the ministerial consultations, ministers and heads of delegation are expected to engage in interactive discussions in round-table format.

67. It has become the practice for the President of the Governing Council/Global Ministerial Environment Forum to prepare a summary of the ministerial consultations that take place at each session. The summary would afford an opportunity for environment ministers to send a collective message at a critical stage in the preparatory process of the United Nations Conference on Sustainable Development.

68. The following are some questions that could serve as a starting point for the interactive discussions:

- (a) How can we promote bridging the data gap and improving information accessibility (Rio Principle 10) as an element of the outcome of the United Nations Conference on Sustainable Development?
 - (b) What are the key requirements to support the establishment of more effective environmental goals in the future and to speed up implementation?
 - (c) How can the current model for economic growth be modified with the engagement of all stakeholders to realize the aims of sustainable development, without further compromising ecosystems and natural capital?
 - (d) What are the key messages within the summary for policymakers of the fifth Global Environment Outlook assessment that should be considered for the draft outcome document of the United Nations Conference on Sustainable Development?
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