UNITED NATIONS
UNIVERSITY

UNU Report

to the Second Preparatory Session for the
2002 World Summit on Sustainable Development

28 January – 8 February 2002
New York, USA

United Nations University

The United Nations University was established by the United Nations General Assembly in 1972 to be an international community of scholars engaged in research, advanced training, and the dissemination of knowledge related to pressing global problems of human survival, development and welfare. Its activities focus mainly on the areas of peace and governance, environment and sustainable development, and science and technology in relation to human welfare. The University operates through a worldwide network of research and postgraduate training centres, with its planning and coordinating headquarters in Tokyo.

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Effective Pathways to Sustainable Development

Contents

We live in a challenging, rapidly changing, complex world. It becomes more and more clear that the issues crucial for the survival and happiness of human kind cannot be separated. So when we talk about sustainable development, we must consider issues of development, poverty, environment, and human dignity at the same time. There are interlinkages at play on two levels, they exist among the issues mentioned themselves and also at the level of implementation of different environmental conventions and agreements. To create synergies in their implementation is crucial to their success. Education also plays a crucial role. It is critical to the understanding of complexity and also in terms of identifying ways to contribute to much needed solutions. Higher education has special responsibilities both in terms of curriculum development and in providing training for the trainers.

Hans van Ginkel
Rector
United Nations University

Executive Summary

UNU has focused a substantial proportion of its efforts on the pursuit of sustainable development and this report is aimed at providing an outline of some of the key research findings and capacity development activities that have resulted. The report begins with a list of key recommendations for consideration at the World Summit on Sustainable Development that have been generated through UNU's research over the last decade and the remainder of the report outlines the research upon which these recommendations are based. The second section provides an assessment of the state of affairs in relation to particular chapters of Agenda 21 that have been addressed through UNU research. As a key aspect of UNU's mandate is to understand and resolve "pressing global problems of human survival, development, and welfare" UNU has also aimed to highlight key sustainable development priorities that were not specifically addressed within Agenda 21 and these are outlined in the subsequent section of the report. The following section provides a more elaborate explanation of each recommendation made by UNU in the context of its past research and capacity building activities. The final section of the report, in keeping with the university's emphasis on education and capacity development, serves to highlight a representative sample of UNU's extensive capacity development programme.

1. Introduction

United Nations University has taken up the challenges of sustainable development, as they are outlined in Agenda 21, with great vigour. Many of the objectives outlined in this blueprint for sustainability and development strike at the very heart of the university's mission and mandate. UNU is an international community of scholars that aims to generate knowledge and build capacity in areas relevant to the global problems of human security and development, in developing countries in particular. The mission of the university, as formulated by its founders over twenty–five years ago, is "to contribute, through research and capacity building, to efforts to resolve the pressing global problems that are the concern of the United Nations, its Peoples, and Member States." The university also has a special mandate to alleviate the intellectual isolation of academics in developing countries by organising worldwide networks of collaborating scholars and research institutions.

Since the first conference on environment and development was held in Rio de Janeiro in 1992, there has been an obvious decline in the condition of the natural environment. This decline, coupled within the obviously widening gap between the world's richest and poorest peoples, has generated a global appreciation of the urgency with which we prepare for the 2002 World Summit on Sustainable Development. It is becoming increasingly clear, that this summit must serve as a turning point on the path to global sustainable development.

The Johannesburg Summit must signal a new and widespread appreciation of the need to approach sustainable development in a more comprehensive and integrated manner. Of critical importance is the development of a more strategic approach to the implementation and achievement of the priorities set out in 1992 in Agenda 21. Such an approach would require a greater effort to identify and take advantage of the links that exist between the different components of sustainable development and the priorities laid out in Agenda 21.

The very concept of sustainable development is rooted in the recognition of the inherent links between the social, political, and economic conditions of the world's people and the impact that this has on their relationship with their natural environment. Sustainable development is the sum of many separate, but deeply connected, parts and must be approached accordingly. To be achieved and maintained, sustainable development must be set about from several directions, through many key aspects, and on a number of levels. Identifying the most appropriate entry points for addressing a number of specific environmental and development issues has represented a key aspect of UNU's research on sustainable development. To this end, this research has not only examined each issue in detail but has also explored how each specific environmental or development issue fits into the larger global governance picture.

The university's research continues to place a strong emphasis on the role that institutions play in the pursuit of sustainable development and how these institutions can be made to better work together in order to make more effective policies. It is the institutions of governance at all levels; international, regional, national, and local, that play a key role in locating the balance between wealth and poverty, and environment and development. UNU research has also focused on the combined impact of globalisation, and information and communication technologies, on the prospects for sustainable development and how they influence the institutions of governance at all levels.

In recognition of the multiple interests and concerns that are bound up within the sustainable development debate, UNU has placed a strong emphasis on ensuring that all stakeholder groups are included within its research. In this regard the university has consistently maintained a core focus on the problems and concerns of developing countries and their peoples, particularly women. The types of issues addressed include, inter alia, poverty alleviation, community empowerment, the need for clean drinking water, food security and nutrition, and other basic health and welfare issues. At the same time, UNU's research has emphasised developing country perspectives in relation to broader questions such as international finance, global institutions, and the development and use of new technologies, including biotechnology.

UNU's emphasis on developing country needs and concerns is reflected in the magnitude and depth of its capacity development programme. Underpinning this programme is the assumption that sustainable development cannot be achieved without enhancing education and capacity building programmes in the developing world. UNU has, throughout its entire history, demonstrated its support for this assumption through both its research initiatives and capacity development activities.

UNU has focused a substantial proportion of its efforts in the pursuit of sustainable development and this report is aimed at providing an outline of some of the key research findings and capacity development activities that have resulted. The report begins with a list of key recommendations for consideration at the World Summit on Sustainable Development that have been generated through UNU's research over the last decade and the remainder of the report outlines the research upon which these recommendations are based. The second section provides an assessment of the state of affairs in relation to particular chapters of Agenda 21 that have been addressed through UNU research. As a key aspect of UNU's mandate is to understand and resolve "pressing global problems of human survival, development, and welfare" UNU has also aimed to highlight key sustainable development priorities that were not specifically addressed within Agenda 21 and these are outlined in the subsequent section of the report. The following section provides a more elaborate explanation of each recommendation made by UNU in the context of its past research and capacity building activities. The final section of the report, in keeping with the university's emphasis on education and capacity development, serves to highlight a representative sample of UNU's extensive capacity development programme.

2. Recommendations

- Enhance Interlinkages between Multilateral Environmental Agreements at the Regional and National Level
- Financial Mechanisms and Donor Institutions Must Promote Greater Interlinkages between Multilateral Environmental Agreements
- The Principle of Subsidiarity Should Be More Readily Applied in Environmental Decision–Making and Implementation
- Effective Ways to Cluster Multilateral Environmental Agreements Should be further Explored and Implemented as Soon as Possible
- The Trade and Environment Debate Must Finally be Reconciled
- Greater Connectivity Is Required between Urbanisation and Sustainable Development and Priority Issues such as Poverty, Health, and Rural Development
- Promotion of Information Communication Technologies Are Critical for Environmental Education, Increased Resource Efficiency and Conservation
- "ZERO Emissions" Strategies Are a Practical and Economically Efficient Path to Sustainability
- Promotion of Best Practices on Agrobiodiversity through Local Knowledge Is a Key to Biodiversity Conservation
- Creation and Implementation of Strategic National Frameworks for Sustainable Development are Required
- Greater Consideration of the Social Aspects of Disaster Vulnerability is Required
- Greening of the UN System Should be a Priority
- Innovativeness at the Community Level Would Help to Foster Local Action
- As an Essential and Fragile Ecosystem, Mangroves Must be More Widely Protected
- Poverty Eradication Must be a High Priority for WSSD Success
- Reverse the Nexus between Conflict and Poverty
- Recognise the Multiple Values of Forests
- Use the WSSD to Explore the Link between Globalisation and Sustainable Development
- Develop Integrated Approaches to Combating Desertification and Drought
- Recognise the Crucial Role of Higher Education in Sustainable Development

3. An Assessment of the Implementation of Agenda 21

Chapter Three: Combating Poverty

Given the scale and depth of poverty in the developing world, fast poverty reduction is imperative. It is not only the case that people's incomes must be increased through better livelihoods in small-holder agriculture and micro-enterprises. It is also crucial that human development indicators be raised directly, through better basic health care, higher quality primary education, and investment in safe water and sanitation. Given the large demands that these pro-poor investments will place on the scarce financial and managerial resources of countries, close attention must be paid to the setting of priorities. At present, national priorities are often ill-defined as a result of underfunded and underdeveloped budgetary and planning mechanisms that are a reflection of fiscal problems and, in many countries, social conflict. This has meant that opportunities for accelerating poverty reduction are often missed.

Priorities can only be tightly defined if information on poverty is readily accessible in a timely manner and connected into the policymaking process. Such information can consist of household surveys (collecting the data essential to calculating the incidence and depth of poverty) and also qualitative information (including priorities for poverty reduction identified by poor communities themselves). The last decade has seen considerable methodological progress in designing both quantitative and qualitative information collection. The quality of policy research on poverty has also vastly improved but the challenge still remains for national policymakers and their donor partners to use this information and analysis more effectively. Again, there have been advances. The introduction of Poverty Reduction Strategy Papers (PRSPs) is an encouraging consultative process for achieving better prioritisation for poverty reduction. The development community is now evaluating the first round of strategy papers. Early evaluations have highlighted the critical importance of better public expenditure management in order to ensure that the resources re-leased by debt relief are actually redirected toward the priorities identified in the PRSPs.

Chapter Five: Demographic Dynamics and Sustainability

In the 1990s, China, India and Indonesia improved their family planning polices and adopted integrated population control strategies that include much broader objectives such as human development, poverty alleviation, education promotion, and also female and infant medical care. These strategies have generally succeeded in slowing population growth. The population growth rate in China decreased from 1.5 percent per annum in the 1980s to 0.9 percent per annum in the late 1990s. Similarly, India and Indonesia's population growth rates also decreased from a high of 2.12 percent and 1.84 percent per annum in the 1980s to 1.69 percent and 1.35 percent in the late 1990s respectively.

An important dimension of the demographic dynamic in these three countries has been the pro-cess of urbanisation. Although more than two-thirds of the population of all three countries still lives in rural areas, the rapid urbanisation that has taken place over the last two decades has threatened to overwhelm the environmental resources of urban areas to the point of posing a threat to human health. This is particularly the case in regard to the growing number of mega-cities (cities with over ten million inhabitants) in the Asian region.

Chapter Six: Protecting and Promoting Human Health Conditions

With the exception of HIV/AIDS, significant progress has been made in the Asian region in regard to the eradication of various major diseases. As a consequence, average life expectancy within the region has risen at a much sharper rate than in previous periods. During the 1990s, China, India, and Indonesia added two to four years to their average life expectancy. Chinese life expectancy increased from 68.8 in 1990 to 70.1 in 1999, Indian and Indonesian life expectancy increased from 59.8 and 61.7 in 1990 to 63.2 and 65.7 in 1999 respectively. It is worth noting that these countries also reduced their adult illiteracy rates significantly throughout the 1990s. During this period China reduced illiteracy from 23.0 to 16.5 percent, India reduced its rate from 50.7 to 43.5 percent, and Indonesia experienced of drop from 20.3 to 13.7 percent.

Chapter Seven: Promoting Sustainable Human Settlement Development

Urbanisation

Of the two billion people that will be added to the world's population over the next thirty years, approximately 99.5 percent will be located in urban centres. This translates into the addition of approximately 190,000 people daily to cities around the world. Yet the urbanisation of the world will not take place evenly as most of this population growth will take place in cities of the developing world. That is, for every five to six people added to cities in the developed world, one hundred will be added to cities in the developing world. Within the developing world there will also be extreme variation. Of total urban growth, approximately 61 percent, or almost 1.3 billion, will be added to Asian cities. If new cities were built to accommodate all these people, this would mean that 130 new megacities would need to be created within the Asian region.

A comparison between cities in Asia and Africa highlights the need for diverse responses to urban growth that are based on local, national, and international conditions. It is becoming increasingly clear in the twenty-first century, for example, that urbanisation is a driving force in terms of environmental change and that cities are the new engines of global economic growth. This is nowhere more so the case than in the Asian context and in parts of South America where cities are increasingly being considered as lynchpins in the search for regional environmental if not 'earth security.' Yet, in other regions of the world such as sub-Saharan Africa, massive urbanisation is taking place but without the high economic growth that is associated with Asian urbanisation. Furthermore, many of the cities in other parts of the African sub–continent have remained largely marginalised.

Recent UNU studies have indicated that rapid development processes that have occurred under the influence of globalisation flows have followed a dramatically different path to those development processes that have been overlooked by globalisation. In Asia, transnational economic flows have been encouraged by national and local decision making that privileges growth over environmental concerns. This has left many cities within the Asian region in a condition of environmental stress. While many nations and cities have, since the 1997-98 financial crisis, demonstrated an increasing interest in sustainable urban development, most public decision makers remain uncertain as to the type and nature of policies to implement in order to improve their environments. This is partly because environmental conditions vary tremendously among cities and across the region due to a variety of factors including differences in income, health, basic infrastructure, housing stock, and culture. At the same time, variations between environmental conditions within cities also seem to be on the increase. This said, the positive impact of recent efforts to reduce environmental degradation within these cities is becoming increasingly evident in some areas.

In many African cities that have remained largely isolated from the impacts of economic globalisation, the situation is very different. Rapid urbanisation has left many cities in a state of crisis because they lack sufficient economic vitality to employ vast numbers of migrants. As a consequence, entirely new cities have sprung up almost overnight with no water supply or sanitation and sewerage systems. What is more, many of the cities in Africa risk becoming even more disconnected from the global economic system because of the increasing digital divide.

Disaster Management

It is in cities, with their large collection of human habitation, where disasters can cause the greatest damage. Death tolls from recent urban earthquakes have been large. The 1996 Tangshan Earthquake in China reportedly killed 250,000 people, the 1990 earthquake in Tabbas, Iran, killed 40,000, and the 1991 earthquake in Spitak, Armenia, killed 20,000. Earthquakes are not the only deadly natural phenomena. In 1992, Hurricane Andrew brushed Miami and caused US $22 billion in damages in the area. While the problem of disasters is a concern for both developed and developing countries, the impacts of disasters are much greater in the developing world. In areas such as Mexico City, Manila, Lagos and Accra, development has caused cities to grow in ways which exacerbate disasters because it forces more and more people to live in hazardous or disaster prone areas.

Although there are also mitigating aspects of living in a city that increase the chance of surviving disasters, these positive aspects such as the existence of facilities and the abundance of supplies, are usually countered by other negative factors. These include over-crowding, poor infrastructure, and the existence of more human-made hazards, such as dangerous materials and chemicals.

While these types of shortcomings are offset in developed countries through intensive planning, recent earthquake disasters in California and Kobe have demonstrated that these extensive mitigation measures are not enough. In many of these cases, the mitigation measures that were put in place fell short on one critical characteristic; the treatment of the social aspects of a disaster. Research has shown that city vulnerability is equal to human vulnerability. Yet, most disaster planning currently focuses on the physical aspects of disasters, the weakness of buildings and structures, while focusing very little attention on the people who actually use and occupy the structures, i.e., the people.

Chapter Eight: Integrating Environment and Development in Decision–Making

After the 1992 Rio Summit, large developing countries such as China, India and Indonesia made concerted efforts to improve their institutional capacity to deal with sustainable development issues. To begin the process, China and Indonesia developed their own Agenda 21 in 1994 and 1996 respectively. China was, in fact, the first country in the world to develop its own Agenda 21. China also upgraded its National Environment Protection Agency to the ministerial level. All three countries created National Councils on Sustainable Development that involve a number of ministries and agencies. These councils also involve a range of other stakeholders in an attempt to achieve a balance between the competing priorities and interests of the governments and major societal groups. In addition, these countries have all made environment impact assessments man-datory, particularly in relation to the larger projects. Moreover, these countries formulated a number of environment related standards and laws and established environmental regulation and control boards. In essence, these countries have made significant progress in terms of integrating environmental considerations into the development process and vice versa. The success of their efforts has been limited, however, by overlapping responsibilities and conflicting objectives among implementing agencies and ministries.

Chapter Eleven: Combating Deforestation

Over the last decade of the twentieth century, rapid deforestation has taken its toll with some fifteen million hectares of forests lost annually, mostly from the tropics. It is also clear that the structural integrity of much of the forest cover that remains has deteriorated. The facts are startling. Forests have virtually disappeared in twenty-five countries; eighteen have lost more than ninety–five percent of their forests and another eleven have lost ninety percent. The highest current estimate of the world's remaining forested areas is about 3.6 billion hectares from an originally forested area of more than 6.0 billion hectares. Primary forests have undergone the greatest transition. About fourteen million hectares of tropical forests have been lost each year since 1980 as a result of changes in land–use from forest to agriculture. Forest decline threatens the genetic diversity of the world's plants and animals. The decline of forests is relentless and could change the very character of the planet, and of human enterprise, within only a few years.

Chapter Twelve: Managing Fragile Ecosystems: Combating Desertification and Drought

The UN estimates that some 70 percent of the 5.2 billion hectares of drylands used for agriculture around the world are already degraded. This impacts approximately 250 million people across the world, although some estimates suggest a figure that is four times higher than this. As an example, the worldwide area of arable land per person has been reduced by as much as 25 percent during the last quarter of the twentieth century. This has serious implications for food security and the livelihoods of people who are dependent on the degraded lands. The impact of land degradation on ecosystems is also readily apparent in the destruction of biodiversity resources. According to UNEP estimates, about 65 million hectares of forest were lost across the globe during just five years (between 1990 and 1995). The resultant loss in biodiversity at genetic, species and community level is also severe.

Chapter Seventeen: Protection of the Oceans, All Kinds of Seas, Including Enclosed and Semi–Enclosed Seas and Coastal Areas and the Protection Rational Use and Development of Their Living Resources

The coastal areas of East Asia are a critical and high–priority ecosystem. Agriculture, manufacturing industries, and urban areas are all major contributors to the pollution observed in East Asian coastal waters. The level of pollution in these areas can be approximately correlated to the level of industrialisation in the countries adjacent to the coastal areas. This means that the most highly industrialised countries tend to have the worst pollution in their coastal waters. In addition, the concentration of certain toxic pollutants, such as DDT, appears to be on the rise in East Asian coastal waters despite a ban on their commercial use. The influx of fertilisers, pesticides and herbicides has also increased in the recent years. Various parts of the coastal ecosystems have been seriously impacted by toxic pollutants that have land–based sources. The negative impacts on shellfish (such as mussels), mammals (such as dolphins), and mangrove forests are pronounced and have been well documented.

Furthermore, the previously widespread mangrove ecosystems in the Asia-Pacific region have been decimated in recent years as a direct result of human pressures including, shrimp farming, urban development, and tourism, etc. The loss of biological diversity as a result of this damage to the mangrove systems is severe. It is crucial from an economic development perspective, however, that any attempts to remedy current environmental problems take full account of the potential social–economic impacts that these remedies may have on those groups whose livelihoods depend upon coastal natural resources.

As a result of institutional, historical, financial, or capacity reasons, the laws, conventions, treaties, institutions, mechanisms, and information for the environment have been developed in isolation and are often segregated based on topic or theme. Such systems have not paid due regard to the natural interconnections that exist between ecosystems or bio/geophysical relationships. Similarly there is a chronic lack of coordination at the international, regional, and national levels, and between environmental institutions that deal with related environmental problems. The segregation of these institutions has led to inadvertent conflicts between governance regimes, which has resulted in a general lack of institutional effectiveness.

A cross-sectoral approach to sustainable development better reflects the natural links that exist within the earth's ecosystems and between these ecosystems and societal action. These links are both positive and negative and occur in a never-ending cycle of cause and effect that, in turn, influences human activities and the ways in which we interact with natural systems. It is already evident, for example, that any change in global climate patterns will ultimately affect every major natural and societal system in the world. As climate changes, land use patterns would alter as countries attempt to cope with rising sea levels. Climate change would also alter the fertility of soil in different regions, which would impact on crop yields and possibly threaten food supplies. In addition, even slight changes in temperature would influence the outbreak and spread of major infectious diseases. Thus, any change in climate could potentially lead to the large-scale loss of livelihood, economic dislocation, biodiversity loss, decline in agriculture and food production, worsening human health, and even loss of life. It would be possible to prepare a similar list of linkages for every issue covered by each Chapter of Agenda 21.

In the context of sustainable development, recognition of these inherent links within the natural environment, and between natural and societal systems, has not always been translated effectively into comprehensive and coherent policymaking or institution building. At present, it is still the modus operandi for the United Nations to segregate problem solving on the basis of whatever institutional framework, legal boundary, or specific issue is acceptable to the majority of parties involved the making of a decision. This has led to inconsistencies between naturally synergistic environmental and societal issues, and the fragmented formal legal and institutional instruments that we formulate in an effort to manage them.

4. New Priority Issues for the World Summit on Sustainable Development

Trade and Environment

The trade and environment debate has continually raised speculation and created a climate of uncertainty in regard to the potential incompatibilities between international trade and the rules of various multilateral environmental agreements. In essence, these concerns are centred on the perceived incompatibilities between the goal of global trade liberalisation and the objectives involved in environmental protection. The underlying cause of this debate is the concern of developing countries that the linking of environmental and trade issues within the context of the WTO would lead to an increase in the number of environment–related trade restrictions that would limit their access to global markets. Any future environmental or trade negotiations must be aimed at ensuring that this concern is not realised.

Globalisation and Sustainable Development

Economic globalisation has an impact on the environment and sustainable development in a wide variety of ways and through a multitude of channels. The core challenge in this regard relates to the question of how the positive aspects of economic globalisation can be more directly focused toward those who need it the most. There are several possible solutions to this question, all of which need to be more fully researched and considered. Most of these solutions relate to the structure and functioning of the current global governance system. Some have suggested that current difficulties stem from the fragmentation of environmental and economic international institutions. Others suggest that environmental institutions are weak and have no teeth when compared to global economic institutions. Still more have suggested that there are no institutions in place that can gain control of the rapid forces of globalisation or its tendency to move power, capital, and technology in ways that serve only to make the rich richer, while leaving the poorest out on the margins.

Zero Emissions

Zero Emissions is a strategy for reducing waste and improving the productivity of resources by improving symbiotic linkages between industries. These goals are achieved by identifying value-added uses for process emissions as raw-material inputs for other processes. This approach has proved to be especially effective in Japan, where many firms have used it successfully to reduce industrial waste while maintaining profitability. Zero Emissions has excellent potential for a broader application. While the existing track record for manufacturing industries suggests application in this area, there are examples from the agricultural industry as well, the expansion of which needs to be explored.

Agrobiodiversity

Through generations of innovation and experimentation, farmers have nurtured a diversity of plants and animals, either wild or domesticated, and accumulated a vast amount of knowledge concerning the management of biodiversity. New commercial and intensified farming methods are, however, beginning to contribute substantially to biodiversity loss. In the face of these

increasing pressures, it is crucial that the indigenous knowledge that has been gained through the process of learning, experimentation, and innovation in farming and land management throughout the developing world is not lost. Indigenous knowledge of the management of fragile environments, the local genotypes of food crops and traditional farming practices has the potential to teach us many lessons on how to preserve diversity and halt environmental degradation. At present, an insufficient amount of research has been aimed at capturing the potential embedded within these indigenous knowledge systems.

Information and Communication Technologies

While Agenda 21 acknowledges the importance of information and communication technologies, there was no way that delegates at the Rio conference could have anticipated the vast implications of the information revolution that so dramatically shaped the last decade. Indeed, it is now widely recognized that information and communication technologies are "changing the ground rules for information flow in society." The Internet and computer–mediated information systems shift the balance of control from information suppliers to consumers. Moreover, the pool of electronic information worldwide is growing exponentially.

At present, Internet usage is not evenly distributed around the globe with fifty-five countries accounting for ninety–eight percent of all information and communication technologies in 150 countries across the globe. Of these, eleven are located in the Asia-Pacific. In the Asian region Internet use has grown rapidly and is expected to reach 130 million by 2005. Much of this new growth will be fuelled by China, whose annual rate of Internet growth over the next five years is expected to reach sixty percent.

In recognizing the role that information and communication technologies could play, and to some extent are already playing, within the sustainable development challenge it is crucial that the benefits of these technologies are made available to all. It was in this context and in response to the resolutions made at the Millennium Summit in September 2000, that the UN Secretary-General formed an advisory group of twenty–one experts from the private and public sectors to help bridge the digital divide by harnessing the potential of these technologies for human development. While this represents a significant step in the right direction, much research is still needed in order to identify how information and communication technologies can best be used to further the purposes of sustainable development and, particularly, how they can best be utilised to the advantage of the developing world.

African Natural Resources

Africa is richly endowed with diverse natural resources and its forests host the largest proportion of the world's reservoir of genetic materials. For example, Africa's tropical forests harbour over 8,000 species of higher plants, a figure only rivaled by the Mediterranean vegetation zone of South Africa. Africa's mineral wealth is legendary as the continent is one of the world's major sources of gold, diamonds, copper, tin, bauxite, manganese, uranium and crude oil. This enormous wealth in natural resources should provide potential opportunities for addressing the multifaceted challenges facing the continent. However, past modes of exploitation and management of the natural resources have engendered some problems. In many instances, the exploitation of Africa's mineral wealth has fostered and fueled war and deprivation; situations that compound the already dire situation of the poor rural population.

Another concern is that the natural resources (food crops, useful plants, animal and land) that form the mainstay of the livelihoods of most Africans and are being rapidly degraded. This degradation manifests itself in many ways, most noticeably in deforestation, in the loss of productive capacity of soils used for agriculture and pasture, in serious distortions in the hydrological balance and the access to water resources, and in the continuing loss of plant genetic resources.

The challenge is to ensure that Africa's natural resources serve as the basis for economic growth that would result in more active and sustainable participation in the global economy. Also crucial is to reverse the degradation of the natural resources. Consistent efforts must be made in the short to medium term to build up the resources to levels never before attained in order to meet the demands of a population growing at more than 3 percent a year.

Conservation and Sustainable use of Biodiversity

Conservation and the sustainable use of biodiversity is a key goal that has been stressed on a number of occasions in the preparations for this year's world summit and in major environmental treaties such as the Convention on Biological Diversity. The Millennium Ecosystem Assessment will contribute significantly to the development of a more complete understanding of the link between biodiversity and other environmental issues such as wetlands, desertification, and climate change. This assessment will also provide a more comprehensive account of the capacity of various regional, sub-regional, and sub-national ecosystems to provide the goods and services that are essential to the well–being and development of the peoples of the world.

International Standards for Environmental Management

Under the Global Compact launched by the UN Secretary-General Kofi Annan in January 1999, a new relationship between the UN and the world's business leaders is emerging. This relationship could help build the social and environmental pillars that are required to sustain the new global economy and make globalisation work for all the world's people. Within this framework, the Global Reporting Initiative has been established as a multi-stakeholder effort to create a common framework for voluntary reporting on economic, social and environmental aspects of corporate activities. Related to this, as of December 2001, around 36,000 businesses around the globe, including a large and growing number in developing countries, have obtained certification under ISO14001 and the European Eco–Management and Audit Scheme.

While ensuring the move towards the creation of sustainable business practices, it is also important that the UN system as a whole promotes green practices within its own operations. The UN spends US $3 billion every year on the procurement of goods and services (about thirty percent of the UN's total budget) and operates facilities across the globe. It is also a convener of major international conferences and activities in different countries that require considerable travel for UN personnel.

Criticality of Innovativeness in Communities

Agenda 21 clearly realised the criticality of local communities, and civil society in general in managing the local environment and almost every chapter contains a reference to the need to involve communities at the local level in environmental management. The increasing attention that is being focused on the local level has raised concerns regarding the capacity of local institutions

and groups, including communities and citizens groups, to address local concerns while keeping global issues and implications in mind. This highlights the criticality of developing innovative capacities at the local level, to be able to come up with local resources and local solutions to solve local problems that have beneficial global impacts. The urgency of translating global talk to local action, and building capacity to facilitate that action, has spurred much discussion on the criticality of innovative action by and for communities.

5. Recommendations for Consideration by the World Summit on Sustainable Development

Recommendation ONE:
Enhance Interlinkages between Multilateral Environmental Agreements at the Regional and National Level [1]

In recent years, attention has focused on improving inter–agency coordination at the global institutional level, mainly as a result of the UN Secretary-General's proposals for better issue management and the 1998 Report of the UN Task Force on Environment and Human Settlements. Several of the Task Force's recommended actions pertain either directly or indirectly to the growing number of linkages among environmental conventions.[2]

While efforts to enhance synergies at the global level must continue, challenges and opportunities for enhanced coordination at the regional and national levels also need to be addressed.[3] Examining the dynamics of these two scales is important for a number of reasons. First and perhaps foremost, abundant natural linkages exist in ecosystems having boundaries within and across the sub–national, national and regional levels. This geographic grouping offers promising scales to implement agreements using a synergy approach and can achieve visible as well as tangible results on the ground.

Second, implementing global multilateral environmental agreements often requires regional frameworks and cooperative action plans to specify how global agreements can be applied to the contextual particularities of a geographic or ecological region or sub-region. Such frameworks and action plans are elaborated regularly in the scope of regional or sub-regional intergovernmental meetings, such as the African Ministerial Conference on the Environment, the Asia–Pacific Ministerial Conference on Environment and Development, the ASEAN Senior Officials on the Environment or South Pacific Environmental Cooperative Programme. They may also result from the negotiation of specific arrangements designed to apply global multilateral environmental agreements to a given region, or to protect a threatened resource in a given area. The same applies to the national level in the sense that global and regional agreements require action plans (NAPs) and strategies that provide guidance on how environmental commitments will be implemented sub–nationally and locally.

Third, although there are worthy avenues to establish synergy and mutual support among global multilateral environmental agreements (e.g. Rio Conventions), most agreements are regional in scope, such as the various environmental conventions negotiated under the auspices of the UN regional economic commissions or sub-regional organisations and programmes (e.g. ASEAN, SPREP, SACEP). There are also interesting avenues and possible synergies to pursue across regional and sub–regional arrangements.

Fourth, many of the administrative problems experienced at the global level also surface at the regional and national levels in the form of coordination and conflicting institutional roles, communi-

1 United Nations University Policy Report (Draft), *Interlinkages: Synergies and Coordination among Multilateral Environmental Agreements: National & Regional Approaches in Asia and the Pacific*, Tokyo: UNU, August 2001.

2 See *Report of the United Nations Task Force on Environment and Human Settlements*. A/53/463, 6 October 1998.

3 The regional and national levels are defined broadly. Regional may comprise any sub-regions; national may include sub–national and local levels.

cation failures, duplication, etc. For effective implementation to take place it is important to address any existing deficiencies that may impair proper and effective environmental management.

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Recommendation TWO:
Financial Mechanisms and Donor Institutions Must Promote Greater Interlinkages between Multilateral Environmental Agreements[4]

Financial mechanisms play a key role in creating the priorities for achieving sustainable development. A close examination of current financial mechanisms and existing donor arrangements shows that although there are increasing efforts to create projects that encourage and support synergies between multilateral environmental agreements, efforts are still greatly lacking. Opportunities should also be explored in terms of how common lending criteria, reporting, and policies between multilateral and bilateral donor agencies could be developed. At the national level capacity needs to be strengthened to better promote integrated and coordinated policymaking processes and synergistic implementation of environmental and sustainable development agreements. Innovative and alternative financing methods at national and local levels for projects that have multiple or synergistic benefits should also be explored.

Further information: Please contact UNU/GEIC: Dr. Jerry Velasquez jerry@geic.or.jp or visit the GEIC website http://www.geic.or.jp/interlink/ or UNU/IAS: W. Bradnee Chambers chambers@ias.unu.edu or Shona Dodds dodds@ias.unu.edu

Recommendation THREE:
The Principle of Subsidiarity Should Be More Readily Applied in Environmental Decision–Making and Implementation[5]

The principle of subsidiarity, which calls for decisions to be made and implemented at a level appropriate to the problem they address, should be facilitated in environmental management and governance. Ecosystems are best defined, understood and protected at the regional or local level rather than the global level. The level and type of decisions taken have to match the scale of the challenge or issue. This has long-term implications for the empowerment of communities and their ability to decide for themselves those aspects that affect their everyday lives. Creating an environment that facilitates such subsidiarity is a challenge for local governments, stakeholders, and for those responsible for global decision-making as well as regional and national implementation.

Further information: Please contact UNU/GEIC: Dr. Jerry Velasquez jerry@geic.or.jp or visit the GEIC website http://www.geic.or.jp/interlink/ or UNU/IAS: W. Bradnee Chambers chambers@ias.unu.edu or Shona Dodds dodds@ias.unu.edu

4 Recommendations are drawn from: United Nations University Policy Report (Draft), *Greening the Global Financial Architecture: Towards a New Strategy of Financing and Investing in Sustainable Development*, Tokyo: UNU, 2002.

5 United Nations University Policy Report, *Interlinkages: Synergies and Coordination between Multilateral Environmental Agreements*, Tokyo: UNU, 1999; United Nations Meeting Report, *World Summit for Sustainable Development International Eminent Persons Meeting on Interlinkages Strategies for Bridging Problems and Solutions to Work Towards Sustainable Development 3–4 September*, Tokyo: UNU September 2001.

Recommendation FOUR:
Effective Ways to Cluster Multilateral Environmental Agreements Should be further Explored and Implemented as Soon as Possible[6]

A fundamental starting point for environmental law and policy is science. The bio/geophysical relationships between sectors, substances and the inter–relationship of ecosystems, and activities that multilateral environmental agreements seek to protect or regulate, provide an obvious organising principle for their coordination. From this starting point policymakers could ensure greater effectiveness and cost efficiency of multilateral environmental agreements by initiating a process to strategically group MEAs together according to their scientific and natural relationships. A suggested grouping could be the following:

- Conventions related to biodiversity (possible sub–clusters are regional, sea, etc)
- Conventions related to oceans and seas
- Conventions related to fresh water, forests and lands
- Conventions related to the atmosphere
- Conventions related to chemicals and hazardous wastes

Pragmatic work programmes could be devised within each grouping based on common functions such as capacity development, technology transfer, education and awareness raising, and information dissemination and reporting. Such clustering should consider more effective modalities for future international negotiation, scientific assessment, and international-regional-national implementation and coordination.

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Recommendation FIVE:
The Trade and Environment Debate Must Finally be Reconciled[7]

The Doha WTO Ministerial Declaration reaffirms the need to place developing countries at the heart of the future round of trade talks and also stresses its commitment to the objective of sustainable development. These two guiding imperatives must form the basis to finally resolve the ensuing international debate on the multilateral trading system and legitimate environmental concerns.

In this context the work programme on trade and environment of the WTO that, according the Doha Ministerial Declaration, will be proposed for the Fifth Session of the WTO Ministerial Conference and be considered for the "desirability of future action" should include the following key issues:

- Consistent interpretation and application of the precautionary principle, and other recognized principles under international environmental legal instruments in WTO dispute settlement proceedings.
- Perverse subsidies are both harmful to the economy and to the environment. In a number of sectors (such as fish and fish products, and agriculture) they restrict imports from developing countries. In such cases, removing perverse subsidies is considered to be a "win-win" scenario where the environment could be improved and the exports of developing countries and least developing countries could be expanded.

6 Ibid

7 Gary Sampson and W. Bradnee Chambers eds., *Trade, Environment and the Millennium* (Second Edition), Tokyo: UNU Press, 2001.

- Multilateral environmental agreement rules that have trade implications and which enjoy "universality" must be recognised as having supremacy and authority over conflicting trade rules. Such cases must be recognised as legitimate exceptions under the WTO and regional trading agreements. Member states of multilateral environmental agreements and the WTO and other economic legal instruments should conclude mutually recognised guidelines of how possible legal inconsistencies could be interpreted between their respective agreements.
- Other UN agencies and international organisations must join forces to provide greater capacity development and technical assistance to create awareness and expertise to ensure that trade and environment can be mutually supportive. UNU, as the premier research and training institution within the UN system, could play and strong role in this regard.

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Recommendation SIX:
Greater Connectivity Is Required between Urbanisation and Sustainable Development and Priority Issues such as Poverty, Health, and Rural Development [8]

There is still a crucial need for more in-depth research concerning the relationships between increasing wealth because of globalisation-driven growth and demographic shifts, and environmental conditions in cities and the well-being of urban populations. As most data is collected at the national level, there is only a limited body of regional knowledge relating to the environmental conditions of most cities. This remains the case despite the recognition that cities play such a crucial environmental and economic role. It is vital, therefore, that more information be collected and assessed in order to further our understanding of the relationships between the driving forces of change, their impacts, the state of the urban environment, and current policy responses. The first step in understanding these complex inter-relationships is an urban assessment.

Urban ecosystem assessments, or the urban ecosystem approach, must become part of urban action plans to promote the understanding of these linkages. The key to urban ecosystem approach is the connection between driving forces (i.e., demographic shifts), pressures (i.e., wealth and poverty), states of the environment (including the health of populations), and responses (policies) related to urban activities that focus on the ability of cities to provide the environmental/ecological services needed for human well–being. As many cities throughout the developing world have not performed environmental assessments, notwithstanding integrated efforts, urban managers are at a loss for responding to pressing environmental conditions. Urban ecosystem assessments have the promise of facilitating integrated and multi-scaled policy analyses and therefore would be vital to decision–makers at all levels.[9]

Further information: Please contact UNU/IAS: Dr. Peter Marcotullio pjmarco@ias.unu.edu

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8 Peter J. Marcotullio, "Asian Urban Sustainability in the Era of Globalisation," *Habitat International Journal of the Study of Human Settlements*, 25(4), 2001, 577 – 498; Peter J. Marcotullio, Awais L. Piracha and Caroline King, "Overview of Urban Ecosystems: Towards an Assessment Framework," *UNU/IAS Working Paper*, Tokyo, 2001; Fu–chen Lo and Peter J. Marcotullio, eds., *Globalisation and the Sustainability of Cities in the Asia Pacific Region*, Tokyo: UNU Press, 2001.

9 In collaboration with a number of scholars and UN agencies (WHO and UNESCO/MAB) and other international organisations (International Institute for Environment and Development), the UNU/IAS is leading an effort to conceptualise and promote urban ecosystem assessments as part of the Millennium Ecosystem Assessment. The assessments are envisioned to operate in ways commensurate with Local Agenda 21, as multi–stakeholder dialogues and public participation will be important components.

Recommendation SEVEN:
Promotion of Information Communication Technologies Are Critical for Environmental Education, Increased Resource Efficiency and Conservation

The rapid diffusion of information and communication technologies has resulted in the opening up of new avenues for the preparation and presentation of environmental information in formats that can be more easily understood by decision makers and the general public. Multimedia technologies, software packages, and such tools as indicators and animated graphical presentations, can assist decision-makers in understanding environmental change. Utilisation of the World Wide Web and other computer networks can facilitate rapid information exchange and communication essential to the pursuit of sustainable development goals. Sophisticated global, national and local environmental monitoring systems can be linked and accessed real–time to ensure feedback on the implementation of environmental sustainability objectives.

The speed inherent in information and communication technology use has brought additional benefits in terms of bridging the gap between scientific data, policy decisions, action and education. This has the additional bonus of improving environmental governance by increasing the transparency of decision-making processes and enhancing public awareness of environmental concerns, thus complying with the objectives set out in Chapters Thirty Six and Forty of Agenda 21. The potential being opened up by these new patterns of ICT supported communication, policy formulation and education is revolutionary and still far from being appreciated adequately and needs to be further explored.

It has also been increasingly recognised that the application of information and communication technologies can bring about environmental benefits through schemes such as teleworking and the development of e-commerce solutions. Regional strategies (e.g. European Commissions e-Europe strategy) could also offer a way to maximise the potential economic and environmental opportunities associated with the shift to an information society in across the globe. This should not be a case of "grow now, clean later" but "grow a clean industrial structure now" and share knowledge in the process.[10]

Further information: Please contact UNU/IAS: Dr. Brendan Barrett barrett@ias.unu.edu or UNU/HQ: Ng Chong chong@hq.unu.edu and Dr. Eric Williams williams@ias.unu.edu.

Recommendation EIGHT:
"ZERO Emissions" Strategies Are a Practical and Economically Efficient Path to Sustainability[11]

Strategies such as the Zero Emissions concept, which advocate all industrial inputs being used in final products or converted into value-added inputs for other industries or processes, are practical methods to achieve greater environmental sustainability. Such strategies could be implemented by reorganising industries into clusters such that each industry's wastes or by-products are fully matched with the input requirements of another industry, and the integrated whole produces no waste of any kind. National governments should, with the cooperation of industry, sponsor feasibility studies to determine what sectors could most benefit from the application of Zero Emissions.

10 The UNU is implementing a number of projects under the theme of ICT and the Environment. These include pro jects on information harmonisation for national reporting on multilateral environmental agreements, exploratory research on the impact of ICTs in relation to environmental conservation, and an exciting initiative called the UNU Virtual University.

11 See http://www.unu.edu/zef/ and http://www.ias.unu.edu/special/zeri.cfm

In some cases, national investment in research and development will be needed to get past the initial non-market barrier that exists for all new technologies. As Zero Emissions symbiosis requires new cooperation between companies, local governments can play an important brokering role between firms, as well as stimulate development of Zero Emissions industrial parks.

Further information: Please contact UNU/HQ: The Zero Emissions Forum unu-zef@hq.unu.edu

Recommendation NINE:
Promotion of Best Practices on Agrobiodiversity through Local Knowledge Is a Key to Biodiversity Conservation[12]

Biodiversity exists largely in landscapes that are managed for agriculture and rural livelihoods. Generations of farmers have experimented and developed innovated ways to manage biodiversity. In the process they have devised management practices that combine superior production along with the enhancement of biodiversity. One useful approach to the preservation of biodiversity within Asia is to promote best practice farm management by identifying "expert" farmers and facilitating their training of other farmers, technicians, scientists, extension agents, and policymakers. This represents a bottom-up approach to technology and knowledge transfer that is dramatically different from the top-down approach that is often used in agricultural extension and reforestation programmes.

The most promising method of improving livelihoods by encouraging the maintenance of agrobiodiversity, relies heavily on hybrid management systems that take the insights offered by locally developed knowledge, expertise, and practice and integrates them with the most modern techniques. This strategy creates entirely new management systems that are both distinct and well adapted to local resource use patterns.

Further information: Please contact UNU/HQ: Luohui Liang liang@hq.unu.edu or http://www.unu.edu/env/plec/

Recommendation TEN:
Creation and Implementation of Strategic National Frameworks for Sustainable Development Are Required[13]

Strategic planning frameworks for sustainable development are an effective method of identifying the priorities, compromises, and trade-offs that countries must take account of in order to achieve sustainability. Such frameworks should measure progress and set priorities. They should also serve to identify, analyse, and help show how best practices can be adapted in pursuit of the socio-economic and environmental goals outlined in Agenda 21. As an example of how such frameworks could be constructed UNU has formulated three strategic frameworks that focus on China, India, and Indonesia. The frameworks were country driven and took into consideration specific country factors that are inherent to large developing countries. These include the tremen-

12 United Nations University Report, *PLEC Progress Reports*, Tokyo: UNU, 1999–2001 http://www.unu.edu/env/plec/documents.html; Harold Brookfield, *Exploring Biodiversity*, New York: Columbia University Press, Forthcoming 2002; Juha I. Uitto and Akiko Ono, *Population, Land Management and Environmental Change,* Tokyo: UNU Press, 1996, Special Edition *Global Environmental Change*, 5(4), London: Butterworth–Heinemann, September 1995. This special issue of GEC was dedicated solely to PLEC Research.

13 Fu-chen Lo and Yu-qing Xing, eds., *China's Sustainable Development Framework*, Tokyo: UNU/IAS, 1999; T. Palanivel, "Sustainable development of China, India and Indonesia: Trends and Responses", *UNU/IAS Working Paper*, Tokyo: UNU/IAS, 2001.

dous population pressures that can give rise to deforestation and soil erosion as well as the natur al resource endowments of each country.

Many of the key recommendations put forward in the sustainable development frameworks formulated within UNU projects have centred on the need to create more effective, integrated, and transparent national institutions. Such institutions are required to develop the kind of broad packages of policy instruments, including economic instruments, which are essential to sustainable development. These institutions are also crucial in terms of reconciling economic development and environmental priorities within large countries with diverse populations. This is even more so the case given the additional pressures that are caused by rapid globalisation.

The effectiveness of these integrated national institutions will depend, to a large extent, on their capacity to establish positive partnerships with national and international private sector interests and also upon their ability to engage civil society and community actors in a constructive manner. This is because some of policy reforms directed towards sustainable development are contro versial nature such as raising prices, closing polluting factories, accepting international agreements and prohibiting farming or grazing in degraded ecosystems. Without popular support for these reforms, changes will be difficult and well designed. The effectiveness of these institutions will also depend on their success in terms of coordinating the work of various ministries and agencies in order to reduce the overlaps and contradictions that exist between them. Their effectiveness would also be enhanced if they prove capable of taking advantage of any possible synergies that exist between various ministries and agencies.

Further information: Please contact UNU/IAS: Dr. T. Palanivel palani@ias.unu.edu or Dr. N. S. Cooray cooray@ias.unu.edu or http://www.ias.unu.edu/research/sdf.cfm

Recommendation ELEVEN:
Greater Consideration of the Social Aspects of Disaster Vulnerability is Required

The key role that disaster management plays in the effective implementation of Agenda 21 has been stressed on numerous occasions in preparation for the Johannesburg Summit. Natural disasters divert much-needed resources from other purposes, thus hampering an already difficult development process, especially in the poorest countries. The recently concluded International Decade for Natural Disaster Reduction has shown that it will not be easy to deal with such phenomenon.

In order to more effectively prepare for disasters it is important to consider the social aspects of vulnerability, effectively dealing with the people that will be affected by disasters. Linked with the other aspects of sustainable development, this will include the upgrading of the well-being of people before disasters, social support systems, partnership and networking, awareness and education, eradication of social and cultural stigma and racism, as well as prodding of political will and corruption reduction. Although somewhat distant to the usual approach to disaster management, it is nevertheless obvious that these are the root causes of vulnerability, which not only affect resistance to disasters impact, but also influence the capability of communities to rebound and reconstruct.

Further information: Please contact UNU/GEIC: Dr. Jerry Velasquez jerry@geic.or.jp or http://www.geic.or.jp/interlink/

Recommendation TWELVE:
Greening of the UN System Should be a Priority

A number of UN agencies take their environmental responsibilities very seriously. UNHCR, for example, has developed and implemented a green procurement system [14]; UNDP has implemented the Green Office Initiative, and UNU obtained ISO14001 certification in January 2001.

In line with the requirements of the Global Compact, there may considerable merit in making greater efforts to ensure that the UN system has its own house in order by promoting the greening of the UN through the establishment of an effective environmental management system. Related to this, the UN should take measures to ensure that the major conferences, including WSSD, are implemented in a manner that is friendly to the environment and involves minimum waste. The UN organisation could also increase its use of information and communication technologies, including video-conferencing, in an effort to reduce staff travel and its associated environmental impacts.

Further information: Please contact UNU/HQ: UNU ISO14001, Dr. Brendan Barrett barrett@ias.unu.edu or Makiko Yashiro at yashiro@hq.unu.edu or http://www.unu.edu/ISO14001

Recommendation THIRTEEN:
Innovativeness at the Community Level Would Help to Foster Local Action

Many ingredients go into the development of successful community–centered local environmental management, but key is the facilitative, or fostering, environment that enables communities to be innovative. Innovative Communities nurture new ideas and solutions, focusing on knowledge, education, information exchange, networking. Absorption and diffusion of knowledge and information is a critical part of its innovativeness. These communities can better manage development with a long–term perspective, focusing on implementation, behavioural change, and lifestyle. Innovative communities also tend to be more sustainable because of their capacity to respond to changes in the larger environment. They are better able to utilise their resources in a way to ensure that community members can attain a high degree of health and well–being, economic security, and have a say in shaping their future while maintaining the integrity of the ecological systems on which all life and production depends.

Further information: Please contact UNU/GEIC: Makiko Yashiro yashiro@hq.unu.edu or Izumi Ono ono@hq.unu.edu

Recommendation FOURTEEN:
As an Essential and Fragile Ecosystem, Mangroves Must be More Widely Protected

It is essential that some quantifiable indicators for evaluating mangrove ecosystems be developed. These indicators must incorporate socio-economic factors and could, usefully, be based on an assessment of goods and services provided at an ecosystem level. An in-depth evaluation of the impacts of the introduction of foreign species of mangrove plants into coastal habitats is also

14 Note: UNCHR (1996), *Environmental Guidelines*, UNCHR, Geneva.

urgently needed. This is closely linked to biotechnology issues pertaining to the exploitation and modification of the living resources in mangrove ecosystems. Emphasis should be given to the evaluation of various novel uses of mangroves plants, including for medicinal purposes and as a food source.

Further information: Please contact UNU/HQ: Dr. Libor Jansky jansky@hq.unu.edu

Recommendation FIFTEEN:
Poverty Eradication Must be a High Priority for WSSD Success

A focus on the eradication of poverty is paramount to the success of the Summit. In order to move forward on the issue, we need to concentrate on the lessons learned since the Rio Summit in 1992. Key lessons include the need to focus on both sides of the reciprocal relationship between environment degradation and poverty. It is also important to give priority to improving the ecosystems and resources upon which the poor depend (e.g. water) and to endorse the ownership of essential support systems by the poor themselves. Other lessons include the importance of giving priority to pre-growth stage of economic development rather than relying on 'trickle down' economic approaches. Empowerment of the poor is, for example, a core pre-condition for sustainable development and equitable environmental problem solving.[15] In addition, there is a need to upgrade the fiscal system in many countries to ensure that any savings from debt relief are effectively and speedily translated into pro–poor spending (particularly primary education and basic health services).

Further information: Please contact UNU/WIDER: Dr. Tony Addison addison@wider.unu.edu or http://www.wider.unu.edu

Recommendation SIXTEEN:
Reverse the Nexus between Conflict and Poverty

Conflict, both civil war and war between states, is highly destructive of human capital and of development more generally. UNU research has demonstrated the importance of reducing the gap between rich and poor in an effort to ensure that grievances are not available to be exploited by unscrupulous leaders. In particular, this research highlighted the importance of ensuring a fair and equitable allocation of public spending on basic services (across ethnic groups and regions), as well as a fair allocation of the burden of taxation. If peace can be secured, then it is vital to engage in early economic and social reform to shift resources to pro-poor spending so that the most vulnerable can speedily rebuild their human capital and livelihoods. Unfortunately, the reconstruction process often leaves the poor behind, resulting in the creation of further grievance and an unsustainable peace.

Further information: Please contact UNU/WIDER: Dr. Tony Addison addison@wider.unu.edu or http://www.wider.unu.edu

15 A useful resource for policymakers is the UNU/WIDER's income inequality database (the World Income Inequality Database found online at http://www.wider.unu.edu/wiid/wiid.htm) which tracks inequality over time and across countries, enabling national policymakers and their donor partners to give more attention to inequality-poverty linkages.

Recommendation SEVENTEEN:
Recognise the Multiple Values of Forests

An effective approach to the problem of deforestation is based on an intrinsic understanding of the true nature of the value of forests. As people often do not realise the multiple uses of forests, its proper utilisation is often overlooked. A greater level of coordinated and integrated scientific research on the multiple different values of forests is needed among the international academic community. There is also a need to strengthen capacity development in order to inform foresters, researchers, policymakers, local communities and other actors of the true value of forests and to stress the important role of forest–based communities in supporting sustainable forest management.

Worldwide awareness building and a concerted effort for improving forest policy management are needed to promote the adoption of an "International Year of Forests" by the United Nations in the near future.[16]

Further information: Please contact UNU/HQ: Dr. Libor Jansky jansky@hq.unu.edu or UNU/GEIC: Dr. Jerry Velasquez jerry@geic.or.jp

Recommendation EIGHTEEN:
Use the WSSD to Explore the Link between Globalisation and Sustainable Development

If we are to truly realise the concept of sustainable development then we should work towards making better use of the positive connections between globalisation and sustainable development. This would lead to a better understanding of how the challenges of sustainable development could be effectively met and how solutions could most equitably be implemented. The World Summit on Sustainable Development could provide an opportunity to look afresh at different possibilities for improving current approaches.

Recommendation NINETEEN:
Develop Integrated Approaches to Combating Desertification and Drought

The development of integrated approaches is critical to minimising land degradation and its related societal and economic impacts. There is a need to promote actions for building and strengthening existing institutional capacities for regional, national and basin-level agencies to effectively address and integrate cross-sectoral aspects. Defining such integrated approaches is a complex job and the outcome will vary from region to region. In order to develop a general framework for such integrated approaches, the following four dimensions of the problem must be considered.

Technical Dimensions:

- All renewable natural resources (water, soil, vegetation, etc.) should be taken into account when developing integrated management programs;
- Innovative solutions have to be identified for managing land degradation, mainly through water use efficiency and productivity, and soil conservation;

16 UNU and it partners have published several books on forests, please see: Matti Palo and Jussi Uusivuori (ed) World Forests, Society & Environment, Volume I, Kluwer Academic Publishers, 1998, Helsinki; Matti Palo and Heidi Vanhanen (ed) World Forests from Deforestation to Transition? Volume II Kluwer Academic Publisher, 2000, Netherlands; and Matti Palo, Jussi Uusivuori and Gerardo Mery (ed), Kluwer Academic Publishers, 2001, Netherlands." World Forests, Markets and Policies, Volume III Kluwer Academic Publisher, 2000, Netherlands.

- Potential conflicts and synergies between highlands and lowlands should be given due considera tion, particularly because highlands and mountains serve as water towers for the lowlands; and
- Due consideration be given to trans-ecozone characteristics of resources - especially water. Planning and conflict resolution on a trans-ecozone level become crucial in approaches to improve the resources situation in dry areas.

Human Dimensions:

- Localised approaches for land ownership and land tenure are often critical in conservation of resources;
- Impacts on livelihood of local people need to be accounted for when designing and discussing resource management approaches; alternative livelihoods for communities that may be impacted have to be developed;
- Effects of indigenous practices on natural resources, both positive and negative, should be accounted for;
- Whenever applicable, indirect social benefits of integrated management should be explicitly con sidered; and
- Mechanisms for conflict resolution during the implementation of management approaches should be built into the programmes.

Economic Dimensions:

- Evaluation of social, environmental and economic costs and benefits has to be undertaken to ensure long–term sustainability or viability of integrated approaches;
- Capital investment into developing new infrastructure as well as maintaining existing and tradi tional practices should be made; and
- Linkages to national economic development should be elaborated.

Natural Resource Dimensions:

- Rehabilitation of ecosystems in marginal lands should have the highest priority in integrated pro grammes; and
- Whenever applicable, in situ conservation of biodiversity within ecosystems should be considered.

These dimensions are closely interlinked with each other and need to be considered explicitly to develop fully integrated approaches. A number of international organisations are already working towards development of such approaches, although successful examples of such programmes are few.

Further information: Please contact Dr. Zafar Adeel adeel@hq.unu.edu or http://www.unu.edu/env/resource/resource.html

Recommendation TWENTY:
Recognise the Crucial Role Played by Higher Education in Sustainable Development

UNU supports the Lüneburg Declaration on Higher Education for Sustainable Development[17] of October 2001 and recommends that the principles and priorities outlined therein be adopted and pursued by governments, higher education institutions, non-governmental organisations and other stakeholders, and the various UN agencies and bodies involved in training and capacity building activities. It is a recognition of the indispensable role that higher education plays in addressing the critical challenges of sustainable development that underpins UNU's extensive capacity develop-ment and postgraduate education and training programmes.

17 *The Lüneburg Delcaration on Higher Education for Sustainable Development* was adopted on 10 October 2001 in Lüneburg, Germany, on the occasion of the International COPERNICUS Conference "Higher Education for Sustainability: Towards the World Summit on Sustainable Development (RIO+10)" held at the University of Lüneburg from 8-10 October 2001.

6. Activities to Assist Developing Countries to Implement Agenda 21

The overarching goal of UNU is to advance knowledge for human security and development. To this end, the overwhelming majority of our research and capacity building efforts are focused on developing countries and the issues that concern them the most, including sustainable development. A large share of UNU's budget is specifically devoted to its post-secondary education and capacity development programme. A recent survey among the various contributors to UNU's capacity development activities has shown that these are widely and highly appreciated and have in many cases been critical to the career development of the participants. Encouraged by this assessment, UNU is establishing a UNU Capacity Development Fund to help strengthen and further expand its capacity development programme.

All parts of UNU system engage in capacity development activities. These are aimed, in particular, at strengthening academic institutions in developing countries and increasing the capability of young scholars and professionals in these countries to contribute to the extension, application and diffusion of knowledge. UNU places a strong emphasis on strengthening cooperation among institutions in developing countries and building "south-south" cooperation to further enhance the teaching and research capacities of existing centres of excellence. The University also aims to alleviate the intellectual isolation of researchers and institutions from developing countries by supporting their integration into the wider international academic community.

Throughout the last ten years UNU has undertaken a wide range of both long-term and short-term post-secondary education and capacity building activities that are aimed at enhancing the potential of developing countries to meet their environmental and development objectives. Many of these activities were explicitly endorsed within Agenda 21 and also fall under the umbrella of action recommended within the Lüneburg Declaration on Higher Education for Sustainable Development.

Further information: Please contact UNU Centre Dr. Birgit Poniatowski poniatowski@hq.unu.edu or http//:www.unu.edu

Please Note: The following summary is only intended to represent a broad outline of the types of activities UNU has engaged in over the last decade. A more detailed outline of UNU activities in this regard may be found in the University's annual reports and the reports of the various research and training centres and programmes.

Chapter 34: Transfer of Environmentally Sound Technology, Cooperation and Capacity-Building

Fisheries

Over–capitalization of the world's fishing fleet has led to over-exploitation of fishery resources and world fisheries are now on the verge of becoming another natural resource disaster. This situation has created a new demand for high professional standards in relation to a large number of fisheries skills, particularly in the developing world. In order to meet the growing needs of developing countries in this regard, United Nations University, in cooperation with the Marine Research Institute of Iceland and with the support of the Government of Iceland, holds an annual six-month fisheries training course. This course provides advanced training in various fisheries-related areas to specialists from the public, private and academic sectors in developing countries. Provincial fisheries administrators, fisheries scientists and operational managers, economists, planners and technicians receive in-depth, individualised training in fisheries policy and planning; marine and inland waters resources assessment and monitoring; quality management

of fish handling and processing; management of fisheries companies and marketing; fishing technology; fleet operations; aquaculture; or environmental protection assessment and monitoring.

Further information: Please contact UNU/FTP Dr Tumi Tómasson tumi@hafro.is or http://www.hafro.is/unuftp/

Geothermal Energy

The overall aim of UNU Geothermal Training Programme in Iceland is to assist developing countries that have significant geothermal potential to build groups of specialists with a competence in most aspects of geothermal exploration and development. In each annual six-month course, specialised training is offered in geological exploration, borehole geology, geophysical exploration, borehole geophysics, reservoir engineering, chemistry of thermal fluids, environmental studies, geothermal utilization, and drilling technology. The trademark of this training course is that it provides university graduates that are engaged in geothermal work, very intensive on-the-job training in their chosen fields of specialisation. The trainees work side by side with professionals of Orkustofnun, an agency actively working on most aspects of geothermal research, exploration, and development. Within each course, the training is tailor-made for each individual and the needs of his/her institution or country.

Further information: Please contact UNU/GTP Dr Ingvar Birgir Fridleifsson os@os.is or http://www.os.is/unugtp/

Software Technology

The UNU Institute for Software Technology in Macau, China, provides advanced training to young software engineers from developing countries. Training is offered in software research and development, curriculum development for postgraduate and postdoctoral courses in formal software development, and the development of curricula for computer science departments. Recently, the Institute extended the scope of its advanced courses and training schools on the RAISE method and duration calculus, creating web sites and algorithmics to include new training courses on software project management and the co-design of hardware and software systems.

Further information: Please contact UNU/IIST Prof Zhou Chaochen iist@iist.unu.edu or http://www.iist.unu.edu/

Food Technology

With the aid of private funding, UNU organises an annual twelve-month training programme on food science and technology at the National Food Research Institute in Tsukuba, Japan. The programme targets scientist at universities or research institutes in developing countries, with a particular emphasis on the Asia-Pacific region. The programme covers a wide range of research activities and its focus includes such topics as technology development for food processing and distribution food safety, scientific evaluation of food and food components in relation to human health, and the identification and utilisation of new functionalities found in living organisms.

Further information: Please contact UNU Centre Dr. Birgit Poniatowski or http://www.unu.edu/capacitybuilding/shortcourses.html

Biotechnology

The UNU Programme for Biotechnology in Latin America, located in Caracas, Venezuela, focuses on modern biotechnology–related health issues, bioethics, biosafety, bioinformatics and genomics. The overall objective of the programme is to promote the development of biotechnology in Latin America through research and academic exchange. These academic exchanges are carried out through the awarding of fellowships for research and advanced training in leading biotechnology laboratories within the region and also through the conduct of short training courses. These training courses are aimed at young scientists and technicians, both from academia and the private sector. The programme also assists in the establishment of links between biotech institutions in the developed world and similar institutions in Latin America. A specific effort is also made to better inform countries within the region of existing biotechnology resources that could be used to promote technology transfer.

Further information: Please contact UNU/BIOLAC Dr. José Luis-Ramirez unu@reacciun.ve or http://www.unu.edu/capacitybuilding/Pg_biolac/pg.html

Science and Environmental Decision–Making

The political-scientific interface has emerged as one of the key dimensions of multilateral negotiations and environmental diplomacy. For this reason, the capacity of diplomats and other actors to access, understand, and deal with increasingly complex factual and scientific data is of critical importance. With this in mind, the UNU Institute of Advanced Studies has conducted a number of capacity building seminars aimed at providing negotiators from developing countries with better access to, and a more in-depth understanding of, the key scientific issues that have become increasingly relevant to multilateral environmental negotiations. These seminars have focused on the issues of climate change, trade and the environment, and biodiversity and have taken place primarily in the ASEAN and MERCOSUR regions.

Further information: Please contact UNU/IAS W. Bradnee Chambers or http://www.ias.unu.edu

Chapter 36: Promoting Education, Public Awareness and Training

Leadership

Leadership is critical to resolving conflicts, building peace, protecting the environment, reducing poverty, and ensuring sustainable development. The art and skills of leadership, its ethics and values, and the tasks and competencies required to make good leaders in a national, regional and global context are in pressing demand. The UNU Leadership Academy in Amman, Jordan, is dedicated to the task of imparting leadership education to outstanding mid-career men and women from around the world through intensive courses encompassing theoretical and experiential learning. This task is undertaken with a view to the particular needs of developing countries. This translates into an emphasis on the issues of crucial importance to the developing world, such as sustainable development, and also an effort to solicit a high level of course participation from developing country representatives.

Some of the more recent activities have included a three-week intensive leadership for poverty reduction course held in September 2001 and a leadership training course for African women entrepreneurs that was held in Ghana in 2001. This latter course built upon a UNU Institute for

Natural Resources in Africa study on African women who have succeeded as professionals and entrepreneurs in natural resources management enterprises. Previous courses have focused on such issues as disaster management.

Further information: Please contact UNU/LA Dr. Kennedy Graham un2@ju.edu.jo or http://www.unu.edu/la/index.htm

Degree–Oriented Programmes

UNU helps to upgrade the academic qualifications of young researchers, particularly from developing countries, through three types of programmes: Ph.D. internships, programmes that lead to the award of a degree, and postdoctoral fellowships.

UNU Ph.D. Internships provide Ph.D. candidates who have been accepted in Ph.D. programmes, particularly at universities in developing countries, with the opportunity to conduct part of the research for their dissertation at one of UNU's research and training centres. Interns gain access to the latest scientific information, receive expert advice from the academic staff of the institute and can link up with the wider academic community at the location of the institute. These interns take up short–term positions at several UNU research and training centres including: the UNU World Institute for Development Economics in Helsinki, Finland, the UNU Institute of Advanced Studies in Tokyo, Japan, which focuses on sustainable development research, and the UNU Institute for New Technologies in Maastricht, the Netherlands, which conducts policy research on the economic and social impact of new technologies in the developing world.

UNU currently supports three degree-oriented studies programmes. Fellowships for Masters and Ph.D. studies in the field of Science and Technology for Sustainability are available at the Kwangju Institute for Science and Technology. Once every biennium, UNU awards fellowships to students, mainly from anglophone Africa, to participate in the two-year postgraduate training programme in nutrition planning offered within the framework of the Applied Nutrition Programme at the Department of Food Technology and Nutrition of the University of Nairobi, Kenya. The UNU Institute for New Technologies in Maastricht and the Maastricht Economic Research Institute on Innovation and Technology, a division of the University of Maastricht, have, since 1995, jointly offered a Ph.D. programme on the economic and policy dimensions of technical change.

Postdoctoral fellowships are newly available at the UNU Institute for Advanced Studies for research in the areas of biodiversity, biosafety and sustainable development; information technology for the environment; ecosystems and socio-economic impacts; urban ecosystems; and ecosystems and multilateral institutions. Roughly eighty percent of these positions are awarded to suitably qualified candidates from developing countries.

Further information: Please contact UNU Centre Dr. Birgit Poniatowski or http://www.unu.edu/capacitybuilding/degree.html

Disseminating Capacity Development Expertise

The concept of integrated capacity development includes the manifold non-regular training seminars and workshops that are conducted in direct connection with ongoing UNU research projects. In the past, a number of UNU research and training centres and programmes have engaged in a large number of these types of ad hoc capacity development activities, the details of which can be found on each centre's website.

Some of the most recent non–regular capacity building activities have included a training workshop for local practitioners and managers on a predictive model of physical, chemical and water quality processes in Lake Malawi that was organised by the UNU International Network on Water, Environment and Health in 2001 and also a capacity development workshop for integrated approaches to the biosafety of genetically modified organisms that was organised by the UNU Institute of Advanced Studies and held in Jakarta, Indonesia, in 2001. The Institute of Advanced Studies also conducts a short training programme that seeks to enhance the skills, tools, and knowledge of various stakeholders vis-à-vis recent advances in environmental research and management. These courses are conducted in collaboration with regional academic institutions such as the Asian Institute of Technology and normally target mid-career academics, government officials, and personnel from non-government organisations, particularly from developing countries.

In close connection with their research work, UNU research and training centres assist institutions of higher learning in developing countries to upgrade their teaching curricula. Some of the most recent efforts in this regard have included the UNU Institute for Natural Resources' development of a modular postgraduate training course in environmental management and policy analysis for use by universities in Africa and also the support offered by the UNU Institute for Software Technology to universities in the development of curricula for computer science departments.

UNU also cooperates with international and national organisations to upgrade capacity development strategies in their fields of work: The UNU International Network on Water, Environment and Health, for example, co-organised an international symposium on human capacity development in the water sector in Delft, the Netherlands, to feed into the upcoming International Conference on Freshwater, the World Summit on Sustainable Development, and the Third World Water Forum. The UNU Food and Nutrition programme has also conducted a number of workshops in Africa aimed at identifying strategies for capacity development in nutrition leadership, which will be followed up in the coming years with various capacity development initiatives.

Further information: Please contact UNU Centre Dr. Birgit Poniatowski or http://www.unu.edu/capacitybuilding/index.htm

Virtual University

In 1996 the UNU Institute of Advanced Studies initiated the Virtual University project. More recently, from 2000 onwards, UNU, UNEP, Agder University College and a number of universities across the globe have been collaborating in the development of a Global Virtual University on Environment and Development. The initiative promotes the co-development of online courseware on environment related themes between institutions and experts from the North and South. A decentralised delivery system is being developed for courseware through collaborating institutions in the developing world supported by mechanisms to ensure face-to-face interaction between students and lecturers initially via the Norwegian University system. Provision will also be made to ensure enhanced access for learners to environment related information from within the UN system and its networks utilizing products and processes including UNEP's groundbreaking Global Environmental Outlook 2000 report.

Further information: Please contact Ng Chong chong@ias.unu.edu or http://vulab.ias.unu.edu

Biodiversity

UNU and UNESCO jointly offer a two-week international training course on coastal biodiversity in mangrove ecosystems at the Center of Advanced Study in Marine Biology of Annamalai University in Tamil Nadu, India. The course provides training in the methodology for assessing, monitoring and conserving biodiversity in mangrove ecosystems for young professionals with a postgraduate degree in marine sciences or a closely related field. UNU also cooperates with the University of Ghent to offer professionals in the fields of monitoring, conservation and management of biological diversity in developing countries in-depth training to broaden their theoretical knowledge and practical capabilities.

Further information: Please contact UNU Centre Dr. Birgit Poniatowski or http://www.unu.edu/capacitybuilding/index.htm

Food Composition Data

Compilations of data on the nutritional composition of foods are essential tools for nutritionists, especially those concerned with studies of nutrient intake in populations and at the individual level as well as for those involved with feeding large numbers of people or designing diets for people with specific needs. Since 1995, UNU has cooperated with the Food and Agriculture Organisation to offer courses to those involved in nutritional database programmes as analysts and/or compilers, those teaching nutrition and nutritional aspects of food chemistry as well as users of nutritional databases who wish to have a better understanding of how databases are prepared and the constraints upon their use. Courses have been held at Wageningen Agricultural University in the Netherlands and also in Chile in 1995, in Argentina in 1996, in South Africa in 1997 and 1999, and in Jamaica in 2001.

Further information: Please contact UNU Centre Dr. Birgit Poniatowski or http://www.unu.edu/capacitybuilding/index.htm

United Nations University Global Reach

Programmes at UNU Centre, Tokyo, Japan

Peace and Governance Programme (Vice-RectorP&G@hq.unu.edu)
Environment and Sustainable Development Programme (suzuki@hq.unu.edu)
Capacity-building and Fellowships (yokota@hq.unu.edu)

UNU Research and Training Centres or Programmes (RTC/Ps)

UNU Institute of Advanced Studies (UNU/IAS), Tokyo, Japan
Focus: strategic approaches to sustainable development; E-mail unuias@ias.unu.edu
URL http://www.ias.unu.edu

UNU World Institute for Development Economics Research (UNU/WIDER), Helsinki, Finland
Focus: development economics; E-mail wider@wider.unu.edu
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UNU Institute for New Technologies (UNU/INTECH), Maastricht, The Netherlands
Focus: socio-economic impacts of new technologies; E-mail postmaster@intech.unu.edu
URL http://www.intech.unu.edu

UNU Institute for Natural Resources in Africa (UNU/INRA), Accra, Ghana
Focus: natural resources management; E-mail unuinra@ghana.com
URL http://www.unu.edu/inra

UNU International Institute for Software Technology (UNU/IIST), Macau, China
Focus: software technologies for development; E-mail: iist@iist.unu.edu
URL http://www.iist.unu.edu

UNU Programme for Biotechnology in Latin America and the Caribbean (UNU/BIOLAC), Caracas, Venezuela
Focus: biotechnology and society; E-mail: unu@reacciun.ve
URL http://www.unu.edu/capacitybuilding/Pg_biolac/pg.html

UNU Leadership Academy (UNU/LA), Amman, Jordan
Focus: leadership development; E-mail: un2@ju.edu.jo
URL http://www.unu.edu/la

UNU International Network on Water, Environment and Health (UNU/INWEH), Hamilton, Canada
Focus: water, environment and human health; E-mail: contact@inweh.unu.edu
URL http://www.inweh.unu.edu

UNU Programme for Corporate Regional Integration Studies, Bruges, Belgium
Focus: local/global governance and regional integration; E-mail:info@cris.unu.edu
URL http://www.cris.unu.edu

UNU Food and Nutrition Programme for Human and Social Development, Cornell University, USA
Focus: food and nutrition capacity building; E-mail: Cg30@cornell.edu
URL http://www.unu.edu/capacitybuilding/Pg_foodnut/cornell.html

UNU Geothermal Training Programme (UNU/GTP), Reykjavík, Iceland
Focus: geothermal research, exploration and development; E-mail: os@os.is
URL http://www.os.is/unugtp/

UNU Fisheries Training Programme (UNU/FTP), Reykjavík, Iceland
Focus: postgraduate fisheries research and development; E-mail: tumi@hafro.is
URL http://www.unu.edu/iceland/fisheries/fisheries.html

The Initiative on Conflict Resolution and Ethnicity (INCORE), London, United Kingdom
Focus: ethnic, political and religious conflicts; E-mail: incore@incore.ulst.ac.uk
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