

WORLD CONFERENCE ON HIGHER EDUCATION

**Higher Education in the Twenty-first Century
Vision and Action**

UNESCO, Paris, 5-9 October 1998

VOLUME IV

Thematic Debate:

Preparing for a Sustainable Future: Higher Education and Sustainable Human Development

Note of the UNESCO Secretariat

The present volume is part of the Proceedings of the World Conference on Higher Education (Paris 5-9 October 1998).

Volume I :	Final Report
Volume II :	Speeches and Lectures
Volume III :	Reports of the Commissions
Volume IV :	Thematic Debates
Volume V :	Plenary Speeches
Volume VI :	Listing of Titles of Individual Documents.

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Note du Secrétariat de l'UNESCO

Le présent volume fait partie des Actes de la Conférence mondiale sur l'enseignement supérieur (Paris, 5-9 octobre 1998).

Volume I :	Rapport final
Volume II :	Discours et exposés spéciaux
Volume III :	Rapports des commissions
Volume IV :	Débats thématiques
Volume V :	Discours en séances plénières
Volume VI :	Liste des titres des documents individuels.

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Nota de la Secretaría de la UNESCO

El presente volumen forma parte de las Actas de la Conferencia Mundial sobre la Educación Superior (París 5-9 de octubre de 1998).

Volumen I :	Informe Final
Volumen II :	Discursos y Ponencias Especiales
Volumen III :	Informes de las Comisiones
Volumen IV :	Debates Temáticos
Volumen V :	Discursos de la Plenaria
Volumen VI :	Lista de Títulos de los Documentos Individuales

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Introduction

In organizing the World Conference on Higher Education, UNESCO's goal was to create favourable conditions for a sweeping debate and to increase awareness of the principal issues in this important field.

The Thematic Debates were organized in parallel with the Commissions and the Plenary sessions and so constituted one of the selected frameworks for reflection and for deepening discussions.

Planning the Thematic Debates included the participation of some fifty representatives of NGOs and IGOs, as well as a number of resource persons and UNESCO staff members.

Each working document was prepared under the coordination of a leader with the contribution of partners chosen by the Secretariat from organizations already cooperating with UNESCO.

Working documents of the Thematic Debates were taken into account in preparing the Conference's principal working documents and in elaborating drafts of the Declaration Framework for Priority Action. This synergy marked the entire preparation phase.

The 12 Thematic Debates were regrouped into three large themes:

Higher Education and Development

- *The Requirements of the World of Work*
- *Higher Education and Sustainable Human Development*
- *Contributing to National and Regional Development*
- *Higher Education Staff Development: A Continuing Mission*

New Trends and Innovations in Higher Education

- *Higher Education for a New Society: A Student Vision*
- *From Traditional to Virtual: The New Information Technologies*
- *Higher Education and Research: Challenges and Opportunities*
- *The Contribution of Higher Education to the Education System as a Whole*

Higher Education, Culture and Society

- *Women and Higher Education: Issues and Perspectives*
- *Promoting a Culture of Peace*
- *Mobilizing the Power of Culture*
- *Autonomy, Social Responsibility and Academic Freedom*

The introduction to each Debate was given by the author of the working document. This was then completed by input from the panel members.

Each Debate produced a synthesis report representing the results of the discussions and the recommendations made.

The general coordination of the preparation and organization of the Debates was undertaken by the Division of Higher Education, UNESCO.

Volume IV of the Proceedings of the World Conference on Higher Education regroups for each of the 12 Debates:

- The Working Document;
- The Synthetic Report for each Debate;
- The interventions of the panel members.

With regard to the thematic debates on students and women, contributions which were addressed to the Organizing committee and judged relevant were also taken into account.

Thematic Debate

Preparing for a Sustainable Future: Higher Education and Sustainable Human Development

Leader: The United Nations University (UNU)

Working Document drafted by. Prof. Hans van Ginkel
Rector, UNU
Tokyo

in collaboration with:

I.A.U.
CRE-COPERNICUS

The draft document was submitted for comments to a large number of Organizations.
Comments were received from:

1. International Council of Nurses (ICN)
2. World Federation for Medical Education (WFME)
3. World Business Council for Sustainable Development
4. UNEP - "State of the Environment Reporting Programme
5. UNESCO - Transdisciplinary Project (EPD)
6. UNDP - Bureau for Development Policy
7. Inter-university Conference on Agricultural and Related Science in Europe (ICA)
8. Soroptimist International
9. International Council for Local Environmental Initiatives (ICLEI)
10. Indira Gandhi Institute of Development Research
11. Association of Universities of Asia and the Pacific (AUAP)
12. Association of European Universities (CRE)
13. Association of University Departments of Environmental Sciences in Europe (auDes)
14. Global Organization of Students for Environmental Action (GOSEA)

and

the UNESCO SECRETARIAT

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Summary

The World Conference on Higher Education seeks to ensure that higher education will be capable of responding to the needs of society in the 21st Century. As a part of the World Conference, the Thematic Debate on “Preparing for a Sustainable Future: Higher Education and Sustainable Human Development” will help to focus on the role of higher education in preparing new generations for a sustainable future. The paper preparing the ground for the Thematic Debate is based on the arguments and outcomes of debates held in and among universities in various settings over the past decade, as well as work done by the United Nations subsequent to the Earth Summit held in Rio de Janeiro in June 1992.

The paper reviews the emerging concepts of “sustainable human development” noting that sustainable development is not a fixed notion, but rather a process of change in the relationships between social, economic and natural systems and processes. These interrelationships present a challenge to us in reconciling economic and social progress with safeguarding the global life support systems. This challenge relates then to the role of universities, and all institutions of higher education, in increasing our understanding of the issues at stake and calls for them to lead and develop consistent future scenarios and to increase awareness of problems and solutions in their educational programmes. It also draws attention to the need for universities to take the lead in setting good examples themselves at the local and regional levels.

The focus of the paper is on “higher education and sustainable human development”, not education in general. It asks a number of specific questions on how inter-disciplinary and collaborative research and education programmes can best be encouraged, how networks of interdisciplinary discourse can be promoted and how staff and students can be encouraged to have an - environmental - perspective in whatever field of study they are engaged. The paper describes the emerging role of universities in refining the concept and key messages of education for sustainable development, integrating environmental, demographic, economic, social and a range of other concerns inherent in the complex notion of sustainability. Key to the success of universities to re-orient their research programmes and curricula is their capacity for flexible interdisciplinary cooperation and to collaborate with institutions outside the university. Changing the way people operate, strengthening their “inner drive” to contribute to sustainable development is seen as more important than changes in higher education at the system level.

In addition to setting out the key issues to be discussed during the thematic debate, the paper elaborates a strategy for future action with six key actions to be undertaken to close the gap between theory and practice, ideals and reality in preparing coming generations for a sustainable future.

PANEL

Chair: Prof. Hans van Ginkel, Rector, UNU, Japan

Panelists:

Mr Gustavo Lopez Ospina
Director UNESCO
Transdisciplinary Project:
a Sustainable Future

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Executive Director
Canopus Foundation
Germany

Prof. Hauhouot Asseyo
Rector
University of Cocody
Ivory Coast

Prof. Dr Rietje van Dam Mieras
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McGill Centre for Medicine
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Senior Economic Adviser
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Dr Ruben C. Umaly
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International Association
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Advisory/Steering Committee:

Prof. Jorge Brovetto
President of UDUAL and the
Montevideo Group of Universities
Uruguay

Synthetic Report

The leader in organizing this thematic debate was the UN University, in collaboration with the International Association of Universities and CRE-Copernicus. The chairperson, Mr. Hans van Ginkel, Rector of the UNU, opened the session by explaining that four short keynote speeches and comments by four discussants would be followed by discussion by all participants of four key questions: How can interdisciplinarity be developed and managed? How can theoretical knowledge be better linked to its potential practical applications? What changes will be necessary in higher education programmes and institutions to prepare future generations better for complex situations and problems, including ethical dilemmas? How can cooperation between national, regional and international institutions be promoted? Mr Chairman emphasized the need to focus on action rather than theory.

The first keynote address was delivered by Mr. Gustavo López Ospina, Director of UNESCO's Transdisciplinary Project "Educating for a Sustainable Future", on the topic "Universities as key actors in building a sustainable future: changing ways of thinking, linking the disciplines, providing the knowledge base, transmitting new skills". He pointed out that higher education bears a particularly important responsibility not only for generating the knowledge base for finding solutions to society's problems but also for transmitting the skills needed to find gainful employment and to contribute constructively to the building of a sustainable future. In rethinking their role, universities need to confront numerous challenges, including coping with complexity, inculcating a new way of thinking, and translating interdisciplinarity into practice. The key to the new vision was ethics and values. This new vision of education was reflected in the international consensus and framework of action which emerged from the series of international conferences organized by the UN during this decade. The International Work Programme on chapter 36 of Agenda 21 adopted by the UN Commission on Sustainable Development provided an excellent international platform to promote higher education for sustainable development.

Dr Peter W. Heller, former Chairman, International Council for Local Environmental Initiatives and Executive Director of the Canopus Foundation, presented the keynote address on "Universities in local initiatives the view of stakeholders". Dr. Heller identified key factors driving the need for attention to sustainable development: the increasing urbanization of countries including developing countries; globalization influenced by information technology; and the devolution of power in terms of decentralization and regionalization. Additionally, chronic problems of poverty, consumerism, malnutrition, unemployment and illiteracy drove human action in the direction of the non-sustainable use of resources. In this context, he saw investment in people, community learning and the participatory creation and design of systems as keys to sustainability. The link between higher education and local authorities as outlined in chapter 28 of Agenda 21 was therefore critical. He identified five key elements in the local Agenda 21 process. The potential for strengthening links between universities and local government was seen in research and in the application of sustainable planning techniques; the targeting of senior local officials for joint lifelong learning with the university; and for the application of the methodologies to key issues like solid waste management; waste water and public transportation.

In his keynote address "The importance of higher education for sustainable development: an African perspective", Dr. H. Asseypo, President of the CRUFAOCI, and Rector of the University of Cocody, Abidjan, a souligné que, "en Afrique, l'enseignement supérieur a un rôle essentiel à jouer dans la recherche des solutions aux problèmes du développement durable, qui n'ont pas encore pu être adressés, faute de ressources humaines et financières suffisantes. Trois changements s'avèrent nécessaires. Premièrement, la mission de l'enseignement supérieur doit être renforcée. Ainsi, il faut non seulement

transmettre le savoir, mais également socialiser la jeunesse et devenir une véritable locomotive de la société. En deuxième lieu, il est nécessaire de pratiquer plus intensément la transdisciplinarité. Finalement, il faut remanier profondément les structures institutionnelles de l'enseignement supérieur et créer des centres de formation tout au long de la vie ouverts aux étudiants et travailleurs. Vu des moyens financiers limités, des mécanismes inter-universitaires et internationaux de coopération doivent être mis sur pied, ainsi que la création et le développement d'écoles doctorales et de centres régionaux d'excellence. La Conférence des recteurs des universités francophones d'Afrique occidentale, centrale et d'océan indien (CRUFAOCI), s'adresse également au problème du développement durable".

Prof. Dr. M. van Dam-Mieras, former Rector, Open University of the Netherlands, Chair of CRE-Copernicus introduced her speech on "Promoting a sustainable future: the perspectives of universities" by underlining that universities should reflect on their role in society, both at the local and global levels. First of all, they should make students "environmentally literate", capable of taking action in favor of sustainable development from their own discipline. Secondly, they should transmit knowledge to policy and decision-makers and take a leading role in communication to the public. Finally, they should train people to deal with complex social relations and bring a global, inter-cultural dimension to education. Cooperation networks, such as the CRE-Copernicus network, should be encouraged as sharing knowledge and expertise will allow funds to be used more efficiently. She cited the Global Seminar on Environment, Agriculture and Sustainable Development coordinated by Cornell University, as a good example of how the new information and communication technologies can promote the learning process.

During the discussion of the four key questions, a number of speakers addressed the issue of the development and encouragement of interdisciplinarity in an institutional framework where knowledge has become increasingly specialized and fragmented. Among the approaches mentioned was the creation of learning environments for promoting disciplinary excellence in more than one discipline, and the use of field studies based on the interconnectedness of real world problems. Professionals such as medical doctors, economists and engineers needed to be encouraged to understand the implications of their activities within the framework of sustainable development. A specific suggestion commended by several participants was attributed to Edgar Morin, that of devoting within each discipline 10% of teaching to transdisciplinary issues and dimensions.

Linking theoretical knowledge to practical applications required greater recognition of the real problems relating to sustainability, including those of the dominant patterns of production and consumption, the implications of the many dimensions of "globalization", deregulation, and intellectual property rights, disparities and contrasts within and between countries, and basic issues such as hunger, poverty and intergenerational solidarity. Several speakers pointed to the existing disparities. It was emphasized that there was a need for the industrialized world to build capacities to negotiate and deal with the transnational corporations.

In terms of changes necessary in higher education programmes and institutions, and in terms of preparing future generations better for complex situations and problems, transdisciplinarity could become a driving force in university reform, and not merely a result of it in the view of one participant. The changing roles of different stakeholders, governments, employees, students, teachers and local communities in the process of university reform was mentioned by several speakers, as were perceptions of the changing functions of universities and the increasing importance given to such facets as their role as leaders in the lifelong learning process. In many regions of the world, the development of closer links with local communities was seen of priority importance for the future of higher educational institutions and of local and national economies alike. Challenges of developing new employment opportunities (e.g. in terms of "green jobs") was also mentioned, together with the importance of recognizing higher education institutions other than universities. Reference was also made to the importance of rigorous evaluation of existing curricula shaping future education programmes and of the key role of teacher training, in shaping future capacities, innovations and attitudes.

Education leading to changes in values and attitudes was mentioned by several speakers, including the importance of the climate and ethos of the learning environment, and of universities practicing what they preach. The need for education to strengthen the inner drive of each individual was mentioned as were the relations between science and spirituality as one of the key issues of the next century.

One view from the discussion was that it was critical for higher education to be future oriented. There had to be a holistic vision based on scientific evidence, transparency and a fusing of the cultural, spiritual, socio-economic and ecological perspectives. Student participants emphasized that sustainable human development was best expressed in on-going action. Higher education institutions had in their day-to-day management to be themselves “green” institutions. Moreover, since youth were the bridge between today’s stakeholders and the future generations, there was need to invest in youth by building their interdisciplinary strengths and appropriate attitudes to sustainability.

Finally, the six key actions outlined in the discussion paper were commented upon, and two further actions suggested from the floor:

1. Create a “University Platform for a Sustainable future”.
2. Create an electronic network by establishing a major website.
3. Establish a sustainable future award scheme.
4. Develop a “preparing for a sustainable future” audit system.
5. Start a feasibility study to identify the potential of universities to contribute to the further implementation of Agenda 21.
6. Establish a special fund for direct mutual transfer of knowledge.
7. Establish programmes for the training of trainers.
8. Reinforce UNESCO’s work as task manager for chapter 36 of Agenda 21 and for the International Work Programme of the Commission on Sustainable Development. Encourage all actors within the international community as well as at national level to implement this work programme.

Working Document

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Preparing for a Sustainable Future: Higher Education and Sustainable Human Development

“the key to sustainable, self-reliant development is education – education that reaches out to all members of society, through new modalities and new technologies in order to provide life-long learning opportunities for all. We must be ready, in all countries, to reshape education so as to promote attitudes and behaviour conducive to a culture of sustainability.” (Federico Mayor, Director-General of UNESCO, June 1997)

1. Introduction

The World Conference on Higher Education aims high. Re-"thinking", even the re-"creation" of higher education, to ensure that it will be capable of responding to the needs of society in the 21st century, is the ultimate aim. Not what "is", but what "should be" will be the core of the discussions. Not only the directions to go should be indicated, aims, hopes and recommendations should be expressed, but also clear action plans should be formulated.

Such a system of higher education, one that fits the needs of society in the 21st century we will be entering soon, must be much broader than the concept of the traditional research university allows. The differentiation of the system of higher education is already an important trend in many countries, if not even a fact in some. But it will become universal. Universal, because higher education around the world will have to cater for increasingly heterogeneous groups of students. Heterogeneous in cultural backgrounds, motivation, age and experience, aims, job perspectives, etc.

Higher education institutions will – as a consequence – have to differ in the ways and degrees in which they combine teaching, training and research, transfer innovations and innovative thoughts into applications and to society as well as in the ways in which they stimulate their students to study, to search for knowledge. Therefore, they will differ in the content and structure of their programmes and the ways in which these are delivered, as well as the preparation and the profile of their teaching staff: their educators and tutors. Together these institutions, in whatever form and combination, often explicable only by culturally diverse historical processes, will have to provide the broad spectre of study facilities that can cater for an increasingly differentiated demand.

What, however, will not change is the necessity that these institutions will have to prepare new generations for the future. A future that, nowadays, is quickly and vastly changing like never before. Such a perspective should, however, not be seen as frightening, but as a challenge instead. It is a time for change to enter a new stage of humankind in which many of the ambitions on peace and progress of people around the world as these were laid down in the Charter of the United Nations, could be realized, if the opportunities are taken well. To prepare new generations for such a challenge, to empower them to make a difference, is an exciting task for all who are directly involved in or concerned with higher education today.

This paper serves to introduce the thematic debate on the role of higher education in preparing new generations for a sustainable future. It is based on the arguments and outcomes of debates held in and among universities in various settings over the last decade, as well as work done by the United Nations, its organizations and agencies since the United Nations Conference on Environment and Development (UNCED) held at Rio de Janeiro in 1992. In particular, the United Nations Commission on Sustainable Development (CSD) and UNESCO's Transdisciplinary Project "Educating for a Sustainable Future" acting as the CSD's task manager for Chapter 36 of Agenda 21 on "Education, Public Awareness and

Training” have contributed importantly to a clear and focused approach to our topic. This paper sets out the issues at stake and the focus of the debate.

2. Sustainable Human Development

Recently, the Secretary-General of the UN, Kofi Annan (1998), introduced the challenges of the New Global Era, with the following words:

"At both the international and national levels, fundamental forces are reshaping patterns of social organization, structures of opportunities and constraints, objects of aspiration, and sources of fear. Globalization envelops the world even as fragmentation and the assertion of differences are on the rise. Zones of peace expand while outbursts of horrific violence intensify; unprecedented wealth is being created but large pockets of poverty remain endemic; the will of the people and their integral rights are increasingly both celebrated and violated; science and technology enhance human life at the same time as their by-products threaten planetary life-support systems.".....

The United Nations University may have been early, when it appointed in 1976 the first Vice-Rector for "Human and Social Development" and included global life support-systems as one of the major topics in its research programmes, soon after. The concept of human development and the related concept of human security have, however, gained widespread interest and acclaim since UNDP's trail-blazing Human Development Report was first published in 1993. Indeed, important changes have taken place in the period of time in between. In particular the end of the era of super-power rivalry and military confrontation has unleashed an unprecedented number and variety of international transformation processes of economic and political, but also of social and cultural nature. Globalization, introduced as an economic concept, has now become understood in a much broader sense as a forceful, overarching process that, indeed, penetrates into all different aspects of life and society. It offers great opportunities for sustained welfare and well being, but poses also numerous policy challenges. Those are related to the inherent risks created by financial markets lacking critical regulatory safeguards, as well as by a lack of or inadequate understanding of long-term development and interests of humans/people. Both, in developing as well as developed countries, it has become fully clear that the state, although not a creator of wealth itself, has critical roles to play in providing an enabling environment for sustainable development. The 1997 *World Development Report* of the World Bank shows clearly how crucial an effective "State" is in this regard. It is becoming, however, an ever more complex task to find an appropriate balance, in particular, where civil society is weak and transnational forces overpowering.

One of the crucial roles the "State" has to play is to ensure human security on the local, national and - in cooperation - within regional associations and the United Nations on the regional and global levels. To ensure human security without which sustainable human development will not be possible. Our sustainable future will depend strongly on the ways in which we successfully can link up the spheres of daily (social) life at the individual and local level and that of economic life on the regional and global level. This is particularly true in a time in which a remarkable revolution in information and communication technology permits high volume and high quality real-time voice and data transmissions. Under such circumstances:

"the adjective global refers less to a place than to a space defined by electronic flows and a state of mind" (Kofi Annan 1998)

Sustainable human development, however, is not only based on economy, organization and communication. Fundamental to a sustainable future is to ensure the proper use and stewardship of the heritage that was given to humankind in the form of the earth. This earth does not only provide us with the firm ground we live on and the natural resources we use in a great variety of production and consumption processes, but also the air we breathe and the water we drink. More than anything else our common earth represents a public interest and shared responsibility. Shared not only here or at a specific

place, as water and air move freely - shared also, not only now or in a specific time period, as what we use now - in particular of depletable resources - will not be available for future generations.

UNESCO in its background paper for the International Conference on “*Environment and Society: Education and Public Awareness for Sustainability*” (Thessaloniki, 1997) identified some important and interrelated factors contributing to the rising concerns over “*sustainability*” among people around the world. These range from the rapid growth and changing distribution of the world’s population, via the persistence of widespread poverty and environmental degradation to the very notion of “*development*” itself: what it has come to mean and how it is measured.

As a consequence of its multi-dimensional character, *sustainable development* has been variously defined and described. The concept was for the first time indicated in Principle 1 of the *Stockholm Declaration on the Human Environment*:

....."Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being, and he bears a solemn responsibility to protect and improve the environment of present and future generations."

The Rio Declaration on Environment and Development in the Principles 1 and 3 stated in the same line, stressing more the right to development:

....."Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature."

....."The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations."

These formulations link clearly human rights and environmental protection recognizing human rights as a fundamental goal and environmental protection as an essential means to achieve the "*adequate conditions*" for a "*life of dignity and well-being*" that are guaranteed. The links between human rights and the environment may be viewed deriving from the fact that human health and existence, legally protected as the right to health and the right to life, are dependent upon environmental conditions.

The concept of sustainable development was launched in 1987 by the report of the World Commission on Environment and Development (the "Brundtland Report"). There it was defined as: "*meeting the needs of the present without compromising the ability of future generations to meet their own needs*" and as "*a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.*"

Sustainable development is not a fixed notion, but rather a process of change in the relationships between social, economic and natural systems and processes. UNESCO continues in the publication mentioned above as follows (page 13):

....."Perhaps the most widely used definitions focus on the relationship between social development and economic opportunity, on the one hand, and the requirements of the environment on the other: i.e., on improving the quality of life for all, especially of the poor and deprived, within the carrying capacity of supporting eco-systems. This does not necessarily set fixed limits on "development," but rather recognizes that the prevailing notions and definitions of development must themselves evolve in relation to changing requirements and possibilities.

.....sustainability calls for a dynamic balance among many factors, including the social, cultural and economic requirements of humankind and the imperative need to safeguard the natural environment of which humanity is a part. What is sought is the condition of "human security" for all people.".....

The transformation processes indicated in the foregoing paragraphs, have intensified the global environmental interdependencies. Hence, the importance of the Agenda 21 process, officially started at the UNCED in Rio de Janeiro in 1992. There the international community endorsed the concept of sustainable development as the key to reconcile economic and social progress, while safeguarding the planet's ecosystems. The intense public interest in the recent Kyoto Conference (1997) of the Parties to the United Nations Framework Convention on Climate Change provided a good illustration of the widespread support for sustainable development. The progress since Rio, however, has been disappointing so far; with a few exceptions like the initiatives to implement the Local Agenda 21. The discussions in Kyoto also illustrated that there exists still much uncertainty as to what actions exactly will have to be taken, to which levels we will have to rise to meet the challenges posed to us and also how to share common responsibilities in a just manner.

It is here that there is a major responsibility for universities, indeed all the institutions of higher education, preparing new generations for a sustainable future. There is a need to increase our understanding of the issues at stake. Through their reflection and fundamental research they should not only warn or even alarm, but also work out sound solutions. They should also take the lead and show possible ways to go by developing consistent future scenarios. They should also increase awareness of problems and solutions in their educational programmes and set good examples themselves.

3. Universities: Intellectual Powerhouses

This debate will focus on *Higher Education and Sustainable Human Development*; not on education in general. What, then, has sustainable development to do with higher education, in particular the universities? The answer of David L. Johnston, then Principal and Vice-Chancellor of McGill University in Canada and Member of the IAU Administrative Board at the IAU 9th Roundtable, Kyoto, Japan (19 November 1993) was extremely clear:

...."Everything, I would agree, because universities are uniquely equipped to lead the way. By their special mission in teaching and training the leaders of tomorrow; by their rich and increasingly extensive experience in conducting transdisciplinary research and thereby

overcoming traditional boundaries between discipline-based departments, and by their fundamental nature as engines of knowledge, universities have a major role to play in a world whose national boundaries are dissolving daily into ever-smaller regional entities. In fact, "major role" is understanding. The universities have an indispensable role.".....

The university leaders present at this Roundtable concluded that universities have a unique contribution to make, a contribution implicit and utterly in keeping with their mission of advancing learning through research and teaching. At the heart of any effort to understand and promote sustainable development are four key elements:

- the serious and pressing nature of the problem;
- the inter-/transdisciplinary scope of potential solutions;
- the international scale of their impact; and
- the ethical imperatives of self-knowledge, self-discipline, moderation, fairness and justice for all.

This unique contribution, however, is not self-evident. Specific action plans will be required, when universities are prepared to play this leading role. The *Draft Action Plan for Individual Universities of IAU* (Kyoto, 1993) e.g., states that to this end each university, in its own action plan, should strive:

- (1) *to make an institutional commitment to the principle and practice of sustainable development within the academic milieu and to communicate the commitment to its students, its employees and to the public at large;*

- (2) *to promote sustainable consumption practices in its own operations;*
- (3) *to develop the capacities of its academic staff to teach environmental literacy;*
- (4) *to encourage among both staff and students an environmental perspective, whatever the field of study;*
- (5) *to utilize the intellectual resources of the university to build strong environmental education programmes;*
- (6) *to encourage interdisciplinary and collaborative research programmes related to sustainable development as part of the institution's central mission and to overcome traditional barriers between disciplines and departments;*
- (7) *to emphasize the ethical obligations of the immediate university community - current students, faculty and staff - to understand and defeat the forces that lead to environmental degradation, North-South disparities, and inter-generational inequities; to work at ways that will help its academic community, and the graduates, friends and governments that support it, to accept these ethical obligations;*
- (8) *to promote interdisciplinary networks of environmental experts at the local, national and international level in order to disseminate knowledge and to collaborate on common environmental projects in both research and education;*
- (9) *to promote the mobility of staff and students as essential to the free trade of knowledge;*
- (10) *to forge partnerships with other sectors of society in transferring innovative and appropriate technologies that can benefit and enhance sustainable development practices.*

To become really successful and become true intellectual powerhouses in this field, universities will have to pay specific attention to the *internal drive* in university life of students and staff; of teachers, tutors and researchers. Universities are in the first place centres of knowledge -not training schools, but places of critical thinking and scientific development. That is what

justifies their teaching offer. And science is not motionless, a kind of pool of accepted ideas academics can draw from to provide a consensual lesson for the world to act on environmental matters. There is *no consensus* – neither in scientific nor in political terms. This is not due to a lack of debates but, more so to the *inner drive* of science development that cannot be planned and organized. Hence, the ups and downs of the *climate debate*, for instance.

However, the facts are firmly on the table and sufficiently clear to choose for a cautious course. Conviction is needed here. Conviction needed to move on from the stages of *knowing* (savoir) and *being able* (pouvoir) to the stages of *wanting* (vouloir) and *daring* (oser)...to act.

True leadership is wanted here to move in the direction of active participation in bringing about the desired changes:

- 1) to encourage inter-disciplinary and collaborative research and education programmes;
- 2) to promote inter-disciplinary networks of environmental experts at the local, national and international level;
- 3) to encourage among both staff and students *an environmental perspective whatever the field of study;*
- 4) to emphasize the ethical obligations.

4. Higher Education and the Sustainable Development Debate

Universities, indeed all institutions of higher education, have become increasingly aware of the role they do have to play in preparing new generations for a sustainable future. Since the late 1980s, (the “Brundtland Report, 1987”) and increasingly after Rio’s Earth Summit, they tried to define and also to implement their roles in education for a sustainable future. To this end, they have at different times and places drafted and adopted ambitious declarations in which they have formulated the major principles and aims for the reform process into which they are prepared to engage themselves. A few early examples are the:

- Talloires Declaration of University Leaders for a Sustainable Future (1990 at Tufts University);

- Halifax Declaration (IAU – UNU – AUCC, together with 20 university presidents from among others, Brazil, Indonesia and Zimbabwe, 1991);
- Kyoto Declaration on Sustainable Development of the International Association of Universities (IAU, 1993);
- University Charter for Sustainable Development (CRE-Copernicus, 1993).

(For an overview of these declarations: see background document 2).

Indeed, universities are increasingly called upon to play a leading role in developing an inter-trans-disciplinary and ethically-oriented form of education in order to devise solutions for the problems linked with sustainable development. They must, therefore, commit themselves to an on-going process of informing, educating, and mobilizing all the relevant parts of society concerning the consequences of ecological degradation, including its impact on global development and the conditions needed to ensure a sustainable and just world.

Among all institutions of higher education there exists a strong feeling of responsibility with regard to their role in preparing new generations for a sustainable future. More than 200 universities from 42 countries are now members of the Talloires Group; almost 250 signed the

CRE-Copernicus Charter. Of course, their arguments for this are also very pragmatic: at no time in history has there been a greater need for a well-educated, skilled and motivated work force, community and citizens. This is true for two reasons: (1) the highly competitive nature of today's global economy, and most importantly, (2) the growing realization that economic progress, both in developed and developing countries, must be based on the principles of sustainable development.

The universities involved share the conviction that economic progress and environmental protection are irrevocably linked. The one cannot be had without the other. One way to assure that this relationship is understood could be by incorporating environmental issues into the general education system - both in formal education and in corporate training programmes. In this context, it is unhelpful to think of environmental education as a separate category - the true world need is for better basic education. In fact the need for general environmental scientists is limited. The conferences of the Association of University Departments of Environmental Studies (auDes) have made quite clear that we will probably need more the different environmental specialists in, among others, environmental law, resource economics, environmental chemistry, environmental medicine, toxicology and engineering. A good illustration here is the need to prepare future medical doctors to inform and teach the public on questions of environmental consequences. Probably, the most important contribution of environmental scientists could be in the "*greening*" of curricula, by which in disciplinary curricula due attention is given to related environmental aspects. The most urgent need is to set good examples in ongoing activities. Starting with "*greening the campus*" and particularly focussing also on setting good examples in the practicals and research laboratories as well as paying due attention to choosing research topics and methods.

In line with their growing conviction that economic progress and environmental protection are irrevocably linked, the universities gradually shifted their focus from the environment to sustainable (human) development. They paid, among others, specific attention to the need of direct transfer of knowledge to developing countries. This is also the orientation that has been chosen by the World Commission on Sustainable Development, while preparing a work programme, which has to "*refine the concept and key messages of education for sustainable development*" and in so doing to integrate environmental, demographic, economic, social and a range of other concerns inherent in the complex notion of sustainability. This work programme (Table 1) outlines the priorities for action by the United Nations system, and by UNESCO in particular as the specialized agency in the UN system for education and science and as a "task manager" for Principle 36 of Agenda 21, as well as by governments, NGOs, including organizations in higher education, major groups and the private sector.

Since the Rio Earth Summit (1992), a new international consensus has emerged concerning the critical role of education in achieving sustainable development. Principle 36, one of the forty Principles in Agenda 21, concerns "*promoting education, public awareness and training*", while in Rio there was unanimous agreement among developed and developing countries alike that education is "*critical for promoting sustainable development and increasing the capacity of the people to address environment and development issues.*"

The scope of Principle 36 is extremely broad, ranging from formal education systems at all levels, vocational training and development of the workforce to education in agriculture and health care, adult education and communication about environment and development. Principle 36 also emphasizes that basic education is a prerequisite to environmental and development education, and remains a priority for many countries of the world, linked to the overall effort to combat poverty.

Principle 36 is divided into three "programme" areas:

- * Reorienting education towards sustainable development;
- * Increasing public awareness; and
- * Promoting training.

It is a "cross sectoral" principle and therefore seen as linked to virtually all other areas of Agenda 21.

Table 1: Work Programme of the Commission on Sustainable Development: Education, Public Awareness and Training

	Priorities Agreed Upon by the CSD	Key Actors Cited by the CSD
A	Develop a broad international alliance, Taking into account past experience and Promoting networks	UNESCO as task manager, in partnership with UNEP, IUCN and other key institutions
B	Integrate implementation of recommendations concerning education, public awareness and training in the action plans of the major UN conferences and conventions	UN system, Governments, major groups
C	Advise on how education and training can be integrated into national educational policies	UNESCO, in co-operation with other governmental and non- governmental organizations
D	Refine the concept and key messages of education for sustainable development	UNESCO
E	Advance education and training at national level	Governments, with assistance from the UN system and others
F	Provide financial and technical support	Developed countries, international organizations, private sector
G	Develop new partnership arrangements among different sectors of society. Exploit the new communications technologies. Take into account cultural diversity	Educators, scientists, Governments, NGOs, business and industry, youth, the media, other major groups
H	Work in partnership with youth	Governments and all relevant stakeholders
I	Analyze current investments in education	Bretton Woods institutions
J	Take the preliminary results of the work programme on Chapter 36 into account in the 1997 review	Secretary-General of the United Nations
K	Make relevant linkages with the CSD programme of work on changing production and consumption patterns	UN system, Governments, NGOs

(CSD, 1996)

At the heart of the new international consensus is a new vision of education and public awareness as the essential underpinning for sustainable development, a linchpin to support advances in other spheres, such as science, technology, legislation and production. Education is being redesigned in terms of how to prepare people for life: job security and employability, the demands of a rapidly changing society, technological changes that now directly or indirectly affect every part of life; and, ultimately, the quest for happiness, well-being and quality of life. Education is therefore being redefined as a lifelong process that needs to be not merely readjusted, but restructured and reformed according to new requirements. The World Conference on Higher Education is designed to develop the "*Vision and Actions*" needed to support this process. One of the requirements is the goal of sustainable development, an overarching concept that has broad implications for curricula at all levels of education. The thematic debate "*Preparing for a Sustainable Future: Higher Education and Sustainable Human Development*" tries to identify the visions and actions needed to ensure improved performance of Higher Education in this field. In doing this, it should contribute to the work programme of the Commission on Sustainable Development (See Table 1, para.6, and Annex 2).

5. Unruly Reality: Core of the Thematic Debate

The evaluation five years after the Rio Earth Summit in the United Nations (1997) of accomplishments in the field of Agenda 21 was not favourable. Certainly, the universities have not done better. Good intentions and elaborated visions may not have been lacking, but the implementation in an unruly reality has proved to be difficult. Two years after almost 250 universities signed the University Charter for Sustainable Development, few European universities could show real progress in the implementation (Leal Filho, et al., 1996). In his contribution to the IAU 4th Mid-term Conference (Bangkok 1997) Carl Einar Stålvant, CRE-Copernicus co-ordinator, titled "*Universities as actors in sustainable development*" comes also to the conclusion that many universities seem not to have lived up to the levels of their ambitions. The "*inner drive*" to contribute among staff and students in daily university life seems not yet strong enough. From the student side, however, this might already be changing. The establishment of the Global Organization of Students for Environmental Action (GOSEA) is an encouraging sign.

Stålvant is disregarding the limited success thus far, convinced that the Charter provides a focal point for university activities in the midst of a large amount of other activities and that it is this what makes the charter useful. To support his view, he listed a series of institutional mechanisms that have been put in place in recent years and hold the promise of more effective actions in the near future in the field of environmental care and housekeeping. In Barcelona University, e.g. a vice-rector has been assigned to perform this wide-ranging task.

Sincere engagement of the university leadership is essential. In many cases, however, true commitment and continuity and consistency in actions on the part of the students have also proved to be effective. Often, however, the increasingly larger numbers of students, the teaching "load", financial problems, lack of time and adequate facilities are given as arguments why actions were postponed. Others blame the lack of strong competition between universities, the governance structure of universities, the overly strong disciplinary character and ill-fated academic reward-system for the lack of action.

Against the aforementioned background it seems appropriate to focus the thematic debate not so much on visions: these do already exist, even quite elaborate ones. There is much more need to focus on the reality, the difficulties in implementing all the beautiful ideas. One of the difficulties being that research has not yet produced all the required technical, economic and social solutions for the implementation of ideas and ideals. The discussion could therefore focus on:

- (1) how to bring environmental concerns and hopes in a more sound relation with the concerns and hopes regarding human development?

- (2) what are the most important reasons for the slow and often lacking implementation of the well-developed visions in this area?
- (3) in which ways and with what kind of instruments could the process of implementation be energized and the “inner drive” strengthened?
- (4) in particular: how could the interaction between higher education institutions and society-at-large be strengthened to promote more forcefully the desired sustainable human development? And to start with: in their own “local” environment?

The first question focusses on a balanced integration of ecological, technological, economic and socio-cultural components of sustainable development. To develop the argument and to see how this could be implemented in curricula and research, a world conference is particularly appropriate as it will ask for contributions from, among others, developed and developing countries as well as from countries in the transition phase.

The second and third questions are strongly related and are based upon the underlying questions:

- (1) How can we stimulate universities to re-design their education and research “*to deliver green graduates*” in the same way we asked the private and public sectors to improve their products and policy some two decades ago?
- (2) How can we stimulate the private and public sectors as employers to require certain knowledge and skills of graduates to green their products and services, what will challenge students and universities?
- (3) How can we stimulate that “*green universities*” will more and more directly profit from their investments?

Having answered these questions, universities should address topics like:

- How can inter-disciplinarity be developed and encouraged?
- How can (theoretical) knowledge be better linked to its (potential) practical applications?
- What changes will be necessary in higher education programmes and institutions to prepare future generations better for complex situations and problems, including ethical dilemmas?
- How can cooperation between national, regional and international (global) institutions in the field of sustainable human development be promoted so as to increase understanding for different positions and to become more effective?

The last question focusses on the relations of higher education institutions with the outside world. In the different university declarations mentioned, three aspects are stressed:

- the relations with alumni and others in a world where employability and life-long learning are basics;
- the relations with governments and others in their enabling roles: to create the conditions under which the universities can perform their tasks well;
- the relations with different partners in various sectors of society which will help to shape shared responsibilities and cooperation in matters related to sustainable human development; in particular on the local and regional levels.

6. Re-orienting Higher Education

Since the UN Commission on Sustainable Development (CSD) adopted the Work Programme on Education, Public Awareness and Training (Table 1), much work has been done to “*refine the concept and key messages of education for sustainable development*.” In particular, UNESCO has contributed as task manager for Chapter 36 of Agenda 21 through its Transdisciplinary Project “*Educating for a Sustainable Future*.” The development of ideas resulted eventually in the preparatory document “*Educating for a Sustainable Future –*

A Transdisciplinary Vision for Concerted Action.” This document was written in preparation of the International Conference on “*Environment and Society: Education and Public Awareness for Sustainability*” (Thessaloniki, 8-12 December 1997). These ideas served as input for the discussions on Chapter 36 in the Sixth Session of CSD from 20 April to 1 May this year. Annex 2 comprises the final texts of this session on Chapter 3 (Education, Public Awareness and Training) and Chapter 4 (Science for Sustainable Development). In these texts, the CSD explicitly calls upon the World Conference on Higher Education:

- *to address the challenge of how to promote and strengthen an interdisciplinary approach in university curricula and research agendas for a sustainable future and to consider the further adaptation of higher education systems, as appropriate in this regard;*
- *to give due consideration to how the reform of higher education systems may support sustainable development;*

The CSD in its Sixth Session also, among others:

- *recognized the important role of schools and universities in the further implementation of Agenda 21, especially at the local level;*
 - *invited UNESCO, working closely with relevant educational institutions and international organizations, to develop guidelines for the reorientation of teacher training towards sustainable development;*
 - *urged institutions of higher education, with the support of governments and the academic community, to adapt their teaching and research to introducing an interdisciplinary approach conducive to addressing sustainable development issues;*
 - *invited UNESCO to continue its work on the international electronic registry and knowledge management system for Chapter 36 and requested that this information be made available in both electronic and conventional formats to all countries, in particular for the developing countries. Innovative programs and projects from all sources, such as various major groups, including industries, women, youth and NGOs, should be encouraged and included in this inventory;*
 - *encouraged the development and strengthening of international and regional alliances, associations and networks among universities and other educational and training institutions and professional bodies in all countries, in particular between those in developing and developed countries. These alliances should include distance learning, training for trainers, exchanges and mentoring; and*
1. *stressed the need to improve the processes of generating, sharing and utilizing science for sustainable development and for more action-oriented, interdisciplinary research with greater focus on prevention and early identification of emerging problems and opportunities.*

Many of the recommendations are clearly focussing on cooperation, creating synergy and exchanging information. These can be implemented in a balanced and pragmatic action plan. (See section 7, below.) The challenge of how to promote and strengthen an interdisciplinary approach in university curricula and research agendas for a sustainable future, however, is of a different nature. So is the need to improve the processes of generating, sharing and utilizing science for sustainable development and for more action-oriented interdisciplinary research with greater focus on prevention and early identification of emerging problems and opportunities, as well as the necessity to carefully redesign effective processes of knowledge-sharing between universities, schools, NGOs, public institutions and enterprises in developed and developing countries.

“Reorienting education to sustainability requires recognizing that traditional compartments and categories can no longer remain in isolation from each other and that we must work increasingly at the interface of disciplines in order to address the complex problems of today’s world. This is true both within education where interdisciplinarity is slowly and with difficulty gaining ground, and between the spheres of education, work and leisure as life-long learning emerges as a key concept for planning and developing educational systems. It is also true as concerns the most important boundary of all: that separating those included in education systems from those who are excluded from them...

Ultimately, sustainable development will require an education that not only continues throughout life, but is also as broad as life itself, an education that serves all people, draws upon all domains of knowledge and seeks to integrate learning into all of life’s major activities....

As concerns sustainable development specifically, it is impossible to predict with reliability what will be the key issues on which people will need information in five, ten, twenty or fifty years. It is predictable, however, that such developments will not fit neatly into the existing and artificial sub-divisions of knowledge, which have been in place for more than a century. Hence, understanding and solving complex problems is likely to require intensified cooperation among scientific fields as well as between the pure sciences and the social sciences. Re-orienting education to sustainable development will, in short, require important, even dramatic changes, in nearly all areas.”... (UNESCO: Educating for a Sustainable Future, p. 21).

The changes in nearly all areas will be dramatic indeed. The crucial question, however, will be whether an adaptation or even reform of higher education systems will be necessary to support sustainable development, to accommodate these dramatic changes. This is questionable for two reasons:

1. Higher education systems are quite different from country to country and have changed over time in the last century quite a lot. It is often the great differences from country to country and institution to institution that make international cooperation at the university-level so difficult.
2. We do not know what questions and problems we will have to solve even in the near future and which combinations of expertise will prove to be the most fruitful. Besides, aspects of sustainable development will be important in all different fields of knowledge, as “*sustainable development will require education as broad as life itself.*”

The problem is not in the systems or structures, but in the way *people* operate. The *change* has to come from the *minds of the people*, their *inner drive*. They have to be ready to cooperate in very flexible ways over disciplinary and institutional boundaries. We must realize the slow evolution of the idea of specialization: a true specialist is often someone whose mind, because of the precision and richness of its knowledge can constantly open out onto other fields and know-how to put his own scholarship to work in training and to link it to all forms of knowledge.

This does not mean that no changes at the system-level will occur. These will occur like before. These are, however, neither necessary nor in themselves sufficient to bring out the necessary dramatic changes. The action plan should instead aim more at actions that will not miss their impact on the *inner drive* of people. To stimulate them to rise to the occasion: to re-orient higher education in very flexible ways to sustainable development.

Strategy for Future Action

The *Strategy for Future Action* should aim at closing the gap between theory and practice, ideals and reality. To prepare future generations for a sustainable future young people should be made aware of the complex nature and the interrelatedness of environmental issues as well as the multifaceted relations between environment and sustainable human development. They should learn to think not only in terms of threats and problems, but also of challenges and solutions instead and act accordingly. They should learn to understand that such solutions demand close cooperation between experts from a great variety of disciplines, cooperation and mutual understanding as well as of practitioners, theoreticians and policy-makers, and of people from all different sectors of society and walks of life. They should also learn how to do this in practice and, in this way, to understand what the expression “*think globally, act locally*” really means.

Universities, indeed all institutions of higher education, should first and foremost set a good example

in their own housekeeping. They should confront their students with issues of sustainable human development, not only when they attend specialized major or minor programmes focussing on those issues, but also while dealing with topics in disciplinary programmes with clear consequences in the field of sustainable human development. Environment should be part and parcel of specialized university education. Here we should align the educational process with the policy process. Universities should try to make, through their research, a major contribution to the understanding and solving of issues of sustainable human development, including ethical aspects. Universities should effectively interact with the society that supports them and share up-to-date and focussed knowledge with regard to sustainable development, without restrictions, with each other around the world and with all interested partners in society.

Six key-actions are recommended:

1. Create a "**University Platform for a Sustainable Future**" to enhance synergy in knowledge, thought and actions of all organizations in higher education, including students and staff, prepared to work together on a more effective contribution of higher education to sustainable human development through teaching and research. Part and parcel of this effective

contribution is an adequate preparation of graduates to function in the future world of work. Convene this platform every year in the framework of UNESCO's NGO-consultation. Make this an inclusive, not an exclusive platform, inviting representations of the business community, public authorities, NGOs, etc. The UNU could be an obvious choice to play a facilitating role in the development of this platform and its activities.

2. Create an **Electronic Network** by establishing a major website including electronic discussion lists to facilitate the *active exchange of ideas and information* as well as to *share examples of good practice* in university housekeeping, management, education and training, research and knowledge transfer with regard to sustainable human development. This network should be linked to the International Registry of Innovative Practices that currently is being developed by UNESCO. Universities experienced in the use of ICT to create and support learning environments could be invited to play a leadership role in establishing and developing such a network, based more on substance than solely on the means of delivery. UNU-Press could produce essential information in the form of CD-ROMs for those partners in the network for whom electronic communication still involves too much time and/or too high costs.
3. Establish a "**Sustainable Future**" *award scheme* for initiators of excellent, innovative contributions to sustainable human development in all three areas: (1) university management/housekeeping, (2) teaching and training/dissemination, as well as (3) research and development. Special attention should be given to the best case studies that integrate environmental concerns in disciplinary problems. Separate competitions could be arranged for each discipline. Short-listed entries could be published in electronic and printed form. In this way, one could build up good teaching resources. Organize high-profile "*Sustainable Future*" *award celebrations* during the meetings of the "*University Platform for a Sustainable Future*". Pay due attention, while developing the criteria for awarding the prize, to aspects of cooperation and bridging gaps: between disciplines, between universities in different parts of the world, between universities and social partners, etc. Organizations like ICLEI and GOSEA, the university associations, as well as UNESCO's regional offices could play a role in identifying potential candidates.

Develop a "*Preparing for a Sustainable Future*" **Audit System** on a *voluntary* basis. The audit would focus on the structures, strategies and mechanisms in universities that contribute to their performance in this respect. The audit should focus on support to the participating institutions in order to improve incrementally their performance in contributing directly and indirectly to the improvement of the

environment. Associations like the Commonwealth Universities, the Talloires Group, CRE-Copernicus, the Association of African Universities (AAU), the Association of Universities in Asia and the Pacific (AUAP), and IAU could play a leading role here. Such audits should be based on self-assessments followed by assessments by peer groups. The audits should not be "stand alone" events, but part of a process which includes, among others, follow-up visits to support policies to improve the performance of individual universities. Universities (and/or faculties) should also have the possibility to obtain an ISO-certificate for a "*green university*." This certificate should be developed in cooperation between the ISO-organization and pro-active industries and NGOs.

4. Start a **Feasibility Study** to identify in very practical terms the potential of universities in their different geographical, economic and socio-cultural settings to contribute on the university

level and as major stakeholders to the further implementation of Agenda 21, to begin with the Local Agenda 21. This study should contain many good practice case studies that should help to illustrate possible ways and means for universities in the pursuance of the goals of sustainable development. One product of such a project could be a sort of "*manual*." The involvement of other stakeholders should be considered. This idea might fit into the proposed key-actions 2 and 4. Invite UNU and university associations active in this field to support such a study. The CRE-Copernicus Secretariat is prepared to play an active role in this key-action.

6. Establish a **Special Fund** for *direct mutual transfer of knowledge* between teachers and researchers from developed and developing countries, among others, by organizing workshops as well as common projects in research, education and extension activities. Such common projects should not only involve universities, but also NGOs, enterprises and public institutions.

Background documents

Annex 1:

1. Agenda 21:
 - . Chapter 34 Transfer of Environmentally Sound Technology, Cooperation and Capacity-Building.
 - . Chapter 35 Science for Sustainable Development.
 - . Chapter 36 Promoting Education, Public Awareness and Training.
 - . Chapter 37 National Mechanisms and International Cooperation for Capacity-Building in Developing Nations.
2. Reports 1996, 1997 and 1998 of the Secretary General to the United Nations Commission on Sustainable Development (CSD)
 - Decision of the CSD to establish a work programme on education, public awareness and training (1996).
 - UNESCO has been appointed as task manager for chapter 36 of Agenda 21 and prepares as such the reports on “Promoting Education, Public Awareness and Training.”
 - UNESCO’s Transdisciplinary Project: Educating for a Sustainable Future prepared, with the Government of Greece, the International Conference on “Environment and Society: Education and Public Awareness for Sustainability” (Thessaloniki, 8-12 December 1997); see *Educating for a Sustainable Future – A Transdisciplinary Vision for Concerted Action* (UNESCO: EPD-97/CONF.401/CLD.1, November 1997).
 - UNESCO’s Transdisciplinary Project organized together with the World Bank a Concurrent Meeting of the Fifth Annual World Bank Conference on Environmentally and Socially Sustainable Development, “Partnerships for Global Ecosystem Management: Science, Economics and Law;” see Ismail Serageldin, Tariq Husain, Joan Martin-Brown, Gustavo López Ospina and Jeanne Damlamian (editors): *Draft – Organizing Knowledge for Environmentally and Socially Sustainable Development* (Washington, World Bank, 1998).
3. An overview of activities and declarations of various university associations has been prepared by Dr. Hilligje van’t Land and Prof. Dr. B. Mazurkiewicz of IAU. This overview can be consulted by visiting website <http://www.unesco.org/iau/tfsd>.
4. Kofi A. Annan (1998), *The Quiet Revolution*. In *Global Governance 1998*, No.1.
5. Report of the World Commission on Environment and Development (1987: Brundtland Report)
6. Five years after Rio: UNU's Responses to Agenda 21, the United Nations University, Tokyo 1997.
7. David L. Johnston (1995), *Sustainable Development and University Cooperation*. In: *Global Civilization and Cultural Roots. Bridging the Gap – The Place of International University Cooperation*. Report of the Tenth General Conference of IAU, JNU –New Delhi, pp. 141-157.
8. Walter Leal Filho, Frances Dermott & Jenny Padgham (1996), *Implementing Sustainable Development at University Level: A Manual of Good Practice*. CRE-Copernicus/European Research and Training Centre on Environmental Education, University of Bradford.

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Annex 2

Chapter III: Education, public awareness and training

6. The Commission on Sustainable Development:

- (a) Recognizes education, public awareness and training as underpinning all the cross-cultural themes of Agenda 21;
- (b) Reiterates that a fundamental prerequisite for sustainable development is an adequately financed and effective educational system *at all levels*, that augments human capacity and well-being, and is relevant to the implementation of all chapters of Agenda 21. Education is a lifelong process and should be fully accessible to all;
- (c) Recalls that education, public awareness and training includes, inter alia, non-formal and informal modes of teaching and learning, e.g. within the family and community, and maintains that education for sustainable development should take *an interdisciplinary approach* incorporating social, economic and environmental issues;
- (d) Notes that public awareness is a prerequisite for public participation in decision making for sustainable development and is closely linked to access to information;
- (e) Recognizes that educating women has a crucial impact on sustainable development and on changing the attitudes and behaviour of families, society and nations;
- (f) Expresses its appreciation to the Government of Greece and UNESCO for organizing an intersessional conference on "Environment and Society: Education and Public Awareness for Sustainability" (Thessaloniki, 8-12 December 1997);
- (g) Welcomes the contributions of major groups in sharing case studies of innovative practices in promoting, in particular, education, public awareness and training within their respective contexts, including youth-sponsored initiatives, encourages their continued action through such initiatives, and requests that the Commission continue to be informed of this work at future sessions;
- (h) *Recognizes the important role of schools and universities in the further implementation of Agenda 21, especially at the local level;*
- (i) *Notes that the World Conference on Higher Education to be held in Paris in October 1998, provides a good opportunity to address the challenge of how to promote and strengthen an interdisciplinary approach in university curricula and research agendas for a sustainable future and to consider the further adaptation of higher education systems, as appropriate in this regard;*
- (j) Takes note of the International Registry of Innovative Practices Promoting Education, Public Awareness and Training for Sustainability being developed by UNESCO and encourages its further development;

7. Taking into account the work programme on education, public awareness and training initiatives at its Fourth Session (1996), the Commission:

A. Clarifying and Communicating the Concept and Key Messages of Education for Sustainable Development:

- (i) Urges UNESCO and other United Nations organizations, governments and major groups to pursue the implementation of Chapter 36 of Agenda 21, and the Work Programme on Education approved by the Commission at its Fourth Session, as part of the integrated follow-up to the major UN conferences and conventions related to sustainable development, taking into account the work of ECOSOC in this regard;
- (ii) Calls on UNESCO to continue its efforts to clarify and communicate the concept and key messages of education for sustainable development, with emphasis on assisting in the interpretation and adaptation of these messages at *regional and national levels*;

B. Reviewing National Education Policies and Formal Educational Systems

- (i) Calls on Governments *at all levels*, with the assistance and participation, as appropriate, of international organizations, the *educational and scientific communities*, NGOs and local authorities to develop policies and strategies for *reorienting education towards sustainable development*, including roles and responsibilities of actors at local, national and regional levels;
- (ii) In this context, Governments may wish to include the establishment of *national centres of excellence* in such strategies;
- (iii) Calls upon Governments at all levels to include sustainable development objectives into curricula or equivalent instruments corresponding to the level of education and encourages them, where appropriate, to consider the effectiveness of education for sustainable development;

- (iv) *Invites UNESCO, working closely with relevant educational institutions and international organizations, to develop guidelines for the reorientation of teacher training towards sustainable development*
- (v) *Calls on Governments to take appropriate steps, in consultation with international, national and sub-national representatives of teachers (including unions) as well as specialists in higher education and youth, to reorient teaching training in formal education systems towards sustainable development;;*
- (vi) *Urges institutions of higher education, with the support of governments and the academic community, to adapt their teaching and research to introducing an interdisciplinary approach conducive to addressing sustainable development issues;*
- (vii) *Invites the World Conference on Higher Education in 1998 to give due consideration to how the reform of higher education systems may support sustainable development;*

C. Incorporating Education Into National Strategies and Action Plans for Sustainable Development

- (i) Urges Governments to make education and public awareness significant components in regional, national and local strategies and action plans for sustainable development;
- (ii) Invites UNESCO, working with UNDP, UN-DESA and other relevant organizations, to complete the survey of existing regional and national strategies and action plans for sustainable development to determine recommendations resulting therefrom and to make such information available to the CSD;
- (iii) Encourages Governments at all levels to integrate education, as appropriate, into national and local strategies for sustainable development, and calls upon the international community and the United Nations system to assist developing countries as needed in this regard;
- (iv) Urges Governments to integrate the aspect of gender balance and the empowerment of women into national education strategies.

D. Educating to Promote Sustainable Consumption and Production Patterns in All Countries

- (i) Requests the Task Managers for Chapters 4 and 36 of Agenda 21 (UN-DESA and UNESCO), working together with other relevant organizations, including UNEP, the OECD and representatives of business and industry, trade unions and NGOs, to continue their efforts to raise awareness of the implications for sustainability of current patterns of consumption and production in particular in developed countries; *making better use of educational tools and consumer feedback mechanisms to facilitate policy-making*; and developing and promoting social instruments through *education and training intended to change consumption and production patterns*, with industrialized countries taking the lead, and in this context, to continue the work on indicators for sustainable consumption and production patterns;
- (ii) Calls upon the media as well as the business community including the World Business Council for Sustainable Development, the International Chamber of Commerce and other Business institutions, trade unions, and civil society, to work with UNESCO, UNEP, UN-DESA, UNIDO and other key institutions, to collect best practices in media and advertising that address concerns related to promoting sustainable consumption and production patterns, particularly in the developed countries;
- (iii) Requests the Secretary-General, in cooperation with UNESCO, to report to the Commission on progress made and actions taken in this area including those identified by the Nineteenth Special Session of the General Assembly, at its seventh session, when Consumption and Production Patterns will be the cross-sectoral theme;

E. Promoting Investments for Education

Calls upon UNDP, the World Bank and other international financing institutions to consider the current levels of financing for education for sustainable development with a view to developing a strategy or policies for mobilizing new and additional resources from all sources for ensuring greater financial support for education for sustainable development;

F. Identifying and Sharing Innovative Practices

- (i) Invites UNESCO to continue its work on the international electronic registry and knowledge management system for chapter 36 and requests that this information be made available in both electronic and conventional formats to all countries, in particular for the developing countries. Innovative programs and projects from all sources, such as various major groups including industries, women, youth and NGOs, should be encouraged and included in this inventory;
- (ii) *Encourages the development and strengthening of international and regional alliances, associations and networks among universities and other educational and training institutions and professional bodies in all countries, in particular between those in developing and developed countries. These alliances should include distance learning, training for trainers, exchanges and monitoring;*

- (iii) Calls on Governments to encourage and strengthen networks and partnerships for education for sustainable development which include, inter alia, schools, parents, private and public institutions and organizations as well as private firms;
- (iv) Encourages the recognition and use of traditional knowledge, innovations and practices of indigenous people, and local communities for the management of natural resources in education for sustainable development;

G. Raising public awareness

- (i) Calls on Governments to facilitate the development of capacities for raising public awareness and access to information on sustainable development and on social, economic, environmental impacts of unsustainable production and consumption patterns at global, regional and national levels;
- (ii) Calls on Governments at all levels, the media and advertising agencies to undertake information campaigns to communicate to the public the key messages of sustainable development;
- (iii) Calls on Governments to take fully into account the provisions of relevant international conventions when providing information in order to raise public awareness.

8. The Commission:

Calls upon UNESCO, as task manager, to further strengthen and accelerate the implementation of the work programme on education for sustainable development, in cooperation with, inter alia, UNEP, UNDP and NGOs. Requests the Secretary-General to include in his report to its seventh session information on progress made in implementing the work programme.

Chapter IV: Science for Sustainable Development

9. The Commission on Sustainable Development:

- (a) *Recognizes the serious gaps in scientific capacities especially in developing countries and stresses the need for strong and concerted action at national and international levels to urgently build up and strengthen national scientific infrastructure and research management capabilities of these countries, to formulate national strategies, policies and plans for that purpose, as well as to strengthen their science education programmes at all levels;*
- (b) *Stresses the need to improve the processes of generating, sharing and utilizing science for sustainable development and for more action-oriented interdisciplinary research with greater focus on prevention and early identification of emerging problems and opportunities;*
- (c) *Notes that the World Science Conference co-organized by UNECO and ICSU to be held in Budapest, Hungary in June 1999, in cooperation with other UN agencies and international scientific organizations provides a good opportunity to address key issues of science for sustainable development;*
- (d) *Urges the scientific community to work with government authorities, the education community, major groups and international organizations, to strengthen science education at all levels and to overcome the communication gaps within the scientific community and between scientists, policy makers and the general public;*
- (e) Invites Governments, the UN system and major groups to provide information on best practices and other illustrative examples related to the future sectoral themes of the Commission where science has been effectively employed to support the development and implementation of policies in these sectors;
- (f) Also invites relevant international scientific advisory bodies and programmes to contribute, as appropriate, to consideration of the sectoral themes of the CSD session in 1999, 2000 and 2001 on issues relevant to their interest;
- (g) Calls on multilateral and bilateral donor agencies and Governments, as well as specific funding mechanisms, to continue to enhance their support to strengthen higher education and scientific research capacities related to sustainable development in developing countries, particularly in Africa and LDCs. Such efforts should aim at:
 - (i) *strengthening research and teaching infrastructures in universities, and their proper re-equipping as a critical precondition for the development of capacity in science and technology;*
 - (ii) *linking technical assistance programmes to education and research in the broad field of environment and sustainable development;*
 - (iii) *fostering university-business-civil society partnerships within and among countries;*
 - (iv) *promoting regional and sub-regional cooperative training and research programmes and networks; and*
 - (v) *acquiring modern information technologies so as to ensure easy access to information sources around the world, as well as to be part of existing global and regional scientific and technological information networks to address the scientific needs of developing countries.*

- (h) Encourages Governments of all countries to join forces with international organizations and the scientific community to strengthen the global environmental observing systems;
- (i) Invites UNESCO and ICSU in planning for the World Science Conference in 1999 to take fully into account the interdisciplinary nature of sustainable development issues with the view to strengthen the role of natural and social sciences in sustainable development and to mobilize increased investment in research and development of scientific themes of sustainable development.

Universities as key actors in building a sustainable future: Changing ways of thinking, linking the disciplines, providing the knowledge base, transmitting new skills

Address by: Prof. Gustavo López Ospina
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Signs of the need for complex overall change

1. In these days of rampant deregulation, nothing is predictable. Our age is full of unanswered questions. The largest one of all perhaps is how to manage our lives properly. But it is also necessary to answer the requirements for well-ordered development of communities, States and a world inhabited by almost six billion people. This calls for accepting the many challenges arising in the midst of such contradictory interests as the economy, society and the environment. It is a matter of finding the right path towards justice and equity, efficiency, job-providing economic growth, active and creative grass-roots participation, stronger cultural identity, multicultural dialogue and sharing, protection of bio-diversity, preservation of ecosystem integrity, and coping with the massive pollution of our planet and its huge production of waste.

2. At the dawn of the twenty-first century, people and institutions are faced with increasing complexities: globalization of society, technological advance and rapid - and often unpredictable - change. We are beginning to understand that the earth functions as a single natural system. Humanity is becoming interdependent on a global scale. Population growth, environmental degradation, consumption and production patterns are key parts of this global picture, which have to be taken into account in our move towards a sustainable development. Moreover, as the world population may exceed nine billion in 2050, how to respond to a combined system of humans and nature? These new realities, combined with political and military complexities, amount to a “new world” which is vastly different from the past. But in this new world a sustainable future will depend on the right contribution from all: governments, the private sector, communities, universities, etc.

A Glimmer in the confusion: All is not lost

3. Sustainable development is not a static or fixed concept, nor is it neutral. It is value-based. It aims at promoting social transformations and ensuring in the future a quality of life and well-being for everybody. It means supporting and nourishing people, prolonging life in each part of the world and developing the capacity to meet human needs. Sustainable development is anchored in realities and is advanced or held back by daily choices made at all levels. “The key to sustainable, self-reliant development is education - education that reaches out to all members of society through new modalities and new technologies in order to provide genuine lifelong learning opportunities for all.”. Figure 1¹.

4. Sustainability represents a new vision for the educational system. It implies both new educational content and new structures. It is built on values and ethics which reinforce our sense of sharing a common goal with other peoples. Education for sustainability places values at the centre of the educational enterprise.

It goes beyond the passive assimilation of knowledge and a critical reproduction of a homogeneous development model, and calls for the application of a holistic and complex approach. It is essentially a transdisciplinary activity, supporting all subjects with its values rather than constituting a discipline in its own right.

¹ Extract from the address by Mr Federico Mayor, Director-General of UNESCO, at the Special Session of the United Nations General Assembly: Earth Summit +5, New York, 25 June 1997 .

5. This new challenge for education is particularly acute for higher education, at both undergraduate and post-graduate levels, as this phase of the educational process is the most directly related in time and in substance to preparing people for integration into society at large. At present, students in industrialized and developing countries alike complain about feeling out of touch with reality, and upon completion of their university studies find themselves all too often faced with unemployment, with all its related problems.

6. An international consensus and framework of action has emerged from the series of international conferences organized by the United Nations during this decade². At the heart of this consensus is not only the new vision of education to achieve sustainability, but the challenge for higher education to take a leading role, to have imagination, to take risks and to innovate. Some universities have to move away from the traditional focus of enrolling as many students as possible, of maintaining existing institutions, of making a profit, of having a good reputation, to give more importance to the real global needs and challenges, with a long-term and action-oriented vision.

New Ways of Thinking

7. The university is the "temple" of thought, a place where knowledge, ideas and values can be developed with a large degree of freedom. It also guards the memory of cultural heritage. This means that, thanks to the acquisitions of the past, it can respond to the challenges of the future. This ability is all the more precious in that we are confronted today with a myriad of powerful forces posing the threat of cultural disintegration. The university should defend the values which are intrinsic to itself: "autonomy of the mind, framing problems (with research needing to remain open and plural), the primacy of truth over usefulness, an ethic of conscience ..." (E. Morin).

8. As this century comes to an end, universities, in their teaching and their research, are under strong pressure to adjust to and comply with the demands of the economy, the administration and technology. They are tending to retreat from their humanist culture, thereby endangering the balance which should be preserved between the two major cultural disciplines, namely science and the humanities. Despite the dangers, the university has strangely never been called upon before to deliberate in depth – taking the long view, comprehensively and exactly – upon its future. The easy way, which consists in restricting thinking to the short term, is not the right answer, since sustainable development demands long-term reflection.

9. The university, if it is to meditate successfully upon its future, must respond to a number of challenges, including **complexity**, a **new way of thinking**, **trans-disciplinarity** and **inter-disciplinarity**.

10. The problems of the future force the university to face the challenge of **complexity**. Viable development requires the university to be genuinely capable of adjusting itself to the preparation of the cultivated and enlightened citizens whom tomorrow's society will need. It will also require new responses and proposals in nearly every compartment of life. This in turn requires new methods of interpreting today's realities, imagining fresh approaches, helping to build new models that are not necessarily solutions and to incorporate uncertainty into rational thinking. Economics, for example, can now be regarded only in the context of a complex reality, as a multi-dimensional and forward-looking activity respecting the need for inter-generational solidarity. It is here that ethics and practical imperatives make an appearance. Economics can no longer mould itself to market rules and go on contributing to inequality. This is the first challenge to be met by a university mindful of the destiny of humanity.

² " World Conference on Education for all", Jomtien 1990; "World Summit for Children", New York, 1990; "United Nations Conference on Environment and Development", Rio de Janeiro, 1992; "International Conference on Population and Development", Cairo, 1994; "World Summit on Social Development", Copenhagen, 1995; "Fourth World Conference on Women: Action for Equality, Development and Peace"; Beijing, 1995; "Second United Nations Conference on Human Settlements (Habitat II)", Istanbul, 1996; "World Food Summit", Rome, 1996; and also the Conventions on "Climate Change", "Biological Diversity" and "To Combat Desertification".

11. These considerations lead us to another challenge also of key importance to the future of higher education and the university. This is the **way of thinking**. Today we are obliged, not to separate areas of knowledge as is at present the case, but to relink them. Instead of separating humanist from scientific culture, we must on the contrary join them together. Instead of splitting reality into fragments, we must use education to develop the ability to synthesize and set in context. This new way of thinking makes it possible to develop a set of talents in a person rather than a single skill. It presupposes a general, diversified but sound culture rather than over-specialized and hence fragmentary knowledge.

12. In order to attain sustainable development, **inter-disciplinarity** and **trans-disciplinarity** need to be fostered, given how much disciplines depend one on the other. The same holds true of interdependence among the world's major problems. Day after day, all of life's problems convince us of this fact, whether it be a matter of preserving biodiversity, maintaining health or coping with the complex difficulties of the world's mega-cities.

13. The rethinking of higher education supposes first of all a profound change in mentality – leading to a review of its structures and organization – within higher education itself. The question which immediately springs to mind is who can make the main players in higher education (administrators and teachers) change? The answer is, "The university itself is solely responsible for bringing about change. The new university will proceed from within itself." In dealing with the future, the university will have to "problemize" everything, even matters – such as progress, growth or technology – that provide answers to modern society's queries. The university will have to rely both on various multi-dimensional sciences like history, which encompasses the multiple facets of human reality, and pluri-disciplinary sciences, whose subject is that of complex systems, like the earth sciences (earth system) or ecology (biosphere-ecosystem)³.

14. Students, as learners, as consumers, as citizens and, also, as members of students' organizations, have a great responsibility in re-thinking the university system, by being pro-active to influence change and innovation. They must give more of themselves to university life and should no longer consider the university simply as a place to passively acquire knowledge.

A strategic vision for change

15. There is no strategic formula for changing universities. Much thinking, discussion, trial and error is required. A few proposals are put forward here:

- * Firstly, **the key to the new vision is ethics and values**. We need to rethink higher education through an ethical filter that coincides with the kind of society we want for the future, with the kind of society which is sustainable, equitable, kind, just.
- * We need to create an **"international democracy of knowledge"** which would move the world towards the future without losing the richness and diversity of cultures. We need to reverse the paradoxical situation where people find that "the information they have is not what they want; the information they want is not what they need, and the information they need is not what they can obtain".

³ Edgar Morin, an eminent authority on trans-disciplinarity, suggests that, "University reform might include the setting up of departments or institutes devoted to sciences that have performed a pluri-disciplinary remapping around a systemic organizing nucleus (ecology, earth sciences, cosmology). It could be pursued through a redrawing of boundaries in the biological and social sciences. It would introduce arrangements whereby all the anthropo-social and natural sciences would be coordinated. The university, in order to establish a mode of (complex) thought conducive to trans-disciplinarity, should as a first step introduce a trans-disciplinary title within itself." This suggestion – for devoting a tenth of teaching to trans-disciplinary subjects – was made at the international congress in Locarno organized by the Ciret and UNESCO (30 April - 2 May 1997) on "What university for tomorrow?" Edgar Morin went on to say, "We may also imagine each university instituting a centre for research into the problems of complexity and trans-disciplinarity."

- * Ways should be found so that **research** can fully contribute to the quest for a sustainable future; universities can find ways to promote networks and cooperation.
- * The **reinforcement of international cooperation** is necessary in order to translate the available scientific knowledge and information into a form that can be used for educational purposes and for workable policies to promote sustainable development.
- * The drive to adapt to an era of rapid technological change and globalization should **not compromise the freedom of the academic community to pursue intellectually “pure” thinking and research.**
- * **Reorienting the educational system** according to the new requirements has implications for curricula at all levels of education. But it is not, and cannot be, the task of the educational system or universities to solve all the problems of society. Of critical importance will be to bring about the changes in lifestyles needed in all regions and societies.

16. The international “work programme” for Chapter 36 of Agenda 21 “Education, Public Awareness and Training”, adopted by the UN Commission for Sustainable Development, is an excellent platform to promote these strategic key issues and other initiatives. In 1994, UNESCO launched an international initiative on “Educating for a Sustainable Future”, a transdisciplinary and inter-agency project related to environment, population and development. To accelerate progress towards the new vision of education, emphasis has been shifted to action at the national and local levels and in December 1997, UNESCO prepared a document entitled “Education for a sustainable future: a transdisciplinary vision for concerted action” to which the UN system, Organization for Economic Cooperation and Development (OECD), the World Conservation Union (IUCN), Organization of American States (OAS) and other institutions, as well as numerous experts contributed⁴.

CONCLUSION

17. Many universities and networks in the different continents are making efforts today to re-think the university system and develop projects which generate change. This huge fabric which has still to be woven as a reply to the present and future challenges, requires from all of us enthusiasm, a real obligation, creativity and action

⁴ The document was presented at the International Conference held in Thessaloniki (Greece, 8-12 December 1997) “Environment and Society: Education and Public Awareness for Sustainability”, organized jointly by UNESCO and the Government of Greece, to celebrate the 20th anniversary of the Tbilisi Conference on Environmental Education.

A Comment from a Local Authorities' Perspective

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1. The Rationale of the Conference

The World Conference on Higher Education, Paris 1998, aims to redefine higher education for the 21st century in the context of sustainable human development, and to develop academic concepts providing a substantial input to global, regional, national and local activities striving for a sustainable future of mankind. Local authorities and their associations worldwide will certainly welcome this initiative, as they are more and more actively taking responsibility to meet the challenges of globalization and environmental degradation and their growing impact on the daily social life in communities everywhere on this planet. The current global trends are accelerating the process of *urbanization*, and sustainability concerns have risen rapidly on the urban agenda over the last ten years. The fundamental importance of knowledge to promote sustainable human development is precisely expressed by Juha Sipilä, the former Director of the Helsinki Metropolitan Council: «Sustainable development means that we use our unlimited brain capacity instead of our limited natural resource». *The imperative, therefore, is to invest in people themselves.*

In most societies today, people are no less wasted than natural resources. In our communities, human wastage is as evident as litter on city streets or the depleted soil in many agricultural regions. Poverty, malnutrition, unemployment, illiteracy, abuse, sexism and other oppressions force people and communities into patterns of non-sustainable resource exploitation to meet short-term basic needs, encourage human exploitation to meet short-term individual interests, and prevent the development and accumulation of knowledge, culture, and technology. Just as reducing our investment into «symptoms management» can free resources for the development of ecological systems, the development and management of these systems provides opportunities for investment in people: community learning and involvement in system design, employment and training in system creation and maintenance. This can also support a refocussing of human intelligence from its present preoccupation with waste towards the creation of higher quality energy and resources.

2. Building Local Government Capacity for Sustainable Human Development

2.1 The Principles of AGENDA 21

Principle 36 of AGENDA 21 defines the basic programme areas of education in achieving sustainable development, and concerns all other areas of activities in AGENDA 21, including Principle 28 which addresses local authorities. The new conception of education as a lifelong process preparing old and new generations for a sustainable future is closely linked with the mandate that the Earth Summit has given to local authorities, which, by 1996, should have undertaken a consultative process with their populations and achieved a consensus on a «Local Agenda 21» for the community» (Principle 28). Five years later, at the Earth Council's Rio +5 Forum, the Chairman of the Earth Summit, Maurice Strong expressed his perception of the Local Agenda 21 movement as one of the most successful and substantial brainchilds of the Earth Summit.

The *practical impact* of urban management on the implementation of international treaties and conventions has long been underestimated. The total annual expenditures of local authorities related to the thematic areas of AGENDA 21, according to an extrapolation based on their annual budgets for solid waste management (Principle 21), water supply and waste water management (Principle 17, 18), and public transportation (Principle 17) account for hundreds of billions of dollars in these areas alone.

2.2 Higher Education and Local Agenda 21

In the world of local authorities and their associations, the Local Agenda 21 programme provides a good platform to «refine the concept and key messages of education for sustainable development» (UN-CSD) at the local level, in order to build and improve the practical skills in urban planning and management. The input of higher education is relevant to all five key elements of the Local Agenda 21 planning process:

- ❖ Multisectoral and *interdisciplinary engagement in the planning* process through a local stakeholders group which serves as the coordination and policy body for preparing a long-term sustainable development action plan;
- ❖ Consultation with community groups, NGOs, business, churches, government agencies, professional groups and unions, in order to raise public awareness, to create a *shared* vision and to identify priorities for action;
- ❖ Participatory assessment of local social, economic, *and environmental conditions* and needs;
- ❖ Participatory *target-setting* through negotiations among stakeholders in order to achieve the vision and goals set forth in the action plan;
- ❖ Monitoring and reporting procedures, including local indicators, to track progress, and to allow participants to hold each other accountable to the action plan.

A number of higher education programmes emerged from the increasing attention of researchers and lecturers given to aspects of the Local Agenda 21 programme, and the increasing demand of students and local officials. Among them are:

- ❖ the “UN Habitat Project” of the School of International and Public Affairs at Columbia University, New York City;
- ❖ the Expert Seminar “New Public Management of Natural Resources”, jointly organized by ICLEI and the London School of Economics and Political Science, London.

2.3 The educational gap: Dissemination of knowledge for the South

In Principle 2, the Earth Summit addresses specifically international cooperation to accelerate sustainable development in developing countries. A major obstacle is the limited access of senior officials in developing countries to advanced training in urban management. The Local Agenda 21 programme and the initiatives of Municipal International Cooperation (MIC) provide a direct and cost-effective medium for development cooperation, bringing together peers in partnerships based on appropriate professional expertise, innovation and mutual benefits. The institutions of higher education find a vast potential of efficient international development assistance which could be significantly improved by research and training activities focussing on the application of sustainable planning techniques for local authorities in developing countries.

2.4 A Focus on Reality: Building Local Government Capacity for Sustainable Human Development in Mexico City, Mexico

For decades, Mexico City was known for its pollution problems. However, after research and training programmes were executed, and special legislation was passed in the city, providing the local government with increased administrative, political, and fiscal powers, the city achieved dramatic improvements in environmental conditions.

In the 1970s, Mexico City established a reputation as both the largest and most polluted city in the world. By the mid-1980s the city's 35.000 industries and service facilities daily used 1.8 million liters of fuel oil and 340 million cubic feet of natural gas. These fuels were burned mainly in old vehicles and in obsolete industrial facilities. Ninety-seven percent of all gasoline consumed contained lead, while diesel and fuel oil had high sulfur content. The combined daily combustion of these fuels produced 11.700 tons of pollutants. The national government seemed powerless to stop the downwards spiral of its capital into environmental oblivion.

In 1989, the Federal Government of Mexico established the «General Law of Ecological Balance and Environmental Protection», which decentralized authority to control sources of pollution to states and municipalities. Article 9 of the law granted Mexico City the authority to regulate emissions from business, service industries and all mobile sources, to regulate urban development, land use, vehicle traffic, and to operate environmental laboratories. The same year the mayor of Mexico City launched a municipal clean air initiative without precedent in the world. The initiative implemented a clean fuel programme, which reduced lead content in gasoline by 50 % and enriched its oxygen content. The programme provided a new gas-oil fuel for industry to reduce sulphur content by 33 %, 62 high pollution industries were permanently closed. The city also invested in a major expansion of the public transit system, adding 10 miles to the subway system, retrofitting 3.500 buses with low emission engines, and replacing 55.000 taxis with new models. These measures were accompanied by programmes of environmental education for citizen and officials of the municipal administration to raise awareness about the local environmental conditions. Within the first year, Mexico City saw a 23 % reduction in total pollutant emissions - over two thousand tons per day. Winter ozone levels decreased by more than 40 %.

3. Thematic Debate: the Major Questions from a Local Authorities' Perspective

3.1 How to bring environmental concerns and hopes in a more sound relation with the concerns and hopes regarding human development?

Case studies like Mexico City usefully highlight the critical balance between environmental and economic components of sustainable development. How far can legislation go in closing high pollution industries, changing patterns of energy use and mobility? Is the effect on the economy detrimental or stimulating? What is the «net» effect on the local community? Practical experience of this kind provides the most important information available for *risk assessments* of sustainability issues.

3.2 What are the most important reasons for the slow and often lacking implementation of the well-developed visions in this area?

There is evidence that, in many cases no adequate attention is given to the institutional constraints for the implementation of measures to promote sustainable human development. Research and training programmes need to thoroughly review and reflect the existing policies and fiscal frameworks at all levels of government, which serve as barriers to efficient resource use. An *interdisciplinary approach* might serve best to address the complex set of barriers ranging from economic incentives/disincentives that encourage unsustainable practices to statutory development plans that do not reflect sustainability objectives.

3.3 In which ways and with what kind of instruments could the process of implementation be energized?

In light of the first five years' experience, Local *Agenda 21 planning* has proven its potential to serve as a comprehensive instrument for the implementation of sustainable human development at the local level. Institutional reforms triggered by the Local Agenda 21 movement may not immediately produce physical improvements in development or environmental conditions. Nevertheless, they are

changing the fundamental approaches and policy focus of hundreds of local governments. These changes include extending the time horizon of local planning, establishing participatory, accountable decision-making frameworks, and operating through multi-sectoral partnerships. As a result, these local governments are becoming more effective and dedicated agents of the sustainable human development agenda.

3.4 How could the relations between higher education institutions and society-at-large be strengthened to promote more forcefully the desired sustainable human development?

Universities and local governments could explore more intensively their relations with regard to the mandates given to each of them in AGENDA 21. Research and training activities on Local Agenda 21 planning concepts, local governance, decentralization and municipal international cooperation (MIC) offer a variety of projects for cooperation in a sense of shared responsibility for the theoretical and practical aspects of implementation.

The international community has recognized that major responsibilities for sustainable urban development are in local government hands. Indeed, since the Earth Summit national governments in more than 60 countries have been decentralizing public sector authority for environmental protection and social development to local governments. So higher education institutions, may consider senior local officials as an important target group for “life-long learning”, building expertise at exactly the place where the future form of an urbanized world is conceived.

L'importance de l'enseignement supérieur dans le domaine du développement durable: une perspective africaine.

Présenté par: Prof. Hauhouot Asseyo
Président CRUFOACI
Recteur, Université de Cocody
Côte d'Ivoire

Monsieur le Président,

Permettez-moi de vous remercier pour l'amicale invitation que vous avez bien voulu nous adresser pour prendre part à ce débat sur le développement humain durable. Cela est d'autant plus important que le millénaire qui s'annonce est porteur de défis, car

- ❖ l'extraordinaire accélération des changements réclame dès maintenant un développement soutenu de l'intelligence et des connaissances sans cesse renouvelées ;
- ❖ la complexification sans précédent des tâches va imposer à l'homme un apprentissage tout au long de la vie avec des épisodes de changement de métier ;
- ❖ la globalisation et la mondialisation ont déjà commencé à imposer des formes révolutionnaires de communication.

Pour ces raisons, il nous faut préparer les générations montantes à y faire face. C'est là que se situe le fondement des problématiques du développement humain durable.

La perspective africaine de cette question majeure s'organise autour de trois préoccupations :

- ❖ les difficultés de réalisation des programmes africains
- ❖ l'engagement réclamé de l'enseignement supérieur
- ❖ les possibilités offertes par la coopération internationale.

1. Les difficultés africaines

Depuis Rio, il ne semble pas que des progrès sensibles aient été faits pour transférer concrètement dans la vie courante, le concept du développement durable. Ce qui est observable ailleurs l'est davantage en Afrique parce que nous ne parvenons pas à trouver des réponses aux questions posées, notamment en ce qui concerne la dégradation de l'environnement les effets néfastes de l'urbanisation, les conflits armés, la progression des maladies et de la pauvreté, etc.

2 L'engagement de l'enseignement supérieur

Après avoir qualifié l'enseignement supérieur de luxe pour les pays en développement, on en vient à reconnaître et réclamer son intervention dans la préparation du futur. Cette perspective est intéressante pour notre continent qui dispose d'une gamme nombreuse et variée d'établissements d'enseignement supérieur dont une large partie se regroupe au sein de l'Association des Universités Africaines (A.U.A.).

Pour engager plus à fond ces institutions dans la préparation des hommes, il est nécessaire d'étoffer les missions de l'enseignement supérieur, de pratiquer plus intensément la transdisciplinarité et de remanier les structure institutionnelles.

2.1 Renforcer les missions de l'enseignement supérieur

Les établissements doivent cesser de privilégier leurs statut et fonction de centre production de savoir pour devenir de véritables locomotives de la société. Ils doivent cesser de faire peur aux classes politiques. Il est devenu impératif de leur confier cette responsabilité de façon claire et acceptée. Cela devrait hâter leur stabilisation.

2.2 Pratiquer la transdisciplinarité

Les conditions politiques étant réunies, il ne restera plus qu'à retoucher les morphologies institutionnelles des établissements en créant des coalitions disciplinaires pour préparer la jeunesse à affronter la complexité. L'exemple de la mobilisation des spécialistes de tous horizons autour de la pandémie du sida est un bel exemple pour convaincre les sceptiques de la transdisciplinarité.

Créer des instituts de formation tout au long de la vie

Quelques universités africaines ont mis en place des embryons de centre de formation continue ouverts aux étudiants et aux travailleurs. Il nous faudra parvenir aux universités ouvertes. Les réformes de l'enseignement supérieur qui ont cours en Afrique en admettent la nécessité et l'urgence, même si cela réclame de gros moyens.

3 Les possibilités de la coopération internationale

Les engagements financiers réclamés sont au-dessus des possibilités individuelles de nos Etats. La responsabilité de nos associations d'universités, notamment des conférences de recteurs appuyées par les syndicats, est de favoriser les mises en commun. Nous pourrions alors revenir un peu à la situation - premiers moments des indépendances. Les écoles doctorales et autres centres régionaux d'excellence sont actuellement encouragés par l'A.U.A., l'AUPELF-UREF et l'UNECO. Ces regroupements tournés vers l'application de méthodes et technologies de la complexité seront particulièrement efficaces pour le futur.

Pour sa part, la conférence des recteurs des universités francophones d'Afrique occidentale, centrale et d'Océan indien (CRUFAOCI) s'efforce de créer quelques sites dans ce domaine.

- ❖ en Côte d'Ivoire pour les systèmes d'information géographique
- ❖ au Sénégal par la production alimentaire (à partir de l'école vétérinaire inter-Etat)
- ❖ au Gabon pour le milieu forestier
- ❖ à Madagascar pour le milieu marin.

Monsieur le Président,

Je me suis efforcé de présenter de façon très incomplète sûrement quelques aspects de notre vision des choses. On doit retenir que nous avons partout une conscience claire des défis et la complexité des réponses réclamées et que nous sommes même passés aux actes. Ce que nous recherchons maintenant, ce sont les partenariats décisifs à travers la coopération internationale. L'UNESCO nous en donne l'opportunité.

Promoting a sustainable future: The universities' perspective

Address by: Prof. Dr Rietje van Dam Mieras,
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Important items with respect to a more sustainable development are:

- growth of the world population
- availability of raw materials
- renewable energy
- a vital environment
- sharing prosperity

If we want to work on a more sustainable future, we will have to take at least all these elements into consideration. We need to understand the dynamics of system earth. We also need to have insight in technology, which contributes to causing environmental problems, but also is essential for solving them. Last but not least we need to understand the social behavior of individuals in the context of different cultures. In other words, for contributing to sustainable development, we need an approach, which integrates social sciences, natural sciences and technology.

At the level of an individual, the considerations given above imply that, in addition to being specialized in a certain field, he or she must be 'environmentally literate'. At the level of universities they imply that universities must, not only concentrate on their core businesses fundamental research and education, but they must also put the integration of disciplines, transmission of knowledge to policy and decision-makers, and communication to the public, high on their agenda. Thus, universities must reflect critically on these different roles in society. Another important point is that universities have to make individuals aware that a more sustainable future can only be realized when individuals are aware of the global dimension of social activities. Therefore, an international dimension has to be added to the learning environment of individuals. Of course student and staff exchange programs are very important in this respect, but also the application of information and communication technology can be very useful.

Thus, universities have to think critically about their role in society both, at the local and at the global level. Universities should also reflect on the use of information and communication technology in knowledge transfer processes. In my opinion, universities must not only concentrate on their role in knowledge generation and knowledge transfer via education, they must specialize also in the integration of disciplines and transfer of knowledge to society at large. This task is much broader than the traditional tasks of universities and therefore universities will have to cooperate more intensively. The new opportunities created in the rapidly developing field of information and communication technology are highly promising in this respect. They offer universities new possibilities to share their knowledge and expertise and to transform from 'knowledge islands' into nodes in a knowledge network. Of course each node in the network has its own identity and its own characteristics, but draws knowledge and expertise from a much larger reservoir. The future action plan of CRE-COPERNICUS focuses very much on such a sharing of knowledge. For the different client groups of modern universities this means that their learning environment can be much more global. Of course face to face contact remains important in knowledge transfer, but in addition to, that the sensible use of information and communication technology can be very rewarding, both from the scientific and from the social point of view.

An example of the use of information and communication technology for creating a cooperative international learning environment is the Global Seminar on Environment, Agriculture and Sustainable

Development coordinated by Cornell University. In this Global Seminar universities from the USA, Honduras, Costa Rica, Sweden and The Netherlands create together an international learning environment in which staff members and students with different cultural backgrounds work together. In this Global Seminar a rich blend of classical face to face teaching, computer conferencing, and videoconferencing is used. For all participants it is an exiting experience, not because of the technology, but because of the social interaction and exchange of views between individuals with different cultural backgrounds.

The Global Seminar approach described above is only an example of the use of information and communication technology in the context of a learning process. In that example the addition of an international dimension to the learning environment is important but information and communication technology can be used in many different ways. Universities can use the technology not only in research and education, but also for the purpose of knowledge transfer to society in a broader sense. Information and communication technology can be used as an instrument in creating a more sustainable future.

Capacity Building for Sustainable Human Development: Role of Higher Education

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1. The Context

The experience with economic development of the last several decades has taught us some lessons, in the light of which, thinking about development has evolved. To day, the following are generally recognized:

- (a) Development is more than economic growth and increase in income. A more holistic concept of human development is the objective of development. In addition to growth of income, literacy, good health, ability to withstand unexpected events provided by own wealth, family support or social or public institutions, dignity and freedom are considered important elements of human well-being and of the notion of sustainable human development (SHD).
- (b) Top-down approaches to development have had limited success in achieving such holistic development. The failure is at various levels and for similar reasons.
 - (i) The most notable shortcoming is in poverty reduction programmes. Poverty has persisted in many countries despite governments' stating it to be an important object of their development efforts and despite allocation of resources for it. Often these efforts have not addressed the most relevant problems of the poor who have been generally not consulted in defining the problem. Thus "their reality" is not reflected in the programmes. Participation of the stakeholders, the beneficiaries, the poor, is now considered essential to pose the relevant questions.
 - (ii) Participation of the stakeholders in the design of the programme is also important to find feasible, implementable solutions. Their knowledge of local environment, appreciation of implicit constraints and awareness of opportunities can make critical contributions.
 - (iii) Stakeholders' co-operation is also essential for successful implementation of programmes. This is particularly so for projects relating to natural and environmental resources. Such co-operation is easier to obtain if the stakeholders have participated in problem identification and design of the project, and a sense of ownership is created.
 - (iv) Participation is facilitated by civil society institutions and non-governmental organizations (NGOs).
- (c) Even when they are well-designed and have addressed relevant problems, top-down centralized approaches have degenerated due to capture by bureaucrats and/or vested interests other than the intended beneficiaries, and due to leakage and corruption. To guard against corruption and inefficiency we need transparency and civil society institutions, which perform the functions of a watchdog.
- (d) While government has to play an active role in development, the appropriate role is considered now very different from the roles governments have played in many countries. The inefficiencies introduced in the economy due to government failure (i.e. the inability of the policy making and administrative apparatus of the state to perform as per the stated social objectives) are often much more than the inefficiencies due to market failures government policies are intended to correct. Governments' role is

now seen to be at once limited and enlarged. In economic matters it is now widely believed that governments should confine themselves to using market friendly instruments to ensure that markets function competitively and to regulate monopolistic behaviors. In the area of provision of education and other social infrastructure governments should be more active than some of them have been in the past.

- (e) Private sector has to play an important role in economic development. The economic efficiency with which private sector operates could be mobilized to accelerate economic growth. However, it needs to be regulated to ensure that social objectives are not compromised. Such regulation should as far as possible, rely on market friendly instruments.

Apart from the lessons learnt from experience of the last five decades, one needs to recognize the changing environment within which countries must operate to day. Among these are the increasingly globalizing world, accelerating technological change and the mounting environmental problems in many countries and at the global level.

All these call for a very different set of skills, capacities and institutions of governance.

2. The Needed Capacities

A society committed to sustainable human development needs a whole range of capacities at various levels: individual, institutional, social and governmental. The sum total of these capacities should lead to a society that permits, encourages and effectively ensures wide participation in decision making to address relevant concerns, that has the technical competence to identify options and select optimal policy from amongst them, that is able to efficiently execute the policy through appropriate governance and regulatory mechanisms, and that is adaptive in its policies and institutions so that it remains relevant under changing context and circumstance through being receptive to feedbacks and by avoiding getting locked up in bureaucratic stubbornness.

What kinds of capacities are needed and at what level? We now look at these.

Whatever may be the institutional framework within which individuals have to function they need certain skills. Technical competence to assess needs and problems, to identify options and to select efficient or optimal strategies is needed. The need for such skills should not be underestimated. Of course, given the emphasis on participation, transparency and market friendly instruments to function effectively in the new set up additional capacities are needed.

2.1 Capacity for Mobilizing Effective Participation in Projects.

For participatory project planning, one requires the ability to dialogue with stakeholders to find their needs, to encourage them to define them and to do this without introducing one's prejudices and biases. Methods of participatory appraisal have been developed. Yet their reliability is yet to be assessed. How does one develop such capacities and among what group of people? NGOs seem to be the obvious candidates as they are the ones likely to have the ability and may already have invested the time needed to earn the trust of people. Learning by doing is perhaps the best way to teach such methods. Once some of them have successfully used such methods, they could be transmitted to other NGOs. By facilitating networking of NGOs, one can hasten such capacity building.

Participatory project implementations can be facilitated by appropriate institutional designs. Thus, capacities to design, build, and operate such institutions are also required.

2.2 Capacities to Function in a Globalizing World with Rapid Technological Change

Many countries have to acquire new capacities to take advantage of a fast globalizing world with rapid technological change. Among the capacities needed, are capacity to manage transition from a planned or a mixed economy to a freer market economy, capacity to regulate a free market economy to ensure competition, capacity to negotiate international agreements, capacity to deal with TNCs, and capacity to manage technology. These capacities require not only individual skills, but also appropriate institutional structures:

2.2.1 Capacity to Manage Transition to a Market Economy

The process of privatization is full of pitfalls, and there are many approaches to it. Various countries have followed different strategies. Their experiences constitute valuable lessons in how to go about privatization. Without transparent procedures, privatization in some countries has provided scope for corruption where public sector assets have been sold for a song to cronies of the people in power. In some countries, even when done honestly, bureaucrats well meaning, but naive and innocent of the ways of business have done it. Here too, public assets did not fetch fair prices. The lessons from various experiences around the world if, synthesized and transmitted to developing countries, could help build their capacity to carry out privatization efficiently.

The process of transition involves more complex issues besides selling public assets. Many countries find it easier to introduce gradually private producers in areas reserved for public sector. Power sector is an example. But operating a power system in which private parties own some plants is a very different matter from operating a power system which is fully owned by the public sector.

If the managers of the power system are not sufficiently knowledgeable, there is a danger that privately owned power plants might acquire a larger share of the market and higher profits at the cost of both, the public-sector power system, and consumers will have to pay a higher price. Capacities for management of systems with mixed ownership need to be built. It needs special and advance efforts to do so.

2.2.2 Capacity to Benefit from FDIs

Official Development Assistance (ODA) is dwindling and private capital flows into many developing countries now by far exceed ODA. Foreign Direct investment (FDI) now appears to be a major source of financing investment in developing countries. Many of them want FDI, encourage it and see it as a way to rapidly develop their industries, and in particular their infrastructures. FDI is also seen as a source of new technology.

To get the full benefit of FDIs, countries need special skills. Developing countries who are used to ODA, and who have followed inwardly looking policies, usually do not have the needed capacity.

If a foreign firm comes to produce a product that is competitively sold and if the country does not protect the product against foreign imports, then what the foreign producer does is not of much concern. People will buy the product only if it is worth the price. If the producer makes super-normal profit, competition will bring it down in due course. However, in infrastructure such as power, telecommunication and transport, often there is no competitive market. Moreover, one cannot import them easily. Usually these are government owned and/or operated, and do not have much of competition. Often prices charged to consumers involve subsidies, which are politically difficult to remove. The price charged to the consumer most likely does not reflect the marginal cost of supplying it. As a consequence, the public-sector organization (such as a state electricity board) supplying the product or service, often is a loss making entity. Its financial sickness may be the main reason why it is unable to

invest, to expand production capacity and to meet growing demand. It is also the reason why FDI may seem to be the only solution to expand production capacity to some developing countries.

Since the market is not competitive, an agreement would have to be arrived at with the foreign investor. Developing countries need special capacity to negotiate satisfactory agreements. They are at a considerable disadvantage in negotiating such deals. First, they know less about the real costs and technology than the foreign investor does. Second, they are buyers in a seller's market as they are more eager to clinch the deal, and third their resources to negotiate ability to hire consultants, lawyers etc, are limited. Thus, very unfair agreements can be signed. And if the social rate of return were less than the rate of return conceded to the foreign investor, the country would become poorer. An example in India, which among developing countries has comparatively a more sophisticated techno-economic capacity, is provided by the controversy surrounding the power plant being set up by the Enron Corporation of the U.S.

An agreement was signed between the Maharashtra Government and a subsidiary Dhabhol Power Corporation, DPC, set up by the Enron Corporation. DPC was to construct a power plant in fixed time and at fixed cost, and the Maharashtra State electricity board (MSEB) agreed to a purchase price and gave an assurance to lift enough power to provide an 86 percent load factor to the plant. A huge controversy arose. Some critics argued that the purchase price was too high, and provided an internal rate of return of 30 to 35 percent in US dollars (the exchange rate risk was borne by the MSEB) on the equity which itself, the critics further argued, was grossly inflated. The issue was made one of its election planks by the opposition, which on winning the election, canceled the earlier agreement. In the end, a new agreement was negotiated which showed a saving of US \$590 million from a total cost of US \$3. 10 billion. The importance of negotiating capacity and its potential payoffs are obvious.

This episode also underlines one another point. In India's democratic system, it was possible to question and revise a deal, which was unfair. Democracy and transparency are important elements for good governance. Yet, they can also be paralyzing in the absence of appropriate capacity and self-confidence. Again India provides an example. The Enron episode made people aware and questioning about deals. As a consequence very few agreements were finalized. In the wake of the first agreement with Enron signed in 1993, some 240 private parties both domestic and foreign, offered to set up power plants and signed memoranda of understanding with various state electricity boards. The end of 1997 finalized only 3 agreements including the Enron one. The reason was that Indian negotiators become very unsure of themselves and fearful. They had inadequate knowledge to say what is a fair deal. Again capacity building for such analysis and provision of credible fair benchmarks adjusted to the particular local conditions can go a long way in speeding up decision processes and development.

2.2.3 Capacity to Manage Technology

Technology transfer is an important objective of developing countries. In many international negotiations particularly relating to climate change, developing countries ask for technology transfer. Advanced technology is perceived to be important for development. Yet, the process of technology transfer has many steps. At each level different skills and capacities are required. Without these capacities countries would not be able to absorb the technology even when it is offered. The stages in technology acquisition can be defined as follows:

- 1 Know Which - capability to identify which technology the country needs and is relevant for the country;
- 2 Know How - capability to operate the technology, i.e., to run the plant/equipment that embodies it;
- 3 Know Why - capability to know why a plant is designed the way it is which is needed to improve and innovate;
- 4 Know What (next) - ability to develop new technologies and be a technological pace setter.

These stages require different skills and capacities, and a country's particular needs have to be recognized in designing programmes of capacity development. For example, know-which requires skills for techno-economic assessment of options; "know-how" requires relatively standard blue collar technical abilities to operate and maintain; "know-why" requires deeper engineering understanding and design capabilities; and "know-what" (next) calls for vision and creativity.

For the last two stages, apart from the human capacities, a country needs organizational capacities to develop and maintain R&D organization and policies that provide incentives for R&D to private firms. Management of R&D organizations, where creative individualists have to be motivated to work towards a common goal, needs special skills.

In to-day's world of rapid technological change, these capacities are critical, and they need an ail around development of the educational system, from primary education to technical training institutions to higher education in science and engineering. Moreover to be competitive the higher education has to have excellence.

2.2.4 Capacity to Manage a Freer Economy

If a country were to benefit fully from globalization, it would require a competitive economy. Competition provides the needed incentives and discipline in a more efficient and reliable way. A freer trade environment brings foreign competition to rein in even domestic monopolies and to keep domestic economy from getting too distorted. Yet competitive conditions do not come about by themselves. And even if competitive conditions are established, they need not remain so for long. Government has to play an active role in ensuring that markets remain competitive. Thus, while liberalization and globalization imply on the one hand, a large contraction of the role of the government in the economy, on the other, it calls for an increased, but a different kind of role of the government. It will need new capacities to regulate markets and monopolies, to manage the economy, to serve social needs through market friendly and self-enforcing instruments, to supervise and oversee stockmarkets, to see that they are efficient, transparent and just, and involve no insider trading. It also needs to ensure that liberalized money markets do not lead the country to a financial crisis. It will need to regulate banks.

The capacities needed are not just individual skills, which are of course required in the first place but also institutional mechanisms that create a system of governance and transparency where civil society institutions such as interest groups and non-governmental organizations can seek quick redress through legal means and the judiciary.

3. Institutional Capacities

One of the lessons learnt from the past fifty years of development experience is that governments, howsoever well meaning, have not always been able to achieve objectives. Capture by vested interest groups, bureaucratic indifference, misconceptions and inefficiency, corruption and tendency to centralization have been common. New modes of governance are called for. Governance for a transparent, just, efficient and humane society that has SHD as its primary goal is not the task of government alone. It needs a whole range of institutions. The capacities needed to establish and operate these institutions have to be nurtured. Developing appropriate institutions thus raises a country's capacity for SHD in very meaningful ways. The following kind of institutions is important

3.1 Stakeholder Participation, Bottoms-up Development and Decentralization

Stakeholder participation and development through a bottoms-up approach requires decentralization and delegation of power to local governments. Institutions of local governance, which can execute such developmental efforts, have to be built. These institutions need a governance structure

that is responsive to changing needs. Moreover, there should be safeguards against capture by local elites. They need to function in democratic participatory modes. Local government should be provided financial as well as executive powers.

3.2 Institutions for Economic Management

The need for a variety of regulatory institutions is already referred to above while discussing the capacities needed for economic management. In particular, institutions to regulate markets and monopolies, for banking supervision, for financial market regulation, to ensure stock market transparency, efficiency and fairness, are needed. Also needed are accountability, disclosure and auditing regulations to let transparency function as an effective tool for discipline.

3.3 Social Institutions

Access to education, clear water, healthy environment where sanitation and waste disposal are adequate, health services, infrastructure services and other public facilities (parks, safety, etc) is important for human development. In most countries government shoulder the bulk of the responsibilities for providing these services. Yet in a number of countries the level of these services are not satisfactory. New and innovative civil society institutions can play important roles in increasing the capacity of public institutions to provide these social services in more effective and efficient ways, which can contribute to SHD.

3.4 Institutions to Sustain Environmental Resources

Institutions to monitor the quality of environmental resources, air, water, parks, forests, biodiversity and special ecosystem are needed. Greater reliance on private sector for development necessitates that appropriate incentives are created for private firms and individuals to behave in environmentally responsible manner. While market friendly economic instruments can play an important role in creating these incentives, vigilance by civil society institutions is needed to ensure compliance which has to be over wide ranging activities spread geographically all over. Institutional mechanisms have to be developed that permit civil society institutions to raise environmental concerns effectively and in time so that other economic activities adopt environment friendly alternatives.

Also needed are, special institutions to restore and preserve environmental and national common property resources which in many communities are degraded, due to a variety of reasons such as: increased population pressure, breakdown of traditional regulatory mechanisms, appropriation by private parties, larger economic pressure, commercial exploitation by outsiders, and so on. Innovative institutions need to be developed for this purpose.

3.5 Legal Framework

A well functioning judiciary and a rule of law are essential to the functioning of a liberalized, globalized economy. However, one needs to emphasize judicial reforms and efficiency from the SHD perspective also. In any open, transparent and participatory decision process all kinds of objectives may be raised by well meaning parties from their own perspective. At the same time, vested interest groups may use the process to delay and derail projects they don't like. There is a danger of paralysis of decision making. In spite of such a danger, such open procedures may be the best guarantee of responsible decision making.

To minimize delay, one needs to set up legal framework and a judiciary system that can quickly settle dispute and set aside frivolous objectives.

3.6 Dealing with Corruption

Deregulation and liberalization greatly reduce discretionary power of politicians and bureaucrats. This reduces the scope for corruption. If, at the same time, transparency, participatory decision making processes, civil society institutions, and a quick and just judicial system are established, also, the incidence of corruption should go down.

Thus, mode of governance and policy framework both play important roles in containing corruption.

4. The Role of Higher Education

Capacity development for SHD needs new types of capacities and institutions in a whole range of areas. Not only individual skills, but also institutional innovations are required to promote SHD. Universities and institutions of higher education have a particularly important role to play. The task is complex.

As I see them, the main problems are going to be:

- how to get Universities which are traditionally organized along disciplinary lines to be inter-disciplinary?
- how to produce multidisciplinary teachers?
- how to inject environmental issues in various disciplinary courses?
- how to produce teaching material that is interesting and effective?
- how to spread not just awareness but **informed awareness** among people?

While all these are difficult problems under any situation, they are even harder to resolve for developing countries facing a globalizing world economy undergoing an ever-increasing rate of technical progress.

Let me make some suggestions on how these can be accomplished.

4.1 Multi-disciplinary work

University departments do not like multi-disciplinary work and look upon them with suspicion. Both the disciplines (assuming that only two are involved) look upon it as being second rate work. The gain in multi-disciplinary work often is in the relevance of the question asked, and the options considered. For example, economists often worry about optimal choice from amongst alternatives, without considering new technological possibilities, which usually drive progress, and technologists get preoccupied with options, which are economically irrelevant. The worth of asking the right question is often given a lower value by academics than the technical sophistication used in tackling the problem. The only way multi-disciplinary work can get respect is when it not only asks the right question but also uses state of the art techniques. This requires people who have excellence in both the disciplines.

4.2 How to produce multi-disciplinary persons

We need people who have depth in both the disciplines. At least, those who are going to teach the first set of teachers have to be trained in both the disciplines. The experience at Indira Gandhi Institute of Development Research shows it is possible to take people with a master's degree in science

and technology and give them graduate level training in economics to turn them into top class economic analysts. They are able to do work that meets the disciplinary standards of economists and technologists, and also able to communicate across the disciplines. This requires special effort.

4.3 Environmental education

Disciplinary courses should contain case studies of problems where environmental issues raise difficult dilemmas. This can capture students' interest in environmental issues. For example engineers should be taught to carry out environmental impact assessment and cost benefit analysis as a part of the course on project design. We need to develop teaching materials and case studies for a whole range of different disciplines incorporating in each the environmental dimension.

4.4 Developing countries' capacities

This is the most difficult task. The technological gap is widening and will continue to do so unless something is done. The dilemma is how to create centres of excellence without encouraging brain drain. For many small countries, these centres have to be set up in cooperation with others. Keeping such multi-country multi-disciplinary centres in good health is a formidable task. The disciplinary battles get translated into nationality terms and so on. The UNU can play a very important role here in promoting such centres.

Also, modern technology can help bridge the gap. One major difficulty in keeping abreast is the high cost of books. I guess that the total amount of library's budgets of all the institutes and universities in India is perhaps smaller than what Harvard University spends on its libraries. Using the internet technology one can provide access to up to date literature, at least to selected institutions in developing countries. That is still not a substitution for books and journals. Also, even when accessible on internet they won't be free and may still be beyond the reach of developing country institutions. For that, we need to work towards freely accessible internet publishing internet, publishing as the norm as is now the case in Physics through the initiative of CERN. This will bring down the prices of journals, and that will also help other developing country institutions not having internet. UNU can take a leading role here.

4.5 Action Plan

The idea of a platform is a very good one. This can be used to develop teaching material. Prizes can be given to best case studies that integrate environmental concerns in disciplinary problems in each area, for which a separate competition may be arranged for each discipline. Short listed entries could be published on the internet as well as in cheap editions. This way one could build up good teaching resources.

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When addressing Sustainable Human Development, one is compelled to address the difference brought about by the word human in the definition of Sustainable Development. In my eyes this basically places an emphasis on the human being, the manpower that can facilitate Sustainable Development. When narrowing the scope of analysis to Higher Education one cannot but project one's thoughts on the largest population in this sector, the student. The question then is how do students interact among themselves, among other people in the society, with their environment and lastly with their destiny. This clearly becomes a question of student participation and involvement in higher education activities.

The way in which students participate in the curricula, recreational and even the day to day running of their institutions equips these young people with the necessary skills to tackle complex situations and problems. If students are integrated properly and democratically into institutional structures they learn to respond to situations and complexities in a democratic manner. Students should learn to live in a culture of peace, accepting other ethnic groups and races communicating with different generations, for which institutional structures play a facilitating role. Higher education institutions should also allow for the efficient and reliable dissemination of information to all institutional sectors.

It is not enough for Sustainable Human Development literature, knowledge and practice to be concentrated into institutions alone. It is important for individuals to personally adopt the new ways of thinking and acting. Student participation at all institutional levels gives young people the voice to determine their future in a committed manner. This commitment develops a sense of responsibility, which is the basis of personal and individual initiative. Student participation should not be limited to an institutional level but should evolve into a global dimension. This promotes a concerted effort from the students internationally, broadens perspectives and encourages collaboration in solving international dilemmas and global complexities. In doing this Higher Education should take advantage of the new information technologies.

Higher Education programmes should extend their fields to include Sustainable Human Development. This is easier done by partnerships with organizations already spearheading sustainability for instance the UNEP or the Earth Council. These organizations should assist in making necessary additions or alterations to curricula in order to enhance a transdisciplinary approach. These organizations should also look at integrating students and supporting student initiatives on sustainability such as GOSEA.

Finally I would like to stress that any society that is concerned about its future should begin investing in those sections of society that will carry the concerns into the future. When looking at Higher Education institutions, the section that is going to take those concerns to the future generation, are the students. They are in positions that not only make information accessible to them but they also provide the link between today's stakeholders and tomorrow's generation. We should appreciate and take advantage of the fact that students are able to decipher the concise and elevated diction of the policymakers on the one hand and to understand on the other hand, the enthusiastic and inexperienced expressions of the young people. This leads to continuity of Sustainable Development between the generations. Investing in students is sustainable.