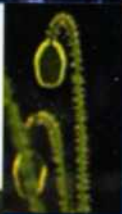


SUSTAINABLE DEVELOPMENT

*education,
the force
of change*



Transdisciplinary Project "Educating
for a Sustainable Future" (EPD/UNESCO)

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"UNESCO believes in education as the force of the future -which cannot be other than a sustainable future- and is committed to maximising its efforts and multiplying its partnerships for the development and deployment of this force in the cause of peace and human betterment"

Federico Mayor

Foreword

The International Conference on Environment and Society: Education and Public Awareness for Sustainability, was held from 8 to 12 December 1997 in Thessaloniki, Greece, the Cultural Capital of Europe for 1997. Organised by UNESCO and the Government of Greece, the conference brought together nearly 120 experts from 84 countries.

The Conference was held at an important juncture, five years after UNCED and the Toronto ECO-ED Conference and twenty years after the Tbilisi Conference on Environmental Education. The Conference was undertaken as an inter-sessional activity contributing to the work of the UN commission on Sustainable Development (CSD) on chapter 36 of Agenda 21 ("education, public awareness, and training"), for which UNESCO is Task Manager. It was designed to contribute to the implementation of the international work programme of the Commission Sustainable Development on chapter 36 initiated in 1996 at its fourth session.¹ The proceedings of the conference were published late 1998 in both printed and CD-ROM formats.

The objectives of the Conference were to highlight the critical role of education and public awareness in achieving sustainability; consider the important contribution of environmental education; provide elements for the further development of the work programme of the CSD; and mobilise action at international, national and local levels.

The conference took place against the backdrop of the new vision of the role of education and public awareness in achieving sustainability which had emerged during the last few years. Education was no longer seen as an objective in and of itself but as a means to bring about changes in behaviour and life-styles, to disseminate knowledge and develop skill, and to prepare the public to support changes towards sustainability emanating from other sectors of society.

Education is to be considered an effective instrument to promote a new civilisation. In other words, the question is about value systems. Because value systems based on our present materialistic civilization will have to be rethought and changed. New concepts of civilisation, together with human values and life-styles, which are in harmony with the global environment, will need to be made. Future use of science and technology, with an overly optimistic view that we can control and govern nature, is not always appropriate. The basic of scientific and technological activities should be strictly controlled so as to harmonise con co-exist with nature.

In the 21st Century the expectation for the contribution and cultural and social sciences will be heavy indeed, and the value of the environment will be defined through those sciences. By promoting fusion of science and technology with cultural and social sciences, the basic foundation for solving the global environmental issues could be defined.

This vision had been reflected in the new international consensus and framework for action which emerged from the series of conferences organised by the United Nations, beginning in 1992 with Environment and Development in Rio, and followed by Population in Cairo (1994), Social Development in Copenhagen (1995), Women in Beijing (1995), and Human Settlements in Istanbul (1996). Also relevant were the conventions on biological diversity, climate change, and desertification.

In an attempt to clarify the concept of education for sustainability as requested by the Commission on Sustainable Development, UNESCO, in its function as Task Manager for chapter 36 of Agenda 21 adopted in Rio in June 1992, prepared a document entitled "Educating for a Sustainable Future: A Transdisciplinary Vision for Concerted Action", intended to provide a stimulus to discussion rather than as a document for discussion per se. This document was translated by UNESCO into all the official UN languages and has been very well received within the countries. The document was written based on a wide variety of source materials, including background papers prepared by experts at the request of UNESCO.

Much progress has been made in advancing the new vision of education, public awareness and training as key instruments for achieving sustainable development.

As there is no "formula" for bringing about the kind of changes required, there is a great need, at both national and international levels, to identify and share innovative practices, and to reinforce, constantly, the co-operation between the academic institutions, networks and research groups and to promote a public-private partnership and an effective participation of NGOs.

The only way to build a sustainable future with a long-term vision is by putting into practice every day solidarity, imagination, real understanding, tolerance and respect for diversity, and, as mentioned by the Director General of UNESCO, Dr. Federico Mayor, in his article "The Role of Culture in Sustainable Development",

"Our greatest need at the present time is perhaps for a global ethic - transcending all other systems of allegiance and belief- rooted in a consciousness of the interrelatedness and sanctity of all life."

UNESCO wanted to publish in this book the contributions made by the personalities and experts who had been prepared to involve themselves completely in the work of preparing for the conference at Thessaloniki, and who continue, still, to give us their special support in the implementation of the international work programme "Education, public awareness and training for sustainability".

It is also an opportunity to thank the hundreds of experts and institutions who contributed, including FAO, IUCN, OECD, OAS, UN-DESA, UNDP, UNFPA, WHO, the World Bank, regional banks as well as academic institutions and NGOs and with whom we maintain a special dialogue.

Thanks must go to UNESCO's office in Caracas, which is the Regional Centre for Higher Education in Latin America and the Caribbean, for its contribution in the preparation of this book.

Gustavo López Ospina
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UNESCO

REFERENCES

- 1 The priority areas for action in this work programme are: 1) Clarify and communicate the concept and key messages of education for sustainable development; 2) Review national education policies and re-orient formal education systems; 3) Incorporate education into national strategies and action plans for sustainable development; 4) Educate to promote sustainable consumption and production patterns in all countries; 5) Promoting investments in education; 6) Identify and share innovative practices; 7) Raise public awareness.

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*The Role of Culture in Sustainable Development**

FEDERICO MAYOR,
DIRECTOR GENERAL OF UNESCO

"Traveller, there is no road; you make the road by walking".¹ The words of Antonio Machado may be applied to the quest for development. Development is not a fixed destination, but a path along which the traveller is also a pathfinder.

We have been a long time in discarding mental maps that identified development goals in terms of linear economic growth, in discovering the complex nature of the development process. In recent decades, our understanding of this complexity has passed through a number of stages, marked by the deployment of such terms as 'endogenous', 'integrated' and 'sustainable' to signpost the path to development. The report of the Brundtland Commission represented an important conceptual advance by placing development in its broader environmental and intergenerational setting. Nine years later, we are still pondering and debating the requirements for a development that "meets the needs of the present without compromising the ability of future generations to meet their own needs."² However, there is an increasing consensus - in the United Nations system as elsewhere - that development must be concerned with "the flourishing of human existence in all its forms and as a whole"³ and that culture is an essential dimension of such development.

Culture is elusive to definition. However, it may be taken to refer to all those mentally generated forms of organisation created, preserved and transmitted within a social group or, in a wider context, the human species. Such a definition encompasses culture both in its special sense of the arts and in the broader anthropological sense of a whole way of life, material, intellectual and spiritual. Culture comprises all the expressions of our creativity, including language, science

* Keynote article by the Director-General of UNESCO for the special issue of the UNEP magazine "Our Planet"

and technology, architecture, music and art. It includes our whole system of beliefs, values, attitudes, customs, institutions and social relations. It shapes the way we perceive the world (including ourselves) and how we interact with it.

Culture is thus inextricably bound up with the great developmental challenges of our time: eliminating poverty, curbing population growth, combating disease, protecting the environment and the resource base, promoting a culture of democracy and peace. The global crisis facing humanity at the dawn of the twenty-first century is above all a reflection of our collective values, behaviour and lifestyles. In a word, it is a cultural crisis.

UNCED and the implementation of Agenda 21 have served to highlight the complexity of the concept of sustainability, which reduced to its simplest expression leaves open the question of what exactly is to be transmitted to future generations. They have also underscored the imperative of ensuring that the moral obligation of intergenerational solidarity is not met at the expense of our contemporaries. In many parts of the world, people have little natural capital to pass on to posterity apart from their cultural identity. It has become clear that the concept of sustainable development is meaningful only when construed in multidimensional and global terms, that is to say, when envisaged in its interrelated economic, social, environmental and cultural aspects and in the perspective of an increasingly interdependent world.

The relationship between these different aspects of sustainable development naturally poses highly complex questions of ends and means. Culture, for example, will have an instrumental role in relation to economic, social or environmental objectives deemed necessary or desirable within a particular society. Within a sustainable society, however, it is culture itself that will be the arbiter in the difficult trade-offs between conflicting ends, the "final court of appeal" with regard to developmental goals. Culture becomes an end in itself when it plays its creative, pathfinding role of determining our ultimate destination. As pointed out in the recent report of the World Commission on Culture and Development set up jointly by UNESCO and the United Nations, culture is not only the "servant of ends but (...) the social basis of the ends themselves", a factor of development but also the "fountain of our progress and creativity".⁴

Culture will clearly have a key instrumental role to play in efforts to achieve an environmentally sustainable economy. Technology alone will not suffice to compensate the effects of waste and wastage on our environment. Reducing energy consumption to combat environmental pollution and the risk of global warming will call for far-reaching cultural changes in domestic living, transportation, work location and urban-rural dynamics. Responsible stewardship of the planet's material resources will involve a revolution in the habits of the throwaway society. Conservation of the biological resource base will require new patterns of

consumption consistent with sustainable farming, forestry and fishery practices. Education -itself an aspect of culture - will have a major part to play in facilitating this cultural shift as well as in promoting capacity-building and technological innovation for sustainable development.

These changes will concern disproportionately the affluent 20% of the world's population that currently monopolises some 80% of its resources of all kinds. Indeed, unless changes of lifestyle are accompanied by a new ethical awareness the prospects for global sustainable development cannot be said to be bright. By breeding poverty, our asymmetrical world aggravates its other ills, notably damage to the environment. The inhabitants of the rich countries will have to discover within their cultures the source of a new and active solidarity if such development challenges are to be met through greater international sharing of knowledge and resources.

In the realm of ideas, sustainability implies a break with mechanistic and one-sided approaches to development issues. Modern science, for example, is increasingly recognising the value of indigenous ecological knowledge and traditional resource management practices, based on generations of observation and experiment and deeply embedded in local cultures. The developed world is discovering that traditional pharmacopoeia, fertilisers and insecticides can often be turned to account. Traditional knowledge and values are combining fruitfully with modern science to foster sustainable environmental management - as in the over 300 biosphere reserves in 85 countries making up the World Network of UNESCO's Man and the Biosphere (MAB) programme. Culture can here be seen to be playing a very practical role in sustainable development.

The politics of participation - and the cultural ethos that makes it possible - is arguably another of the requirements for sustainability. A sustainable society is conceivable only in terms of the involvement and empowerment of people - men and women equally. Individuals and grassroots organisations were prominent in the environmental movement that has transformed the political landscape in most countries over the last decade. Sustainable development needs to be rooted in the lives and concerns of people at large, including traditional cultures and minority groups. It implies a knowledge of and respect for cultures in their diversity. It is predicated on a spirit of dialogue and democracy and, beyond that, a climate of civil and international concord. A culture of peace, in the broadest sense of the expression, is one of the constituents of sustainability.

Culture becomes an end when we think of the ultimate purposes of development. 'Sustainable development' is, after all, but a stage on a chartless road. Who can say what are the conditions of "cultural sustainability"? It is in this sense that culture in the diversity of its forms is an end that encompasses the objective of sustainable development.

There is an important parallel to be made here between biological and cultural diversity, which may be seen as aspects of the same phenomenon. Just as the multitude of diverse species and life-forms that constitute the earth's biodiversity have evolved in adaptation to different geographical and climatic conditions, so the adaptability of *homo sapiens* - being the only species that has the potential to exploit every feasible ecological niche on the planet's surface - is expressed in humanity's cultural diversity. In this way, not only the plants and animals but also the human cultural patterns that we find in the humid tropics differ from those in the tundra or in the arid temperate zones. Just as nature produces a variety of species adapted to their environment, so humankind develops varied cultures in response to local conditions. Cultural diversity may thus be seen as a form of adaptive diversity and, as such, a prior condition of sustainability.

Globalisation is posing a serious threat to both kinds of diversity. Peoples and cultures that have existed for thousands of years in equilibrium with the natural environment are disappearing along with the ecosystems that sustained them. The loss of diversity is debilitating the biosphere of which humanity is a part. At the same time, the rapid destruction of age-old cultures and traditions is diminishing our collective repertoire of cultural response. Unlike modern industrial society, many traditional cultures promote not only the need but the sacred duty for people to live in symbiosis with their natural environment. If the unique and particular understandings of humanity's different cultures are lost or simply reduced to a lowest common denominator, something precious and perhaps even essential for our collective survival will have been squandered. Their world view, their values and their innate respect for nature and life represent potential contributions to the profound change in attitude and behaviour that can alone engender a global culture capable of acting responsively and responsibly in the face of global change. The world's cultures must be preserved in their diversity - 'for their sake and ours'.

Yet while posing a threat to diversity, globalisation is also giving us an expanded vision of the human situation and of the repercussions of our individual and collective actions on ourselves and on the biosphere as a whole. The concept of sustainable development may itself be seen as an expression of this new awareness. Our greatest need at the present time is perhaps for a global ethic - transcending all other systems of allegiance and belief - rooted in a consciousness of the interrelatedness and sanctity of all life. Such an ethic would temper humanity's acquired knowledge and power with wisdom of the kind found at the heart of the most ancient human traditions and cultures - in Taoism and Zen, in the understandings of the Hopi and the Maya Indians, in the Vedas and the Psalms, in the very origins of human culture itself. Is this not perhaps the essential role of culture in and beyond sustainable development - to be the crucible for a common ethic, corresponding to the intuition of a shared yet diverse destiny?

REFERENCES

1. Antonio Machado, Nuevas Canciones ('Proverbios y cantares', XXIX)
2. Our Common Future, Report of the World Commission on Environment and Development. Oxford University Press. 1987.p.8
3. Report of the World Commission on Culture and Development. p. 24
4. Ibid. PP 24-5

The Reform of the University

*EDGAR MORIN, SOCIOLOGIST,
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THE DOUBLE MISSION

The University preserves, memorises, integrates and makes a cultural heritage of knowledges, ideas, values, ritual; it regenerates it by reviewing, updating and transmitting it; it generates the knowledge, ideas and values which will then become part of the heritage. Thus it is conservative, regenerative, generative.

In this context the University has a trans-secular mission and function, which at present, goes from the past towards the future; it has a trans-national mission which it has maintained despite the trend of nationalist enclosure in the modern nations. It has an autonomy which enables it to carry out this mission.

According to the two meanings of the term conservation, the University's conservative character can be either vital, or sterile. Conservation is vital if it means safeguard and preservation, for a future can be prepared only by saving a past, and we are in a century in which multiple and powerful forces of cultural disintegration exist. But conservation is sterile if it is dogmatic, stiff, rigid. Thus the Sorbonne of the 17th century condemned all the scientific advances made at that time and up to the next century, modern science was to a large extent, formed outside the universities.

But the University was able to respond to the challenge of the development of sciences by means of its great mutation to the 19th century, as a result of the reformation carried out by Humboldt in Berlin in 1809. It was laicised, and its internal liberty was instituted with regard to religion and power, and it considered the great problems which, after the Renaissance, question the world, nature, life, man, God. The University became the very place of the identical problems of the modern European culture; it became more deeply involved in its

trans-secular and trans-national mission, opening up to the extra-European cultures.

The reform introduced the modern sciences in the departments which it created. The University henceforth applies the coexistence - alas only coexistence and not co-communication - of the two cultures, the culture of the humanities and the scientific culture.

With the creation of the departments, Humboldt had seen very well the trans-secular nature of the integration of the sciences in the University. In his opinion, the University could not have a professional training as a direct vocation (suitable for technical schools) but an indirect vocation for the adoption of an attitude towards investigation.

Hence the double paradoxical function of the University: its adaptation to and integration of scientific modernity, response to the fundamental needs of training, the provision of teachers for the new technical professions and others, but also and above all the provision of a meta-professional, meta-technical teaching.

Must the University adapt to society or must society adapt to the University? There is complementarity and antagonism between the two missions, adaptation to society and the adaptation of society to the University: one returns the other in a buckle which should be productive. It is not just a question of modernising culture; it is also a question of bringing culture to modernity.

Here we find again the trans-secular mission, in which the University asks society to adopt its message and its standards; it inoculates in society a culture which is not made for the provisional or ephemeral forms of the *hic and nunc*, but which is however made to help the citizens to live their *hic and nunc* destiny; it defends, illustrates and promotes in the social and political world intrinsic values of the university culture: the autonomy of conscience, the problems (with the consequence that investigation must remain open and plural), the pre-eminence of truth over usefulness, the ethics of knowledge, whence this vocation expressed by the dedication to the frontier of the University of Heidelberg: "to the living spirit".

THE CHALLENGES OF THE 20TH CENTURY

The 20th century has thrown several challenges to the double mission.

First of all there is an over-adapting pressure which urges to conform teaching and research to the economic, technical, administrative demands existing at the time, to comply with the latest methods, with the latest receipts on the market, to

reduce general teaching, to marginalise the humanised culture. Now, always in life and in history, the over-adaptation to certain conditions has not been a sign of vitality, but announces senescence and death, due to the loss of inventive and creative substance.

More radically, the very developments of our century and of our planetary era bring us to face more and more frequently and more and more inevitably the challenges of complexity. Now our schooling, and then university studies teach us to separate (the objects of their environment, the disciplines one from others) but not to connect, and owing to the cutting of the disciplines it is impossible to realise "what is woven together", that is to say, according to the original meaning of the term, the complex.

The traditional thinking which forms the spirits as of the elementary schools directs us to reduce complex to simple, that is to say, to separate that which is linked, to unify that which is multiple, to eliminate everything which brings about disorders or contradictions in our understanding. The thinking which cuts, isolates, enables the specialists and experts to perform very well in their compartments, and to cooperate effectually in non-complex sectors of knowledge, particularly those related to the functioning of the artificial machines; but the logic which they obey extends on the society and the human relations the constraints and the inhuman mechanisms of the artificial machine and their determinist, mechanistic, quantitative, formal vision is unconscious of, hides or dissolves everything which is subjective, affective, free, creative. Furthermore, the spirits divided by small portions are blind to the inter-retro-actions and to the causality in a buckle and they still consider frequently the living and social phenomena according to the linear causality and according to the mechanistic/determinist conception, valid only for artificial machines. The intelligence which only knows how to separate breaks up the complex world into disjointed fragments, divides the problems into fractions, makes the multidimensional unidimensional. It is an intelligence which is at the same time short-sighted, colour-blind, one-eyed; it often becomes blind in the end. It destroys in the egg all the possibilities of understanding and reflection, eliminating also the possibilities of a corrective judgement or a long-term view.

The way we think to find solutions to the most serious problems of our planetary era is itself one of the most serious problems which we must confront. Thus, the more the problems become multidimensional, the greater is the incapacity to think about their multidimensionality; the more the crisis progresses, the greater becomes the incapacity to think about the crisis; the more the problems become global, the less they are thought about. Due to the incapacity to envisage the planetary context and complex, blind intelligence gives rise to unconsciousness and irresponsibility.

Furthermore, there is the disjunction which took place between the humanist culture, which strengthened general intelligence, and the scientific culture, which itself is sometimes comparted hermetically between the disciplines. The non-communication between the two cultures entails serious consequences for one and the other. Humanist culture revives the works of the past, scientific culture values only the present acquirements. Humanist culture is a general culture, which through philosophy, essays, the novel, states the fundamental human problems and calls for reflection. Scientific culture arouses a thinking devoted to theory, but not a reflection on human destiny and on the evolution of science itself. The frontier between the two cultures crosses sociology completely, but the latter is divided instead of attempting a shuttle which relinks it.

THE REFORM OF THINKING

The need for interdisciplinarity is recognised everywhere, whilst one is beginning to envisage transdisciplinarity, either for the study of health, old age, youth, towns... But interdisciplinarity is just as insufficient as the UN for the confederation of the nations, and transdisciplinarity is only a solution linked to a reform of thinking. A thinking which disjoins must be replaced by a thinking which links, and this linking demands that the unilinear and unidirectional causality be replaced by a buckle causality with multiple references, that the rigidity of the classical logic be corrected by a dialogue capable of conceiving ideas both complementary and antagonistic, that the knowledge of the integration of the parts in a whole be completed by the recognition of the integration of the whole inside the parts.

The aptitude for the establishment of a contextual and global setting is a fundamental quality of the human spirit which divided teaching atrophies and which, on the contrary, should be developed. Pertinent knowledge is that which is capable of placing all information in its context, and if possible, within the global whole where it is placed. One can even say that knowledge progresses mainly not by sophistication, formalism and abstraction, but by the capacity to reach the contextual and global standard.¹ This must mobilise, not only a diversified culture, but also the general aptitude of the human spirit to state and solve the problems; the more powerful that this general aptitude is, greater will be its aptitude to deal with particular problems. Hence the need for a general and diversified culture, which would stimulate the full employment of general intelligence, that is to say, of the *living spirit*.

Since then, the reform of the University has a vital objective: the reform of thinking which would enable the full employment of intelligence. It is a question of a

reform, not of a programme, but of paradigms, which is related to our aptitude for the organisation of knowledge.

The necessary reform of thinking is that which will generate a thinking of the context and the complex.

The thinking of the context: It is a question of always looking for the relation of inseparability and inter-retroaction between every phenomenon and its context, and of every context with the planetary context.

*The thinking of the complex: There is a need for a thinking which perceives the links, interactions and mutual implications, the multidimensional phenomena, the realities which are at the same time solidary and conflicting (such as democracy itself which is the system which contains antagonisms whilst regulating them) which respects the diversity when it recognises one, of an organising thinking which conceives the reciprocal whole/parts relation. Pascal had already formulated the imperative need to introduce today in all our teaching: *all things which are caused and which cause, helped and helping, mediate and immediate, and all connected by a natural and insensible link which connected the most distant and the most different, in my opinion it is impossible to know the parts without knowing the whole, or to know the whole without a particular knowledge of the parts.**

All the reforms of the University conceived up to now have revolved around this black hole related to the profound need for teaching, but they have been incapable of perceiving, because they stem from the type of intelligence which it is a question of reforming.

Hence there is a link which could be described as circular between these inter-dependent imperatives.

- problems arising again regarding the principles of knowledge and problems regarding what appeared as a solution,
- reform of thinking (aimed at a thinking capable of achieving a linking, contextual and global situation, hence a complex thinking),
- transdisciplinarity.

THE COURSES OF THE REFORM

A reform of the University arouses a paradox: the institution (university structures) cannot be reformed unless the spirits have been reformed previously; but the spirits cannot be reformed unless the institution has been reformed previously.

That is a logical impossibility, but it is the type of logical impossibility at which life scoffs. Who will educate the educators? They will have to educate themselves bearing in mind the glaring needs of the century, which affect their students also.

The reform will certainly be announced on the basis of marginal initiatives, often judged as aberrant; but the University itself will be in charge of accomplishing the reform. Certainly, external ideas, criticisms and external replies are needed, but above all an internal interrogation is required.

The reform will come from inside reverting to the sources of the modern European thinking: the problems. Today one must no longer raise the problems of Man, nature, the world, God, one must consider the problems aroused by the solution to these problems: science, technology, progress, and also consider the problems regarding that which we believed was the reason and which often was only an abstract rationalisation. Then it is necessary to consider the problems of the organisation even of thinking and of the university institution.

The reform will not begin at zero. There are multidimensional sciences, such as geography, which covers an extremely vast field ranging from geology to economic and social phenomena. There are sciences which have acquired many scopes such as history which encompasses the multidimensionality of the human realities in their evolution, and prehistory which examines all the complex aspects of humanising. Furthermore, a reorganisation of knowledge began in and by the re-grouping of disciplines dispersed up to then. Thus, scientific ecology, the sciences of earth, cosmology are polydisciplinary sciences the object of which is not a sector or a piece of land, but a complex system: the eco-system, and more extensively the biosphere for ecology, the land system for the sciences of earth, and, for cosmology, which understands the Universe on the basis of astronomy of observation and data provided by micro-physical experiences, the strange propensity of the universe to form and ruin the galaxial and solar systems.

Moreover, intelligibility principles have already been formed; based on cybernetics, on the theory of systems, on the theory of information, a conception of self-organisation has been prepared, suitable for conceiving autonomy, the idea of subject, indeed liberty, which was impossible according to the classical science. Rationality and scientificity have begun to be redefined and made complex on the basis of the works of Bachelard, Popper, Kuhn, Holton, Lakatos. More recently, scientific thinkers have occupied the place left empty by a philosophy curled back on itself which ceased to reflect the knowledges provided by the sciences, and they have offered to today's culture their reflections on their knowledge. Thus Jacques Monod, François Jacob, Ilya Prigogine, Henri Atlan, Hubert Reeves, Bernard d'Espagnat, Basarab Nicolescu, Jean-Marc Levi-Leblond and many others re-establish relations between the two disjointed cultures, thereby arousing, if teaching is reformed, a new general culture, richer than that of the

past, and suitable for dealing with the fundamental problems of contemporary humanity.

The reform of the University, conceived as a reform of thinking, can only be an element in a reform of teaching, which would start with the elementary and would also be related to secondary teaching.

Elementary teaching would be based on the great questions of infantile curiosity which should continue to be the questions of the adult: "who are we, where do we come from, where are we going". It is by asking the human being questions that one would discover his or her double nature, biological and cultural. Then one could reveal the physical and chemical aspect of the biological organisation, and insert the human being in the cosmos. On the other hand, one would discover the psychological, social, historical dimensions of human reality. Thus, from the beginning sciences and disciplines would be linked, linked some to others and teaching could ply to and fro between the partial knowledges and a knowledge in a global movement.

Secondary teaching would be the place of the true general culture, that which establishes the dialogue between culture of the humanities and scientific culture, not only by means of a reflection on the acquisitions and the evolution of the sciences, but also by considering literature as a school and experience of life. History should play a key role in secondary education, enabling the student to blend with the history of his or her nation, to be placed in the historical evolution of Europe and more extensively that of humanity, to understand and assimilate a rather complex type of knowledge in order to encompass all the aspects of human reality.

The reform of the University would involve the founding of Departments or Institutes dedicated to the sciences which have operated a polydisciplinary re-grouping around a systemic organising nucleus (ecology, sciences of the earth, cosmology); it would progress with the future re-grouping of the biological sciences, of the social sciences, and would prepare the devices which would enable the coordination of the whole of the anthropo-social sciences and of the whole of the sciences of nature.

In order to install and ramify a manner of thinking (complex) which enables transdisciplinarity, the University should at first, introduce into it a "transdisciplinary tithe". According to a suggestion of the International Congress of Locarno organised by the Ciret and Unesco (April 30 - May 2, 1997) "What university for tomorrow?", a tenth of teaching could be consecrated to the transdisciplinary problems, such as:

- the cosmos-physis-bios-anthropos relation
- the circuit of the sciences according to Piaget (who makes one and the other interdependent)

- the problems of the complexity in the different knowledges
- literature and human sciences
- science, ethics, politics
- etc...

One can also envisage the institution in each university of a research centre regarding the problems of complexity and transdisciplinarity, as well as workshops dedicated to complex and transdisciplinary complexes.

It would also be necessary to guarantee the possibility of poly or transdisciplinary diplomas and thesis.

MISSION

The reform of thinking is a key social need: the training of citizens capable of facing the problems of their time. This would enable the curbing of the democratic withering which leads, in all political fields, the expansion of the authority of the experts, specialists of all lines, which progressively limits the competence of the citizens, condemned to the ignorant acceptance of the decisions of those who supposedly know, but in fact practise an intelligence which breaks the global and contextual aspect of the problems. The development of a cognitive democracy is possible only in a reorganisation of knowledge, where the ideas crushed by the disciplinary cutting would be re-aroused again: the human being, nature, the cosmos, reality.

A key historical need is: since we are disarmed by the complexity of the problems of our time, we must become intellectually rearmed by learning to think about the complexity, face the challenges of the agony/birth of our time between two millennia, and try to think about the problems of humanity in the planetary era.

We must understand that our lucidity depends on the complexity of the manner of organisation of our ideas.

Finally we indicate that a manner of thinking capable of linking and joining together the separated or disjointed knowledges is capable of attaining ethics of linking and solidarity among human beings. A thinking capable of integrating the local and particular contexts in their wholes, thereby avoiding closure in the local and particular, would be fit to favour the sense of responsibility and that of citizenship. The reform of thinking would therefore have existential, ethical and civic consequences.

The University must get ahead in order to find itself again. Thus it will enter more profoundly in its trans-secular mission, which, assuming the cultural past, will advance towards the new millennium to be civilised.

REFERENCES

1. Economic science is the most sophisticated and formalised human science. Nevertheless, the economists are incapable of agreeing on their predictions, which are often erroneous. Why? Because economic science has become isolated from the other human and social sciences which are inseparable from it, and because it is incapable of envisaging that which is not quantitative, that is to say human passions and needs. Hence the economy is at the same time the most mathematically advanced science and the most humanly backward one.

*Shifting Gears for the Applications of Knowledge**

*DON AITKIN
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My topic is a straightforward one: the need to think again about how we generate knowledge, in the interests of a world in which that knowledge is desperately needed. I think I can set out the problem clearly enough: it is that we remain in the grip of an older paradigm about the creation of knowledge, a paradigm useful in its day but almost counter-productive now. It is hard to get out of its grip, because the paradigm seems the normal way of doing things, and our universities and the learned professions are to a considerable extent still based on it. I make some suggestions about what we should do to escape from the grip. I know that they will be resisted and opposed, because I have been here before. But the need is great, and I make the suggestions again. Let me start by outlining what I call the old paradigm, and explaining how it came to be dominant.

THE OLD PARADIGM

The old paradigm is not very old, because it got its great start at the end of the second world war, when Vannevar Bush successfully advised President Harry S. Truman that he should establish a national science foundation so that science could flourish, and in consequence the US could win the peace just as it had won the war. Bush was clear about one central aspect of his proposal: scientists should be allowed to follow their own noses in determining what re-

* Address to the World Bank Conference "Organizing Knowledge for Environmentally Sustainable Development". Washington D.C., 9 October 1997.

search should be done. Bush was a believer in what we now call the 'linear model' of knowledge: pure untrammelled research leads to discoveries about the nature of things which again lead in time to applications of the new knowledge that can be developed and commercialised and appear as new products or new processes. The causal arrow is a straight one, without feedback loops.

The notion that scientists should not only be allowed to follow their own noses but should be given public money to enable them to do so was understandably attractive to scientists. Since many of them worked in universities, access to research funds on what proved to be a large scale helped in the expansion of universities, and made the carrying out of research in some form an ordinary expectation of academic life. Since the NSF model was adopted by several other Western countries in whole or in part the consequence was a great increase in research activity throughout the Western world. This whole process was greatly assisted by other stimuli, the most important of them being sustained prosperity for nearly three decades after the war, together with a new interest in education, especially higher education, which sent steadily increasing proportions of the relevant age-groups right through high school and on to university, where they were taught by increasing numbers of academics who were persuaded that they, too, should be engaged in research at the cutting edge and quickly expected to be given research grants to enable them to do so.

One outcome was a very great increase in the amount of what we call human knowledge, which is perhaps better defined as 'what academics think they know'. It is hard to measure this increase accurately. If it is measured simply as a function of the increase in the number of university students in the Western world, then there is probably thirty times as much knowledge now as there was at the end of the war. A more realistic increase, to take into account the generation of knowledge outside the university context, might be fifty times. There are now more than half a million different scholarly journals. Libraries that once aimed at comprehensiveness have given up the struggle; every library has to be selective. Advanced information technology has come just at the right time to enable us to select what it is that we want to know from among the mad abundance that is available, but of course this technology brings its own problems with it. These problems are for another address.

The great increase in knowledge has had two most powerful concomitants. The first is the continuing atomisation of knowledge and a consequent kind of elephantiasis in the old scholarly disciplines. Both Johann von Goethe and James Mill, in the early 19th century, have been credited as the last men who knew everything there was to be known. Today it is not possible, I should think, to know everything there is to be known in one major discipline. Everyone is a specialist, and generalists are held in some suspicion, if not outright scorn. Before the second world war it was possible to be a 'social scientist', expert in one

field but knowledgeable across them all. One celebrated man of my country held chairs at different times in philosophy, political science, sociology and education, and published to advantage in them all; he was a first-class generalist. I cannot think of a counterpart today.

When I was a young academic, in the early 1960's, the divisions within my own discipline, political science, were broad ones, and you were expected to become knowledgeable in one but to have at least a passing knowledge of the names and issues in the others. That would be a herculean task in the late 1960's, and the specialities which academics profess now seem very narrow indeed in comparison. There is a good reason: it seems that an intellectual programme works best when there are only a few hundred involved in it. Once the numbers become greater the group breaks in two or three as the issues acquire adjectives or other qualifiers. Knowledge has expanded not through big leaps of insight and the discovery of the general rules underlying adjoining broad fields of study (one of the dreams of the 1950's and 1960's, but mostly through little incremental additions to what has already been known. The boundaries between research areas have been fertile ground for new research, but that in turn has been followed by the erection of new boundaries, and the naming of new specialities. 'Review articles' aside, published research is for the most part restricted to the small, the narrow-gauge, the incremental. Few researchers are brave enough to generalise, and they always have to duck the sniping fire of the specialists.

There is a lot more that could be said about this process, notably the part played by learned journals, the institution of the PhD as the certification of the learned, which has fuelled much of the production of knowledge, and the way in which disciplinary knowledge has become 'territory' defended against other disciplines and the undisciplined alike. But that too must be left to another address.

The second major concomitant of the increase in knowledge has been the elevation of 'research', especially 'pure research', to its dominant place in the world of higher education, and the movement of universities to become suppliers of new knowledge rather than hosts of teaching and learning. The linear model gives the universities a special place in the generation of knowledge because it is the universities which particularly concentrate on pure research, which is thought to be the foundation of all knowledge. But, although most faculty are unaware of this movement, the 'research university' is quite a recent phenomenon in the nearly thousand-year history of institutions of higher education. Indeed, until our own century it would be easier to show that advances in knowledge came from outside the university than from within it.

THE NEW PROBLEM

Let us move from the old paradigm to the modern problem. We live in a world of 6 billion human beings who, if nothing changes, will number 12 billion by the middle of the coming century. We already put tremendous pressure on our planet through our sheer abundance as a species. Most of us now live in cities of one kind or another, and the urban proportion is rising steadily. The cities cover great areas, create huge demands for food and fresh water, require complex communications, transport, sewerage, education and civil order systems, and create dreadful environments in terms of water, air and soil pollution, not to mention in the potential for epidemic disease developed among undernourished urban populations through viral and respiratory pathogens.

The problem is ourselves. Whatever the solutions are, and I want to suggest some at the end of this address, they need to be general, or holistic. Just as a wise physician treats the patient, not the disease (which is a symptom of an underlying cause), so in building a sustainable world for human beings to thrive in and enjoy, we need to see our major policies as being at the level of the societies in which human beings live. That puts a different demand on knowledge, for, to make the point again, as presently constructed, human knowledge advances increment by tiny increment, and the guardians of the increments are specialists, who are often unable to link what they know to what other specialists know.

The linear model of knowledge-generation is not especially useful in such a situation. Pure understanding of what are highly dynamic contemporary social processes is a long way off, and the need for quick action has been clear for many years. We usually cannot wait for understanding of the pure kind. Is there an alternative? I think there is. It is a mistake to think that we must always search for new knowledge. We already know a great deal about our predicament, and it can make sense to employ first of all the knowledge we already possess. I would like to give two examples, each of them at least passingly familiar.

The first is the growing discovery, throughout the 19th century, of the linked importance of clean water, sanitation, hygienic practices and fresh air in reducing mortality and morbidity in the urban populations of Europe and America. What we now regard as the ordinary municipal services or public utilities needed for any human settlement other than one of a tiny size grew out of that 19th century experience. In Western countries there has been at least a hundred years of acceptance of this need, to the point where it is probably true that our contemporary city populations cannot imagine that it was ever otherwise. But in the rapidly expanding cities of the developing world there is neither the understanding or the experience. What they need is not ever-more ingenious solutions to particular diseases that medical science can provide, but major preventative

measures which deal with these diseases at the root, by avoiding them in the first place. In this case we already have the knowledge that is necessary: it is not dramatic, or new, or a breakthrough. It is old-fashioned, and it still works.

The second example is the link between smoking tobacco and the onset of lung cancer and other diseases like emphysema, a link which has been well known for two generations. Because people who smoke like to smoke, and find it hard to give up the practice even when they want to, and also because growing tobacco was a virtuous farming activity and making cigarettes was an industry which employed people, the move to discourage smoking was slow to occur, and governments (which obtained revenue through taxing tobacco products) engaged in it diffidently. What they finally did was to draw to people's attention that smoking was bad for you, to compel the manufacturers of tobacco products to print warnings on the packets, and so on. In time non-smokers and ex-smokers began to complain about the risk they ran of disease contracted through the smoking of other people, and smoking began to be discouraged or even banned in workplaces, public buildings, restaurants, aeroplanes and the like.

The outcome of this story, which is still of course continuing, has been a great reduction in the incidence of lung cancer and related disease on the part of those who stopped smoking. Of course smoking continues as a practice, and we have not yet discovered how to discourage young people from taking it up in the first place—it is still seen by some young people as glamorous and 'adult'. But the reduction in health-care costs that has occurred has been enormous. Once again, this advance has come not from a breakthrough in research but in systematic advocacy over a generation. It has worked partly because governments had the resolve to keep up the advocacy, despite the intense objection to it from pro-smoking interests, and because our populations are sufficiently well educated to be able to make up their minds for themselves. And that points to another of the great levers available to us in contemplating the world of the future: a well-educated population can do a great deal through understanding the dilemma it is in, and taking appropriate action to combat it. In both cases the role of government, broadly defined, has been obvious.

If I combine the lessons of these two examples I get the possibility of a strategy: use the knowledge we already have, and tell people what is known. There may be a third element to the strategy: put as much effort into education as possible, because the better-educated people are, the more they can take responsibility for their own welfare and well-being. Perhaps there is even a fourth: ensure that governments or national agencies have the knowledge and the support to undertake the other three elements of the strategy. My own view is that these precepts provide all that is necessary for a well-intentioned government, and that international funding agencies like the World Bank need little more than the combination of these precepts *plus* a well-intentioned government.

This is so easy that it must be wrong. What seems worrying is that it runs counter to the prevailing orthodoxy that government intervention to produce outcomes in society is usually wrong, is always productive of unintended consequences, and is never as beneficial as letting the market solve the problem. It is probably because my own intellectual preparation has been in history and political science, rather than in economics, that I am not a great believer in the creative capacity of the market in transforming human society. But in any case much of what I have been describing as humanity's problem can be dealt with in economics under the rubric of 'market failure'. If that is allowed, let us move to the third section of this paper, which offers some suggestions about what might be done in the 'knowledge industry'.

SOME POLICY SUGGESTION

First I need to dispose of any suggestion that I want to get rid of 'pure research' and have all research 'targeted' or 'applied'. That is not my view: human curiosity is a powerful weapon in the advancement of knowledge, and Vannevar Bush was right to think that the intellectual curiosity of scientists themselves will probably get them further than following the mundane priorities of others. But there are other useful human qualities, and compassion and problem-solving are two more which can work very well in dealing with human predicaments, and producing useful outcomes for them. Medical research and defence provide dozens of examples.

What we need, and what we don't in fact have, is an easy linkage between governments and universities in the area of knowledge application. The reasons are familiar enough. Some are financial: Western governments are now chronically short of money, and unable or unwilling to raise more through increased taxation. Some are functions of scale: there is so much knowledge that is available, often so little agreement about what is relevant to a given problem. Some are cultural: government and academia have different senses of time, different meanings for the word 'deadline', and different imperatives. Some are territorial: universities see knowledge as their own product and want to surround it with rules of various kinds, while governments and funding agencies are uninterested in ownership and recognise that knowledge always has to be applied in a real and dirty world, not in an aseptic laboratory or a computer model. Some are epistemological: a lot of 'knowledge' is conjectural rather than factual, and governments are reluctant (outside the area of economics!) to rely too much on theories and possibilities; governments want certainty, and do not understand the university's need for extensive and continuing critique.

What is more, Western governments seem to have lost confidence in their capacity to achieve good outcomes through social and economic policy, and that makes them especially leery of pinning their faith on the outcomes of research in universities. Thirty years ago things were different, and there was a prevailing belief that, in principle at least, all human problems, whether social, economic or political, were solvable provided there was sufficient knowledge, money and political will. We do not think that way any longer, quite apart from the financial question. The more we know, the harder it all seems.

So to my suggestions. It is not much use directing them at universities, although I do so, because they have a strong sense of their own virtue, and are inclined to see the responsibility lying elsewhere. So I direct them at governments and international funding agencies, because they have, through their actions, some capacity to change thinking inside universities.

- We need to recognise that in dealing with large human populations the policy prescriptions must be simple, easy to explain and based on past successes. Developing such policies will require among other things the use of historically knowledgeable generalists—which good historians often are.
- We need to recognise also that we already know a lot, and be prepared to distil that knowledge in a form that allows it to be transferred to new situations. Things that work in one country may not work in another, for straightforward reasons of history, culture or level of technology. Knowing when and when not to try to transfer policy successes will require among other things the use of generalists who find it easy to compare and are actually good at doing so.
- Balancing the long term with the short term is the hardest part of policymaking. But when in doubt, governments and funding agencies should prefer the long term. The long-term goal is a sustainable world, and the aim should be to empower populations to make good decisions for themselves, not to have to rely on others to make them.
- That pushes us to remember that the best short-term policies should also have excellent long-term outcomes. Equipping shanty-town dwellers with decent housing, running water, electricity and sewerage will not only improve their material conditions; it will give them a stake in the preservation of the society they live in. Educating their children will enable their generation to take the next great step forward. Making them a real part of the body politic can only take place when these earlier conditions have been met.

These first few suggestions are not at all radical; indeed, they are almost banal. But they point to a mis-match between what governments and funding agencies

are involved in and the world of the university. Because these suggestions do not require or depend on much new research. Rather, they require a relatively rare kind of knowledge person—the wide-ranging generalist with a good sense of history and an interest in comparison. The growth in new knowledge is almost unmanageable. Somehow or other we need to develop many more people who are capable of interpreting research findings in one field and linking them to those in other fields so that their joint use is possible.

That does not mean that I think we should flood the world with historians. Most of them are specialists too. What it does mean is that in seeking to use the knowledge that universities have developed in the last half-century we need to start with making clear what outcome we are seeking, and then attract people who find interesting the challenge of applying existing knowledge to that problem to produce a given outcome. Sometimes they will say, after examining what is already known, that further research is needed. If that is the response, then those who are commissioning the research need to make sure that it is directed to the outcome. Academics love research for its own sake: it is an intellectual game against nature, and they sometimes have to be dragged from it to undertake the work that is needed.

I finish with three quite pointed suggestions about the funding of research on the part of governments and international funding agencies.

- **Encourage applications** Resist the cry that understanding must come first—there are many people engaged in that activity already. What is more, we don't ordinarily devote ourselves to complete understanding before we do things: life is short, and tasks are many, and it can be enough to know that automobiles, aeroplanes and computers work (not to mention public health initiatives) without our knowing exactly why. Understanding can come afterwards, as it did for Pasteur.
- **Encourage outcome-oriented social science** Attract the best practitioners to work not on models and theories but on the real world, in all its difficulty and noise. The natural sciences are not the best model for the social sciences, for the world of the social sciences is not the laboratory but humanity itself. And if part of the problem lies in the domain of the natural sciences (as it does, for example, in the field of the environment) make sure that the work involves the social sciences, because the final point of all such work is human society itself.
- **Encourage cross-disciplinary work** The 'disciplines' of the university world are divisions of academic history and convenience, and they get in the way of real-world analysis. They cannot be ignored, because the 'knowledge' that we have is largely organised within disciplinary boundaries. So make sure that projects are based on cross-disciplinary teams which comprise

knowledgeable specialists—people who have a base in one discipline but a wide-ranging interest in knowledge generally.

Once again, these suggestions are hardly revolutionary. They imply a shift in perspective for universities from the generation of knowledge for its own sake to the generation of knowledge in the interests of humankind. It is not at all difficult to justify the shift. What is the advancement of human knowledge for, if it is not to serve humanity? And we need that knowledge, now. The problems facing us are large and daunting, and the speed of change is very great. Surely that ought to be enough.

In fact, I don't think it is, and that is why I have made the suggestions to those who actually provide money to support the generation of knowledge. Because academics and universities, like virtually all actors in our society, are quite responsive to financial incentives. Quite small amounts of money, intelligently applied, can have powerful cultural effects.

REFERENCES

It is impossible to document a paper like this, since it arises from the experience and thought of a working life as much as from anything else. But since I have mentioned Vannevar Bush, and not everyone will understand the reference, the place to go is

United States Office of Scientific Research & Development (1945), *Science—the Endless Frontier*, report by the Director, Vannevar Bush, July 1945. Reprinted 1980 (Washington, US Government Printing Office, 1945, National Science Foundation, 1980).

My own writing in this field began with 'How Research Came to Dominate Higher Education and What Ought to be Done About it', *Oxford Review of Education*, Vol. 17, No. 3, 1991, pp 235-247.

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Drawing on the Power of Knowledge for the Environment

VINOD THOMAS, NALIN KISHOR, TAMARA BELT
WORLD BANK

THE SOURCES OF ENVIRONMENTAL DAMAGE

All countries are facing problems of environmental degradation in varying degrees of severity. In country after country, there is mounting evidence of air pollution, water pollution through toxic industrial discharges, and contamination of groundwater through the leaching of agro-chemicals. Forests in the developing world are being indiscriminately cleared at unprecedented rates, leading to extensive soil erosion, siltation and flooding of rivers and waterways, loss of productive capacity of dams via sedimentation, and loss of critical biodiversity. Equally serious is the destruction of fisheries and coastal areas. Thirty-four percent of the world's coastal ecosystems are highly threatened from development-related activities (World Resources Institute, 1996). In six of the eleven major fishing regions, more than 60 percent of all commercial fish stocks either have been depleted or are being fished to their limits (World Resources Institute, 1996).

Deterioration of the environment in turn is manifest in increasing human morbidity and mortality and in loss of the productive capacity of economies. In Pakistan, India, and Bangladesh it is estimated that as much as 3-5% of GDP could be lost from environmental degradation (Brandon, 1996). At the sectoral level, it is estimated that soil depreciation amounts to almost 10% of annual agricultural production in Costa Rica (Solorzano et al., 1991). For Mali, income forgone nation-wide due to one year of average soil loss amounts to between 4 and 16% of agricultural GDP (Bishop and Allen, 1989). On another index, the genuine savings rate for Tunisia was as low as -5% for some years in the 80s, although the corresponding net savings was about 10% (World Bank, 1997).

At the same time, under-investments at the country level are adding up to severe collective losses on a world-wide scale. This has extremely pernicious implica-

tions in the form of global climate change, and disruption of the ecosystems of the world. It is estimated that 2-3% of the GDP of the world (or about \$600 billion) could be destroyed annually due to global warming alone (IPCC, 1996).

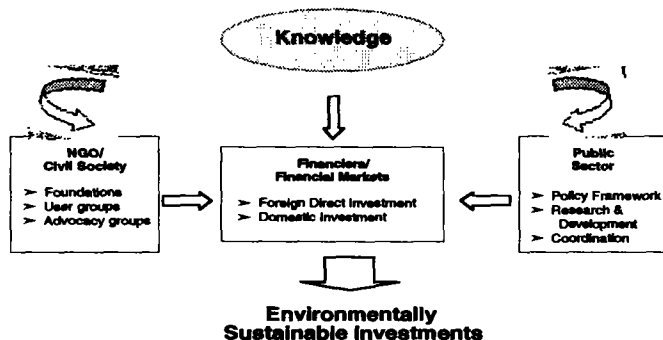
It is well known that societies underinvest in environmental protection and that financial investments in environmental actions remain sub-optimal. Policies to correct these problems remain inadequate, as does investment in knowledge on the environment to support these actions. Why such underinvestment?

- ❖ Damage from environmental degradation affects present and future generations. These costs are seldom factored in decision making by individuals who only see their own private (and often short term) gains. Private returns on investment are significantly smaller than the benefits which accrue to society today and in the future.
- ❖ Policies (taxes, subsidies, controls) can, in principle, correct such underinvestments in environmental protection. However, given other priorities, countries seldom take adequate policy measures to correct the neglect of the environment.
- ❖ All this is compounded by the lack of diffusion of knowledge on the environment to individuals in the public and private sectors, who could press for stronger environmental actions. Addressing this under-investment in knowledge and learning, in turn, can stimulate financial investments for the environment.

This paper looks at these three types of interrelated underinvestments - in financing, in policies and knowledge. We look at investment opportunities, policies to stimulate them and knowledge to support them.

Distinct roles emerge for a proactive public sector and civil society (advocacy groups, civil society and foundations) which can potentially be more effective in harnessing the dynamism of private financial flows (figure 1).

Figure 1: Knowledge for Environmental Financing



More specifically, the public sector is strategically placed for the building and the diffusion of knowledge and establishing policy frameworks which encourage environmentally sustainable investments. The private sector has a comparative advantage for financing environmental activities as it is most closely linked to financial markets. Finally, NGOs and the civil society have a critical role in knowledge diffusion to the public and also to private companies with regard to motivating and monitoring cleaner business practices.

Evidence shows that most of the innovative cases for environmental management have arisen due to the infusion of knowledge by the public and private sectors and civil society. Such examples are occurring in the marketplace in recent years, and their numbers are likely to accelerate even further, as diffusion of knowledge identifies opportunities which the private sector can exploit.

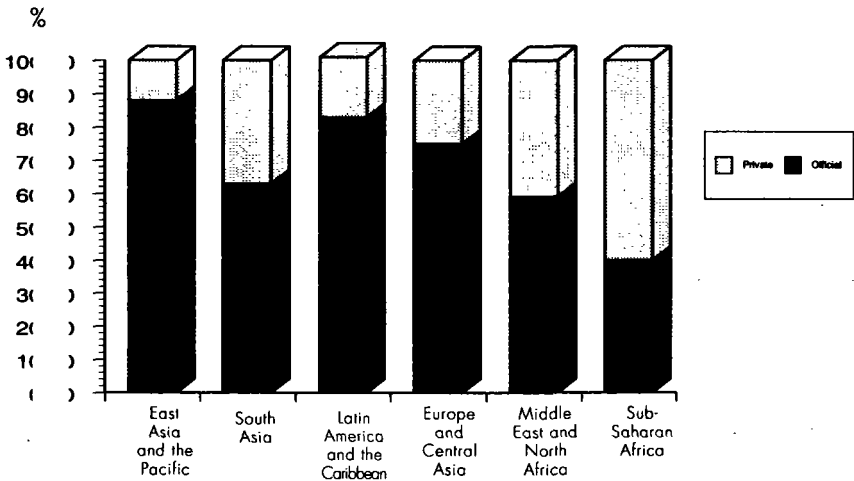
UNDERINVESTMENTS IN ENVIRONMENTAL PROTECTION

Estimates of the financing required to protect the environment, that are socially and economically justified, often amount to one percent of output. Current financing is usually less than one-tenth of that estimate. These figures capture the enormous financing shortfalls for the environment and suggest that new and more innovative approaches are needed.

How can investments be promoted and where can financing be tapped? Private sector investment is the single most powerful engine for economic growth in industrial and developing countries. Private entrepreneurs harness consumer tastes and preferences by monitoring and interpreting market signals and investing in areas where new business opportunities arise and higher profits are to be made. At the global level, private capital flows to developing countries has far outpaced foreign aid by a ratio of five to one in recent years. Private capital inflows to developing countries soared by a third to reach \$245 billion in 1996; whereas official development finance fell to \$41 billion (World Bank, 1997). Private capital inflows almost always bring additional benefits -technology, management know-how, and access to export markets- all of which are critically needed by developing countries.

Official aid is still an important source of capital flows in some regions. It can be seen in chart I that the proportion of official aid for Sub-Saharan Africa and Middle East and North Africa still comprise a large share of resource flows. Of the official aid, the World Bank is the largest financier of targeted global environ-

Chart I. Distribution of Long-term Net Resource Flows, 1995



Source: World Bank. 1997. *Global Economic Prospects*. Washington, D.C.

mental projects, with an active portfolio of 166 projects with a funding level of US\$ 11.6 billion (World Bank, 1997).

Another growing source of targeted environmental development aid is the Global Environment Facility (GEF), established to finance and transfer technical expertise for environmental sustainability. GEF activities are expected to reach US\$ 402 million during fiscal year 1998 (table 1).

Table 1.
GEF Operational Outputs by Type in Fiscal Years 95-98 (US \$ millions).

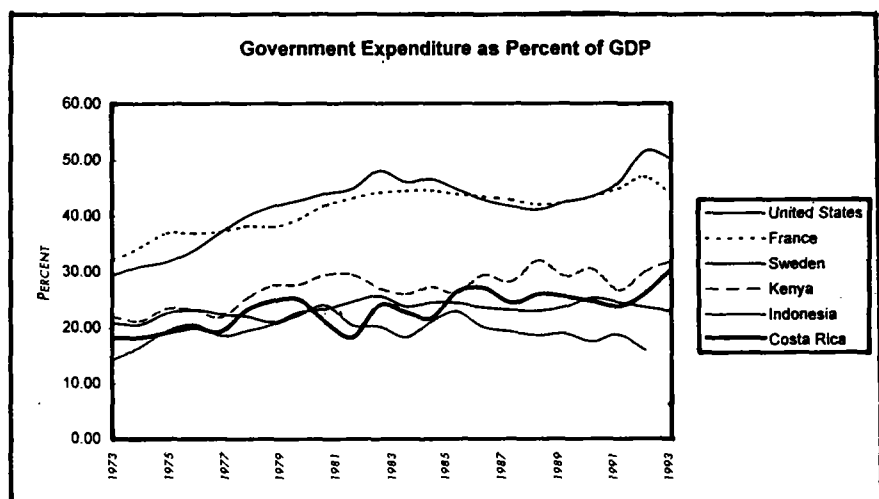
	FY 95	FY96	FY97	FY98
Long-term Operations	88	253	324	370
Enabling Activities	10	6	21	17
Short-term Measures	37	58	49	15
Total	135	317	394	402

Notwithstanding the dynamism of the private sector and to some extent the multilateral development banks, the financial resources of national governments still remain crucial, especially in an area such as the environment where actions have a fundamental public goods character. The government's presence in expenditures remains large (in both industrialised and developing countries), and according to some estimates, it has actually grown despite the rhetoric of small governments.

In 1960 the average share of national income spent in industrialised countries by the government was 30%. By 1980 this had risen to 42.5% and during the 1980s (characterised by a frenzy to privatise state-owned companies), ironically, the share increased to 45,1%. Corroborating these trends, graph 1 illustrates that for selected industrialised and developing countries during 1973 to 1993 government expenditure as a percentage of GDP increased. Thus, an emerging challenge is to protect the productive capacity of economies by redirecting a part of this expenditure from current consumption into environmental investments.

Graph 1: Government Spending (% of GDP), Selected Countries, 1973-1993

Government Expenditure as Percent of GDP



Source: Government Revenue Statistics, IMF

In addition, increased civil society involvement (e.g., international and local NGOs, foundations and user groups) is directing financing for environmental protection. For example, large international NGOs such as the US-based Nature Conservancy, and the World Wildlife Fund (WWF) are strong advocacy groups and protectors of endangered habitats through a variety of programmes.

Based on their scale of financial resources, public and private sectors and, to a lesser extent, civil society all have important roles in financing environmental management. How can we utilise the dynamism of the private sector to address the under-investment in environmental protection? What role should the public sector and NGOs/civil society play and to what extent?

Unfortunately, incentives for environmental sustainability often run counter to those in private financial markets. A dramatic example of an open-access resource identifies some of the obstacles confronting financial investment for sustainability, and the scope for action of private and public sectors. In the financial markets, it is more profitable to totally exploit a renewable resource all at once as most resources have a MSY (maximum sustainable yield) far below interest rates. Take for instance the example of the blue whale. Assume there are 75,000 blue whales in the ocean, and that the MSY is 2,000 whales per year. Imagine, that only one company can hunt this stock and that each processed whale has market values of \$ 10,000. By whaling sustainable -2,000 whales a year- the company would produce an annual revenue of \$20 M. Now assume that it is possible for the company to catch all 75,000 whales in a single year, producing a lump sum revenue of \$750,000 million. If this were invested at a modest rate of return of 5 percent a year, it would yield an annual return of \$35.7 million, considerably above the \$20 million figure without the inconveniences of whaling². Thus, if left in the hands of the private sector, the blue whale appears doomed to extinction.

A ceiling on the number of whales harvested would be the classic command and control response to preserving the species. A potentially more feasible approach is to build the effective demand of whale-viewing -i.e., eco-tourists are willing to pay to sight whales in their natural environment. Thus, developing a market for whale spotting could be a profitable option which when combined with harvesting could tip the balance in favour of preservation of an optimal stock.

The lessons to be learned from the example are the following:

- ◆ The rates of return in financial markets define the opportunity costs of private investments and determine harvesting to extinction as a rational strategy;
- ◆ Public intervention is needed to establish property rights, i.e., changing the open access nature of this resource to one of controlled access helps create an incentive framework for sustainable use;

- ❖ Knowledge about additional financial returns (whale spotting in this case) has the potential to critically alter private sector decisions towards sustainability.

The question is how can the private and public sectors and civil society combined with knowledge move towards a more sustainable outcome? We now move on to how policy frameworks can help to more effectively utilise knowledge.

GAPS IN ENVIRONMENTAL POLICY

Countries have made some progress in environmental policies. The scope of the traditional command and control approaches to enforcing safe environmental standards has been expanded to many sectors in many countries (OECD 1994; REC 1994; Zyllicz 1991; Baumol & Oates 1992). At the same time, complementary market based approaches to harness the efficiency and cost effectiveness offered by markets have been adopted. Some specific examples include pollution taxes, pollution permits, effluent charges, deposit-refund systems, and so forth. Market based instruments were designed to create incentives to reduce pollution and internalise pollution costs. Many of the problems with market instruments are that the charges and taxes continue to underestimate pollution costs -thereby only changing partially polluting behaviour.

In addition, a number of international treaties and agreements (Convention on Biodiversity, Montreal Protocol on the Ozone layer, Convention on Desertification, Climate Convention, Convention on International Trade in Endangered Species -CITES, and the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal), have provided a rationale and framework within which environmental issues can be addressed.

But progress has been slow. While some successes have been achieved (e.g., Ganges water clean-up, and the restocking of the once-endangered white rhino in Southern Africa), much more remains to be done. The application and effectiveness of conventional approaches have been rather limited both at the national and international levels, particularly in less developed countries where institutions are weak and monitoring and enforcement difficult. The effectiveness of legal statutes, policies and instruments has been severely hampered by lack of: leadership and political will; consensus on the priority issues and approaches; financing options and the necessary institutional capacity for monitoring and regulation. Air and water-bodies continue to get more and more polluted; forests continue to disappear; groundwater is being depleted at alarming rates; destruction of coastal zones is accelerating; and human diseases arising from degradation continue to escalate.

In the international arena, the effectiveness of treaties and conventions has been seriously blunted by lack of coincidence of interests and a North-South political divide. The developing South is suspicious of the developed North and openly accuses the North of using eco-imperialism to gain control over the resources of the South. Whatever be the truth, the fact remains that much less progress has been made under the aegis of the international treaties than their potential.

UTILISING THE POWER OF KNOWLEDGE

Mirroring the massive under-investments in financing and policy is the paucity of investment in research and education on the environment. Knowledge is critical to increase the demand for environmental quality and to improve the management of natural resources. Lasting changes in the way resources are used can only be achieved if common values and broad-based consensus by all stakeholders for sustainability exists. The essence of this consensus is a fundamental understanding of ecological systems and their relationship with socio-economic systems.

USEABLE KNOWLEDGE ON THE ENVIRONMENT

Knowledge on the environment by public and private sectors and civil society has significantly lagged behind market dynamism. A general understanding of the effects of environmental damage on human and ecosystem health and the concomitant effects it has on economic efficiency is lacking. Knowledge on the environment tends to occur in crisis situations, e.g. oil spills, cholera epidemics, nuclear meltdowns, or forest fires. Most recently, the intense environmental crisis in Southeast Asia caused by the combined effect of El Niño, drought, and man-made fires brought environmental damage to the international spotlight once again.

The shortcomings of this information are threefold. First, knowledge and information on the environment only occurs after the damage has been done. Second, the information is only an advisory of poor environmental conditions and is not necessarily instructive in reversing the trend. Third, proactive steps to immediately reverse the trend are not outlined. Eventually clean air statutes may be enacted or water quality monitoring enforced, but this occurs well after the damage has been done.

A forward-looking vision of environment and an approach of environmental stewardship are needed. Unfortunately, these are rare phenomena and only occur in

particular niche areas. For instance, some unique ecosystems have been identified and recognized by local populations and/or governments, and have been designated for in-situ protection. The only way these areas are effectively protected is vis-à-vis the support and understanding of the local populations to manage and protect the particular resource. Usually this is done within the context of supportive government policy and institutions.

COMMUNICATING KNOWLEDGE FOR FINANCING

The single most effective way to motivate financing is to change the values of people today through the effective communication of environmental issues. Complex scientific information needs to be made accessible so people can readily understand ecosystem functioning. Potentially, the most lasting changes can occur through educating school children on the effects of environmental degradation, who can then become cognisant of how their actions influence the integrity of ecosystems. Today, how can knowledge be mobilised to change values?

Knowledge is embodied in people, and people (ecologists, marine biologists, animal behaviour specialists and so forth) who often have the knowledge about ecosystem health and sustainability are often those who are not running businesses or designing and implementing policy. Thus knowledge *per se* is not always the problem, but increasing the flow of information and thereby expanding the knowledge base to all stakeholders. Then there is a need to transfer best practices to policy makers and private sector entrepreneurs. Multilateral development institutions can play a key role in this respect.

Increased dissemination of knowledge in the private sector is an important step to improving environmental conditions. Many win-win changes can be made which benefit the producer through lower production costs and also benefit the environment through reduced consumption or degradation. The only way these changes can be made though is through the diffusion of new practices such as waste minimisation in industrial processes or integrated pest control and composting in agriculture.

In addition to the diffusion of best practices, incentives to stimulate those who can make the technical changes are needed. Technicians and practitioners are the ones who have the ability to design and engineer change. What is lacking are the incentives for these people to initiate this. According to Stephen Schmidheiny, it is apparently easier to inculcate environmental thinking into the work force than into financial directors. The US manufacturing company 3M is famous for drawing from its work force over the past 20 years ideas for more than 3,000 pollution prevention projects which have saved the company more than \$500 million. This is explained by the fact that most workers have a daily close-up view of

corporate resource waste and pollution. Once asked to consider these problems— and appropriately rewarded for doing so —they are perfectly placed to provide sound ideas³.

This does not address the lack of cash flow in developing countries. Many industrialists may be aware of the long-term cost and environmental advantages of cleaner technologies but lack the financing. In cases where the investor and financier are separate entities, possession of full knowledge of environmental investment opportunities by an investor does not ensure that a financier automatically possesses the same information and perceives the true risks and returns. Thus, for investments to flow, the investor (or a third party) may have to educate the financing party.

Potentially the sector which can most rapidly absorb knowledge on the environment, and link it to proactive responses is the public sector (international & national). It is also the mandate of the public sector to look out for the well-being of society and compensate for the externalities of the private sector. The public sector can draw on a wide base of basic knowledge including the research on environment and natural resources being undertaken at universities and research institutions. Multilateral development organisations can be key in influencing policy for sustainability and diffusing best practices on global and regional levels. National and local governments are strategically placed to use this and other knowledge to encourage win-win actions, and to implement environmental policy.

A key ingredient to induce investments into environment is the proactive and cooperative approach by the public sector in managing the flow of this information to financiers and users. However, this does not automatically occur. Although many scientists have knowledge of ecosystem functioning and health, this is not passed on to government officials. Secondly, government officials may not have strong environmental constituencies influencing greener policy therefore they have no incentive to exploit and diffuse the scientific information. In some countries environmental proponents in the government may be instrumental (e.g. Al Gore in the USA or Jose Ma. Figueres in Costa Rica), but these people are only one of the ingredients to effecting change. It is necessary to educate a wider base of stakeholders for lasting change. An innovative example of this is President Clinton's recent educational event at the White House for weather forecasters to educate them on global warming. In turn, the administration hopes that the weather forecasters would be able to influence how the American people think about global warming (*New York Times*, Oct. 3, 1997). Hence, from the long-term perspective, it is important to design incentives to facilitate the flow of information from those who possess to those who can support, encourage and implement policies and investments for environmental sustainability.

THE SYNERGY AMONG KNOWLEDGE, INVESTMENTS AND THE ENVIRONMENT

The extent of underinvestment is enormous, and the agenda for action daunting, which might make the environmental challenge seem hopeless. But a number of case examples have emerged in diverse sectors, illustrating how the infusion of knowledge and financing of the environment have made real changes in how resources are used. They also illuminate the unique attributes of the public sector, private firms and NGOs/civil society. If these examples can be scaled up and rolled out, prospects could look much brighter.

CASE 1.

PROTECTION OF WATERSHEDS FOR HYDROPOWER GENERATION

Global Energy is a privately owned electric utility company which owns and operates two hydroelectric plants in the watersheds of Rio Volcan and Don Pedro, in the Central valley of Costa Rica. Global Energy enjoys a reputation for being a responsible company which works in close cooperation with the government.

FUNDECOR is the largest NGO in Costa Rica with a clear mandate of arresting and reversing deforestation in the Central Valley Area where these hydropower plants are located. On account of its excellent track record over the last five years, FUNDECOR has earned the respect and confidence of the government and the local landowners.

FUNDECOR approached Global Energy, and using satellite data on deforestation, convinced Global Energy that its watershed areas were threatened by deforestation. As a result a contract was signed whereby Global Energy has agreed to pay FUNDECOR \$ 10 per hectare per year, against assured protection of its watershed areas against deforestation.

The contract is a case of a win-win situation. Through infusion of very specific knowledge, FUNDECOR succeeded in making Global Energy a willing partner in investing for environmentally sustainable development. This willingness arose largely because Global Energy could benefit from potential reduced risk and increased profitability. Finally, the government sees this as a start to replicate similar contracts in other parts of the country and has already started disseminating information in the regard. This is likely to set off a virtuous spiral of environmentally sustainable investments.

CASE 2. *MITIGATING GLOBAL CLIMATE CHANGE: CERTIFIABLE TRADABLE OFFSETS IN COSTA RICA*

Under the pilot phase of the Joint Implementation programme, industrialised countries are collaborating with developing countries to identify the cheapest options for the control of greenhouse gases. Costa Rica has designed an instrument that can be used to sell greenhouse gas offsets in the international marketplace, call the Certifiable Tradable Offset, or CTO. A CTO represents a specific number of units of carbon dioxide gas emissions expressed in carbon equivalent units reduced or sequestered via, for example, tree planting. The quality of the CTO is ensured via independent verification and monitoring by a private sector company.

In July 1996, Costa Rica sold its first CTOs. The governments of Norway and Costa Rica, along with private sector companies from both countries, agreed to cooperate on a JI project, that involves, among other things, reforestation and forest conservation. The Norwegian parties are contributing US\$ 2,000,000 to the Private Forestry Project-US\$ 1.7 million from the Norwegian government, financing by a Norwegian carbon tax, and US\$ 300,000 from Consorcio Noruego (a consortium of 3 private sector Norwegian companies) in exchange for 200,000 CTOs.

The direct benefits of this scheme are twofold. Costa Rica received additional funds for protecting its forests and expanding reforestation. Norwegian companies receive CTOs that could be used to cheaply offset its carbon emissions in the event the greenhouse gas emissions quotas became binding.

By tapping the climate change knowledge base (FCCC and IPCC, which lay out the scientific evidence, and the framework and guidelines for international cooperation) and investing significant amounts of resources in research and development, the Government of Costa Rica was able to develop this scheme. From the other side, the Norwegian government invested US\$ 1.7 million to encourage private sector confidence and investment in the scheme. With this success, Costa Rica is now actively seeking to enter into partnerships with other countries, with a view to making CTOs into a fully marketable commodity with the potential to be traded on commodity boards, and where considerable progress has already been made.

CASE 3. ***EXPLOITING THE POTENTIAL OF (GREEN) NICHE MARKETS IN INDIA***

The solar sewing machine conversion kit of the Green Electrons Eliminating Poverty (GEEP) retrofits a conventional pedal sewing machine to run on solar power. A shirt made on this machine has a logo to identify that it is an environmentally friendly (green) product. This is sold in niche markets for such products where it commands a higher price relative to its non-green counterpart.

In order to promote adoption, garment retailers have collaborated with the conversion-kit manufacturer, to provide easy credit. The government has aided retailers in the identification and development of niche markets for garments, while NGOs have been instrumental in disseminating information on the benefits of adoption to rural artisans.

This scheme generates several benefits. For the tailor the benefits accrue in the form of increased productivity (this can double from 9 to 18 shirts a day), assured income and on-site work. Secondary benefits linked to packaging and transportation will also accrue at the village level. For the retailer there is the attraction of additional income via exploiting new markets and developing a green image which could translate into more profits if environmentally conscious consumers switch to this company. Environmental benefits come in the form of reduced emissions of polluting gases had these goods been produced with fuel energy.

CASE 4: ***COMMUNAL AREA MANAGEMENT PROGRAMME FOR INDIGENOUS RESOURCES (CAMPFIRE) IN ZIMBABWE***

The CAMPFIRE programme in Zimbabwe was launched by the government in close consultation with local users of natural resources and technical experts, with the aim to more effectively manage wild species and natural resources to contribute to sustainable rural development. Rural communities which demonstrate a capacity for sustainable wildlife management are granted legal authority to manage natural resources on their communal lands. The committees in conjunction with technical assistance from the government and NGOs decide how to best use wild species to contribute to rural development.

Most communities opt for a combination of ways to use their wildlife, depending on local environmental and economic conditions. Controlled safari hunting is currently the most profitable option. Other options include wildlife tourism and

marketing of natural products such as hides, meat, and wood that are harvested on a sustainable basis. Revenues generated from these natural resources have contributed to community development projects such as the construction of schools, clinics, roads, wells and installing grinding mills. Revenues are also used to compensate villagers for livestock lost due to damage by wildlife.

The reasons this scheme has been successful is because it has been strongly supported by national government policy in consultation with local governments or communities. Knowledge from technical experts and indigenous local communities has guided the management decisions and has resulted in the sharing of risks of wildlife preservation between the government and local communities. Because revenues are shared between the national government and user groups, monitoring and enforcement are reduced to a minimum. Finally, initial financing was obtained from the government, NGOs (esp. international) and local communities. Revenues in the medium and long term derive from tourists and those generated from sales of natural products.

CASE 5:

INDONESIA: A PROPER PROGRAMME FOR POLLUTION CONTROL

The Programme for Pollution Control, Evaluation and Rating (PROPER) in Indonesia targets pollution reduction by publicly disclosing pollution information⁴. The government, in an effort to clean-up polluting industries, compiled information for 187 highly polluting factories and then ranked companies on the level of emissions. Highly polluting firms were given six months to clean up, otherwise their pollution emissions would be disclosed publicly.

Through government policy, and the increased environmental awareness polluting industries were forced to clean-up. The compilation of information was conducted with the technical assistance of the World Bank and illustrates how information dissemination by the public sector to civil society can effectively mobilise the private sector to move towards more sustainable production patterns. In this case the monitoring and enforcement is shared by the government and civil society. Financing of the policy was conducted mainly by the government of Indonesia with financial and technical assistance from the multilateral development banks. Financing for clean-up, of course rests with the private sector.

CASE 6.

THE BLUE FLAG CAMPAIGN, EUROPEAN COMMUNITY

The European Blue Flag Campaign is operated through a network of national organisations and coordinated by the Foundation for Environmental Education in Europe. Its main objective is to encourage citizen understanding and appreciation of the coastal environment and the incorporation of environmental concerns in the decision-making of coastal authorities. The EC has been financing about 25% of the campaign's budget which is presently over ECU 1 million and the rest by private sponsors.

A beach or marina has to meet three sets of criteria to receive the Blue Flag. The first tests the environmental quality of the locality. The second considers management and safety. The third emphasises environmental education and information, which ensures that visitors are provided with environmental information on the coastal environment.

Based on a completed questionnaire, maps, photographs and water samples, a national jury selects sites to be presented to a European jury which makes the final selection by unanimous vote. The results are announced in the beginning of June before the main holiday season. The campaign has attracted several commercial sponsors in addition to schoolchildren, etc. Over the years, the standards of environmental quality have been raised to provide a dynamic incentive for improved environmental management.

The governments see this as an efficient way to promote environmental awareness and also increase revenues through increased domestic and foreign tourists. Private sponsors see this as an opportunity to attract more tourists via the Blue Flag award.

CASE 7.

BIOPROSPECTING. PUBLIC-PRIVATE INVESTMENTS TO CONSERVE RESOURCES AND EARN PROFITS

Governments are beginning to understand the economic potential of local natural resources and biodiversity. The USA and many countries in Western Europe are offering tax breaks, grants and regulatory reforms to attract private sector firms such as pharmaceuticals to invest in bioprospecting. For example, recently in Germany \$86.6 million in grants was awarded in three regions for use as biotech seed money⁵. These awards build on local expertise and knowledge found in public universities and pave the way for the creation of new industries. For the last thirty-five years, the US National Cancer Institute has supported a programme that has searched the earth's biodiversity for chemical structure that

might have utility. A similar example is found in Costa Rica with the creation of INBio (National Biodiversity Institute), a public agency which partners with private enterprises, most notably Merck Sharp and Dohme, and research institutes to explore and develop commercial applications of compounds found in the biodiversity contained in the rainforests.

Critical to the success of all these initiatives are the incentives from the State to bear some of the risks for venture capitalists and at the same time support research and development to increase the knowledge base on the environment. There is also a visible change of thinking among European academics who are beginning to feel less inhibited about turning cutting-edge research into corporate profits, in the name of the environment. These actions in turn are fuelling investments. According to the European Venture Capital Association, its members invested nearly \$ 160 million in biotech firms last year, an increase of 53% over 1995.

CASE 8.

INTEGRATED TOURISM DEVELOPMENT IN THE MALDIVES

Coastal tourism is difficult to manage in developing countries and is typically characterised by spontaneous development and clearing of coastal forest and mangroves which leads to coastal and soil erosion. Other common environmental problems associated with coastal tourism is the lowering of the groundwater table which results in inflows of saltwater as fresh water is pumped out, improper solid waste disposal sites and littering.

Proactive government policy in Maldives which targets foreign direct investment in the tourism industry has resulted in favourable economic and environmental outcomes. After the first thorough evaluation of tourism in Maldives took place in 1983, ten years after tourism development, specific policy actions were made to curb spontaneous settlements. In conjunction with scientific information and economic data government planners designed an integrated tourism plan. Strict government regulations were enacted which gave a clear signal to foreign direct investment of the viability of short and long term returns on their investments.

The result was a boom in the tourism industry. Tourism in 1995 comprised 17% of the GDP, over 25% of government revenue and 60% of the country's foreign exchange earnings. It is the second largest contributor to the economy and is increasing in importance year by year⁷.

CASE 9. SUSTAINABLE MARICULTURE

SeaPhix, LLC., associated with the marine aquarium industry, aims to preserve coral reefs through the propagation of coral reefs and ornamental sea life, instead of harvesting coral reefs for exotic fish species for sale on the market. The company markets the equipment, (e.g. insulated larval rearing tanks, day-light spectrum lights, etc.) and mariculture installations for the propagation of ornamental marine life based on a total ecosystem approach for the classroom or private residences.

This company is building on a forward-looking vision of marine biodiversity preservation by moving away from teaching approaches where children are encouraged to capture a species, i.e. exotic fish, place it in an aquarium, only to have it die months later. The company now, because of advanced scientific methods and heightened awareness of the destruction of coral reefs, hopes to encourage the propagation of coral reefs for the enjoyment of children. Exposure to the reef and other marine ecosystems in the classroom or in private homes may increase future generation's sensitivity and need for the protection of the world's reefs⁸.

The driving forces in this example is building on increased public awareness and knowledge of the need for preservation of coral reefs. With that as a basis, the financing is solely driven by the private sector.

RECOMMENDATIONS

These examples show that the traditional roles of private and public sectors are evolving in new areas and much is being left to the workings of the market. The following table illustrates the extent to which different players can become involved in successful activities. Broadly, three agents—the public sector (*international and national*), the private sector, and civil society and NGOs—can become involved in activities to protect and manage natural resources. Four basic elements are necessary for their success—financing; environment policy; monitoring and enforcement and knowledge. Three stars denotes high, two stars denotes medium and one denotes low levels of involvement. Table II has been constructed on the basis of the case examples described in the previous section.

Table II: Characteristics for Successful Environmental Activities

Characteristics of Activities	Public (International)	Public (National)	Private Firms	NGOs/Civil Society
Financing	**	**	***	*
Environmental Policy	**	***	*	*
Monitoring, Enforcement	*	***	*	***
Knowledge	***	***	***	***

Some of the important emerging implications are:

- The role of knowledge in inducing environmental investments is critical in all cases. FUNDECOR disseminated information on the threat of deforestation to Global Energy; knowledge of scientific research was applied for the propagation of coral reefs for commercial purposes, etc.
- Knowledge has been disseminated primarily by the public sector: carbon offsets, Costa Rica; industrial pollution, Indonesia; bioprospecting; tourism development, Maldives; Blue Flag campaign of EU
- In a few instances knowledge has been disseminated by NGOs/civil society: niche markets, India; hydropower, Costa Rica; and CAMPFIRE, Zimbabwe.
- In some cases a holistic approach comprising dissemination of knowledge, technological innovations, policy, credit and product market development, is required to induce investments, e.g., green niche market in India. In other cases, highly focused learning is sufficient to spark off the investment, e.g., hydropower in Costa Rica.
- In almost all cases the private sector emerges as the major financier of a better environment. In the case where there are global gains (carbon offsets in Costa Rica), the public sector has a significant financing role, but this is more as a one time inducement to the private sector.
- Monitoring and enforcement is not only the responsibility of the public sector. The civil society and NGOs can assist in this, and are often more effective, e.g., certification of CTOs in Costa Rica; PROPER in Indonesia.
- The role of the public sector to establish a framework of policies and property rights that can attract the interest of the private sector is becoming

increasingly important. The international public sector is responsible for setting a global framework and convention guidelines. Governments are the primary agents who can implement these guidelines into policy. In all instances knowledge helps formulate more effective policies.

REFERENCES

- 1 "The Visible Hand" (1997). *The Economist*, Sept. 20-26, p. 17.
- 2 Schmidheiny, Stephan and Federico Zorraquin. 1996 *Financing Change*. Cambridge, MA: The MIT Press, p.9.
- 3 Schmidheiny, Stephan and Zorraquin, Federico, 1996, *op.cit.* p.13.
- 4 Wheeler, David and Shakeb Afsah. 1996. *Going Public on Polluters in Indonesia: BAPEDAL's PROPER-PROKASIH Program* Washington, D.C.: International Executive Reports.
- 5 "The New Icelandic Saga" *Time*, Sept. 29, 1997, pp. 62-63.
- 6 Figueres, Jose Maria. 1997. "Political Dimensions of Rural Well-Being and How to Achieve Results on the Ground" In *Rural Well-Being: From Vision to Action*. Washington, D.C.: The World Bank.
- 7 Saeed, Simad (1997). "Environmental Impact Management in the Tourism Industry of Maldives." Paper presented at the EDI/World Bank/SAARC Seminar on Economic Globalisation and Environmental Sustainability in South Asia, 2-6 June 1997.
- 8 Watch, John. 1995. "Opportunities in Sustainable Mariculture" In Hooten, Anthony J. and Marea Hatzioles (Eds.) *Financing Mechanisms for Coral Reef Conservation*. Washington, D.C.: The World Bank.

BIBLIOGRAPHY

- Basi, R. 1995. "Prioroda and Priority: Environmental Regulation in Post-Soviet Russia." *International Environmental Affairs*. 7(1), pp. 3-21.
- Bishop, J., and J. Allen. 1989. "The On-Site Costs of Soil Erosion in Mali." Environment Department Working Paper no. 21. World Bank, Environment Department, Washington, D.C.
- Brandon, Carter. 1996.
- Figueres, Jose Maria. 1997. "Political Dimensions of Rural Well-Being and How to Achieve Results on the Ground" In *Rural Well-Being: From Vision to Action*. Washington, D.C.: The World Bank.
- Hahn, Robert W. and Robert N. Stavins. "Economic Incentives for Environmental Protection: Integrating Theory and Practice." *American Economic Association Papers and Proceedings*. 82(2), pp. 464-468.
- Intergovernmental Panel on Climate Change (IPCC). 1996. *Climate Change 1995: The Science of Climate Change*, Cambridge, UK, Cambridge University Press, 1996.

- Jenkins, Glenn and Ranjit Iamech. 1994. *Green Taxes and Incentive Policies: An International Perspective*. San Francisco: ICS Press.
- OECD. 1994. *Managing the Environment: The Role of Economic Instruments*. Paris: Organization for Economic Co-operation and Development.
1991. *Environmental Policy. How to Apply Economic Instruments*. Paris: Organization for Economic Co-operation and Development.
- Saeed, Simad (1997). "Environmental Impact Management in the Tourism Industry of Maldives." Paper presented at the EDI/World Bank/SAARC Seminar on Economic Globalisation and Environmental Sustainability in South Asia, 2-6 June 1997.
- Schmidheiny, Stephan and Federico Zorraquin. 1996. *Financing Change*. Cambridge, MA: The MIT Press.
- Solorzano, R., R. de Camino, R. Woodward, J. Tosi, V. Watson, A. Vasquez, C. Villalobos, J. Jimenez, R. Repetto, and W. Cruz. 1991. *Accounts Overdue. Natural Resources Depreciation in Costa Rica*. Washington, D.C.: World Resources Institute.
- Thomas, Vinod and Tamara Belt. 1997. "Growth and the Environment: Allies or Foes?" *Finance and Development*. (June), pp.22-24.
- "The Visible Hand." *The Economist*, 1997 Sept. 20-26, p. 17.
- Watch, John. 1995. "Opportunities in Sustainable Mariculture" In Hooten, Anthony J. and Marea Hatzios (Eds.) *Financing Mechanisms for Coral Reef Conservation*. Washington, D.C.: The World Bank.
- Wheeler, David and Shakeb Afsah. 1996. *Going Public on Polluters in Indonesia. BAPEDAL's PROPER-PROKASIH Program*. Washington, D.C.: International Executive Reports.
- The World Bank. 1997. *Expanding the Measure of Wealth. Environmentally Sustainable Development Studies and Monograph Series no. 17*. World Bank, Washington, D.C.
1997. *Global Economic Prospects*. Washington, D.C.
1992. *Development and the Environment. The World Development Report*. New York: Oxford University Press.
- World Resources Institute, UNEP, UNDP, World Bank. 1996. *World Resources, 1996* 97. New York: Oxford University Press.
- Zylicz, Tomasz. 1991. "The Role for Economic Incentives in International Allocation of Abatement Effort." *Ecological Economics*. Robert Constanza, ed. New York: Columbia University Press.

The Role of an Educational Institution in Environmental Changes

*ELIE POLITI,
ENVIRONMENTAL COORDINATOR
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Solving environmental problems related to products and processes requires new capabilities and skills from industrial organisations

When organisations face new environmental challenges, they should change all their outlooks concerning issues not only in quality, but also in business, including their marketing concepts.

Usually changes in the organisation outlook involve intellectual developing, needing higher level education. Even so, external events causing crisis in organisations are necessary because that causes qualitative changes.

Basically, Organisations have four ways to face environmental challenges:

- 1) To solve the problems the moment they are present.
- 2) Keep close to legal requirements.
- 3) To put in place an environmental management, where corrective and preventive actions are implemented after considering their environmental aspects.
- 4) To reach sustainable development, that is, to adopt actions that cause beneficial effects at long term in economy, environment and the whole society.

Organisations who adopt the two last strategies above will be able to prevent problems and also find new opportunities. This way they could attend increasing markets for cleaner products and services, and also identify cost reductions, by lowering energy consumption and optimising materials.

All kind of organisations, small and big, private and public, seeking profit or not, should be able to satisfy their customers at the same time they improve their environmental performance.

The way in which organisations respond to that challenge will have great impact on their operations. If they choose to be environmentally friendly, this will bring them greater acceptance for their products and they will be seen as more attractive for investors. Apart from that, they will find more community and governmental support.

Neglecting the environment and not developing research on cleaner technologies could cause market losses, along with negative publicity and even loss of operating licenses.

We can see all over the developed world, as in the German environmental regulations, worries about life cycle analysis and waste disposal. These regulations cover product development, re-use, safe recycling; appropriate disposal and product take-back.

All these issues mean environmental pressures on industries, but those seem to accept them. Developing good environmental policy leads to good organisation and sound industrial management.

For example, in the life cycle of a laundry machine, the significant impacts occur after manufacturing, in other words, during haulage, use and post-sale services. Beyond manufacturing an eco-efficient product, information to user is rather important. The concept of technical assistance is a good approach, industry not only sells products but mainly technical assistance. So industries are interested in a greater durability of machines with smaller consumption resources.

Management based on ideas of new sound products and new design and development concepts is willing to achieve environment excellency. This is reached by means of "eco-design", in other words, the green development of products.

Planning environmental design shows us that the integration of knowledge is based on factors like information about resources and a good communication. As an example we can consider that many automobile manufacturers already design their vehicles advancing their "planned break-up" and parts recycling.

Suppliers' role in the productive chain is presently only active in technology and productivity issues. Bigger demand caused by consumers' life style and behaviour gives room to poor performances in the use of available resources.

A well-balanced approach, considering supply and demand, would lead to more efficient results.

For this reason, four questions are necessary:

- 1) How can we readdress demand and what is the role of the producer in this case, in terms of marketing and product development?
- 2) How can we influence producers using information about consumer's real necessities?

- 3) Can the relationship between consumers and suppliers be modified simultaneously so as to influence both?
- 4) What attitudes and capabilities to face environmental changes can transform external pressure into internal changes?

The answers to those questions combine technological, structural and cultural processes aimed at a sustainable development.

Active behaviour change teams in the industries need to communicate each day better the new ideas and to install renewed educational processes.

Education, in this context, involves environmental awareness for everybody, as we are both consumers and suppliers.

In Brazil, in the educational area, we find the National Service of Apprenticeship, which since 1942 has developed specialised professionals for industries. SENAI is the largest private educational organisation in Latin America, has a federate structure and is funded by the Federation of the Industries.

About 3 years ago, SENAI formed its National Committee for Environment under the co-ordination of its National Department. This Committee develops and implements national projects, as for example the ISO 14000 Project and the co-operation agreements projects with Canada and Germany.

SENAI's environmental projects cover the following fields: environmental awareness, service to industry, co-operative applied research and information issues.

SENAI launched in June 1996 a nation wide project called PSQA- Programa SENAI de Qualidade Ambiental (SENAI's Environmental Quality Programme). In each Brazilian State, the PSQA has the support of the local Federation of Industries and presents its own characteristics suiting the regional industries and their specific needs.

The PSQA offers consultation to enterprises in all environmental issues helping them to get all the way through ISO 14000 certification. This programme also includes environmental awareness activities and the adoption of cleaner technologies towards pollution prevention. Service to industry includes chemical and physical analysis, studies and researches on industrial waste recycling, EMS implementation, process control of productive processes aimed at the reduction of pollution produced by effluents, consultation on wastewater treatment facilities and labs, and development of human resources in all those fields.

Therefore industry will be assisted in pollution prevention actions and waste reduction at the source. PSQA's main objective is to promote a better life quality in Brazilian society, combining social and economical development with environmental quality.

In order to make possible small and medium enterprises' participation in environmental improvement programmes, courses in Environmental Management and Environmental Awareness were broken into short term courses. This is a necessary measure because SMEs often do not have the human resources needed for long term courses.

In all SENAI's units there are environmental quality teams, which are the real multipliers for environmental education.

In the environmental area, three SENAI units are worthy of description:

- 1) Centro Nacional de Tecnologia SENAI "Mario Amato": offers technical courses in Chemistry, Ceramic, Plastics and Rubber. The facilities include 23 labs and 28 workshops. Some labs are reserved for chemical, physical and microbiological analysis required by industries.

This unit has two effluent treatment plants: one for domestic effluents and another for electroplating effluents

Customised training is offered to industry in: Environmental Management, Treatment Plant Operator, Wastewater Treatment from Electroplating Processes, Industrial Effluent Analyses, and Environmental Quality.

There is also a Technological Support Sector that offers consulting and assistance to several industries in recycling of chemical wastes from industrial processes and effluent treatment, apart from waste from ceramic and plastics processes. Other services are environmental needs assessment, effluent treatment processes optimisation, effluent and sludge characterisation.

In this Centre, students learn concepts about plastic recycling and environmental education.

- 2) Centro Nacional de Tecnologia em Refrigeração, Ar Condicionado e Ventilação "Oscar Rodrigues Alves": graduates refrigeration technicians and students learn how to recycle the refrigerant gases without escaping to atmosphere and replace them when necessary. This school is an important standard reference for all Brazilian refrigeration industries.
- 3) Escola SENAI "Márcio Bagueira Leal": specialised in leather and shoemaking. It has full time professionals dedicated to environmental technological assistance and it has carried out 5000 analytical essays in the last three years, using 51 parameters, considering the legal requirements. The effluents and industrial waste sector of this school attended since its creation, in 1991, more than 300 inland industries in the cities of Franca, Presidente Prudente, Araçatuba, Ribeirão Preto, Bauru, Itatiba and surroundings.

Industrial sectors serviced were tanneries, leather finishing, agrobased industries, food-process industry, surface treatment industries, alcohol distilleries, sugar production and water treatment. This infrastructure has a specialised lab for industrial effluents and wastes analysis

They also develop joint projects with industries in order to get to use cleaner technologies in the leather sector, having already achieved results in sludge from leather effluents' treatment re-use. Specialists from this SENAI unit have also developed applied researches in air flotation and colour adsorption. Training activities, seminars and lectures are periodically promoted, with a very good acceptance by industries.

Having invested all these years in the environmental area, SENAI is conscious of its accountability vis-à-vis the industry. It has been an avant-garde in areas such as preparing its human resources, launching environmental quality teams, providing prepared technicians on cleaner technologies, reviewing contents of courses to include environmental matters, developing its service labs, and carrying out international agreements on pollution prevention with Canada and Germany.

Reorienting Formal Education for Sustainable Development

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Formal education is the process whereby the state socialises its members, particularly children and youth, with the knowledge, values and skills to be informed, autonomous and contributing members of society. A variety of other social agencies, especially the family, but also including religious institutions, the media, the law, youth groups and peers, play major roles in socialisation. However, formal education is the primary process through which a common set of politically-endorsed cultural norms and social goals are sought by a society. Thus, formal education is generally provided through the processes of schooling at pre-schools, primary and secondary levels but also including technical education, colleges and universities. This paper canvasses ways in which formal education may be oriented towards sustainable development. It outlines key features of a curriculum for sustainability, especially its possible objectives, content and pedagogy, as well as the processes of educational reform that may be necessary to facilitate the implementation of a curriculum orientated towards the objectives of education for sustainable development. The principles underlying such a curriculum are relevant to all sectors of formal education to varying extents although they do need to be interpreted and focused for action in national and local cultural contexts. However, major attention is devoted to the processes of educational reform in primary and secondary schooling because of the importance of this sector, because the large majority of students are found there and because of the urgency of the task of schooling reform.

Most countries in the world today can point to ways in which their education systems are being reoriented towards sustainable development as a result of the expansion of scientific knowledge of the environment and increased public awareness of the increasing scale and severity of environmental problems.¹ These developments have led to increased national and international activity in the formulation of strategies for sustainable development and the increasing levels of environmental reporting in the mass media and public responses to environmental

campaigns which have increased support for environmental education in schools. They have resulted in varied educational initiatives, including the development of environmental education guidelines, the adoption of whole-school approaches to curriculum planning for environmental education, the revision of syllabuses to infuse environmental perspectives, the development of specific environmental education courses, and the establishment of specialist environmental education centres. Environmental education associations are active in some countries, providing support to teachers and encouraging government, NGO and public involvement in environmental education initiatives. In some countries, environmental education in formal education is also being assisted by developments in teacher education at the pre-service, post-graduate and in-service levels and an evolving research culture within the field.

Despite these initiatives, a number of outstanding issues and problems confront the reorientation of formal education towards sustainable development. In most countries in the world, these initiatives have remained embedded within pre-Rio conceptions of environmental education which have tended to favour science and conservation approaches rather than the holistic imperatives of education for sustainable development. Consequently, most initiatives to promote environmental education have tended to come from Departments of Environment, Agriculture or Natural Resources rather than Departments of Education. While welcome, the efforts of such departments tend to be directed to specific environmental issues rather than a whole-of-government commitment to sustainability. As a result, these efforts tend to concentrate upon raising awareness and information campaigns and are directed at individual behavioural change rather than broader educational goals. Indeed, sustainable development is not well understood as a concept outside of limited environmental circles or as a whole-of-government commitment. In some countries there are no national policies or guidelines for environmental education. The result of this has been a lack of coherent strategies and long term planning and, even in those countries which do have such policies, many have not been revised to incorporate the broad social, economic and political, as well as conservation aspects of sustainable development while policies in many other countries suffer from a lack of commitment in financial as well as technical support.

The general lack of involvement in matters of sustainability by Departments of Education has tended to marginalise environmental education - in both its pre- and post Rio forms - from mainstream education policy; and most countries therefore lack a coherent plan for progression in environmental education or education for sustainable development from kindergarten to college level. As a result, it is often not a curriculum priority at the school level, especially where the curriculum is over-crowded. In addition, the low profile of environmental education and sustainable development in external examination subjects contributes to a lack of status in schools. Therefore, it is not surprising to find that many teachers, students

and parents do not perceive it as a curriculum priority, or that it is difficult to attract teachers to become involved. In some countries the innovative teaching methods of environmental education conflict with the traditional culture of schooling also. This problem is particularly acute in countries where there is an emphasis on the content rather than the process of education. Such problems are intensified by a general lack of awareness and support from many education policy makers, school administrators and academics in teacher education institutions. This makes the introduction of both in-service and pre-service teacher education for sustainability difficult and, when in-service courses are provided, these tend to be attended by teachers who are already committed to environmental education.

These are enormous barriers to the reorientation of formal education to sustainability, barriers that cannot be addressed by the efforts of individual teachers or even schools, no matter how committed they might be. Effectively addressing barriers such as these requires an appreciation of the role of formal education in the processes of social continuity and change, the diverse and sometimes contradictory roles of governments, and the corresponding multiple purposes of education. Central to this is an understanding of the roles of schooling in social reproduction and the ways in which the structures of formal education reproduce, albeit unintentionally, unsustainable development and which provide the context for identifying opportunities and strategies to reorient formal education towards the development of a civil society based upon the values and practices of sustainability.

FORMAL EDUCATION AND THE DEVELOPMENT OF CIVIL SOCIETY

Education for sustainable development was always prominent in pre-modern societies where people established a human ecology in harmony with natural ecology. The land was respected and loved as a mother and there was a sense of oneness between the land and all the creatures, including the people, who inhabited it. Traditional systems for codifying knowledge of the land, its cycles and the need to respect it led to management practices that enabled the land and its resources to be used in a sustainable way. This environmental knowledge was knowledge for survival and everyday practical use, and was passed down through the generations through modelling, stories, dance, ceremonies and the establishment of a network of sacred places.² This system of education for sustainability continues today in indigenous communities and even in some progressive non-indigenous schools.

However, pre-modern and indigenous priorities and systems of education have been supplanted by modernist pioneering, colonial and industrial cultures which are based on the belief that the environment is valuable only in so far as it is economically productive. The consequent disregard for the environment means that knowledge, values and skills to support sustainable development are underplayed or ignored in schools in nearly all countries today. Certainly, knowledge about the earth, its plants and animals, the functioning of ecosystems and the ways people use resources is taught in science, geography and social studies. However, there is a widespread problem with the way that this is usually done because few attempts are made to link the health of people to the health and sustainability of ecosystems, and students are rarely asked to reflect upon the impacts of their activities and those of their families and wider society on the functioning of ecosystems.³ Indeed, in formal education, knowledge of the environment is usually compartmentalised into mutually-exclusive disciplines with each one then reduced to an abstract, academic commodity which can be traded for credentials through systems of competitive assessment. Cognitive and practical skills for practising sustainability in one's daily life and community, and the values underpinning a sustainable society, are rarely assessed, and mostly ignored, as a result.

However, schools serve many purposes beyond this academic/cognitive one. Schools are generally public institutions and, in most cases, are subject to the directions of government and its policy-making processes. Thus, in addition to providing students with cognitive skills and knowledge, as noted above, they are also required to educate students in the development of the individual and social skills, knowledge and predispositions to function autonomously in their various life roles as a family member, worker, citizen and friend, and to encourage commitment to various desired social goals, such as equality, multiculturalism, democracy, national loyalty and internationalism, depending upon local political, social and economic priorities. Increasingly a commitment to sustainable development is being seen by governments and education systems as one of these desired social goals.

There is much debate as to which of these goals education has - or should have - priority, and over the extent to which it is the role of formal education to orientate these goals to inculcate students into a set of knowledges and norms that reflect the existing culture or whether the national interest is best served by providing educational experiences that enable students to participate in the creation of a variety of alternative cultural knowledges and norms. These debates reflect the philosophies and policies of the many types of political and education systems found around the world and the many differences in educational philosophy found within individual countries and systems.

However, one point seems to be common in all countries. This is that governments have multiple and sometimes contradictory roles and these are manifested in diverse ways in educational policies and practices.⁴ For example, on the one hand, governments need to ensure that education systems socialise and educate citizens in ways that will enable them to contribute to desired economic activities and goals. This includes not only vocational knowledge and skills but also attitudes of responsibility, diligence, punctuality and social cohesion that will maintain and promote these goals. This is the "reproductive" role of the state and formal education. On the other hand, governments particularly in democratic countries, need to take action to maintain their public legitimacy by anticipating trends that may challenge national well-being and by responding to public concerns about social problems, such as racism, poverty, public safety and, increasingly, the environment. Formal education is one way in which governments seek to achieve this goal and this involves developing educational policies which enhance the capacities of citizens to respond to these anticipated challenges, to identify and articulate their concerns, and to contribute as active and informed citizens to solutions by participating in discussions about them and other public issues. This is the role of the state and formal education in "constructing civil society".

The curriculum of formal education is a product of both the "reproductive" and the "constructing civil society" roles of governments. Unfortunately, the press of short-term political and economic priorities often has given ascendancy to the reproductive roles of formal education. There is an historically embedded reason for this also because many education systems developed to serve the economic needs of colonial empires for factory workers, technicians and clerks at home and clerks and administrators in the colonies. This has resulted in education systems characterised by hierarchical patterns of knowledge which privilege literacy, mathematics and abstract science; hierarchical relationships between teachers and students; teacher-centred processes of teaching and learning; and competitive assessment and credentialing practices that favour the social differentiation and the reproductive roles of schooling.

Many environmental educators argue that these processes also contribute to present day patterns of unsustainable development.⁵ Where a sustainable civil society requires a balance between self-interest and the common good, a spirit of co-operation, a desire to participate, and civic responsibility, many aspects of formal education encourage individualism, material progress and the values that underlie unfettered economic development. While not all of the following practices are found in all education systems because of recent educational reforms in many countries, a sufficient number of these practices remain to reproduce present patterns of unsustainable development, including:

- Assessment systems in formal education prepare and select students for differentiated roles in employment and society by providing the certificates that are the main determinants of where people end up in the competition for jobs - and people are socialised to accept their resultant unequal positions on the grounds that they are deserved in the light of their educational achievements.
- Schools, colleges and universities are often hierarchical and authoritarian institutions in which power is exercised from above, self-regulation and responsibility discouraged, and most decisions about what and how to teach and learn made by those outside the institution or by administrators and teachers, not those with most at stake, the students. Hence, the "conditions of work" in educational institutions often correspond to those of the industrial workplace and fail to encourage the skills in group decision making, collective responsibility and democratic participation that are necessary to work for sustainable development
- Schools, colleges and universities place great importance on personal achievement and describe success in individualistic terms such as "getting-ahead", "rising to the top", and "doing well in the world" because personal success entitles one to higher income, status and consumer power. Thus, formal education tends to condition students to accept competition as natural and reinforce the desirability of excelling over others by measuring success in terms of outcomes for oneself rather than in terms of the means used to achieve it and the needs and rights of those less fortunate. This discourages the values of a sustainable society such as friendliness, cooperation, ethical discernment, and care and concern for others.
- Schools, colleges and universities also tend to treat knowledge as objective and universal rather than as relative, tacit and contextual and, because of the political economy of knowledge production and textbook publishing in the world today, explicitly teach the superiority of Western/modernist society and its economic processes, political systems and technical answers to social and environmental problems, thus undermining the value of local and indigenous knowledges and systems.
- Colleges and universities select and train the scientists and technologists who will be paid and promoted on the basis of the profitability of the new products they develop but generally fail to provide their graduates with an appreciation of the social contexts of science and technology, criteria and techniques for evaluating the social and ecological impacts of new products and production processes, or the ethical discernment for making judgements about such matters.

Summarising points such as these, Orr draws attention to the power of the hidden curriculum of formal education by stating that the processes and contexts of learning often undermine the values of a sustainable society:

Process is important for learning. Courses taught as lecture courses tend to induce passivity. Indoor classes create the illusion that learning only occurs inside four walls isolated from what the students call, without apparent irony, the "real world". Dissecting frogs in biology class teaches lessons about Nature that no one would verbally profess. Campus architecture is crystallised pedagogy that reinforces passivity, monologue, domination, and artificiality.⁶

However, these problems are not the only effects of formal education because reproduction is never even or complete. There are many reasons for this. One is the role of the state and formal education in constructing civil society as outlined above.

Another is that public schools today are not usually elitist institutions: they do welcome academic success by children from all social classes. Indeed, the empowerment and expanded life chances that can come from formal education even in basic literacy, especially for girls and women, are a major contribution to potential capacity building for sustainability. Similarly, the increasing recognition that the complexity of many contemporary social, development and environmental problems requires formal education to promote cognitive flexibility, relational thinking, creativity, and problem solving skills among young people and future employees is beginning to reform traditional educational practices in an increasing number of countries. However, such reform is slow and uneven and, because of the dominance of the competitive academic curriculum in most countries, schools, college and universities continues to define education in ways that make academic success difficult for children from low-income families and certain social groups and render many parts of the curriculum uninteresting and irrelevant to many young people.

EDUCATIONAL REFORM FOR SUSTAINABLE DEVELOPMENT: A PROCESS OF SECOND ORDER CHANGE

The process of reorienting formal education towards sustainability is a broader and more pervasive task than that of revising syllabuses and devising new teaching and learning materials that incorporate principles and examples of

sustainability and even critical reflection about alternative modes of sustainability. As Orr remarks, "The crisis [of unsustainability] cannot be solved by the same kind of education that helped create the problems.... Schools, colleges and universities are part of the problem."⁷ Thus, reorienting formal education towards sustainability requires significant educational reform or what Cuban calls "second-order change".⁸ Where first-order changes seek to improve the effectiveness or efficiency of educational processes through new courses or materials without disturbing the basic organisational or instructional milieu of education, second-order change reforms the fundamental ways in which educational systems and institutions function and includes new goals, structures, and roles for schools, teachers, and students."⁹

Four tasks for second-order change in the reorientation of formal education for sustainable development are identified in this paper. First there is a need for major changes in the attitudes and priorities of governments and government departments so that education for sustainability is seen as a key element in a whole-of-government commitment to sustainable development. Second, it requires changes to the balance of emphasis in education toward reproduction versus capacity building for civil society and a reconfirmation of commitment to the reconstructionist tradition in education. This implies major changes not just in education but also in many conventional conceptualisations of environmental education. Third, it requires a revision of the objectives and content themes of formal education curricula so that sustainability is a central concern, and the development of teaching and learning processes that emphasise moral virtues, ethical discernment, learning how to learn, reflection, creativity, civic mindedness, and the motivation and abilities to work with others to help build a sustainable future for human and non-human nature. Fourth, reorienting education for sustainable development requires structural reforms in education, including a move away from the centralised mandating of courses and textbooks to the promotion of locally relevant learning programmes, new ways of assessing the processes and outcomes of learning, and alternative purposes and approaches for credentialing students. Such changes also have major implications for initial teacher education and the continuing professional development of teachers. Thus, as Smyth remarks, "It is difficult to avoid the conclusion that many have reached that education should be largely recast"¹⁰ when the wide scope of the task of reorienting formal education for sustainable development is considered."

A WHOLE-OF-GOVERNMENT COMMITMENT TO SUSTAINABLE DEVELOPMENT

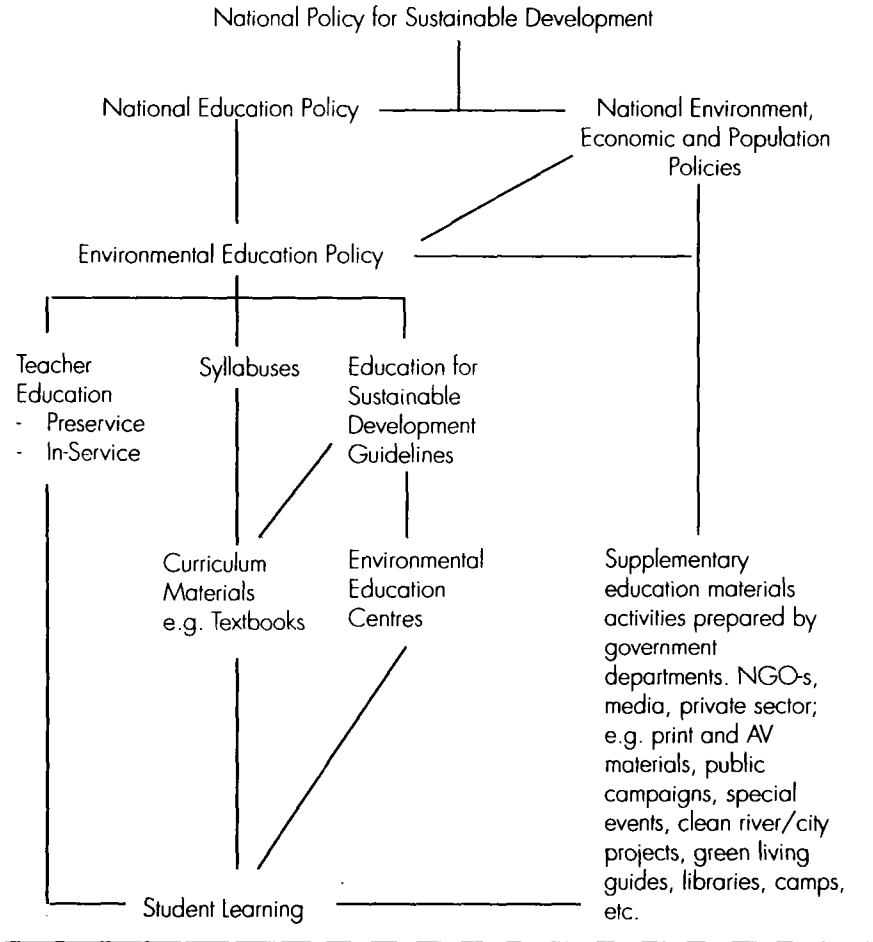
A whole-of-government commitment to sustainable development would see all government departments and agencies working collaboratively, and in

partnership with industry, business, grassroots organisations and members of the public to develop policies and processes which integrate social, economic, cultural, political and conservation goals. The reporting mechanisms of the Commission for Sustainable Development indicate that this is happening in many countries and numerous examples of national strategies for sustainable development can be cited. However, there are at least three problems with many such policies: they represent a political consensus in which economic conceptions of sustainability are given priority over social and ecological sustainability; the rhetoric of sustainability is not matched by effective policy and resources for implementation; and many government departments and sectors of society were not involved in their development and have no commitment to the outcomes. Sustainability is as much about public health promotion, care of the aged and disadvantaged, tourism policy, reforms to taxation schedules, the use of the peace dividend, and the education of girls and ethnic minorities as it is about energy use, water quality, public transport, agricultural reform and wilderness conservation. A sustainable society will be one in which all aspects of civic and personal life are focused on sustainable development and all government departments and levels of government work cooperatively to advance such a society.

Particular attention is needed in relation to the place of education in sustainable development policies. The roles of public awareness, education, communication and training for sustainability are too often usually seen as minor ones, subservient in importance to legislative, economic and sometimes even punitive tools to advance sustainable practices. Such preventative, "end-of-pipe" and rehabilitative mechanisms do not address the need to create a civil society that is aware of personal and structural causes of unsustainability, committed to living sustainably and permitting, indeed desirous, of increased personal, industry and government actions to advance sustainability.

Thus, reorienting formal education for sustainable development requires agreement to a whole-of-government commitment to sustainability as a priority for directing policy development and implementation. In particular, it requires cooperation between all relevant departments and agencies of government to promote the capacity of all citizens to live sustainably. The development and implementation of education policies need to reflect the commitment of society to the priorities of sustainable development. This will involve the integration of environmental, economic and population policies with education policy to formulate the long term goals of formal education, the structure, processes and funding of educational institutions, and the development of curriculum guidelines, educational resources and approaches to teaching, learning and assessment. It will also involve the cooperation of natural resource agencies, NGOs and businesses that prepare educational resources and otherwise support formal education. Figure 1 is a model of how such a comprehensive infrastructure for education for sustainability might be developed.

Figure 1:
Components of a comprehensive approach to promoting education for a sustainable development



Note: Strategic planning and evaluation are an integral aspect of all components

A RE-AFFIRMATION OF THE ROLE OF EDUCATION IN BUILDING CIVIL SOCIETY

The multiple roles of education in response to the range of national goals which a country may have were described above as a balance between the reproduction of politically-endorsed (and mostly economically motivated) values, practices and institutions and the empowerment of students to play an informed and active role as members of civil society. These are not mutually exclusive roles, and formal education is designed to promote both. However, without a whole-of-government commitment to sustainable development in the past, schools, colleges and universities have tended to reproduce an unsustainable culture which intensifies environment and development problems rather than empowers citizens to work towards their solution. This situation of unbalanced priorities calls for a reaffirmation of the role of formal education in building civil society by helping students develop criteria for determining what is best to conserve in their cultural, economic and natural heritage and to discern values and strategies for creating sustainability in their local communities and extending it, with others, to national and global contexts. This is the contemporary version of what Dewey called the "reconstructionist" tradition in education.¹¹

This is not to say that the economic imperatives that underlie the reproductive functions of formal education are to be ignored. Economically sound, ecologically sustainable and socially just forms of development are to be encouraged; indeed, appropriate development is a core principle of a sustainable society. However, a reorientation of formal education towards sustainable development calls attention to the problematical effects of inappropriate development and unfettered economic growth, and also to the ways that these are perpetuated through dominant patterns of schooling and the narrow and limited range of knowledge, attitudes and skills students learn as a result.

Therefore, education for sustainability recognises that formal education is not values free. As Grant and Zeichner explain:

There is no such thing as a neutral educational activity. Any action that one takes in the classroom is necessarily linked to the external economic, political and social order in either a primarily integrative or a creative fashion. Either a teaching activity serves to integrate children into the current social order or it provides children with the knowledge, attitudes and skills to deal critically and creatively with that reality in order to improve it. In any case, all teaching is embedded in an ideological background, and one cannot fully understand the significance or consequences of an activity unless one also considers that activity in light of the more general issues of social continuity and change.¹²

Recognising that formal education is not a values-neutral undertaking and embedding education for sustainability within the reconstructionist tradition in education in order to empower students as committed members of civil society do not mean that education for sustainability is necessarily any more instrumental than the reproductive or other traditions in education. Neither does it mean that only one of the many views of sustainability will be privileged or that the style of teaching and learning experiences planned for students will undermine their capacities for independent, critical thinking¹³ Rather, an emphasis on the reconstructionist tradition in education will mean that education for sustainability is practised as:

*... a shared speculation with pupils on those forms of technology and social organisation which can enable people to live in harmony with one another and with the natural world. It [would be a form of social education cast in ... the liberatory mould. This seeks to empower pupils so that they can democratically transform society. It does this by encouraging them to reflect on their experience in the light of critical theory and to act on the insights gained. It is a form of praxis ... which by allowing pupils and teachers to reflectively construct and reconstruct their social world, develops the critical and active citizens who are capable of bringing about the transition to sustainable development.*¹⁴

This view of education for sustainability as a contribution to the building of a politically literate civil society is central to the reformulation of environmental education post-Rio. As Orr argues, "I see no prospect whatsoever for building a sustainable society without an active, engaged, informed, and competent citizenry" and that this requires "an unwavering commitment by educational institutions to foster widespread civic competence".¹⁵ This view of environmental education calls for what Breiting¹⁶ describes as a "new generation" of theorising and practice and a rethinking of several common and dominant approaches to the field.

Firstly, education for sustainability calls for an end to the unbalanced emphasis on individual lifestyle change and responsible environmental behaviour in formal education¹⁷ and, instead, calls for a recognition that "environmental problems are structurally anchored in society and our ways of living" and that answers to them need to be sought in working to transform the social conditions of human and non-human life as well as in individual lifestyles.¹⁸ This draws attention to the economic and political structures, and to poverty and other forms of social injustice, which cause and perpetuate unsustainable practices and to a need to learn the processes through which such unsustainable problems can be solved through political processes.

Secondly, and as a result, reorienting formal education for sustainable development means increased attention to the humanities and social sciences in order to

focus on the issues of social justice, ecological sustainability and participatory politics in formal education. The goals of changing individual lifestyles and shaping responsible environmental behaviours are guided by the technocratic rationality and behaviouristic goals of modernist Western science and Western approaches to development. Ecofeminist writers have traced the patriarchal assumptions and attitudes to nature, women and development upon which modernist science is based as a major cause of environmental exploitation, poverty, and the increasing marginalisation of many of the world's people.¹⁹ Reorienting education for sustainable development requires a new view of science, an eco-science, which integrates action for the environment with the interests of women and marginalised people. As Vandana Shiva argues:

A science that does not respect nature's needs and a development that does not respect people's needs inevitably threatens survival. In their fight to survive the onslaughts of both, women have begun a struggle that challenges the most fundamental categories of Western patriarchy - its concepts of nature and women, and of science and development. Their ecological struggles are aimed simultaneously at liberating nature from ceaseless exploitation and themselves from marginalisation. They are creating a feminist ideology that transcends gender, and a political practice that is humanly inclusive; they are challenging patriarchy's ideological claim to universalism not with another universalising tendency, but with diversity; and they are challenging the dominant concept of power as violence with the alternative of non-violence as powers.²⁰

Viewed from this perspective, education for sustainable development reflects an alternative epistemology to that of modernist science and seeks to educate young people to value diverse ways of knowing, identify with their own cultural heritage and value it as a contribution to the global cultural diversity, and respect community-based approaches to social change. Such an epistemology also helps to redress the dominance of natural science and nature study in much contemporary environmental education. The natural sciences provide important abstract knowledge of the world but, of themselves, do not contribute to sustainable development. Indeed, education in modernist ways of science has proven to be a recurring means through which much mal-development has occurred.²¹ As Berberet notes, it is scientists who have performed the research, trained the engineers and managers, and developed the technologies which have often had a devastating impact on the environment.²² Vandana Shiva argues that in addition to this impact upon the natural world, modernist science and the impacts of culturally inappropriate technologies have devalued indigenous knowledge and contributed to much family breakdown, rapid urbanisation and other forms of social dislocation in developing countries.²³

Even increased studies of ecology, of themselves, are not sufficient to reorient science education towards sustainability. Even though ecology has been described by some as the foundation discipline of environmental education²⁴, such primacy for nature study and the often apolitical contexts in which it is often taught now need to be realigned with "new assumptions about education which treat the interactions of ecological processes [with] market forces, cultural values, equitable decision-making, government actions, and environmental impacts of human activities in a holistic, interdependent manner."²⁵ This means that the concepts of ecology, conservation and other nature-based themes also need to be immersed in the concepts and values of appropriate development, human rights, equity, peace and democracy which are core issues in education for sustainable development. Studies of the geophysical and biophysical world are a necessary - but not sufficient - prerequisite for learning to live sustainably.

Similarly, the nature-based learning experiences which have been common in environmental education to date need to be seen as a necessary but insufficient prerequisite for learning to live sustainably. Nature-based work has provided many inspirational experiential teaching methods and innovative sets of educational materials, e.g. environmental interpretation, nature trails, sensory walks, magic spots, Earth Education, and so on. It has also led to what Knapp and Goodman²⁶ call "the humanisation of environmental education" and provided students with learning experiences in the outdoors which have helped develop students' self-confidence and esteem, and a sense of oneness with nature. However, reorienting education for sustainable development alerts us to several dangers in this if this is the *only* approach to environmental education that is provided for students. First, it may ignore many of the questions, issues and problems facing the student and her community. Focusing student attention on nature *without* a focus on wider social and economic contexts can direct students to look inwards rather than outwards to the links between nature, the individual and society. Second, there is a danger that nature experiences may become escapism. It is often argued that close contact with nature can help students to develop a strong personal bonding with the earth and, therefore, increase their desire to act for it. However, it is difficult to see how this romantic view of nature will automatically lead to this result *without* a degree of political conscientising as well.

The focus on personal development and nature experiences are characteristics of New Age philosophies which tend to over-emphasise the importance of personal transformation at the expense of seeing personal and broader social transformation as interdependent and that the journey to sustainability requires both for sustained social change. Mellor warns that the focus on the individual in this approach may prove to be less helpful than its advocates intend because developing individual environmental values will not necessarily lead to any wider social transformation. This, she argues "must be done by transforming the mate-

rialism of our culture, not running away from it. In many ways New Ageism can be seen as just another manifestation of the 'me' generation: a movement for the powerful, not the powerless."²⁷

Thus, Jensen notes that both the experiential learning and the New Age aspects of nature based education run the risk of romantic escapism - the first into romanticism in nature and the second into romance with ourselves - and that neither can effectively solve environmental problems. Jensen goes on to say, "This does not mean that such activities cannot have value in themselves or for other purposes, but they do not solve the paradox of increasing anxiety and the currently increasing action paralysis" of the modern world.

They need to be balanced with a social and political engagement with the root causes of unsustainability that people face in their communities.²⁸

Thirdly, a re-affirmation of the contribution of formal education to civil society means that the central goals of education must include helping students learn how to identify elements of unsustainable development that concern them and how to address them. This will involve students in learning how to reflect critically on their place in the environment and to consider what sustainability means to them and their communities. It also will involve practice in envisioning alternative ways of development and living, evaluating alternative visions, learning how to negotiate and justify choices between visions and making plans for achieving desired ones, and participating in community actions to bring such visions into effect. This is the ability which Jensen and Schnack²⁹ call "action competence" or environmental citizenship. Democratic action competence is the opposite of pre-determined behavioural change as a goal for environmental education and aligns education for sustainability as part of the process of building an informed, concerned and active civil society. In this way, education for sustainability can contribute to education for democracy.

Education for action competence or environmental citizenship has a fourth implication for conventional thinking in environmental education. Traditionally, environmental education has been justified as a contribution to environmental problem-solving and environmental education has been evaluated according to whether environmental improvements have been achieved or not. However, the action competence approach in education for sustainability emphasises educational changes and learning, not solving environmental problems *per se*. Of course, it is desirable for students to solve the environmental problems that concern them as this can contribute both to sustainability and to a sense of empowerment. However, this is not the ultimate goal of education for sustainability. This is because education for sustainable development is ultimately about "education" and capacity building and only secondly about environmental problem-solving. As Schnack argues:

It is not and cannot be the task of the school to solve the political problems of society. It is not the task to improve the world with the help of the pupils' activities. These must be assessed on the basis of their formative value and thus according to educational criteria. A school, regarded as a school, does not become 'green' by conserving energy, collecting batteries or sorting waste. The crucial factor must be what the pupils are learning from participating in such activities.³⁰

The primacy of learning as the focus of education for sustainable development directs attention to the need to identify appropriate curriculum themes and pedagogy for formal education.

REFORMING CURRICULUM AND PEDAGOGY FOR SUSTAINABLE DEVELOPMENT

Education for sustainable development is a process of capacity building for participation in civil society. The action competence needed for such participation needs to be made the focus of teaching and learning in formal education. This will involve ensuring the basic rights of all children and youth (and adults) to functional and critical literacy in their family's and community's language(s), as well as skills in mathematical, scientific, technological, social and political literacy, are met. However, beyond these various forms of literacy, the focus on capacity building for civil society education for sustainable development will involve a reformulation of the goals and objectives of education, their integration into various curriculum structures, and a renewed emphasis on student and community based forms of pedagogy.

There have been a number of attempts in recent years to suggested goals, objectives and guiding principles of education so that sustainable development may be enhanced. At the international level, this includes the work of the UNESCO-UNEP International Environmental Education Programme.³¹ Examples at the national level include work in such diverse countries as Canada, the Netherlands, Scotland and Thailand. It is important that all countries undertake the process of curriculum review to identify similar educational processes and desired outcomes so that these can be relevant to local and national contexts. The following goals and objectives are suggested as a guide towards this task:

The long-term goals of education for sustainable development include:

- to foster awareness of, and concern about, the interdependence of natural, social, economic and political systems at local, national, regional and global levels;
- to develop the knowledge, skills, values and ethical discernment and motivation to participate as an informed and active member of civil society; and

- to encourage critical reflection and decision making in the choice of personal lifestyle and civic participation in order to contribute to sustainable development.

Five interrelated categories of objectives contribute to these goals:

Awareness: To help individuals, groups and societies acquire an awareness and sensitivity to the interdependence of natural, social, economic and political systems, especially related to questions, issues and problems arising from the processes of sustainable development.

Knowledge: To help individuals, groups and societies gain a variety of experiences in, and a basic understanding of, the knowledge and action competencies required for sustainable development.

Values: To help individuals, groups and societies acquire feelings of concern for issues of sustainability as well as a set of values upon which they can make judgements about appropriate ways of acting individually and with others to promote sustainable development.

Skills: To help individuals, groups and societies acquire the action competence or skills of environmental citizenship - in order to be able to identify and anticipate environmental problems and work with others to resolve, minimise and prevent them.

Participation: To provide individuals, groups and societies with opportunities to be actively involved in exercising their skills of environmental citizenship and be actively involved at all levels in working towards sustainable development.³²

Suggestions for goals and objectives of education for sustainable development such as these need to be clarified and refined in the light of local and national needs and, from this process of contextualisation, appropriate content themes, curriculum structures, and scope and sequence plans developed for courses. Hopkins, Damlamian and Lopez Ospino have identified a range of curriculum content themes for students to study as a result of the reorientation of formal education towards sustainable development. Their listing is very comprehensive and is based upon the need for students to attain an understanding of the major issues in the forty chapters of Agenda 21, together with the action plans of the subsequent United Nations conferences on population, women and social development, major international conventions on biodiversity, climate change and forests, as well as a range of other pertinent issues. The variety of such themes and possible ways in which they can be - and need to be - translated into concrete learning experiences with global, national, local and personal relevance are depicted in Figure 2.

EDUCATION FOR SUSTAINABLE DEVELOPMENT

	CONSERVATION AND MANAGEMENT	MATTERS OF AGENDA	CONVENTIONS AND STATEMENTS RELATED TO AGENDA 21
<p style="text-align: center;">SOCIAL AND ECONOMIC DIMENSION</p> <ul style="list-style-type: none"> - International co-operation - Combining poverty - Changing consumption patterns - Population and sustainability - Producing and promoting human health <div style="border: 1px solid black; padding: 5px; margin-top: 10px; text-align: center;"> <p>Sustainable Human settlements</p> </div> <ul style="list-style-type: none"> - Making decisions for sustainable development 	<div style="border: 1px solid black; padding: 5px; margin-bottom: 5px; text-align: center;"> <p>Structuring the atmosphere</p> </div> <ul style="list-style-type: none"> - Managing land sustainably - Combining deforestation - Combating desertification and drought - Sustainable mountain development - Sustainable agriculture and rural development - Conservation of biological diversity - Management of biotechnology - Protecting and managing the oceans - Proceeding and managing fresh water - Safer use of toxic chemicals - Managing hazardous waters and sewage - Managing radioactive waters 	<p style="text-align: center;">MATTERS OF AGENDA</p> <p style="text-align: center;">STRENGTHENING THE ROLE OF MAJOR GROUPS</p> <ul style="list-style-type: none"> - Preamble to strengthening the role of major groups - Women in sustainable development <div style="border: 1px solid black; padding: 5px; margin-top: 10px; text-align: center;"> <p>Children and youth in sustainable development</p> </div> <ul style="list-style-type: none"> - Strengthening the role of indigenous people - Partnerships with NGOs - Local authorities - Workers and Trade Unions - Business and industry - Scientists and technologists - Strengthening the role of farmers <div style="border: 1px solid black; padding: 5px; margin-top: 10px; text-align: center;"> <p>Education/training and public awareness</p> </div> <ul style="list-style-type: none"> - Creating capacity for sustainable development - Organizing for sustainable development - International law - Information for decision-making 	<p style="text-align: center;">CONVENTIONS AND STATEMENTS RELATED TO AGENDA 21</p> <ul style="list-style-type: none"> - War and militarism - Governance <div style="border: 1px solid black; padding: 5px; margin-top: 10px; text-align: center;"> <p>Dissemination and information</p> </div> <ul style="list-style-type: none"> - Renewable energy resources - Multinationals - Refugees - Nuclear disarmament - Human rights - Consumption - Media - Tourism <div style="border: 1px solid black; padding: 5px; margin-top: 10px; text-align: center;"> <p>Forests</p> </div> <ul style="list-style-type: none"> - Biological diversity - Climate change - Desertification
<p>Eg. National identity the major issue concerning sustainable human settlements and agree on actors required which are reflected in an international action plan approved by governments (Habitat II)</p> <p>Eg. National/State governments in co-operation with other stakeholders identify the relevant recommendations of the international action plan that they feel need to be understood by the public at large. Appropriate media strategies designed and implemented</p>	<p>Eg. Nations agree upon targets for CO₂ reduction and develop international or regional strategy to achieve these targets</p> <p>Eg. National and State or provincial governments in conjunction with relevant stakeholders develop a media strategy that will make the general population and target groups in the work force aware of the need for CO₂ reduction</p>	<p>Eg. National governments agree on the Rights of the Child in terms of the rights of future generations to a quality life and livelihood</p> <p>Eg. A multisectoral consortium distributes a handbook on developing your environmental clubs to schools and community organisations on a state or national basis</p>	<p>Eg. Nations as the CSD agree upon the need for and the components of a work programme to develop ESD at the international level and within countries</p> <p>Eg. A coalition of sectors contribute funds and other resources to start a state of national effort to promote ESD by developing policies, curricula and staff training.</p>
<p>Eg. Students carry out a neighbourhood study as a part of their geography course. They identify a need in their community that is within their competence and . Addressing</p>	<p>Eg. A coalition of NGOs and other stakeholders begin a media campaign to reduce car usage and mobilise support for public transportation.</p>	<p>Eg. Local school starts an energy conservation club that monitors energy consumption within the school and makes recommendations to the staff and concerned officials regarding possible reductions. Some of the savings from increased energy efficiency are passed on to the club.</p>	<p>Eg. A forest industry company in co-operation with NGOs and other stakeholders launches a community based information programme that targets employers spouses and local schools to that all members of the community understand the issue and can be a part of the solution</p>
		<p>Eg. A university faculty of education launches an initiative to reorient teacher training to address ESD</p>	<p>Eg. Countries jointly identify nations that violate human rights and apply concerted sanctions.</p> <p>Eg. Nations and/or state media campaigns are developed showing the impact of racism and extreme nationalism in the past while fighting the disparities in society that fuel those movements</p>

The titles of the topics and the sample learning experiences outlined in Figure 2 suggest ways in which a start may be made in implementing a curriculum for sustainability by changes to the focus of traditional subjects and topics. Thus, the themes in Figure 2 represent ways in which aspects of sustainable development may be introduced into the teaching of particular subjects, such as science, geography, health or consumer education, or through the teaching of particular cross-disciplinary themes such as community studies; futures education; women, environment and development; population, food and sustainable agriculture; and energy education.

Decisions as to whether a curriculum for sustainability would address themes such as these through interdisciplinary course structures or whether sustainable development themes are best infused into existing discipline based subjects are ones best left to individual education systems and schools. Some have argued that interdisciplinary approaches are preferable in that the problems of sustainability cannot be solved without taking many disciplinary perspectives into account, so why should they be separated in the classroom?³³ However, Hopkins, Damlamian and Lopez Ospino emphasise caution about this, especially "taking into account the lack of training in teaching holistic concepts for nearly all of the world's more than 50 million teachers".³⁴ Certainly, the needs of students and the background experiences and skills of teachers are important factors in such decisions. Perhaps, the most effective strategy is that identified by Hopkins, Damlamian and Lopez Ospino³⁵ who suggest that existing subjects be revised to integrate sustainable development themes, thereby building on the existing strengths of teachers in their subjects. Then, when teachers and students have become familiar and comfortable with teaching for sustainable development, combining insights from the various disciplines to develop holistic concepts, thereby forging the "creative synergy" needed to maximise the potential of education for sustainable development.

However, pedagogy counts: teachers' choices of teaching and learning strategies are the most significant determinant of the learning experiences of students and the nature of the objectives achieved irrespective of whatever sustainable development themes and topics, or whatever curriculum structures, are adopted. As Whitty remarks, whether or not particular curriculum plans are ultimately reproductive or transformative (contributing to empowerment for participation in civil society) is essentially a matter of how they are worked on pedagogically and how they are articulated with other issues in and beyond the school.³⁶ Issues of pedagogy are therefore vital in the reorientation of education for sustainable development. Pedagogy involves more than the traditional concept of instructional practices; it also subsumes the teacher's visions of what education is for and how society might be. The reconstructionist tradition in education involves two related processes of pedagogy: the organisation of knowledge around a range of critical concepts so that they can become critical thinkers, and the

participation of students in community affairs so that they might become active members of civil society. Thus Feinberg argues for pedagogy to be directed towards helping students "develop the modes of thinking and critical perspectives which will enable them to make wise choices and to participate critically in the activities of a political community".³⁷

Focusing upon the concepts that underlie sustainable development can help to ensure that the study of any of the topics in Figure 2 contributes to student learning that is holistic, has a moral base, may be integrated across subjects, and is directed towards a spiralling understanding of the principles that support sustainable development. Eight such concepts for guiding teaching and learning are suggested below. These are adapted from concepts in the 1991 IUCN, UNEP and WWF report, *Caring for the Earth*³⁸, and may be categorized into two groups - those related to human responsibility to care for nature (or ecological sustainability) and those related to our responsibility to care for each other (social justice). Four concepts are identified in each group:

PEOPLE AND NATURE: ECOLOGICAL SUSTAINABILITY

1. Interdependence: People are a part of natural systems and depend utterly on them. Thus, natural systems should be respected at all times. To respect natural systems means to approach nature with humility, care and compassion; to be frugal and efficient in resource use; to be guided by the best available knowledge, both traditional and scientific; and to help shape and support public policies that promote sustainability.

2. Biodiversity: Every life form warrants respect and preservation independently of its worth to people. People should preserve the complexity of ecosystems to ensure the survival of all species and the safeguarding of their habitats and, through this, contribute also to the material and spiritual quality of human life.

3. Living lightly: Everyone should take responsibility for his/her impact on natural systems. They should not interfere unduly with ecological processes, diminish biodiversity, or overexploit renewable resources and the ecosystems that support them. They should use natural resources and the environment carefully and sustainably, and restore degraded ecosystems.

4. Interspecies equity: People should treat all creatures decently, and protect them from cruelty and avoidable suffering.

PEOPLE AND PEOPLE: SOCIAL JUSTICE

5. Basic human needs: The needs of all individuals and societies should be met, within the constraints imposed by the biosphere; and all should have equal opportunity for improving their lot.

6. Intergenerational equity: Each generation should leave to the future a world that is at least as diverse and productive as the one it inherited. To this end, non-renewable resources should be used sparingly, renewable resources should be used sustainably, and waste should be minimised. The benefits of development should not be consumed now while leaving the costs to the future.

7. Human rights: All persons should have the fundamental freedoms of conscience and religion, expression, peaceful assembly, and association.

8. Democracy: All persons and communities should be empowered to exercise responsibility for their own lives and for life on earth. Thus they must have full access to education, political enfranchisement and sustaining livelihoods; and they should be able to participate effectively in the decisions that most affect them.

Working with concepts such as these can help students come to informed decisions about issues and questions of ecological sustainability and social justice within the context of appropriate case studies at local, national and global contexts. Some of the issues they may explore include:

- There are great differences in the availability and use of resources around the world with poverty and need in some areas matched by overproduction and over-consumption in others.

How can the over-consumption, waste and misuse of resources by some people be reduced? How can the severe poverty that causes many to exploit the earth just to survive be eliminated? How can the pressure on the environment from both causes be overcome?

- Some economic activities do great harm to environments, resources and communities.

How can economic activity be made of benefit to the communities and the companies involved, and without critical damage to the environment?

- Economic growth in some parts of the world is so high that it is leading to the production and consumption of many items that are super-luxuries and use resources that could be used to satisfy the needs of many of the world's poor.

How can the resources consumed by such luxuries be redirected to aid the poor or be conserved for future generations?

- Relatively high population densities and growth rates in certain parts of the world, and the associated pressure on the local resource base, are symptoms of the legacy of colonialism and present-day structural inequalities in the world economic system rather than causes of environmental problems. Appropriate social development lies at the heart of the solution to population and environmental pressures.

How can the nexus between the environment, social development and population growth be formulated to ensure the sustainable use of resources?

- The indigenous and farming peoples of many countries have developed an ethic of sustainability and associated land use practices that have preserved their culture and harmony between people and nature for millennia.

How can the rights of these people be maintained and the knowledge and wisdom they possess be shared with others in all parts of the world?

- Women and young people have a vital role to play in environmental care and development, now and into the future. They have viewpoints, skills and interests that can help maximise the potential for sustainable development.

How can the wisdom, courage and talents of women and young people be used as a model for sustainable development policies and practices?

- The most effective arena for action on sustainability and justice issues is the local community.

*How can people best organise themselves locally - and liaise with others nationally and globally - to collaborate in the movement towards sustainable development?*³⁹

Viewing pedagogy as a process of encouraging students to explore questions, issues and problems of sustainability such as these, especially in contexts relevant to them and their communities, means that student-centred and interactive enquiry-based approaches to teaching and learning need to be seen as central aspects of pedagogy in education for sustainable development. Such approaches do not preclude the use of more teacher centred methods such as exposition, narration and demonstration where appropriate. However, it does mean that, wherever possible, student learning will be based in the community, will use the environment and community as a resource for learning, and will involve such activities as debating controversial issues, role play, simulation games, values clarification and analysis, and discovery learning as well as a range of creative and experiential activities.⁴⁰ Naish, Rawling and Hart identify the characteristics of such an enquiry-based pedagogy by describing it as an approach to teaching and learning which:

- Identifies questions, issues and problems as the starting point for enquiry
- Involves students as active participants in a sequence of meaningful learning through enquiry
- Provides opportunities for the development of a wide range of skills and abilities (intellectual, social, practical and communication)
- Presents opportunities for fieldwork and classroom work to be closely integrated

- Provides possibilities for open-ended enquiries in which attitudes and values may be clarified, and an open interchange of ideas and opinions can take place.
- Provides scope for an effective balance of both teacher-directed work and more independent student enquiry.
- Assists in the development of political literacy such that students gain understanding of the social world and how to participate in it.⁴¹

The focus on issues and problems in this enquiry-based approach to pedagogy may cause worry and concern for students if not handled well. However, young people in almost all parts of the world are already seriously concerned about the future of the environment and their place in it.⁴² Thus, in a discussion of the importance of action competence in developing students' capacities for environmental citizenship, Jensen and Schnack argue that, "It is not so much a question of *creating* anxiety during environmental education. The problem is more [one of] how to handle the anxiety and worry which students already feel".⁴³ Thus, they give primacy to the regular involvement of students in learning how to resolve problems, develop and evaluate visions of alternative futures, and actively working in and with the community on problems that are of significance to them.

The manner in which such an action-focused pedagogy is practised will vary for students of different ages and in different cultural contexts. In response to this, several ways of conceptualising educational social action have been proposed. These focus on the types of citizenship skills needed for effective participation types of participation projects that students may undertake, and various approaches to incorporating social action in a teaching programme. For example, Hungerford, Peyton and Wilke⁴⁴ have identified three action skills: (i) evaluating and deciding upon an appropriate form of action, e.g. persuasion, consumerism, political action, legal action or ecomanagement, (ii) the development and implementation of plans, and (iii) the evaluation of action, as key environmental action skills. In similar vein, but with a strong focus on students choosing the issues on which to work and the actions to be attempted, Jensen⁴⁵ outlines a four step process called "IVAC" - Investigation, Vision, Action and the evaluation of Change. The development of the "Action Research: Community Problem-Solving Process" by Bull *et al*⁴⁶ and the OECD Environment and Schools Initiatives Project⁴⁷ provide many examples of the engagement of students in local action research projects in which they are able to develop a wide range of personal, intellectual and social action skills.

Thomas and Brubaker⁴⁸ address the perception that student participation in community issues may prove controversial by outlining four types of educational action projects: informative, stimulative, directive and operative. An informative project is one that describes conditions and options and furnishes such information to the community while a stimulative one not only provides information but

also urges the recipients to take some action. A directive project attempts to motivate other people to take particular actions while an operative project involves students in choosing, planning and taking their own actions to address problems that concern them.

Breiting⁴⁹ suggests that such forms of student action may be incorporated into the study of an environmental topic or issue in at least four different ways. First, teachers may incorporate students' actions and experiences from outside the school at the start of a teaching unit to initiate interest and motivation. This may be extended to include encouraging students to reflect on the appropriateness and efficacy of their actions and to evaluate alternative lifestyle choices and actions they may have taken. Second, the process of learning in a unit may include interaction with the local community through a variety of educational activities in which students interact with the community in order to gather data, survey public attitudes, or present the results of their investigations. Third, a unit may involve the planning and implementation of common action in order to improve some aspect of environmental quality. The fourth form of action involves the development of a future willingness to act on environmental issues.

Whichever approach is appropriate to helping students of different ages, studying different subjects in different countries, learn the skills of environmental citizenship, it is important that the many perceived barriers to this form of pedagogy be addressed and overcome. Students cannot learn democracy except through practising democracy. Thus, when formal education is reoriented towards sustainable development, the primary purpose of pedagogy will become one of giving students the skills to be fully active in society and, as Starr observes, this will mean "a lot of heavy traffic between schools and their communities". In listing the benefits of this pedagogical approach for students, Starr also notes that:

It means participatory decision making. It means getting involved with learning projects that can have political and tangible outcomes. It means learning critical powers of analysis, of working collectively, of critical reflection, 'problem-posing' and of having power in the learning situations.⁵⁰

Indeed, Breiting's model for incorporating social action into various stages in a teaching unit coupled with the breadth of Thomas and Brubaker's typology of social action mean that some form of community action may be possible in the study of all topics and issues in schools. However, two issues concerning educational social action require examination. First, educational action needs to be informed action. Students need a full understanding of the range of perspectives on an issue, the natural and social systems involved, and alternative proposals for its resolution. Students also require an understanding of the social interests involved in a topic or issue in order to decide on appropriate forms of social action. On some issues, it is possible that students may not gain an educational

benefit or sense of personal and social efficacy from direct or operative action. For example, some issues may be too remote from the immediate environment of students, too controversial given particular local circumstances, or too large, expensive or time-consuming for students to experience success. In such circumstances, students need assistance to understand the nature of the social interests and forces involved and the reasons for different approaches to social action.⁵¹ Nevertheless, it is important that students do not have such concerns of their teachers forced upon them. For education to promote democratic action competence, students need to be involved in making decisions about those things that concern them; and, in fact, research by Jensen indicates that confronting barriers in trying to undertake some form of environmental action is an important aspect of learning action competence.⁵²

Second, several principles have been suggested to guide teachers in determining the nature and extent of appropriate influence and direction in planning social action projects with students to ensure that appropriate decisions are made. One useful set of guidelines advises teachers that four principles should apply whenever students are involved in social action:

- ... participants are well informed,
- ... all action alternatives have been carefully considered,
- ... the implications of the action have been considered, in particular those outcomes that might be unfair to some people or groups, or cause them anxiety,
- ... the participants have a clear understanding of the values underlying what they are doing, can defend them rationally and have considered openly the values of those who might differ from them.⁵³

These various aspects of an action-focused pedagogy in education for sustainable development have been explored in depth in order to emphasise the importance of actively involving students in projects to build sustainability in their local communities. Without regular experiences such as these, the reorientation of objectives, curriculum themes, concepts and course structures for sustainable development will be in vein. Empowerment to work for sustainability is the *raison d'être* of reorienting formal education for sustainable development.

REFORMING THE STRUCTURES OF FORMAL EDUCATION

The reforms to curriculum and pedagogy that flow from a reorientation of formal education towards sustainable development, if implemented, would provide a significant challenge to the negative impacts of the roles of schooling in social and economic reproduction. However, the likelihood of such innovations being successfully adopted is low unless they are supported by reforms to

many current patterns of curriculum development and assessment. For example, the centralised control of teaching and learning through nationally mandated syllabuses, textbooks and assessment in many countries do not readily support the localisation of curriculum themes and emphasis on student participation in local action research projects in education for sustainable development. Indeed, the local control of the curriculum has diminished over the last decade due to major educational reforms to centralise curriculum and mandate standards of student performance. However, caution is needed to ensure that such reforms, which can serve the purposes of accountability and efficiency, do not undermine the pedagogical imperatives in reorienting the curriculum for sustainable development.

Two second-order changes to curriculum development and implementation are especially needed to support these imperatives. First, there is a need to decentralise many aspects of curriculum decision-making to the local level, especially to individual schools and teachers. Secondly, there is a need to establish processes of monitoring and moderation so that assessment and certification can be managed at the level of the local school. Such changes will provide a context of empowerment and responsibility for teachers to respond to the need to maximise student and community participation in negotiating what and how students learn and for what purposes.

Centralised educational policies and curriculum guidelines which support the localisation of teaching and learning are an important part of such reforms as are syllabus and assessment policies that maximise local decision making. Syllabuses can be prepared as "broad framework documents" which provide aims and general objectives for subjects, an overview of broad content themes, appropriate learning experiences, relevant resource materials, and criteria for assessing student learning. This type of syllabus can provide centralised accountability but leave schools, teachers and students, as appropriate, free to make choices about specific learning experiences, the relative depth and breadth of treatment for different topics, the particular case studies, examples and educational resources to be used, and approaches to assessing student achievements.

Many aspects of this approach to curriculum development and implementation are presently used in primary and tertiary education all around the world. Generally, it is only at the level of secondary schooling where major reforms are still needed in order to facilitate local curriculum control. However, secondary schools fulfil a major credentialing and occupational filtering function in many countries, usually through systems of external examinations. Thus, there is a need to develop forms of testing which assess higher order reasoning skills and ask students to reflect on the implications for sustainable development of various scenarios and actions. It is also necessary to find ways of devolving responsibility for

assessment in secondary education to the school level balanced by appropriate procedures for local and national moderation of results and standards.

These reforms to curriculum development and assessment processes can help empower teachers to take responsibility for planning learning experiences that can enhance the capacities of students to participate effectively as member of civil society in the interests of sustainable development. However, successfully inducting teachers into the new roles envisioned for them requires a recognition that educational change is multidimensional. Thus, effective changes to classroom practice require change in at least three areas: (i) the preparation and adoption of new curriculum guidelines, syllabuses, teaching activities and educational materials, (ii) changes in teachers' familiarity with, and use of, new forms of pedagogy and assessment, and (iii) the reflective development of teachers' beliefs or practical theories of education.⁵⁴ The clarification of teachers' commitments to education for sustainability, together with the development of their willingness and capacities to adopt new roles as curriculum developers, facilitators of student learning and assessors, make teacher education, at both the preservice and the inservice levels, a vital aspect of the reorientation of formal education for sustainable development. Indeed, the UNESCO-UNEP International Environmental Education Programme has described the preparation of teachers as "the priority of priorities"⁵⁵

However, securing a place in the teacher education curriculum for sustainable development and the appropriate reforms of curriculum and pedagogy is a major task given the scope and limited duration of teacher education programmes and the many other social and professional demands on them. It is not desirable to prescribe a uniform approach to solving this dilemma given the diversity of political, cultural and economic systems in the world and their wide range of educational needs and provisions. The entry requirements, duration, structure and resources of teacher education programmes vary greatly between countries and even between colleges and universities within individual countries. This situation is complicated further by the need to distinguish between the general environmental education needs of primary and secondary teachers and the specialist needs of various subject area teachers, especially in secondary schools. However, it is possible to recommend at least four principles for the development of a framework for including education for sustainable development in a teacher education programme⁵⁶:

1. The main aim should be to alert all teachers to their responsibilities to educate students for participation in civil society and the promotion of sustainable development. Thus, it is necessary to ensure that all teachers have opportunities to develop familiarity with (i) the concepts and processes of sustainability, and (ii) the professional roles and skills needed to teach effectively for participation in civil society.

2. The objectives, content themes and pedagogical approaches of education for sustainable development should be infused into the core and elective education studies of all preservice teacher education students. This includes infusion into integrated and or disciplinary studies in the philosophy, sociology and psychology of education as well as into courses in teaching processes, curriculum theory, and applied curriculum studies for teaching different school subjects.
3. Additional specialist studies related to both sets of competencies for teaching in environmental education should be provided for students who wish to concentrate in this area. These may be provided through specific course(s) in sustainable development and/or through specialist applied curriculum studies for different school subjects.
4. Regular opportunities for continuing in-service professional development should be provided for teachers to encourage reflection on their educational commitments and pedagogical practices in the face of the "press of the classroom" and to develop skills and plans to teach for a sustainable world.⁵⁷

CONCLUSION

Reorienting formal education for sustainable development is a process of educational reform and innovation. Individual countries, education systems, schools and teachers will need to reflect critically on the suggestions for major "second-order changes" to national priorities, educational goals, curriculum and pedagogy, and approaches to curriculum development, implementation and evaluation outlined in this paper and to interpret and focus them for action in national and local contexts. It is possible that pre-Rio forms of environmental education could be considered a "failed innovation"⁵⁸ despite the initiatives that could be cited. As Fullan laments, "We have a huge negative legacy of failed reform that simply cannot be overcome simply through good intentions and powerful rhetoric."⁵⁹ Reorienting environmental education for sustainable development is powerful rhetoric and a great intention. However, we have much to learn about the processes of educational innovation and change. Learning from the successful experiences of other educational reform movements and interpreting their lessons to education for sustainable development and local cultural and educational contexts must become the new priority of priorities for environmental education and all those who, like Orr, view "The crisis of sustainability, the fit between humanity and its habitat" not only as "a permanent feature on the public agenda" but "as *the* agenda". Orr concludes therefore that:

No other issue of politics, economics and public policy will remain unaffected by the crisis of resources, population, climate change, species extinction, acid rain, deforestation, ozone depletion, and soil loss. Sustainability is about the terms and conditions of human survival

Those presuming to educate should not stand aloof from the decisions about how and whether life will be lived in the twenty-first century. To do so would be to miss the Mount Everest issues on the historical topography of our age, and condemn ourselves to irrelevance.⁶⁰

REFERENCES

- 1 The following summary is taken from NIER/UNESCO-ACEID (1996) *Learning for a Sustainable Environment. Teacher Education and Environmental Education in Asia and the Pacific c*, Report of a regional seminar, 29 October - 13 November, National Institute for Educational Research, Tokyo, Chapter 2; and country reports on opportunities and barriers to education for sustainability provided at two conferences, Global Knowledge '97 World Bank Economic Development Institute Development Education Project Stakeholders' Meeting, Toronto, 22-24 June 1997, and North American Association for Environmental Education Annual Conference, Education for Sustainability Panel, Vancouver, 15- 19 August 1997.
- 2 See, for example, Rohanna Ulluwishewa, Abdul Aziz Kaloko and Dy Hairuni Hj Mohamed Maricar (1997) *Indigenous Knowledge and Environmental Education*, unpublished paper presented at National Environmental Education Workshop, Universiti Brunei Darussalam, June.
- 3 See, for example, Milbrath, L. (1990) Environmental understanding: A new concern for political socialization, in O. Ivhilov, ed., *Political Socialization, Citizenship and Democracy*, Teachers College Press, New York, 281 -293.
- 4 See, for example, Carnoy, M. and Levin, H. (1985) *Schooling and Work in the Democratic State*, Stanford University Press, Stanford; and Schlechty, P. (1990) *Schools for the 21st Century*, Jossey-Bass, San Francisco.
- 5 See, for example, Trainer, T. (1990) Towards an ecological philosophy of education, *Discourse*, 10 (2), 92-117; Orr, D. (1992) *Ecological Literacy. Education and the Transition to a Post-modern World*, State University of New York Press, Albany; Smith, G. (1992) *Education and the Environment. Learning to Live within Limits*, State University of New York Press, Albany; Fien, J. ed. (1993) *Environmental Education: A Pathway to Sustainability*, Deakin University Press, Geelong; and Huckle, J. and Sterling, S., eds. (1996) *Education for Sustainability*, Earthscan, London.
- 6 Orr, D. (1991) What is education for?, *The Trumpeter*, 8, p. 101.
- 7 Orr, D. (1992), *op. cit.*, p. 83.
- 8 Cuban, L. (1988) A fundamental puzzle of school reform, *Phi Delta Kappan*, 70 (5), pp. 341-344.
- 9 Fullan, M. with Stiegelbauer, S. (1991) *The New Meaning of Educational Change*, Cassell Educational Limited, London, p. 21.

- 10 Smyth, J. (1995) Environment and education: A view of a changing scene, *Environmental Education Research*, 1 (1), 3-20.
- 11 Dewey, J. (1916) *Democracy and Education*, Macmillan, New York.
- 12 Grant, C.A. and Zeichner, K. M. (1984) On becoming a reflective teacher, in C.A. Grant, ed. *Preparing for Reflective Teaching*, and Bacon Inc. Boston.
- 13 These criticisms of education for sustainability are made in Jickling, R. (1992) Why I don't want my children educated for sustainable development, *Journal of Environmental Education*, 23 (4), 49-69. For a rebuttal of this argument, see van Rossem, J. (1995) Conceptual analysis in environmental education: Why I do want my children to be educated for sustainable development, *Australian Journal of Environmental Education*, 11, 73-81. For a more general discussion of the belief that all education is instrumental, see Hunter, R. (1994) *Rethinking the School: Subjectivity, Bureaucracy, Criticism*, Allen and, Sydney; and Hunter, R. (1996) *Assembling the school*, in A. Barry, T. Osborne and N. Rose, eds., *Foucault and Political Reason*, The University of Chicago Press, Chicago.
- 14 Huckle, J. (1991) Education for sustainability: Assessing pathways to the future, *Australian Journal of Environmental Education*, 7, p. 61
- 15 Orr, D. (1992) *op. cit.*, p. 84.
- 16 Breiting, S. (1993) A new generation of environmental education: Focus on democracy as part of an alternative paradigm, in R. Mrazek, ed., *Alternative Paradigms in Environmental Education Research*, North American Association for Environmental Education, Troy, Ohio.
- 17 For a critique of the pervasiveness of the view that the goal of environmental education is to "shape responsible behaviour", see Robottom, I. and Hart, R. (1993) *Research in Environmental Education: Engaging the Debate*, Deakin University Press, Geelong; and Robottom, I. and Hart, R. (1995) Behaviourist EE research: Environmentalism and individualism, *Journal of Environmental Education*, 26 (2), 5-9.
- 18 Jensen, B. B. and Schnack, K. (1997) The action competence approach in environmental education, *Environmental Education Research*, 3 (2), 163-178.
- 19 See, for example, Merchant, C. (1980) *The Death of Nature: Women, Ecology, and the Scientific Revolution*, Harper and Row, San Francisco; and Shiva, V. (1989) *Staying Alive Women, Ecology and Development*, Zed Books, London.
- 20 Shiva, V. (1989), *op. cit.*, pp. xvii-xviii.
- 21 Orr, D. (1994) *Earth in Mind*, State University of New York Press, Albany.
- 22 Berberet, W. G. (1989) *Education for Sustainable Development*. Testimony prepared for Globescape Pacific Conference, Los Angeles, p. 4.
- 23 Shiva, V. (1989), *op. cit.*
- 24 For an account of the 'ecological foundations of environmental education', see Hungerford, H., Peyton, R.B. and Wilke, R.J. (1980) Goals for curriculum development in environmental education, *Journal of Environmental Education*, 11(3), pp. 42-47.
- 25 Berberet, W. G. (1989) *op. cit.*, p. 5
- 26 Knapp, C. and Goodman, J. (1981) *Humanising Environmental Education: A Guide for Leading Nature and Human Nature Activities*, American Camping Association, Martinsville, Indiana.
- 27 Mellor, M. (1992) *Breaking the Boundaries*, Virago Press, (1992) London, pp. 46-47.

- 28 Jensen, B. (1992) *Current Research in Environmental and Health Education*, unpublished paper presented to the annual conference of the Australian Association for Research in Education, Deakin University, December.
- 29 Jensen and Schnack (1997), *op. cit.*
- 30 Schnack, K. (1996) Internationalisation, democracy and environmental education, in S. Breiting and K. Nielsen, eds., *Environmental Education Research in the Nordic Countries*, Proceedings of the Research Centre for Environmental and Health Education No. 33, The Royal Danish School of Educational Studies, Copenhagen, p. 11.
- 31 Meadows, D.H. (1989) *Harvesting One Hundredfold Key Concepts and Case Studies in Environmental Education*, Afropress, Nairobi, Kenya.
- 32 This set of goals and objectives of education for sustainable development was adapted from "The Tbilisi Declaration", UNESCO-UNEP (1978) *Connect*, III (I), 1-8; and UNESCO and Australian Association for Environmental Education (1993) *Final Report of the UNESCO Asia-Pacific Regional Expert's Meeting on Overcoming the Barriers to Environmental Education through teacher Education*, Griffith University, Brisbane, 5-9 July.
- 33 Greig, S., Pike, D. and Selby, D. (1989) *Greenprints for Changing Schools*, Kogan Page for WWF(UK), London.
- 34 Hopkins, C., Damlamian, J. and Lopez Ospino, G. (1996) Evolving towards education for sustainable development: An international perspective, *Nature and Resources*, 32 (3), p. 6
- 35 *Ibid.*, pp.5,6,8
- 36 Whitty, G. (1985) *Sociology and School Knowledge. Curriculum Theory, Research and Politics*, Methuen, London.
- 37 Feinberg, W. (1989) Fixing the schools: The ideological turn, in H. Giroux and P. Maclaren, eds., *Critical Pedagogy, the State and Cultural Struggle*, State University of New York Press, Albany.
- 38 Adapted from IUCN, UNEP and WWFN (1991) *Caring for the Earth*, /IUCN, Gland. See also the 1990 second draft of this report, p.22; and Fien, J. (1993) *Education for the Environment. Critical Curriculum Theorising and Environmental Education*, Deakin University Press, Geelong, p. 64.
- 39 Fien, J., ed. (1995) *Teaching for a Sustainable World*, UNESCO-UNEP International Environmental Education Programme for Teacher Education, Griffith University, Brisbane; adapted with the assistance of Jane Williamson-Fien and Annette Gough from Beddis, R. and Johnson, C. (1988) *Only One Earth: A Multi-Media Education Pack*, World Wide Fund for Nature, Godalming.
- 40 For a range of strategies for using these approaches, see Fien, J., Heck, D. and Ferreira, J., eds. (1997 forthcoming) *Learning for a Sustainable Environment: A Workshop Manual for Teacher Educators*, UNESCO-ACEID, Bangkok.
- 41 Naish, M., Rawling, E. and Hart, C. (1986) *Geography 16-19: The Contribution of a Curriculum Project to 16-19 Education*, Longman, Harlow, p. 46.
- 42 For example, see Hillcoat, J., Forge, K., Fien, J. and Baker, E. (1995) "It's really great that someone is listening to us": Young people and the environment, *Environmental Education Research*, 1 (2), 159-171.
- 43 Jensen and Schnack (1997), p. 164.
- 44 Hungerford, H., Peyton, R.B. and Wilke, R.J. (1980) Goals for curriculum development in environmental education, *Journal of Environmental Education*, 11 (3), pp. 42-47.

- 45 Jensen, B. B. (1995) Concepts and models in a democratic health education, in B. B. Jensen, ed., *Research in Environmental and Health Education*, Research Centre for Environmental and Health Education, The Royal Danish School of Educational Studies, Copenhagen.
- 46 Bull, J. et al (1988) *Education in Action. A Community Problem Solving Program for Schools*, Thomson-Shore Printers, Dexter, Michigan.
- 47 *Evaluating Innovation in Environmental Education*, OECD Documents, OECD, Paris, 1994.
- 48 Thomas, R.M. and Brubaker, D.L. (1971) *Decisions in Teaching Elementary Social Studies*, Wadsworth, Belmont, California.
- 49 Breiting, S. (1988) Sustainable development and the ideological formation of environmental education, in C.V. Christensen and K. Nielsen, eds., *Environmental Education. International Contributions 1988*, Proceedings of the Research Center for Environmental and Health Education, No. 5, The Royal Danish School of Educational Studies, Copenhagen.
- 50 Starr, K. (1991) What is social justice?, *Curriculum Perspectives- Newsletter Edition*, 11(3), pp. 20-24.
- 51 Fien, J. (1988) *Education for the Australian Environment*, Bicentennial Australian Studies Schools Project, Bulletin 6, Curriculum Development Centre. Canberra, p. 37.
- 52 Jensen, B. B. (1994) Action, action competence and change in the field of environmental and health education, in B. B. Jensen and K. Schnack, eds., *The Action Perspective in Environmental Education*, Studies in Educational Theory and Curriculum, Vol. 12, The Royal Danish School of Education Studies, Copenhagen.
- 53 Ministry of Education, Victoria (1990) The dimension of social action, *Ethos Papers*, March, pp. 19-23.
- 54 Fullan with Stiegelbauer (1991), *op. cit.*, pp. 36-40.
- 55 UNESCO-UNEP (1990) Environmentally educated teachers: The priority of priorities?, *Connect*, XV(1), P1
- 56 Adapted from Fien, J. and Tilbury, D. (1996) *Learning for a Sustainable Environment: An Agenda for Teacher Education in Asia and the Pacific*, UNESCO-ACEID, Bangkok, pp. 58-59.
- 57 For an outline of an approach to educating teachers environmentally which develops their skills for "reflection-in-action", see Hart, P. (1990) Rethinking teacher education environmentally, in D. Engleson and J. Disinger. eds., *Preparing Classroom Teachers to be Environmental Educators*, Monographs in Environmental education and Environmental Studies, Volume VI, North American Association for Environmental Education, Troy, Ohio.
- 58 See Greenall, A. (1981) Environmental education: A case study of national curriculum action, *Environmental Education and Information*, 1 (4), 285-294; and Chapter XI of Orr (1992), *op. cit.*, in which he asks "Is Environmental Education an Oxymoron?"
- 59 Fullan with Stiegelbauer (1991) *op. cit.*, p. 354.
- 60 Orr (1992) *op. cit.*, pp. 83, 145.

University, Interdisciplinarity and Environmental Education

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KNOWLEDGE AND SUSTAINABLE DEVELOPMENT

The increasingly complex and acute socio-environmental problems occasioned by the dominant economic rationale and by the knowledge system which sustains it have created the need to reorient the way in which knowledge is produced and applied, as well as training in the professional skills, in order to create a new basis for sustainable development. This need is greater in "fringe" countries, where the fragility and dependency of their scientific and technological systems, the rare articulation of these with productive processes and their inappropriateness for the social, cultural and environmental conditions of the nations concerned, appear as the cause of their "underdevelopment".

Scientific and technological dependency is revealed by a dysfunctional imbalance between the cost and conditions of acquiring imported knowledge and the skills for its appropriation, adaptation and operation, the waste and destruction of natural and cultural resources due to the use of external technological models, and an unequal exchange of primary products with technological goods governed by market conditions. Nevertheless, this dependency takes on fresh significance from the perspective of sustainable development which is confronted with new ways of using science and technology, and with the strategies of a new world order based on intellectual ownership of the science and technology used for manipulating the planet's environmental resources (biodiversity).

The still-predominant perception of the role of technology in the disparities between industrialised and developing countries has brought about the belief (even promise) that the proper articulation of a scientific and technological system with the established economic and productive system, and full use of the comparative

advantages of the supply of human, natural and technological resources in each country, would close the gap between rich and poor countries and dissolve internal regional and social inequalities in a technological and cultural homogenising process.

In this sense, scientific and technological dependency is reinforced under the economic and ecological globalising agenda with the demand from the countries of the South for the transfer of (clean ?) technology by the North under preferential conditions. They do so instead of encouraging the development of their own scientific and technological capacity in order to increase their environmental potential and technological self-determination, which would be development conditioned by the "underdeveloped" countries' policies in science and technology and by their human resources training.

Within this issue of dependency and unequal development, the environmental crisis marks the ecological and social limits of the predominant profit-oriented logic. Whence the emergence of an environmental awareness to confront the myth of uncontrolled development and the hope of reaping the benefits of economic and ecological globalisation. The strategies to appropriate nature (biodiversity) and control the ecological balance (change of climate), which are in the hands of the economic, scientific and technological power centres of the Northern countries, result in ecological costs and potential being unequally shared, as well as opportunities to access and enjoy the planet's resources, whether at local, national, regional or world-wide level.

The internationalisation of the prevailing economic and technological rationale has led to resources being over-exploited and to the deterioration of the potential productivity of the "underdeveloped" countries' ecosystems. Producing goods with a view to maximising profits and trade surpluses in the short term has led to increasing pollution of their atmosphere, soil and water resources; deforestation, erosion and desertification; soil deterioration; loss of biological diversity and productivity in their ecosystems; destruction of the traditional practices and cultural values which make up their ethnic diversity and of the identity of different peoples; and lack of incentive for scientific and technological development to generate endogenous expertise for the sustainable use of resources.

From an environmental perspective, the articulation of existing knowledge with the governing economic system orients scientific and technological research, the production of knowledge and the training of professionals and technical experts towards the explicit requirements of this system and of the production system in place, discouraging a more creative system for producing knowledge and abilities to build an environmental rationale.

The environmental approach to development undermines and transcends prevailing economic, technological and educational policies, orienting production so

that it takes advantage of what the environment has to offer in each region via the articulation of its ecological, technological and cultural potential. This articulation creates a new productive rationale which can meet basic needs and improve the population's quality of life, and which is based on the ecological potential, cultural identity and technological ability of different social groups. This development strategy requires educational, scientific and technological policies generating the knowledge, abilities and skills needed to carry out an endogenous development process.

The reorientation of academic and research activities needed for sustainable development involves incorporating an "environmental dimension" into the theoretical paradigms and disciplinary practices of research and into the contents of educational curricula. This "dimension" is concretised in specific social, geographical and cultural contexts, and encounters varying degrees of assimilation according to the different disciplines and according to the research and higher education institutions concerned. The environmental question thus engenders a body of knowledge leading to a transformation of existing knowledge, of educational contents and of the social management of natural resources, reorienting research, educational and production systems.

UNIVERSITY, SOCIETY AND ENVIRONMENT

Although universities and higher education institutions enjoy a degree of autonomy (freedom in the areas of teaching and research), they are not independent of the societies around them. Their articulation with the latter is established not only via the explicit demands of the professionals who have the skills and knowledge which are useful to the system and make it function; universities internalise social values and economic valuations which have repercussions on the orientation of their activities. The articulation of the university with society is established via the academic organisations which orient professional training, define vocations and produce disciplinary and professional interests which establish links with different employer institutions. The latter transmit a demand for human resources to the university, the interest being in the efficient, productive and functional training of "human capital".

Society thus effects an assessment of the value of academic work which has repercussions on the university's functioning. The social prestige surrounding the researcher or professor, the incentives or obstacles affecting the development of new themes within the mainstreams in each discipline, the explicit demands of professionals in the labour market, the sense of participating in the process of

producing and transmitting knowledge, the aspirations towards upward mobility via the acquisition of qualifications and professional skills, and the remuneration and possibility of personal fulfilment associated with intellectual or teaching work, combine to produce a system of incentives and frustrations which have an influence on the organisation of academic activity and its institutional structures, as well as on the orientation of teaching and research efforts in universities.

These influences and interests determine the possibilities for transforming educational structures by introducing new teaching methods, renewing study programmes, reorganising curricula or reorienting scientific activities in universities. The social conditions of academic work are translated into incentives or disincentives for professors, researchers and students to introduce new projects for professional training and scientific research. It is in this context that the project to incorporate an "environmental dimension" in universities is envisaged.

Reorienting research and preparing new curricular contents and teaching methods in order to incorporate this new "dimension" implies building a body of environmental knowledge and internalizing this in prevailing scientific paradigms and teaching practices. This process is faced with obstacles generated by the institutionalisation and legitimisation of established learning, firmly rooted in the criteria for valuing knowledge in the academic environment and that of the surrounding society. Environmental training thus has to struggle against the current of the demands and interests of academia and of the dominant economic rationale.

The methodological approaches and concrete contents of environmental educational programmes depend on the conceptualisation itself of the environmental issue, on the processes which constitute this and their place within the rationale of the general development process. The conditions caused by the economic domination of Third World countries, their technological dependency and the resulting over-exploitation of their resources and deterioration of their ecosystems, ethnic diversity and ecological potential, make the environmental question a very complex "dimension", both in the nature of its causes and in the definition of the environment as a potential for alternative development.

Notwithstanding the different meanings adopted in the North and the South, the concept of environment has been developing from a naturalist or ecologist viewpoint towards a perception which includes the social problems determining the environmental issue.² In spite of this conceptual evolution, the ecologist view has been predominant in environmental education programmes. In this sense, basic concepts of ecology and of techniques for assessing and controlling environmental impacts have been incorporated into traditional university courses. Very few efforts have been made to bring the study of environmental processes into the social sciences. The social sciences have been even less open to the incorpora-

tion of environmental expertise and the production of the knowledge needed to build an environmental rationale.

In industrialised countries, educational systems have been creating awareness in order to achieve standards of social behaviour which will prevent damage to the environment and produce technical skills for resolving environmental problems. In this way, environmental education is conceived as "training on environmental protection" aiming to "instruct the students, to enable them to solve environmental problems and to give them insights and convictions as the base for responsible behaviour towards nature" ⁴. Environmental training programmes are only just beginning that are oriented towards building an alternative rationale capable of understanding, promoting, mobilising and articulating the natural, technological and social processes which give rise to the environmental potential and which open up options for "another development".

ENVIRONMENTAL EXPERTISE AND TRANSFORMATIONS IN KNOWLEDGE AND IN THE EDUCATIONAL PROCESS

The dominant economic rationale has occasioned theoretical and ideological training which legitimises the values of the Western world, and of the scientific and technological circles which seek greater efficiency for forces motivated by short-term profits. It is these knowledge paradigms which dominate academic and research practices.

The environmental approach to development does not merely question the behaviour of the affluent society faced with the physical limits which oppose its conservation and expansion. It also implies critical reformulation of those knowledge paradigms to which ideologies responding to the interests of the classes and social groups which support this development "model" have been added. It is from these theories that the planning instruments and decision-making criteria emerge of the economic players who affect the forms of valuing and appropriating natural resources, as well as the processes of environmental deterioration and the distribution of its economic and ecological cost.

The environmental ethic promotes a change of attitudes associated with transforming the theoretical and practical knowledge upon which the dominant social and productive rationale is based. The knowledge required to build an environmental rationale depends on the ideological and political angle from which the demand is made. This in turn determines conceptual strategies and methodolo-

gies for producing knowledge and orienting research and technological development. This is not to say that all scientific paradigms are called into question by the different ideological angles from which the environmental issue is approached, or that the technical resources originating from existing specialised knowledge are not applicable for solving specific environmental problems such as analysis of toxic levels, water treatment, waste recycling, "clean" technology and energy saving.

Many research programmes needed to bring about sustainable management of resources do not question the paradigms, methods and techniques of different scientific branches. Thus, studies on the carrying capacity of ecosystems, their ecological productivity and conditions for the regeneration of their resources under alternative single-crop and mixed-crop systems, are no challenge to the current theories and methods of ecology. In the same way, the study of potential resources, their biological productivity and the forms of their use, generate new research subjects, but no new theoretical subjects or experimental methods for botany, biotechnology, toxicology or processing technology.

Nevertheless, in analysing the causes, conditioning factors and non-technical means of solving the environmental issue, there are processes of varying material orders articulating which infer an interdisciplinary reconstruction of knowledge. From this angle, the environmental issue calls for the production of a global corpus of knowledge, both complex and integrated, concerning the natural and social processes which intervene in its genesis and resolution. In this sense, the environmental potential of each region includes the ecological, cultural and technological conditions which reorganize production with a view to sustainable development.

To build this environmental rationale requires new knowledge, the integration of existing expertise, the collaboration of different specialities and the transformation of the traditional scientific paradigms, which raises the problem of the interdisciplinary organisation of scientific work for sustainable development. The above generates new epistemological and methodological approaches for the interdisciplinary production of knowledge, as well as for the practical integration of various kinds of expertise in dealing with a joint problem (Apostel *et al.* 1975). Thus new epistemological, theoretical and methodological strategies are envisaged, as well as strategies for technological innovation and resource management, and for analysing and solving the environmental issue.

The production of environmental knowledge which emerges from this process is part of the basic functions of the universities, via their freedom of teaching and research. This implies the need to bring about a process for the interdisciplinary production of knowledge which is different from the academic organisation founded on rigidly compartmentalised subject disciplines.

The need to understand the complexity of the environmental issue and the multiple processes which characterise it has created doubts on the disciplinary fragmentation and compartmentalisation of knowledge, which has not been capable of explaining or solving the issue in question. But the "retotalling of knowledge" called for by the environmental issue is neither the sum nor the integration of inherited disciplinary knowledge. The inter- and transdisciplinarity required by environmental knowledge goes beyond the reach of a globalising knowledge paradigm, the systemic organisation of knowledge via the structural isomorphs of different subject disciplines, or the attempts to achieve uniformity in terms and concepts by preparing an interdisciplinary metalanguage.

Beyond an all-embracing paradigm, the ecologisation of knowledge or a general methodology to develop complex knowledge, the environmental problem creates the problem for the whole galaxy of subject disciplines of incorporating a body of environmental knowledge which is complex, yet incapable of softening the edges of the different historically established, ideologically legitimate and socially institutionalised sciences (Leff 1986).

The problem raised by the environmental issue for science in the production of knowledge, and for universities in training human resources, rises above the creation of an academic space formed by the integration of the traditional subject disciplines or by the creation of a universally valid "environmental science". The incorporation of environmental contents in scientific and teaching practices goes beyond the requirement to update university curricula by internalising a generalised environmental "dimension" which can be applied to all the different knowledge paradigms.

Environmental knowledge does not emerge from the systemic reorganisation of current knowledge. It gestates via the transformation of a set of paradigms of knowledge and ideologies, triggered by a social issue which challenges and surpasses them. Environmental expertise is built via different processes, with ontological variations and differing political directions which transcend and surpass any global model, however holistic and open it might be. The logic of the ecological, cultural and technological processes involved is integrated with the rationales of theoretical training, productive organizations, institutional structures and social behaviour patterns where the potential for building an environmental rationale leading to sustainable development practices is mobilised and concretised.

The transformation of knowledge implied by the environmental question is more complex than the simple internalisation of a new "dimension" in the corpus of different established scientific and technical disciplines. Each science and each subject has its theoretical and institutional conditions for the production of environmental expertise, in an unequal and heterogeneous process leading to the

emergence of environmental disciplines. Certain branches of theoretical training prove to be more tractable when it comes to mixing and amalgamating knowledge, as shown by the current paradigms for anthropological disciplines which have taken on board the concepts and methods used in analyses of energy and of ecosystems in studies on productive organisation and traditional societies⁵. The conceptual structures of other - such as economic - paradigms, are more resistant to the incorporation of ecological processes, of the long-term, of human values and of cultural factors into their economic calculations.⁶ Emerging from this is a sociological analysis of the production of environmental expertise, as well as strategies for its inclusion in university research and teaching programmes.

The creation of environmental education programmes presupposes a critical analysis of the conditions in which environmental expertise is assimilated within the legitimised paradigms of knowledge, of the emergence of new concepts and methods in the "environmental disciplines" and of the creation of teaching methods for new interdisciplinary educational programmes. On the basis of these studies, it will be possible to prepare the contents of the curricula for new university courses or environmental specialisations, and design appropriate methods for their teaching

INTERDISCIPLINARITY AND ENVIRONMENTAL EDUCATION

The environmental issue arose alongside the concept of the growing complexity of development problems, demanding the integration of various scientific and technical disciplines to explain and solve them. In this way, consideration was given to the reconstruction of disciplinary knowledge on the basis of a holistic focus and systemic approaches for training in new professional skills. Interdisciplinarity in the educational field thus emerges as a pedagogical project "with the purpose of training minds capable of understanding the unity of the real, almost in a gestaltist form⁷".

Since the Stockholm Conference on the Human Environment held in 1972, environmental education has been considered a priority for attaining the goals of sustainable development. Later, the Tbilisi Conference on Environmental Education (1977) established the general principles which were to guide the efforts of education for the environment. Environmental education is thus understood as training for an awareness based on a new ethic rejecting exploitation, waste and exaltation of productivity as an end in itself. This process of training and creating awareness "should not only create awareness, but also change people's

outlook, enabling them to adopt a new approach and acquire new knowledge... co-operation between the traditional disciplines which are essential for understanding the complexity of environmental problems and for finding solutions to these problems⁸"

The interdisciplinary objective of environmental education is expressed in the following terms:

"...The goal of (environmental education) is to enable people to understand the complex nature of the environment as it results from the interaction of biological, physical, social, economic and cultural elements. So assimilated, it should provide individuals and groups with the means to interpret the interdependency in space and time of these elements so as to foster more thoughtful and prudent utilisation of universal resources for the satisfaction of humanity's needs."⁹

Despite the validity of the interdisciplinary objective in environmental education, there has been little progress since its methodological beginnings in organising interdisciplinary research, educational programmes and integrated development projects. Experience has revealed the rigidity of universities, where compartmentalised learning has taken shape in specialised disciplines in centres, faculties, institutes and departments. These experiences show that the interdisciplinary process is facing epistemological, methodological and institutional obstacles which go beyond the elaboration of knowledge made up of an amalgam of what is currently known or by the joining of the various disciplines to solve a concrete problem. Far from this, interdisciplinarity in education concerning the environment is considered as an aim to:

"... develop an interdisciplinary, project-oriented pedagogy aimed at a specific environmental action. When this is done, the traditional disciplines no longer exist in themselves... they become indispensable instruments for realising the project. The point of departure is no longer the discipline, but an educational project comprising an action concerning an environmental problem and the proposal of alternative solutions to it that will lead to environmental management of an area and to a sought-for body of educational objectives... In other words, in keeping with the project's inherent needs, the disciplines unite their efforts to study a given phenomenon through different but complementary approaches."¹⁰

In this manner, interdisciplinarity is oriented by a practical motive, losing sight of the theoretical and epistemological bases which establish the conditions for articulating knowledge within the framework of an environmental rationale. The sciences do not submit easily to an integration project originating in an outside request, whether this concerns an educational project or the need to solve a practical problem. Possible integration depends on its differentiated capacity to

assimilate a joint analytical concept or approach. In many cases, interdisciplinary cooperation transcends the integration of available knowledge, and involves the reorganisation of the knowledge, methods and techniques of various disciplines, thereby transforming their concepts and fields of application without their specificity being lost. Therefore, any interdisciplinary project must consider that:

"the separate disciplines and fields which are to be brought together each possess a distinctive corpus of knowledge and a characteristic complex of theoretical structures and heuristic strategies, and use a variety of methods and techniques in order to develop and expand that body of structured knowledge and explanation which effectively constitutes the discipline. Furthermore, there are also distinguishable, even conflicting, philosophical (ontological) assumptions implicit in them. Clearly these separate classes of features which characterise different disciplines are not of equal and constant orders of importance in each of the four sets of purposes which have been categorised ... There is no one way to successful interdisciplinary activity, no single solution to the problem of achieving multidisciplinary integration".¹¹

The diversity is thus recognised of methods applicable to different interdisciplinary projects, within the theoretical specificity of each discipline and the ontological specificity of the processes which characterise an environmental problem. The epistemological and methodological principle is necessary in order to avoid any kind of reductionism in considering the causes of this issue, as also in orienting research methods and social actions for building an environmental potential for sustainable development.

The knowledge and methods needed to understand and resolve an environmental issue depend on the geographic, ecological, political, economic and cultural conditions which make up the immediate environments of universities providing training in professional skills. It is in this environment that we find repercussions in the application of knowledge engendered by the social practices and productive organisation of different communities.

In this conceptualisation of the environmental question, environmental education implies changes in educational contents which go beyond the incorporation of a new subject matter or the integration of various subject disciplines in traditional curricula. The objectives of environmental education cannot be met in this context by teaching systemic methods, by interdisciplinary teaching practices or the inclusion of an integrating subject - ecology - within existing programmes. Environmental education demands the production of environmental knowledge and for it to assimilate and transform the disciplines which will have to create the concrete contents of the new "environmental" chairs.

According to the different conceptual approaches to environmental education and the social contexts in which it takes place, differing degrees of incorporation of the "environmental dimension" can be defined¹². "Restructuring contents from different subjects" and "reorienting the themes of study in the traditional disciplines" implies a project to produce and transform knowledge which will enable the preparation of environmental contents in various subjects, for university and postgraduate courses.

THE "ENVIRONMENTAL DIMENSION" IN THE NATURAL, TECHNOLOGICAL AND SOCIAL DISCIPLINES

The environmental question is neither an ecological nor a technical problem. Solving it cannot be reduced to having players in the economy incorporate ecological standards, or productive processes incorporate technological devices. The environmental "dimension" is built on the basis of a new perception of the relations between natural, technological and social processes, in which the latter have a major role in their genesis and means of resolution.

The production and incorporation of environmental knowledge in the development process and in academic practices implies a change in behaviour on the part of social players (business leaders, civil servants, planners, producers and consumers, scientists and technological experts) which influence the organisation of productivity, the perception and use of recognised and potential resources, the innovation of technological patterns for their exploitation and transformation, as well as society's consumer habits. Thus, environmental awareness promotes action and mobilises social forces which privilege the sustained enjoyment of resources and a reduction in pollution levels, improving environmental conditions and quality of life for the population.

The degree varies to which the "environmental dimension" has been internalised in the natural, technological and social disciplines. The social sciences are perhaps the most resistant, since they have incorporated theoretical paradigms which, starting out from natural philosophy and mechanistic praxeology, have crystallized into principles of legal arrangements, social contracts, an economic rationale and technological reasoning, thus legitimising the power structures, institutional arrangements and the organisation of productivity which constituted a social rationale against nature.

The incorporation of the environmental factor in the natural sciences is a more organic advance in the development of their traditional paradigms (ecological

developments in the field of biology). As for the technological disciplines, they have an instrumental role within the economic rationale, and their advances for adapting themselves to environmental objectives do not upset the physical, biological, mechanical or thermodynamic principles on which they are based. Incorporating ecological standards and internalising environmental costs when designing equipment and production methods changes technological design in order to generate cleaner technologies which are better adapted to ecological systems. Reorienting innovative technological practices thus generates new fields of research (biotechnology, ecological technology), but does not modify the physical and biological laws on which technological processes are founded.

Nevertheless, the construction of an environmental rationale implies new forms of social and productive organisation, of cultural values, new forms of meaning and of power balances made necessary by the transformation of the social disciplines which explain the ideological processes and the behaviour of the social players participating in these processes. In this way, the social movements affecting the cultural rights of these players and the appropriation of natural resources call for new legal conceptualisations; the internalization of environmental costs, the long-term considerations of sustainable development and the best use of natural resources call for a new economic paradigm. The construction of an environmental rationale thus implies the deconstruction of the mechanistic and utilitarian concept of economic processes, which has become an instrument for the centralised administration of productive resources and the control of social behaviours.

The environmental issue creates new perspectives for the sociological analysis of social movements, on the interests and values which are an incentive to awareness of the over-exploitation of natural resources, environmental deterioration, the loss of cultural values and the destruction of traditional practices; on the unequal distribution of the ecological cost of economic growth and on social participation in managing communities' resources; on the processes of technological innovation and productive organisation for economic self-management of resources; on the restructuring of the State so that civil society participates in political and institutional organisation, as well as in the decision-making process.

The incorporation of environmental knowledge made up of these social processes, within the natural and technological disciplines, goes beyond consideration of ecological criteria in the analysis of relationships between society, technology and nature and studies on geographical, ethnological and ecological disciplines (human geography, ecological anthropology, human ecology, socio-biology, ethnoecology, etc.). This socio-environmental perspective avoids reductionism, whether ecology-, energy-, biology- or physics-oriented, as well as geographical determinism in these disciplines. In turn, it results in more complex and concrete studies on how the processes which impact on a social context and

a geographic space articulate, integrating the social, political, economic and cultural conditions with the natural phenomena (ecological, geophysical) which impact on the productive processes of a social group.

The incorporation of these sociological aspects of environmental knowledge in the technological disciplines introduces new considerations for evaluating environmental impact and locating industry, for town planning, technological development and agricultural production. These environmental criteria reorient the innovation of productive processes towards appropriate technological systems, which integrate the ecological conditions of each region, together with the cultural values and conditions for the assimilation and appropriation of this technology by direct producers, by one community and by one country. In this sense, technological processes must guarantee the conservation of potential environmental resources for equal and sustained development, capable of satisfying basic needs and improving the population's quality of life.

The construction of an environmental rationale thus implies incorporating the sociological criteria of environmental knowledge in the training of economists, ecologists, technologists, engineers, business leaders and civil servants, with the aim of seeing these criteria become standard principles for professional practice.

INCORPORATION OF ENVIRONMENTAL KNOWLEDGE AT UNIVERSITY LEVEL

"Environmentalising" education is a more complex process than simply assembling scattered disciplines, obtaining their political and systemic integration and the collaboration of experts from different fields of knowledge to deal (by research or teaching) with a joint problem. The production and incorporation of environmental knowledge in universities gives in when it comes up against the theoretical structures, institutional barriers and interests of the different disciplines within which academia operates in its institutions of higher education. Such a transgression of the established university order not only requires awareness of the obstacles to be hurdled if already-existing knowledge is to be reorganised, but also reflection on the nature of the environmental knowledge which it is hoped to include in research and teaching practices, above all in the field of social sciences.

The incorporation of environmental knowledge in professional training must include the preparation of new contents for the curricula of courses, degrees and specialisations. Training in an environmental discipline implies the construction

and recognition of this field of knowledge, its transmission in the lecture room and its exercise in professional practice. The formation of environmental knowledge, with its scattered themes and specific specialisations, does not depend solely on the obstacles and the possible transformations in traditional scientific paradigms into which an environmental "dimension" is inserted. The forming of professional skills must be oriented with consideration to the geographic, cultural and political context in which they will have to be exercised, as well as to the particular environmental issues which will have to be addressed. On these conditions, knowledge will emerge which will have to be moulded into curricular contents, research strategies and teaching methods for environmental training.

From this critical future-oriented vision of the forming of environmental knowledge, it can be declared that its gestation has not reached sufficient maturity to permeate traditional scientific paradigms and academic structures, above all if we consider this knowledge from the historical, political, geographical and cultural perspective of Third World countries. Positive knowledge is yet to be produced for building and operating a productive rationale which incorporates the environmental potential in developing the productive forces and the cultural identities of our societies. Therefore, within the necessary relationship which research maintains with teaching for the incorporation of environmental knowledge in the academic field, possibilities for training processes are conditioned by theoretical practice. Teaching practices depend on the production of these new elements of knowledge in order to prepare curricula which include new "environmental paradigms".

To build environmental knowledge, there has to be a concept, a field of applications and a space for its practical objectification. It is formed through power relationships which hinder or encourage the gestation, emergence and fulfilment of its potential to change history, and the relationships between social groups and their natural surroundings. This environmental expertise emerges from a process which transforms knowledge in direct relation to the conditions of its application. The environmental rationale, as an alternative development strategy, articulates a theoretic rationale with a technical rationale which is an instrument for operating its principles. It is a social issue bringing with it new theories, social movements and institutional changes which impact on the concretion of the environmental concept.

The implementation of environmental education programmes and the concretion of their contents are dependent on this complex process whereby environmental knowledge will emerge and become established, ready for building into teaching practices and to serve as a guide for research projects. Nevertheless, the education process cannot expect a ready-made environmental knowledge paradigm, especially if the former is conceived as a training process connected with reorganising experiments in order to apply environmental principles in concrete

development programmes and self-management projects in communities for the integrated use of local resources. In this sense, the education process, linked with that of research and knowledge production, must be conceived as a laboratory where contents are systemised and experimented with as part of the environmental training process.

There is already an accumulation of knowledge related to the doubts which exist on the predominant social rationale, its knowledge paradigms and its technical instruments. This knowledge, when placed in the relevant context, can be incorporated into the curricular contents of the traditional university chairs in social sciences, without waiting for the production of a complete body of "environmental paradigms", fit to replace current contents. In this context, environmental education reaches different levels of "environmental intensity" which can be interpreted as varying levels of critical awareness concerning established knowledge.

The specificity of environmental knowledge and the conditions for its incorporation into university curricula depend on the particular conditions of each institution regarding the geographical, cultural and political environment, the institution's integration in the national educational, scientific and technological system and the internal politico-academic movements which define the commitments and relationships of academia with regard to society, the civil service, and the communities and various groups of interests in that society

Environmental training, when understood as the construction of a productive rationale based on the environmental potential of each region for decentralised and sustainable development, leads to the generation, and appropriation by communities, of the knowledge, skills and instruments which provide them with the capacity and empowerment to self-manage their resources, so that they are able to control their productivity themselves and enjoy the benefit of their own wealth.

KNOWLEDGE AND ENVIRONMENTAL EDUCATION

GLOBALISATION AND ENVIRONMENTAL EDUCATION

The objectives of sustainable development call for a change in the values which guide the behaviour of economic players and of the society around them, as well as the transformation of knowledge and technological innovations for solving environmental problems. The creation of public awareness, the incor-

poration of the environmental factor in the education system, and training of high-level human resources thus appear fundamental for orienting and directing environmental policies.

Globalisation is transforming the principles of environmental education. Economic neo-liberalism, which is incapable of giving ecological resources and the environmental services of nature their true value, also leads to the devaluation of knowledge. The utilitarianism, pragmatism and over-concentration on efficiency which govern the rationale of the world economic order are interfering with the values of environmental education, which give new orientations to knowledge, development and human existence.

Educational institutions and the public university are faced with economic policies which reduce education, the production of knowledge and professional training to their market value. This has made it difficult for learning contents in educational institutions to be transformed to incorporate the environmental dimension which will ensure that human resources trained are capable of understanding and solving the socio-environmental problems of our time.

In this manner, environmental education and training, conceived since the Tbilisi Conference as a process for building interdisciplinary knowledge and new holistic methods for analysing the complex socio-environmental processes emerging from global change, are being reduced to creating public awareness and the formulation of training "components" which are simply inserted into existing environmental management projects governed by criteria of economic profitability.

Nonetheless, the environmental crisis engenders new knowledge via conceptual strategies aimed at building a new social rationale governed by principles of democracy, ecological sustainability, cultural diversity and social justice.

ENVIRONMENT AND KNOWLEDGE

The globalisation of socio-environmental deterioration has made it essential for various scientific disciplines to internalise ecological values and principles ensuring the sustainability of the development process. In this context, new methodological approaches have appeared to address the multiple causes and the potential for synergy of a set of physical, biological, technological and social processes. In their articulation, these processes form complex systems which surpass understanding and action on the basis of single-discipline knowledge paradigms.

The environment appears as an expression of the different orders of reality which have been externalised (denied), and of "knowledge subjugated" (according to Foucault) by the development of modern science. The environment contains processes both physical and social which are dominated and excluded by the

economic rationale. These include over-exploitation of nature and socio-environmental deterioration; loss of biological and cultural diversity; poverty associated with the destruction of those resources which are the heritage of communities, and dissolution of ethnic identities; unequal shares in the ecological costs of growth and the deteriorating quality of life. At the same time, the environment appears as a new potential for productivity, as a result of the articulation of ecological productivity with technological innovation and cultural organisation.

The environment is not, therefore, the atmosphere surrounding biological species and populations; it is a sociological (and not biological) category relating to a social rationale consisting of behaviours, values and knowledge, as well as of new productive potentials. In this sense, the environment of the economic system is constituted by the ecological conditions for productivity and the regeneration of natural resources, and also by the thermodynamic laws on the decline of matter and energy due to the productive process. The environment establishes potentials and limits for the forms in which resources are used and the rhythm of their use, thus conditioning the processes of capital valuation, accumulation and reproduction.

In the scientific area, the notion of atmosphere arose explicitly in the definition of the life phenomenon, as imported by Lamarck from Newtonian mechanics, as an intermediary fluid between two bodies. This later gave rise to the notion of environment, conceived as a system of connections around centres organising biological, economic and cultural processes. Thus, the environment complements subjects of study such as evolutionary biology, structural anthropology and political economy. It is this mechanistic notion of the environment which has been assimilated in systemic approaches. Whence their ideological meaning: the environment vanishes, along with the specificity of the sciences and of social conflicts, under the cloak of interdisciplinary practices and environmental development planning.

The environmental concept returns from its exile, challenging existing knowledge and recovering a strategic sense in the political process of suppressing the externalities of development (the exploitation of nature, environmental deterioration, social marginalisation) which persist in spite of the aim to ecologise production, capitalise on nature and produce holistic and interdisciplinary knowledge.

The environment is not, therefore, a subject lost in the process of differentiating and specifying the sciences, nor a space which can be re-entered through exchanges between the disciplines of existing knowledge. The environment is this unstoppable gap in knowledge, the place where the desire to know makes its nest, engendering a non-ending movement towards the production of knowledge to found a new social rationale on principles of sustainability, justice and democracy.

INTERDISCIPLINARITY AND RELATIONS BETWEEN SOCIETY AND NATURE

The environment has generated new holistic approaches and a search for interdisciplinary methods which are capable of integrating the fragmented perception of reality which the development of modern science has left us. Nevertheless, it has not been easy to travel the road between the interdisciplinary *dictum* and the *fact* of integrating reality, which involves internalising nature and new potentials within a new production concept and legitimising interdisciplinary research projects and cross-sectoral practices in environmental management.

The interdisciplinarity required by environmental knowledge means integrating natural and social processes of varying material orders. This integration depends on the conditions of their epistemological and political realisation, meaning that we are dealing with a question of power which spans different sciences and fields of knowledge. New conceptual strategies will therefore have to be formulated to build a new theoretical order and a new productive paradigm to challenge the economic and instrumental rationale which has legitimised the homogenising hegemony of modern times.

Interdisciplinarity from the environmental perspective brings general formulations tending towards a holistic and integrative view of reality and of the development process. Beyond its attempts to conceive complexity by ecologizing our view of the world - by generalising ecology, since it is "the science of interrelations par excellence" (Morin, 1980) - it seeks to define the environment via a set of relationships and combinations such as society-nature; population resources; environment-development, which define (at this general level) the integrative character of socio-environmental processes.

Nevertheless, these general categories and the outlines of global themes, while indicating a new view of the interrelations of various processes, are not sufficient to concretise interdisciplinary research methodologies. In practice, programmes conceived within these generic categories can easily slide into theoretical reductionism by adopting supposedly transdisciplinary paradigms in order to cross the bridge between the natural and the social. If this occurs, the social can be absorbed by ecologist approaches and the biological angle, or by a social dynamism unifying bio-social processes according to their energy flows. In this way, sight is lost of the specificity of physical, biological, cultural, economic, political and technological material processes which are part of complex socio-environmental systems.

Complex systems theories have opened up various methodological channels for integrating these ontologically differing processes. Thus, the General Systems Theory (von Bertalanffy, 1968) unifies the differing processes via their structural

homologies. On the other hand, one school of thought on complexity places the ontological complexity within a process of self-organisation of matter which ranges from the physical to the social (Morin, 1977). Looked at from the perspective of the thermodynamics of open systems, the barriers which separate the sciences and their areas of knowledge are weakened. Whence emerges an interdisciplinary method which seeks to hierarchise and articulate the different processes (subsystems) which interrelate within the structure of a complex system, defining the condition of their environment in an iterative process contrasting research hypotheses with reality (Garcia, 1986, 1994).

To analyse socio-environmental systems it is necessary to be able to articulate processes of differing material orders, which cannot be reduced to a transdisciplinary paradigm or a generalising or unifying approach to knowledge. The research approach to such systems requires the preparation of conceptual categories - as well as the definition of specific themes and issues - which can apprehend concrete processes. This analysis of the complex-concrete refers to the theoretical paradigms which go halfway towards apprehending a reality represented by theoretical concepts and practices, and not to an inductive process based purely on the facts of empirical reality.

The above raises the challenge which interdisciplinarity represents for the study of the relationships between natural and social processes, the response to which will depend on the capacity of the sciences to articulate with one another and offer an integrated view of reality. Nevertheless, putting all the sciences together would not result in a paradigm of environmental sciences. Even though complementarity is possible between certain disciplines, these also have their own specific theoretical rationales, and their own fields of knowledge, which are not easy to articulate around socio-environmental problems¹³.

Interdisciplinary analysis of the relations between society and nature is called for by the very nature of socio-environmental processes as complex systems. On the one hand, a multi-dimensional reality has to be understood in which non-linear processes - of differing material, spatial and temporal orders, and different levels of interdependency - come together. As a result, new processes emerge providing different synergies and feedback, both positive and negative.

On the other hand, the environment raises the problem for the sciences of transforming their traditional paradigms and incorporating a new, complex environmental "dimension". This emerging environmental knowledge is not univocal, neither is it ready as it is to be absorbed into the different disciplines. Environmental contents have been creating themselves via ideological processes which have found expression in a range of dispersed and heterogeneous arguments (e.g. conservation of the environment; sustainable development), but they are taking on shape and reality around each of the established sciences and disciplines.

In this sense, the bodies of theories, and the concepts and methods of the new "environmental" disciplines emerge after a process via which theories are produced responding to the specific problems experienced by the sciences. It is these environmental ramifications of knowledge which make it possible to embody new elements in an interdisciplinary approach capable of integrating processes of differing material orders with a view to building a new theoretical and productive rationale.

CONCEPTUAL STRATEGIES AND DIALOGUE BETWEEN FIELDS OF EXPERTISE

The emergence of the environmental question in the field of development and of interdisciplinarity in the field of knowledge make their appearance as two contemporary issues responding to a crisis in the economic and theoretical rationale of modern times. Development takes on a complexity which exceeds understanding and resolution when looked at from the angle of one discipline or sector. This makes us aware of the fragmentation of knowledge with which modern science has left us, and of the urgent need for a systemic approach and holistic knowledge capable of reuniting a reality split apart by ecological destruction and social inequality. Despite the above, interdisciplinarity has acquired a technical nature in refunctionalising existing contents -contents which were the results of a policy of adjustments aimed at rearranging reality as it existed.

Environmental knowledge does not constitute a homogeneous field of logic to be assimilated by the different scientific disciplines. Environmental knowledge is the result of critical reasoning, and takes shape in specific ecological and socio-cultural contexts, upsetting established and institutionalised paradigms of knowledge. It is knowledge which is being constituted in connection with the object and the range of disciplines in each of the sciences. In this process, the "environmental" in each area of science is defined, thus transforming the concepts and methods of that area and opening up spaces for the interdisciplinary articulation of environmental contents.

For the study of socio-environmental systems, *Environmental interdisciplinarity* does not, therefore, refer to the articulation of existing sciences, the collaboration of different specialists from the different disciplines or the integration of select fragments of reality. We are dealing with a process of social reconstruction via an environmental transformation of knowledge.

Poverty, deforestation and erosion, as well as air pollution rates, can be observed from reality. Nevertheless, the perspective from which the causes of these processes are explained and from which alternative actions are proposed de-

depends on conceptual strategies requiring reformulation of the ideologies, values, knowledge, expertise and scientific paradigms which generate the observable facts of reality. For this reason, environmental expertise cannot be achieved by gathering together contents which have externalised and denied the environment. The environmental argument questions the paradigms of the established sciences in order to internalise expertise to build a new social rationale. This expertise is neither homogeneous nor unitary. Around each science an environmental expertise is forming, upsetting concepts and methods and generating new theories, new disciplines and new techniques.

Environmental expertise goes beyond the range of the scientific rationale and the objectivity of knowledge. It is taking shape within a new theoretic rationale, from which new conceptual strategies are emerging. This leads to the re-enhancement of a field of knowledge which does not claim to be scientific. Opposing the determination to resolve the ecological crisis by the "rational management of the environment" are challenges to the reasonableness of the scientific argument (Feyerabend, 1982). Environmental knowledge lives with uncertainty, and incorporates axiological plurality and cultural diversity in forming contents and transforming reality in practice.

The environmental rationale includes new theoretical principles and new instruments for reorienting the ways in which nature is managed for production. This rationale is upheld by values (quality of life, cultural identity, meanings of existence) which do not aspire to a scientific status. A dialogue thus opens between science and know-how, tradition and modernity. This implies processes of cultural hybridisation (Garcia Canclini, 1990), in which value is restored to indigenous knowledge and popular wisdom produced by different cultures in their co-evolution with nature.

Environmental expertise raises the question of cultural diversity in knowledge of reality, but also the problem of appropriating knowledge and know-how within different cultures and ethnic identities. Environmental expertise does not only generate more objective scientific knowledge with a wider scope; it also produces new social meanings, with new forms of subjectivity and of positioning with regard to the world. This is expertise which does not elude the power question, or producing civilising meanings.

The environment, as a condition for sustainability, must be assimilated into various theoretical paradigms in order to internalise the ecological costs of economic growth, the economic rationale of traditional societies and the conservationist values which guide human behaviour. Environmental expertise thus disturbs scientific knowledge in order to carry out its technical role of refunctionalising economic and technological processes, to adjust them to the aims of an ecological balance, social justice and cultural diversity.

In its turn, environmental knowledge is part of a process of building a new productive rationale and new civilising processes. In this sense, environmental knowledge appears as a process re-enhancing the cultural identities, traditional practices and productive processes of urban populations, peasants and indigenous peoples. It opens up new perspectives to the subjective reappropriation of reality, and a dialogue between knowledge and know-how in a meeting of the traditional with the modern.

Environmental expertise recognises the cosmology and identity of different peoples as part of their cultural forms for appropriating their heritage of natural resources. In this way, it is part of the various interests which make up the conflictive area of the environmental. Whence appear new forms of subjectivity in producing knowledge, defining meanings for existence, and judging the quality of life of individuals in various cultural contexts. In this sense, the environmental crisis motivates new conceptual strategies rather than the reinforcement of the prevailing scientific rationale.

ENVIRONMENTAL EXPERTISE AND THE SUSTAINABILITY ARGUMENT: KNOWLEDGE AND UTOPIA

The environmental crisis opens up new spaces for participation and democratic governability in the social management of the development process. The sustainability argument thus unfolds in an area of theoretical and practical strategies for appropriating nature, raising the question of power and of power in knowledge, of which the strategies for knowledge and environmental education are part.

Faced with the purpose of homogenising reality which emerges from the capitalization of mankind, culture and nature, the construction of an environmental rationale establishes a social order founded on ecological productivity and cultural diversity. This view is close to an epistemological project, which instead of subsuming knowledge in an aim to unify the sciences, opens the way to the production of endless knowledge, to a dialogue between values and knowledge, and the hybridisation of traditional practices with modern knowledge.

The need to generate interdisciplinary methods to analyse complex socio-environmental systems, together with the demand for knowledge to be democratised as the basis for the projected self-management of sustainable development, has motivated the birth of environmental expertise. In contrast with the unified, mathematical, quantitative and exact knowledge of formal science, the heuristic paradigms of *post-normal science*¹⁴ seek to address the synchronic and synergetic effects which emerge from the articulation of natural and social processes, and which cannot be measured and do not yield to market values.

This form of knowledge is in line with a process of subjective and collective appropriation which can lead to participation in decision-making, where people stop being controlled (alienated, manipulated) by blind market mechanisms and by scientific laws governing automatic processes which are way above their heads and beyond their understanding.

These approaches to the emerging complexity are forming new theoretical paradigms capable of integrating the relations linking the life processes, technology, culture, economy; the symbolic, and the strategists of power, so as to build a new social and productive rationale. This environmental rationale guides the reconstruction of contents, know-how and practices on the basis of a critical appraisal of the formal and instrumental rationale of modern civilisation.

Nevertheless, economic globalisation, and the predominant reasoning behind sustainability, in its schizophrenia and institutionalised blindness, devalue these methodological efforts. The proposal to capitalise on nature as a solution to the environmental crisis ignores the limits established by ecological and thermodynamic laws, as well as the orders of reality and human values which are resistant to being reduced to market laws.

Knowledge as a project to understand the world has been co-opted by practical interests; expertise is reduced to an aim to solve environmental problems via the use of technological and economic instruments. This is the direction in which environmental communication and information projects are advancing, seeking to establish an interdisciplinary dialogue and a common language. The specificity of expertise and knowledge dissolves in an undifferentiated flow of data, and in a common awareness which leaves no room for the differing social interests in appropriating nature, or for the theoretical and strategic meaning of the concepts. The aim to reach social consensus via a communication project wipes out utopia and knowledge.

Environmental expertise establishes a particular relationship between reality and knowledge. It not only seeks to complete knowledge of the existing reality, but also orients the construction of another social organisation which would not be the projection towards the future of current trends. It is in this sense that *environmental utopia* opens up new possibilities on the basis of recognition of ecological and technological potentials, where moral values, cultural knowledge and scientific knowledge of nature come together in building a new social rationale.

Environmental expertise goes beyond simply environmentalising existing knowledge - i.e. internalising an environmental dimension which would complete the scientific rationale epic by achieving objective and unitary knowledge of reality. Environmental expertise transforms knowledge in order to build a new social order. It is committed to utopia, via new ways of positioning historical subjects with regard to knowledge. This is an expertise which not only articulates existing

sciences, but which forges new ideologies and theories which produce meanings and mobilise social actions to build another social rationale. The latter not only generates new knowledge, but leads to a dialogue between areas of knowledge where new forms of social organisation and subjective appropriation of reality are forged through strategies for power through know-how and knowledge (Foucault, 1980).

Environmental expertise constitutes new identities, interests and meanings, where the social players emerge who mobilise the transition towards an environmental rationale. Here, environmental knowledge is produced in a relationship between theory and praxis. The act of knowing is not confined to its objective relationship with the world, but is open to the production of civilising meanings. The quality of life as a purpose for the fulfilment of man implies a *savoir vivre* in which the values and meanings of existence define vital needs, cultural preferences and people's quality of life.

KNOWLEDGE AND ENVIRONMENTAL TRAINING

The environmental question is a social issue which surpasses the task of the universities, the retraining of professionals or the adaptation of higher education to the global changes of our time. The transformation of contents implied by environmental knowledge go beyond the incorporation of ecological components to adapt traditional courses to the demands of sustainable development. Environmental expertise, which is not a new sector of knowledge, affects all disciplines and all levels in the educational system.

Universities must open up to a research process involving the participation of the communities and populations where the environmental problems exist, grasping the problems at 'grass roots' level, and returning the resulting expertise to these communities and populations for its application in programmes and projects for environmental management. In order to boost the productive forces of these communities, and their capacity to self-manage their development processes, universities must incorporate themes such as the rescue of indigenous and popular wisdom, the amalgam of traditional practices with modern technological skills, and the transmission of environmental expertise and its assimilation.

Environmental training challenges traditional methods of teaching, establishing new goals for transmitting knowledge where there is a close relationship between research, teaching, and the dissemination and expansion of knowledge. Environmental education calls for new attitudes on the part of teaching staff and students, new social relations in order to produce environmental expertise, and new ways in which subjectivity takes its place in teaching practices.

The university must play a fundamental role in this process of transforming knowledge and social changes. This requires an area of academic autonomy and freedom of thought, time for knowledge to mature and new theories to be devised, as well as for systemisation and for experimenting with new research and training methods. These cannot be substituted by technical training of short duration, the mercantilist valuation of knowledge or the spontaneity of environmentalist activism.

Environmental training requires passionate commitment to the production of new knowledge; it means restoring the critical and suggestive role of knowledge; creating efficient expertise and inventing utopias which will have to lead the processes of historic change towards ideals of equality, justice and democracy; creating new knowledge, methods and techniques for building a new social rationale, in which cultural values and the potentials of nature, disdained by the unrelenting productivity of modern society, orient the rebirth of humanity in the new millennium.

THE PEDAGOGY OF THE ENVIRONMENT¹⁵

ENVIRONMENTAL EDUCATION AND SUSTAINABLE DEVELOPMENT

The sustainable development argument is not homogeneous, but stamped and differentiated by the *environmental interests* of various sectors and social players. Thus, the educational process will transmit and disseminate the principles and values of the different views and proposals for achieving sustainability. Environmental education involves creating awareness of emerging socio-environmental processes which mobilise the citizenry to participate in decision-making. It also involves the transformation of research and training methods via a holistic viewpoint and interdisciplinary approaches. Nevertheless, the institutionalisation of environmental education—as of education *tout court*—leads to the adaptation of awareness, attitudes and capacities in accordance with the predominant paradigm of sustainable development.

Popular education has created a critical perception of the education process, establishing active participation in the development of knowledge and its application in strategies for endogenous development for the improvement of living conditions in each community. Popular environmental education is thus part of the above mentioned educational tradition, which is critical of the dominant development model, indicating the construction of a new social rationale. In this

context, the concept of environmental training is relevant for understanding the transformation of reality which is inferred by the environmental issue of development. Training implies a more organic and reflexive process of reorganising expertise and society by building new abilities for understanding and intervening in changing the world.

Training goes beyond a process which seeks to recycle and adapt professional skills to the new ecological roles and standards of the productive processes and to the production and control of new technology. At a given moment, it goes beyond the passive assimilation and non-critical reproduction of a homogeneous development model which is called into question by the interests and perspectives defining the field of sustainable development.

Environmental training thus takes on a double meaning: it is a process creating new values and knowledge related to the transformation of reality for building environmental training, which is understood as a socio-economic structure which internalises the ecological conditions of sustainable development and is oriented towards building an environmental rationale. In this context, the concept of environmental training articulates ideological and conceptual training with the processes of producing and acquiring knowledge and expertise, within a project for social change.

THE ENVIRONMENT OF PEDAGOGY

The environmental issue, as a symptom of the crisis of modern civilisation, establishes the need for creating awareness of its causes and the means to solve them. This is done via an educational process which ranges from formulating new world views and collective imaginaries to forming new skills; from reorienting the values which guide man's behaviour towards nature to building new types of development.

Pedagogy, the science of education, has had to redefine its basis and reorient itself in view of the challenge to the established sciences inferred by the environmental crisis, but also in order to produce and disseminate the new expertise and knowledge which will have to enable the construction of a new social organisation which respects nature, and a productive rationale founded on the potentials of ecosystems and cultures. The above implies revisiting pedagogical methods, not only in the light of the social conditions of access to teaching and the domination exercised via knowledge systems and exchanges of expertise, but also in the light of the new conceptual paradigms and the values which are the reasons for rebuilding the world.

Environmental education has its place in this historic transition which ranges from challenging the dominant social models (economic neo-liberalism, socialism) to

the emergence of a new society, oriented by democratic values and the principles of an environmental rationale. The need is therefore established for a critical review of the functioning of education systems, as also of pedagogical methods and practices.

Pedagogy must respond to the goals which have been set for it by the emergence of the paradigms of complex problems, which have come to shake the foundations of "normal" science with its separation of knowledge into restricted subjects. This compartmentalisation resulted from the need to analyse and objectivise the real world so as to understand it completely, control nature and society, and achieve operational efficiency in transforming resources. The environmental approach to knowledge opens channels for understanding the articulation of different processes and rationales which make up the concrete reality upon which we act in daily life and which affect the conditions in which society exists.

Environmental education promotes new attitudes in the social subjects and new criteria for decision-making by governments, guided by principles of ecological sustainability and cultural diversity, internalising them in the economic rationale and in development planning. This means educating to develop critical, creative and prospective thinking, capable of analysing the complex relations between natural and social processes in order to operate in the environment with a global perspective, which is nevertheless differentiated by the various natural and cultural conditions which define the particular environment concerned.

The environmental question creates a new view of expertise, which emerges alongside the paradigms of complex problems. It also establishes a new system of values which make up an environmental ethic and which have their effects on expertise - as regards social participation in building knowledge - and on pedagogy - as regards the transmission of this expertise in forming new mentalities, moralities and skills.

The incorporation of the environmental perspective in the teaching/learning process raises questions on the structure of knowledge and the education system and their position within the *ideological machinery of the State* which reproduces the unequal, unsustainable and authoritarian model via ideological training which moulds social subjects and controls nature so as to adjust them to mechanisms and roles which are institutionalised by the prevailing social structures.

Environmentalism appears as a process of civic emancipation and social change, with a call for grass-roots participation in decision-making and in self-managing their living and production conditions, questioning the regulation and social control which is exercised via corporate power and centralised State planning. These demands for democracy in resource management are also being made concerning the management of educational services.

Popular environmental education comes to join the proposals for critical popular education and liberation pedagogy (Freire, Fals, Borda), with the purpose of opening new channels for building, transmitting and appropriating expertise. This establishes the need to internalise the concept of environment, the analysis of complexity and interdisciplinary methods within the science of education, thus transforming pedagogical practices.

THE PEDAGOGY OF THE ENVIRONMENT

Environmental education calls for a new pedagogy, due to the need to orient education within the social context and within the ecological and cultural reality where the subjects and actors of the educational process are located. On the one hand, this implies forming the expertise, awareness and responsibilities which take their shape as a result of concrete experiences in the physical and social environment, and proceeding from there to seek solutions to local environmental problems. All this means questioning the tendency to adopt homogeneous concepts of reality by imitating and applying scientific, technological and social models generated in Northern countries to solve environmental problems in the South.

Environmental pedagogy implies teaching which is derived from concrete praxis with the surrounding environment. Nevertheless, this must not lead to empiricism or pragmatism at any price, but to promoting science and theory as the foundations for rebuilding reality. The environmental crisis is leading to transformations in knowledge because of a new perception of the relations between ecological, economic, social and cultural processes, but also because of the different political interests which mobilise the reconstruction of expertise and the re-appropriation of the environment. This promotes changes in teaching contents, in the social relations of knowledge production and the social practices for transmitting expertise which form the object and the practical field of pedagogy.

Pedagogy of the environment implies taking the environment in its physical, biological, cultural and social context, as a source of learning and a way of putting theories into practice on the basis of the specific surroundings. However, environmental expertise is not to be extracted from empirical reality. It aims to take a new look at the world and rebuild it using conceptual and political strategies based on the principles and foundations of an environmental rationale which have been banished and marginalised by the dominant paradigms of science since they are considered not to be pure knowledge, and externalities of the development process. The understanding of these processes of domination exercised through knowledge and learning, linked to a concept of reality as complex systems integrated by differentiated processes of a natural and cultural order, are material for environmental pedagogy. This leads to internalising environmental

principles and values in the contents, approaches and practices of the educational process.

THE PEDAGOGY OF COMPLEX REASONING

Together with criticism of the centralised economy and of the hegemonic principles of the market for measuring the value of things, environmental knowledge questions the positivist programme in the field of science, obsessed by the unity of the sciences and the unification of knowledge, and opens up new perspectives for differentiating expertise. In this context, new methods for studying complex systems are emerging. This is setting new goals for organizing programmes for scientific research and professional training. But the question which has to be asked of pedagogy is, "How to teach complexity at primary school level ? " .

Genetic epistemology (Piaget) opened up an important field of study for understanding the psycho-genetic process by which the child acquires concepts from the simplest to the most complex. The goal set for environmental pedagogy is that of training men and women, from childhood to youth, in a critical and constructive spirit, stimulating their creativity before exposing them to the designs of a computerised world, armed with *bits* (in both senses) of information, linked and chained by technology to a superhuman economic order. The aim is to teach them to perceive and internalise the complexity, diversity and potentials of the environment in the face of a fragmented reality which is being used to further the exploitation of nature and the domination of humanity.

In this context, the pedagogy of complex reasoning would have to teach individuals to think of socio-environmental reality as interrelated and interdependent processes, and not as isolated, fixed facts or data. For this, skills will have to be created in order to understand the multiple causes of these facts, and to give environmental awareness and social action their rightful place in the changes which will have to be made to the current world to lead it towards sustainable, democratic and equitable development.

Education for forming the values, attitudes and skills for understanding and acting within a world conceived as complex socio-environmental systems implies the need for research on the problems of learning about complexity adapted to the different stages of development of the student's learning abilities, within his or her own cultural and environmental context. This opens the way for environmental pedagogy which is capable of designing forms of intervention and interaction between teachers and students, with differentiated and specific programmes for the different educational grades and levels.

The pedagogy of complex reasoning must start with the intervention of the primary school teacher, who will reformulate the contents of his subjects so that they

include a space for convergence and complementation with the socio-environmental problems of the current world as the focus. (Even at this level, the global and individual environment offers study objects which orient towards an integrative view of reality.) It must continue to the higher levels of university studies, where teaching and research teams will have to redefine the curricular structures and contents of study programmes with a view to environmentalising traditional knowledge paradigms and higher education programmes.

THE PEDAGOGY OF INTERDISCIPLINARITY

Environmental pedagogy calls for the application of a holistic approach and complex thinking. Interdisciplinarity has been converted into a *mot d'ordre*, without rigorous analysis of its conceptual meaning or its methodological efficiency. An education aimed at breaking the process whereby knowledge is biased and at promoting a more integrative view of the world, open to the complex phenomena of reality, does not in itself imply interdisciplinary training. The latter is only considered at the level where education is in the field of the scientific disciplines, and where professionals are being trained within established knowledge paradigms, which is to say, as from college and university levels.

In primary and secondary teaching, formative and informative contents are imparted which doubtless are "fall-out" from the scientific subjects, but do not involve training according to disciplines within those scientific paradigms. While these subjects (mathematics, the national language, natural and social sciences, etc.) are taught in a compartmentalised manner, their contents are more informative and more likely to inculcate basic knowledge and values than of a nature to transmit theoretic paradigms or form scientific disciplines.

Traditional teaching fails not so much because of its disciplinarity, as because it neither stimulates nor orients the learning, inquisitive and creative skills of the student, and is detached from the problems of its socio-cultural and environmental context. It is therefore necessary at these levels to encourage critical and participatory complex thinking.

Interdisciplinary training becomes meaningful as it rises through the education levels towards higher education. This does not only imply the fusion and integration of knowledge originating in the different sciences, but also the reformulation of their knowledge paradigms on the basis of the concrete socio-environmental problems which will challenge the abilities of the fledgling professionals.

The goal of interdisciplinarity is not so much to leave the provincialism of disciplines behind in order to cross the frontiers of knowledge and succeed in becoming citizens of a unified and homogeneous scientific order. The idea is not to

install free exchange of learning products or to eliminate tariff barriers for the import and export of knowledge, but to build new territories of knowledge, illuminated by the multifaceted light shed by the beacon of the environmental perspective on the reconstruction of the world.

REFERENCES

- 1 The original text, entitled 'Las Ciencias Sociales y la Formacion Ambiental a Nivel Universitario', was published in the 'Revista Interamericana de Planificacion, XXI (83-84), 106-126, 1987.
- 2 UNESCO, 1980, 'Environmental education in the light of the Tbilisi Conference: Education on the Move', pp.22-23: "Attention has been focused primarily on the problems of the conservation of natural resources and the preservation of animal and plant life... The view of the environment equating it with its biological and physical aspects has given way to a wider conception which takes into account its economic and socio-cultural aspects and emphasizes more clearly the correlations between them... The very concept of environment, reduced solely to its natural aspects, ignores both interactions between the various elements and the contribution social sciences could make to understanding and improving the human environment... Although the biological and physical aspects admittedly constitute the natural basis of the human environment, the socio-cultural and economic dimensions define, for their part, the lines of emphasis and the conceptual and technical instruments that enable man to understand and make better use of the resources of the biosphere in satisfying his needs."
- 3 In Latin America there are very few environmental education programmes in the social sciences, which is symptomatic of the gap between the actual conceptualization of the environmental issue of development and its incorporation into research and higher education programmes.
- 4 Rudolf Hundt, 'The Content of University Teaching on Environmental Problems', p. 41, 'Universities and Environmental Education', UNESCO, Paris, 1986.
- 5 Vessuri H., 1986, "Antropologia y Ambiente", in Leff, E. (Coord.), "Los Problemas del Conocimiento".
- 6 Gutman, P., 1986, 'Economia y Medio Ambiente', in E. Left (Coord.), 'Los Problemas del Conocimiento' op.cit.
- 7 Boisot, M, 'Disciplina e Interdisciplinaredad' in L. Apostel et al., "Interdisciplinaredad", ANUIES, Mexico, 1975, pp 99-109.
- 8 UNESCO 1980, 'Environmental education in the light of the Tbilisi Conference (Education on the move)', op.cit.
- 9 Unesco-UNEP, 'Environmental Education Series, No 14', p. 12,
- 10 Ibid, p. 15
- 11 Rowland P. Moss, 'The integration of teaching on environmental problems', in 'Universities and Environmental Education'; Unesco, Paris, 1986, pp. 75-76.
- 12 Unesco, 1980, 'Environmental education in the light of the Tbilisi Conference', op.cit., pp. 39-40: "These procedures range from the mere introduction of an environmental component

into the different traditional subjects to the total integration of those subjects around a project for community activities relating to the environment, and include an approach combining several disciplines with some affinities as regards their ideas and methods... Among the procedures for incorporating environmental education... mention should be made of the reorientation of the subject-matter in the traditional disciplines ... But the most suitable approach is no doubt to reappraise and restructure the whole content of the different subjects... Lastly, the most complex but perhaps also the most satisfactory method of achieving the aims of environmental education involves doing away with traditional compartmentalization and integrating the content of the various curricular subjects within a framework related to the main environmental problems."

19. Abbreviated version of the author's presentations at: the International Congress 'Extratexias e Practicas en Educacion Ambiental' organized by the Universidade de Santiago de Compostela and Bradford University (UK) (Santiago de Compostela (27-30 June 1996); the International Congress "Challenges of Sustainable Development" for Engineers and Scientists (Amsterdam, 22-25 August 1996); and the III Junta Consultiva sobre Postgrado en Iberoamerica (Havana, 26-29 November 1996). Published in 'Formacion Ambiental', Vol. 7-8, Nos. 17-18, March 1997, pp. 19-23.
13. Leff, E., 1994, ' Sociologia y Ambiente: Formacion Socioeconomica, Racionalidad Ambiental y Transformacion del Conocimiento', in Leff. E (Coordinator), in 'Ciencias Sociales y Formacion Ambiental '.
14. Funtowicz & Ravetz, 1993, 1994.
15. Presentation to the Congress 'Pedagogia 95', Havana, Cuba, 6-10 February 1995. Published in 'Formacion Ambiental', Vol. 6, N° 12, pp. 18-21.

Educating for a Sustainable Future: Public Awareness and Understanding: the Fuel for Change

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INTRODUCTION

During the past few years there has been an explosion of information about the environment. We now have unprecedented knowledge about how ecosystems work, how economic activity affects natural processes, the importance of biodiversity, the nuances of global warming, and the other many environmental and related social challenges we face. A major challenge facing educators, policy-makers in the public and private sectors, and concerned corporate leaders is to translate this scientific information into a form that can be used for workable policies for environmental protection and human betterment.

Since the late 1970s there has been an evolution in thinking in terms of environmental policy. During the early years of the environmental movement the emphasis was almost exclusively on "getting the science right". Beginning perhaps with Rachael Carson's classic book *Silent Spring*, documenting the effect of DDT on bird populations, the model was to do the most exhaustive scientific study possible of a particular problem, present the results to the public, then wait for an effective public policy response. This worked for well for specific pollutants such as DDT whose adverse effects could be directly seen. *Silent Spring* meticulously documented the adverse effects of DDT on eggshells and the resulting decline of songbird populations. After the publication of the book, there was a strong public outcry and the chemical was banned in the United States.

Unfortunately other environmental issues have not proven to be so clear cut or so easy to address as the DDT problem. It is not enough to simply document the science of complex environmental problems such as acid rain, global warming or biodiversity loss. These issues require a deeper level of public understanding and more careful and well-thought-out plans to engage the general public. An

example of good science that had little or no policy impact is the massive study on acid rain conducted by the National Acid Precipitation Assessment Project in the 1980s. This ten year study represented the best acid rain science at the time but was so full of scientific jargon and so couched in qualifications that it had little impact on public policy. Based partly on the acid rain project's shortcomings, and learning from the mistake of not including a social science component in that project, the Intergovernmental Panel on Climate Change (IPCC) established in 1988 by the United Nations Environmental Programme (UNEP) and the World Meteorological Organisation (WMO) has been much more successful in building scientific consensus and public and political support. The IPCC has not been without controversy, but it has done a remarkable job in educating both scientists and the general public about the causes and the consequences of global warming (Grubb 1996, Masood 1996). Whether this success can be translated into effective policies to curb greenhouse emissions is a question that has not yet been answered, but the educational model of IPCC can already be deemed a success. The IPCC has already become a model for other efforts to deal with global environmental problems such as biodiversity loss.

Although it remains to be seen whether the educational effort of the IPCC is translated into political action to curb greenhouse emissions, it does show that it is possible to build public consensus about an exceedingly complex environmental problem. The lesson of the acid rain panel failure and IPCC success so far is that it is not enough to merely present facts and assume that the correct public response will be forthcoming. In a review of Paul and Anne Ehrlich's book *The Betrayal of Science and Reason* (Ehrlich and Ehrlich 1996) Daniel Sarewitz of the Institute for Environmental Education in Boulder Colorado writes: "There is little reason to believe that scientific knowledge has ever, in the short term, dictated political change in society, unless the science is in phase with existing cultural trends" (Sarewitz 1996: 198). Environmental education, if it is to be effective, must be placed within the much larger on-going debate about social values, ethics, and the place of the individual in an increasingly complex and contradictory modern world.

My area of interest is economic education. Economic education is also facing serious challenges and is being transformed to become more relevant to the concerns of the twenty-first century. This will require including environmental education as an essential part of economic education. Understanding the effectiveness of markets in allocating resources *and* understanding the limits of a simple-minded reliance on markets to solve environmental problems should be, I believe, a key part of environmental education.

ECONOMY AND ENVIRONMENT: A PRE-ANALYTIC VISION

The economist Herman Daly (1996), drawing on his experiences at the World Bank, uses the term "pre-analytic vision" to distinguish between traditional environmental economists and ecological economists. Traditional environmental economists begin their analysis of environmental problems with a view that the natural environment is only a source of inputs to be allocated for economic production. Ecological economists, on the other hand, begin their analysis with a pre-analytic view of the economy as a sub-system of the larger human society and institutions and of the still larger biophysical world.

These two pre-analytic views imply two very different kinds of environmental education from an economic perspective. If the natural world is merely a collection of resource inputs (natural capital) to be used to fuel economic activity, then the policy goal is to make sure these resources are used in the most economically beneficial way possible. Policies following from this vision include extending more complete property rights to environmental resources, making sure that the prices of goods and services reflect their environmental costs and benefits, and educating the public about these environmental costs and benefits.

If, on the other hand, features of the natural world are more than economic inputs, but rather essential and irreplaceable requirements for human existence, it is not enough to assign property rights or find the proper set of taxes and subsidies. Some environmental features simply cannot be assigned a meaningful price. This implies a different agenda for environmental education and a more complex one. As discussed below, it means broadening the economists' concept of "value" to include not only market prices but also unpriceable and even unquantifiable human cultural and environmental features.

As a final note to this section, there has been much criticism of Western environmental groups as being "elitist", that is, of wanting to preserve nature at the expense of human beings, particularly if those humans are in the poor countries. There is certainly some merit to this criticism, and it is by now clear that environmental programmes cannot be successful unless the human dimension is taken into account. One should not, however, take this to mean that every human want should take precedence over every environmental concern. If the environmental science of the past few decades has told us anything, it has shown that the adverse effects of human activity on the natural world are real and they are increasing. To say that human needs are critical is not to deny that there is a growing conflict between the scale and type of human activity and the rest of the natural world.

NATURE, SOCIETY AND MARKETS: SYSTEMS IN CONFLICT

The conflict between biological and economic systems is illustrated by the fact that economic indicators have shown vigorous growth since World War Two, and for most of the world they continue to show exponential growth, while a variety of environmental indicators show sharp declines. New evidence about the greenhouse effect is coming out almost daily, and it is confirming the fact that human economic activity is significantly changing the world's climate. Other global assaults on the environmental integrity of the planet such as the loss of biodiversity, widespread chemical contamination, and acid precipitation continue unabated.

Most importantly, the consequences of the experiment the human species is conducting on planet Earth are unpredictable. Global warming is perhaps the best example of the kinds of problems educators and policy-makers face in dealing with the inter-connectedness of social and environmental problems and the uncertainty involved in trying to predict the consequences of human activity on the environment. Evidence from past climates, for example, indicates that the transition to a warmer Earth will not be smooth and continuous. A recent discovery by climatologists analysing ice cores from Greenland found that about 125,000 years ago, during the onset of a warm period, the temperature actually fell by 14C in a span of less than 10 years only to return to its previous warm level about 70 years later. The reason for this was a change of direction in the ocean current conveyer belt that regulates the world's climate. If fresh water is suddenly dumped into the ocean it slows that conveyer belt down (or even reverses it) which stops warm water from the Southern Oceans from reaching Europe and drastically cools the continent. If the geological record is any guide to the future, the greatest threat global warming poses for our species is the probability that, sooner or later, the earth's climate will experience a sudden flip from one state to another.

Thus learning to assess the risks and possible effects of unpredictable and sudden change must also be a part of environmental education. We must learn to assess not only the predictable cumulative impacts of human activity on the environment but also how to assess the possibility of catastrophic change. What is the proper policy response to an activity whose consequences are unlikely to be adverse, but with a remote but possible chance of enormous harm? As human activity begins to affect world-wide climatic, geological and ecosystem processes the possibility of sudden dramatic change increases.

Beyond the direct human impact on the environment, a growing body of evidence suggests a close relationship between social instability and environmental

degradation (Dasgupta) 1995; Homer-Dixon, Boutwell and Rathjens 1993). Homer-Dixon et al. (1993, p. 38) conclude, among other things, that increasing resource scarcity can strengthen the hand of the social elite and exacerbate an unequal distribution of resources. They also conclude that environmental degradation may have passed, in much of the developing world, a threshold of irreversibility. Dasgupta (1995), drawing on empirical studies from a number of disciplines, comes to the conclusion that there are self-reinforcing links between population, poverty, and the degradation of local environments. Dasgupta also points out that power is shared unequally among classes and gender and those who make decisions about resource use and income distribution typically do not pay the environmental and social costs of their decisions. The pressing social and environmental problems we face are intimately connected, and policies to solve those problems must also be linked or they are bound to fail. Understanding the connections between society and environment, and especially why distress signals from one system sometimes fail to show up in the other system, is a major goal of ecological economics.

One of the greatest obstacles to moving toward a more sustainable use of natural resources is the staggering disparity of incomes, apparently at all levels of comparison; between the North and South, between nations in the same region, and within individual nations. The degree of wealth and income inequality in the world almost defies belief. A recent report found that the wealth of the world's 359 richest individuals equalled the annual income of the poorest 2.4 billion humans (*International Herald Tribune* 1995). This disparity seems to be increasing exponentially. In the United States, between 1979 and 1990 the real income of men with only four years of high school declined by a staggering 21 percent. Almost all of the increase in real wealth in the U.S. since 1980 has gone to the wealthiest 20 percent of the population (Wolff 1996). Throughout recent human history, the last 10,000 years or so, those making the decisions about resource exploitation and conservation are those best able to insulate themselves from the negative effects of environmental degradation and resource scarcity. The greater the income differences between rich and poor, the greater the burden that will be felt by those at the bottom, and the greater the benefits accruing to those at the top. The current acceleration of income and wealth inequality bodes ill for the possibility of developing sustainable resource use policies.

We have learned from the science of ecology is that all things are one. This is true of the "social" as well as the "environmental" sphere. In recent years, social economists have become more concerned about the environment and ecological economists have recognised the importance of wealth and income distribution and economic power.

ENVIRONMENTAL EDUCATION AND LEARNING FROM THE PAST

In my own experience in teaching environmental economics and more general environmental studies classes, one of the more powerful environmental education tools is the use of examples from past societies to show successes and failures of sustainability. Although the Club of Rome model of resource depletion and economic collapse (Meadows et al. 1972) was derided by most economists, recent studies of past societies show that the pattern of "overshoot and collapse" is a common one in human history. A now classic example of the pattern described by the Club of Rome model is that of Easter Island. Easter Island is one of the most isolated human habitations in the world lying thousands of kilometres from the nearest inhabited islands. It was first settled around 700 AD (Bahn and Flenley 1993, p. 81) probably by voyagers from Polynesia. When the first settlers landed, the island was forested with palm trees. The soil was not particularly fertile but was rich enough to support an agricultural base for a population that peaked at about 7,000 people. The diet of these settlers included the chickens and Polynesian rats they brought with them and sweet potatoes.

In spite of the extreme isolation of Easter Island and its small size (it is possible to walk around the island in a day) its inhabitants stripped the island of almost all trees, overworked the soil, and in general created an environmental catastrophe for themselves. By the time Europeans arrived in 1722 the population was reduced to a few hundred impoverished residents living in squalor in caves. Apparently the island was controlled by religious cults based on the construction and worship of the huge stone figures for which the island is famous. In a frequently recurring pattern, as the resource base of the island became more and more precarious, religious fanaticism intensified until even the most modest efforts at self-preservation were ignored.

The huge statues were transported using trees as skids. This required tremendous amounts of timber as competition to erect statues increased among the island's clans. The resulting environmental devastation is described by Ponting (1991, p. 5):

From [the year] 1500 the shortage of trees was forcing many people to abandon building houses from timber and live in caves, and when the wood eventually ran out altogether about a century later everyone had to use the only materials left. They resorted to stone shelters dug into the hillsides or flimsy reed huts from the vegetation that grew around the edges of the crater lakes. Canoes could no longer be built and only reed boats incapable of long voyages could be made. Fishing was also more difficult

because nets had previously been made from the mulberry tree (which could also be made into cloth) and that was no longer available. Removal of the tree cover also badly affected the soil of the island, which would have already suffered from a lack of suitable animal manure to replace nutrients taken up by the crops.

It is instructive to examine the histories of past societies to look for similar patterns in our own cultures. It is also sobering to realize that the overshoot and collapse pattern, although not universal, is widespread in human history. In central Jordan, by 6000 BC, less than one thousand years after the first adoption of agriculture, villages were being abandoned as deforestation led to soil erosion and declining crop yields (Ponting 1991, p. 69). The first literate society was that of the Sumerians who kept detailed administrative records about crop yields. Analysis of these records show that increasing salinisation from over-irrigation was a problem early on. Wheat and barley were the two main crops grown by the Sumerians. Wheat is much more sensitive to soil salinity than barley and administrative records show a steady decrease in the percentage of wheat grown over the 1500 year period beginning about 3500 BC. Written and archaeological evidence shows that by 2400 BC crop production began to decline rapidly. From that time on there is evidence of a shrinking resource base, social unrest and eventually external conquest by the Akkadian Empire (Ponting 1991, pp. 70-72). The Akkadian empire, in turn, repeated the pattern of expansion, environmental degradation, and social disintegration (Weiss et al. 1993).

Ponting (1991) discusses this pattern for a number of other cases including the Mayan, the Indus Valley, and the Greek and Roman Empires. Pollen records and other sources shows that the present day Greek landscape is the result of millennia of over-grazing, deforestation, and general land abuse (Runnels 1995). The Mayan civilisation, which expanded by an increasingly intensive system of cultivation until it collapsed around 600 AD, also shows a pattern of overshoot and collapse. Recent evidence indicates that the Maya levelled their forests to make lime stucco used in their monumental architecture. The stucco was used on limestone palaces to make a smooth veneer on which to create bas-relief scenes of deities and Mayan rulers. According to archaeologist Richard Hansen "the object was to display their wealth and power and to manipulate the iconography so as to sustain the ruling class" (quoted by Honan 1995, p. 9).

A disturbing feature of past overshoot-and-collapse examples is the long time lag between environmental degradation and eventual collapse. In the case of Easter Island, for example, the population of the island continued to rise for several hundred years after forest destruction was complete. The inevitable population collapse was sudden and undoubtedly chaotic. Such a long time-lag between cause and effect makes it difficult to convince people to take immediate action to prevent environmental damage. Again, global warming is a case in point. Burr-

ing fossil fuels today will continue to affect the Earth's climate for centuries to come. According to the latest computer simulations, CO₂ levels will quadruple in about 200 years if we continue to burn fossil fuels. This will result in a temperature rise in the Northern Hemisphere of about 20 degrees Fahrenheit within 500 years (Stevens 1997). A challenge of environmental education is to convince people to make sacrifices today to avoid harm to people and environments in the far distant future.

There are other examples of past human societies that managed to live sustainably for thousands of years. The civilization of the Nile Valley persisted because it had a system of cultivation based on the predictable and dependable annual cycle of flooding of the Nile. The inhabitants of the kingdom of Ladakh, in the Himalayan region of Kashmir, managed to live sustainably in a fragile environment for thousands of years until Western development changed their traditional way of life (Norberg-Hodge 1991).

Examples of the successes and failures of past and present societies can play a critical role in environmental education. For one thing, it is easier to put aside cultural blinders when looking at societies other than our own. Problems that would otherwise go unrecognized are easy to see when first spotted in other societies. For another thing, the mere fact that past civilisations have collapsed prompts the disturbing question "Can it happen to our own?". In the words of Ortega "The possibility that a civilisation should die doubles our own mortality." (Quoted in Tainter 1988 p. 2). Of course, many prefer to believe that our society is somehow different. We have science and technology to carry us through any crisis. For many economists, the existence of market economies has assumed a place of honour on an equal footing with scientific and technological achievements. A critical part of environmental education should be to carefully consider the benefits and the limitations of markets.

ECONOMIC EDUCATION: BEYOND THE DISMAL SCIENCE

Most of the past societies that managed to thrive in a manner compatible with natural cycles seemed to have had social institutions that encouraged collective decision-making and customs that mitigated the negative effects of individual self-interest. These customs are in sharp contrast to the modern ideal of "economic man" as a simple, isolated, pleasure-pain calculator.

As an economist I believe that one of the most important messages to get across in environmental education is to explain how markets work and do not work. In

the past too much of economic education has been to merely glorify markets and insist that assigning property rights and correcting market prices to account for "market failure" can solve all environmental problems. Educating people about the benefits of economic efficiency is important but so is educating them about the policy limits of correcting relative prices for "externalities and promoting market efficiency.

Market decisions are made by individuals at a point in time. The "immediate present" focus of consumer theory reflects the fact that people would rather have something today than in the future. All goods which give individuals utility at some future date are subject to discounting, that is, they are worth less and less the further into the future we go. Discounting the future allows economists to use the neoclassical model to determine a present rate of exchange for goods delivered at some future date. If some commodity yields 10 units of utility (*utils*) if delivered today and a consumer has a discount rate of 10 percent per year (meaning that something delivered a year from now is worth 10 percent less than if it is delivered today), then the value of that commodity if delivered one year from today is 9 utils. We can then put this discounted value of 9 utils back into the neoclassical model of market exchange and proceed as before.

There are many consequences of the "immediate present" framework in which market decisions are made. What is good for an isolated individual in an impersonal market may not be good for society as a whole. In terms of the social or biological value of ecosystems, for example, it makes little sense for society as a whole to discount them; to claim that they are worth less in the future. Should environmental policies be formulated based on the assumption that the value of breathable air, drinkable water or a stable climate continually and sharply declines as we go further into the future? This might make sense for a person who considers nothing but his or her own finite lifetime measured in a few decades; however, it makes no sense if one is concerned for the human species whose lifetime may be millions of years. Market decisions reflect the interests of individual humans, not necessarily the community, and certainly not the well-being of the rest of the natural world.

All societies, including our own, have complex customs and rules that act to mitigate the potentially adverse effects of excessive selfishness. One of the dangers of making all public policy decisions on the basis of market-based cost-benefit calculations is the loss of broader democratic collective choice mechanisms. We may make very different choices as individuals than we do as members of families, communities, nations, or even world citizens. In *Rights to Nature*, Susan Hanna, Carl Folke and Karl-Göran Mäler (1996) argue that "the issue at stake is not whether there should be private, or communal, or state-owned rights to the natural environment. The issue is how the bundles of different rights, from private to communal to national to international, and from local to regional to global,

relate to each other, relate people to each other, and relate people to their natural environment on which social and economic development depend." This way of thinking will require a revolution in the way economics is taught.

The problem of relying on markets to assign value to environmental goods is aggravated by the fact that many decisions which affect the productive or assimilative functions of nature are irreversible within a relevant time frame. With most market goods changes in supply and demand are reversible. If consumers want more televisions at a later time they can easily be produced- provided of course that the necessary resources have not been depleted, or that the production itself has not proven to have such negative impacts on consumers' health and well-being that it has to be restricted. Goods like air and water quality, or soil fertility, however, are fundamentally different. If a species is driven to extinction, or if the ozone layer is reduced, or if the temperature of the planet rises due to the greenhouse effect, the system cannot be brought back to its original state even if consumers would want the original condition to be restored (Gowdy 1997). Many ecological effects are either altogether irreversible (as in the case of species extinction) or they are irreversible within a relevant time frame (as in the case of ozone depletion and global warming).

Making choices among various market goods is something all of us do every day. We cannot make the assumption, however, that these choices are a meaningful expression of the value of our consumer goods of choice to other parts of the ecosystem. For this assumption to be valid would require a level of information regarding the consequences of our decisions which goes far beyond the scope of any individual's preferences and far beyond the time span relevant to an individual human. This is not to say that we could not get closer to optimal exchange decisions, if information regarding such consequences was improved. However, the limits of relying on individual preferences need to be explicitly recognised, particularly when consumer decisions affect the life sustaining functions upon which present and future generations depend. The degree of interconnectedness among environmental entities is of a different order of magnitude than that recognised by standard economic theory. Any ecological system is composed of hundreds of thousands of organisms whose survival is intimately linked to all the others. The exact nature of these links is largely unknown and almost certainly unknowable. Furthermore, there are critical connections between the biosphere, the atmosphere, climate, hydrological and even geological conditions. If we disturb one of these elements we disturb all the others. As the American conservationist John Muir noted, everything in the universe is connected to everything else. There is a degree of complexity in the use of the environment that cannot be captured by the simple notion of indifference and the assumption of substitution possibilities between goods and services. Some of the biological laws which constitute the parameters of human activity, operate on time scales of hundreds or even hundreds of thousands of years. All human economic activity

takes place within the boundaries of these laws of physics, chemistry, geology, and biology. However, because market economies are driven by individual decisions made at one specific point in time, parts of our biophysical world which have value over a long stretch of time may be sacrificed for immediate gain under the laws of market exchange. The adverse effect of destroying a rainforest, in terms of biodiversity loss or the contribution to global warming, may not be apparent within the lifetime of those making the consumption decisions. The long-term adverse consequences for the human species will not personally affect those making the consumption decisions.

EDUCATION AND PRACTICE: LEARNING BY DOING

From the current vantage point, it is hard to imagine that the world-wide economy can get to sustainability from where we are now. In the face of this challenge how can environmental education help? One way that has proven to be effective is local environmental projects. Experience has shown that local sustainability is possible. Environmental education can show that there are common characteristics for local sustainability which can be applied to any geographical region, any type of economy, or any social system. Can these common characteristics be the basis for expanding sustainability to the world as a whole? This question might be addressed by local sustainability projects. A variety of local projects encompassing different cultures, regions, environments, and income levels can be undertaken within a common framework. Sustainability can be defined and where possible quantified in terms of economic indicators, social indicators, and indicators (or detailed descriptions) of environmental features. It should be explicitly recognised that the meaning of sustainability is different in each of these three levels. The contradictions between the sustainability of different hierarchies should be recognised and explored.

Local educational projects for sustainability could accomplish the following:

- Local projects could teach people about their immediate environments. Local environmental education initiatives have been especially effective in educating people about specific problems such as acid rain. In the U. S. a network of sampling and monitoring stations for local streams and lakes have been established by high schools and colleges. These sorts of projects teach that global problems are relevant to local areas.
- These projects also teach the basics of scientific sampling, and how to interpret scientific data. Already, a core of students have been trained

who will be better able to understand the scientific research on other environmental issues.

- Local education projects can also be a way to integrate the scientific community and the general public. A substantial fraction of the population is doing environmental science without knowing it. A large amount of knowledge about the environment is carried by such diverse groups as hunters and fishermen, tropical fish enthusiasts, bird-watchers and gardeners (Gould 1997). These groups can be an invaluable source to draw on in environmental education.
- Taken further these local education projects could be the basis for developing a standard valuation framework to assess diverse ecosystems with very different ecological, social and economic characteristics which goes beyond simple, and logically flawed, cost-benefit methods which monetarise all attributes of ecosystems
- Another outcome might be the development of practical, workable scenarios to protect ecosystem integrity which may serve as blueprints for a variety of new initiatives

The simple idea that humans live in a hierarchical world in which sustainability has different meanings for different groups at different levels can, I believe, be the basis for systematising the various contradictory meanings of sustainable development. Local educational projects can provide a framework to evaluate, if not reconcile, the competing interests of individuals, society, nations, and the biophysical world upon which our lives depend.

SOME BASIC PRINCIPLES OF ENVIRONMENTAL EDUCATION

It is clear from the mounting evidence of the pressure humans are putting on natural systems, the evidence of the adverse social effects of environmental degradation, and examples from the past that show the fragility of human civilizations, that we need a new approach to environmental education. As David Orr (1992) points out, most educators approach environmental problems as easily solvable by the reductionist approach of 19th and early 20th century science. This approach assumes that there is some technology available which can solve the particular problem with no side effects. Orr argues that we need a new approach incorporating these fundamental features:

1. Environmental education should be a part of all education.

2. Environmental problems are interdisciplinary to an extent rarely present in other fields.
3. Direct experience in the natural world is an essential part of environmental education.
4. The way education occurs is as important as content.

As the twenty-first century approaches, our "world culture" faces enormous challenges. Similar challenges, ranging from over-population to soil degradation to political crises, have faced different civilisations in the past. Some have met these challenges successfully and others have not. Our culture has the advantage of having unprecedented knowledge about the past, about the science behind environmental problems, data about social indicators that at least describes the social problems we face, and, to a more limited extent, the ability to predict future outcomes if we continue business as usual. To translate these advantages into plans for survival requires a massive education effort to insure that the public understands the problems we face and the choices at our disposal.

REFERENCES

- Bahn, Paul. and John Flenley. 1992. *Easter Island, Earth Island*. New York: Thames and Hudson.
- Daly, Herman. 1996. *Beyond Growth*. Beacon Press, Boston.
- Dasgupta, P. 1995. Population, Poverty and the Local Environment. *Scientific American* 272 (February): 40-45.
- Ehrlich, Paul and Anne Ehrlich. 1996. *Betrayal of Science and Reason*. Island Press/ Shearwater Books, Washington, D.C.
- Gould, Stephen Jay. 1997. Drink Deep, or Taste Not the Pierian Spring. *Natural History*, September: 24-25.
- Gowdy, John and Sabine O'Hara. 1995. *Economic Theory for Environmentalists*. St. Lucie Press, Delray Beach, Florida.
- Gowdy, John. 1997. The Value of Biodiversity: Markets, Society and Ecosystems. *Land Economics* 73(1):25-41.
- Grubb, Michael. 1996. Purpose and Function of IPCC. *Nature* 379: 108.
- Hanna, Susan, Carl Folke, and Karl-Göran Mäler. 1996. *Rights to Nature*. Island Press, Washington, D.C.
- Herman, Edward. 1997. *Triumph of the Market*. Black Rose Books, Montreal.
- Homer-Dixon, T., J. Boutwell, G. Rathjens 1993. Environmental Change and Violent Conflict. *Scientific American* 268 (February):38-45.
- Honan, William. 1995. "Maya: Ecological Doom?" *International Herald Tribune*, April 13, p. 9.
- Jacobs, Michael. 1991. *The Green Economy*. Pluto Press, Boulder Colorado.
- Masood, Ehsan. 1996. United States Backs Climate Panel Findings. *Nature* 382:287.

- Meadows, Donella et al. 1972. *The Limits to Growth*. Universe Books, New York.
- Norberg-Hodge, Helena. 1991. *Ancient Futures: Learning from Ladakh*. Sierra Club Books, San Francisco.
- Orr, David. 1992. *Ecological Literacy*. SUNY Press, Albany, NY.
- Ponting, Clive. 1991. *A Green History of the World*. Penguin Books, New York.
- Redclift, Michael. 1996. *Wasted: Counting the Costs of Global Consumption*. Earthscan, London.
- Sarewitz, Daniel. 1996. Science and Sensibility. *Science* 274:198.
- Tainter, Joseph. 1988. *The Collapse of Complex Societies*. Cambridge University Press, Cambridge, U.K.
- Wallerstein, Immanuel. *Unthinking Social Science*. Polity Press, Cambridge, U.K.
- Wolff, Edward. 1996. *Top Heavy: The Increasing Inequality of Wealth in America and What Can Be Done About It*. New Press, New York.

International Consensus as an Impetus for Action

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THE BACKGROUND

The twentieth century has been a century of change, in all sorts of forms - environmental, scientific, medical, technological, political, social, demographic, and more. The capacity of natural systems to adapt to the rate of human change was surpassed long ago, so stressed and declining ecological life-support systems have become a familiar and sometimes threatening phenomenon. The capacity of human adaptability to cope with the rate of change is now open to question. The consequences raise concerns as to the future which humankind can hope for, if nothing effective is done to redirect the course of our history.

After the end of the Second World War there was a widespread desire for international measures to reduce the risk of any such disaster ever happening again. Education was seen to be a main instrument for world understanding and UNESCO was one of the outcomes. As the century progressed, however, and the relationships between humankind and its environment became ever more obviously flawed, doubts grew about the capacity of existing education to prepare people to respond. During the later 60s the concept arose of a new emphasis in education - environmental education. A definition was formulated by IUCN's Commission on Education in 1970 and at the 1972 International Conference on the Human Environment in Stockholm it received full international recognition and became a task of UNESCO, along with UNEP, to develop.

Its subsequent progress is known to all, marked by major projects such as the International Environmental Education Programme (IEEP), statements such as the Belgrade Charter of 1975 and events such as the international conferences in Tbilisi (1977) and Moscow (1987) and their resultant publications. These led to many other projects at international and national levels, and to the inclusion of Education, Public Awareness and Training as Chapter 36 in Agenda 21, passed

at the Rio Summit (UNCED) in 1992. It thus became a subject of interest to the newly-established Commission on Sustainable Development (CSD) to which UNESCO, as task manager of Chapter 36, reported progress in 1996. It was regularly identified as an important issue at the five UN Conferences following Rio and appeared again, less conspicuously, in the report of the Earth Summit + Five event of 1997.

During this progress the concept of what education is appropriate to the purpose has also evolved. For example what was at first treated as an important but discrete subject addition to the school curriculum became redefined as a cross-curricular, interdisciplinary element, leading to fulfilment of an additional objective of education, environmental competence, of the same status as personal and social competence: it was a revision of educational philosophy itself. Its status was thus raised from an optional element attractive mainly to less gifted students to a requirement for all school students. Its status was claimed to be on a par with literacy and numeracy (someone even coined a word 'ecosacy' but mercifully it did not catch on). This status continues to be what most of its promoters would wish for it. Although realistic as a description of what was needed, however, it presented professional and administrative problems: while raising significantly its potential to influence education it was more difficult to sell to the education establishment and much of the later progress was due to enthusiasts either in formal education but working outside the curriculum, or in organisations outside the formal sector.

Its scope has evolved as well as its structure. Much of the initial impetus came from natural scientists and others concerned to rescue the natural environment from destruction, and in spite of subsequent development of ideas this image of environmental education has stuck in the minds of many. The definitions adopted at the Belgrade and Tbilisi meetings should have made it clear that the environment in question was the whole environment - natural and man-made, social, cultural and political - but this message did not travel as far as it should have done. In 1980 IUCN and its associates included the sustainable use of renewable natural resources in its principles for a world conservation strategy thus recognising the place of humankind in the systems to be conserved, and made it clear that care of the environment could not be expected of people who were unable to care adequately for themselves. Out of this came the concept of sustainable development which has since become a guiding theme of environmental education, sometimes to the extent of replacing it as the title for what is being done.

Environmental education, during these 25 years since Stockholm, has thus changed. It calls for the involvement of social just as much as for natural scientists; it demands a great deal more than improved knowledge of environmental components and processes - heightened awareness and perception, understand-

ing of systems and relationships, the development of values and value judgement, the acquisition of action skills. These have been equated with the objectives of environmental awareness, literacy, responsibility and competence as a set of stages towards the achievement of good environmental citizenship. They are expected to be developed within a programme relevant to society, students and their curriculum as much as to biophysical environmental quality; holistic with reference to the environment, to human life within it, to kinds of experience, and to the whole person; values-orientated, issue-based, action-orientated, and critical education.

Further there has been a growing recognition that education outside the institutional boundaries of the formal sector has an important and often critical role in guiding behaviour towards the environment. We are concerned here with a sustained learning experience throughout life, and thus inclusive of all the different ways in which people learn, and have their learning guided by education. It becomes, therefore, the responsibility of everyone in society who interacts with other members of society, and not something which can be left to specialists.

In spite of all this progress people are still concerned, and perhaps even more concerned, about the role which education is now playing in the achievement of a sustainable human society and environment. It is a main purpose of this conference to find out why this should be so.

In doing so we should re-affirm three central understandings, that:

- the environment we are dealing with is the whole environment, physical, social and temporal (i.e. with a past and a future), that
- education is not only formal education but informal and non-formal, encompassing all the means through which learning is guided towards predetermined objectives, and that
- it must prepare people to live in a society which uses its resources equitably and in such a way as to maintain or enhance their quality for succeeding generations.

THE PRESENT POSITION

Education emerged from the events of 1997 still present on the agenda papers of international and national bodies and assumed to be supportive of their policies for sustainability, but far short of the expectations vested in it by Agenda 21 and the following major UN Conferences. The much-quoted prominence given to education (including for the present purpose public awareness

and training) leaves no doubt that its importance for realising the aims of the Rio Summit continues to be recognised, but the results are far from dramatic. Some national strategies have appeared, many excellent examples of localised good practice have been identified, but progress continues to depend on enthusiastic individuals who take their talents with them when they move on, and co-ordination is lacking between operators in different places or representing different aspects of human and environmental care.

The delegates at UN meetings have had little evidence before them on which to make any comprehensive assessment of progress nor have they been able to do much beyond improving the wording of parts of prepared texts where education is mentioned. For this they cannot be blamed - their responsibilities and expertise mostly relate to environmental issues rather than to educational ones. For the same reason educational issues, when they arise, tend to be relatively low in the priority lists and couched in less precise terms than environmental ones. It would be unreasonable to expect otherwise - educational issues should be promoted by people from the education sector to keep their position of importance: but where are these supporters?

Educators (in the wide sense, comprising the whole education community) are usually scarce at international gatherings such as the Earth Summit + Five event, and mostly dependent on private funding or else present because of connection to some other interest group. This does not accord with Agenda 21's pervasive view of education as important to all sections of its strategy. Even at the CSD-4 meeting in 1996, where education was on the formal agenda in relation to Chapter 36, there were few senior representatives of education either in government delegations or, relatively speaking, among NGOs. Does this mean that sustainable development is also low on the priority lists of the education system? If so the outlook for Agenda 21 may be serious, and progress much poorer than it should have been.

This situation could be ascribed to various causes, for example:

- A theoretical, conceptual difficulty among environmentalists in seeing developmental phases, including learning processes, as a normal part of the dynamics of any system, and according them as much importance as other processes in the system;
- A more practical corollary of this, to think of educators as essentially implementers of policy rather than as partners in its design.

These are compounded with characteristics of the education system, such as:

- The strongly disciplinary structure of formal education, expressed through formal curricula, examinations, professional qualifications and career structures;

- Administrative problems associated with cross-disciplinary programmes;
- A resistance among professional educators to being told how to do their jobs by non-educators;
- Difficulties of definition regarding sustainable development, and the continuing gap in philosophy, training and priorities between environmental and development educators;
- The diversity and fragmentation of existing good practice among both formal and non-formal educators and its dependence on the enthusiasm of individuals whose influence in any one place may be relatively short-term (already noted).

In addition curriculum developers may be confused or discouraged by some perceived features of environmentalism which represent it as poor material for education, such as:

- The complexity of environmental systems, and the inadequacy of simplistic explanations and solutions, requiring systemic approaches for which education has in the past been a poor training;
- Dissension among ecologists e.g. regarding holism and reductionism, experimental and modelling approaches to study, together with many lesser examples of differing interpretations of data confusing to non-scientists who do not always understand how science progresses;
- The value problem - mismatches between ecologically desirable policies and the value systems of both practitioners and public with which they will have to become integrated if they are to succeed in practice;
- The scale problem: people have extreme difficulty in moving from the space and time scales familiar in everyday life to those associated with many environmental issues, or from small to large systems (there is some evidence that without special training few people can cope with systems of more than eight components);
- Ecological fundamentalism, characteristic of environmental pressure groups rather than of professional ecologists, acquiring power through noise but sometimes associated with poorly designed or targeted action;
- The apocalyptic approach to the environmental future, so beloved of the media, which often leads to disregard of natural protective and regulatory processes into which real support should be directed;
- The legislative maze which gives problems to those professionally charged with putting environmental policies into practice, let alone committed members of the public who just want to "do something", and can discourage the keen educator who wants to translate theory into local practice.

If these are significant obstacles in the divide between educational and environmental interests they are all surmountable but might require progress on three main fronts:

- a higher profile for education and educators at the level of policy-making and a determination among educators to be part of a process to which they will then be expected to respond,
- a willingness at the highest levels to look anew at education for a sustainable future and ask how far the system as it has evolved up to now is able to supply it, and
- an improved capacity among environmentalists to convert their ideas into more accessible language and share in the process of determining how they can be incorporated into the things which people actually want for their way of life.

It is noteworthy that the best progress since 1992 has been made where environmentalists and educators have genuinely worked together as partners, e.g. in the development of some national strategies for environmental education (although not always in their implementation), in the production of university courses where the teaching programme reflects wide-ranging environmental research interests among the faculty, in the education programmes of a few environmental NGOs where education units are strong enough to exert influence within the organisation, and in youth activities where environmental and educational concerns have not yet drifted apart.

Concerns for the future development of education in this context now cluster around a few major issues. None of them is new although concepts and interpretations both nationally and internationally are continuously evolving and provide a background against which issues must be considered.

LEADERSHIP

When people look for leadership from government they are certainly not asking for top-down direction of what they should do. They are not necessarily looking for funding, no matter how happy they might be to receive it. What they want is a favourable political climate, and evidence that their efforts are seen and appreciated by government and will be treated as relevant to international and national policy. For that reason they look for support which is visible and continuing. The level of attention both internationally and, in most countries, nationally has lacked visibility.

This also has a share of the responsibility for another concern - the fragmentation of effort. Again people do not want instructions but they would benefit from having behind them a conceptual structure, generally accepted, to which they could refer their own work and relate it to the work of others. Such a structure would have to be comprehensive (e.g. of environment and development), and would benefit from the flavour of authority. There are, of course, many pronouncements and publications which attempt to provide this conceptual structure - perhaps even too many - but the need is for one made with such authority that the others take their places as commentaries or reflections on the basic authorised version.

Environment and development are not the only large fragments which need to be drawn together. These issues overlap broadly with many other special fields of education - health, energy, conservation, biodiversity, peace, multicultural and many more. They should all have a common umbrella which allows them to share and benefit from the elements which are common to them all, while still retaining independence in the areas where they are expert. We should not be juggling with different kinds of 'adjectival' education but looking at Education as a service to humanity and a means for ensuring a sustainable future.

It will simply not do for those at the top to pass down authority for educational policy without making quite clear their determination that this policy will be supportive of the wider policies to which they have committed themselves. Early steps to ensure real government support (civil service as well as ministerial) may be a pre-requisite for real progress. The test may be whether policy is proactive or merely reactive. The responsible body should have enough funding to do something effective. This would not really be very much: one wonders if these programmes would fare better if they were more expensive. What costs little is sometimes deemed to be worth little attention.

Supportive people must, however, also be in the driving-seats. We have deplored the absence of the educational establishment from high levels of consultation, but their record at lower levels has not always been encouraging. For whatever reason - the influence of their own training, reluctance to disturb a record of conventional success, or any of the less individual reasons already suggested - they have on the whole been a conservative influence on education: the progress which has been made in many countries owes more to Environment Ministries than to Education ones. This is a further reason for leadership from a very high level which cannot be ignored.

It is also a reminder that, further down the line, the education of teachers must be a high priority - both initial teacher training and in-service - and, perhaps more difficult, that the right people must be found to do it.

CONSISTENCY

Learning is guided by experience, by instruction and by example. It is the role of education to provide opportunities for the first and to administer the second but the third tends to be left to chance, and many other agents are at work, often contradictory. Consistency is a quality one often has to work for in environmental education - between theory and practice, for example: the lessons taught in school may be quite inconsistent with the quality and management of the environment in which they are taught. Inconsistency may be even more evident outside school, for instance between the professions of green faith of both public bodies and private individuals and what they actually do. Unhappily people are notorious for their ability to separate very rational views about environmental care from daily actions based on the norms of their own social groups.

The various means of bringing people together on issues of mutual concern - participation, partnership and the development of a sense of ownership - offer ways of reducing such inconsistencies, but they must also be consistent in themselves, for example between advocacy of the spreading of power or responsibility and willingness to yield them up.

Learning from the example of others starts early, and powerfully, from the family in early childhood. It expands to relatives and neighbours, through defensible play areas to wider fields of experience associated with formal education, leisure pursuits and the workplace, to new peer groups and role models provided by entertainment and advertising industries, and to the various communities (both locational and occupational) with which people identify, and whose standards and practices they adopt. Instructions, whether through formal education or even through legislation, may run counter to these influences, and even be accepted rationally, but may still not prevail as determinants of behaviour.

Learning by experience may have greater power as a determinant of environmentally-related behaviour, and opportunities for it are often provided under the aegis of the formal system, so it is ironic that they are often the first type of service to suffer when funding to formal education runs short. The willingness of education authorities in some countries to advocate television or virtual reality experiences not just as an aid but as a suitable replacement for the real thing might lead one to despair.

The formal sector of education is not an easily adaptable institution - nor should it be: it sets the standards of performance and content to which other educational standards are referred, and its continuing authority is the source of its power as a producer of employable people. But within it lie some of the most strongly-defended frontiers, those between academic disciplines, backed by professional bodies, career structures and the criteria for personal advancement. Environmental edu-

cation can be seen as a challenge to these, accounting for its greater success at earlier levels of education than at stages where concerns over future examination results are a deterrent. These barriers too are changing as patterns of employment change, but more slowly than environmental educators would wish, whose sights are set on the future. Change might come more easily if it had more government support, but as a rule caution prevails, at least where formal education is concerned.

Nevertheless change is with us and cannot be ignored even in such preserves of stability. So far as environmental issues are concerned, at least, the education establishment must look at its provision and assess its effectiveness in relation to the other influences on learning, and perhaps redesign itself accordingly. But it may require a very authoritative push to do so.

NAMES AND DEFINITIONS

Confusion still continues over what to call what we are trying to do. The term 'environmental education' was never entirely satisfactory, although it was carefully defined internationally by UNESCO and others. The World Conservation Strategy set out to establish for environmental conservationists that humankind and all its ways are integral to the environment as we now know it, introducing the concept of sustainable development later taken up by the Brundtland Report and providing the rallying-cry for the Earth Summit in 1992. Yet for many people a primarily non-human or 'green' interpretation of 'environment', however inadequate, lingers on.

Nowhere is this felt more keenly than among proponents of Development Education, whose frames of reference are round the human rather than the biophysical components of the system, but whose ultimate concerns are with essentially the same issues. Agenda 21 attempted to make clear that sustainable development was seen as an integral part of its concept of the environment but it was still felt necessary to refer to 'Environment and Development Education' to avoid misunderstanding. IUCN's Principles for Sustainable Living, which provided the structure for their 1991 publication *Caring for the Earth*, was an attempt to draw these strands together, but not apparently with enough success to convince many social scientists about where priorities lay.

The principles on which the World Conservation Strategy was based were skilfully chosen. The maintenance of ecological life-support systems refers to the Earth system as a whole, dealing with the biosphere, of which humankind is a component, as a unity. The maintenance of biological diversity (biodiversity), at

habitat, species and genetic levels, refers to the internal machinery of the system, capable of keeping it going in spite of short term and long term changes in its operational conditions. The sustainable use of renewable natural resources refers to the use of the system by an adaptable and manipulative operator in such a way as to preserve its integrity for generations to come - the practice of sustainable development. However attractive the third of these to the new generation of earth managers and educators, they are interdependent and the third will not stand alone.

With the Earth Summit in Rio de Janeiro in 1992 the concept of sustainable development was reinforced and Education for Sustainable Development (ESD), or more ambiguously for Sustainability, became popular alternative titles. Changing the name from an aspect of education to its objective has the advantage of conformity with a major international movement and shares language fashionable with governments and NGOs, thus standing to benefit by association, but there are also some dangers:

- that people will think the two names signal different processes and fail to connect them with the principles fundamental to both;
- that they will base a whole process of education on a conceptual foundation which they cannot safely define;
- that they will launch a new phase of fragmentation.

These statements need some explanation. Sustainable development as introduced in the World Conservation Strategy was a practical measure to maintain human participation in environmental care, but depended on the maintenance of ecological life-support systems and of biodiversity as pre-requisites. Without these there would be no sustainers. Both the measures to achieve sustainable development and learning processes to support them must therefore be based on the conditions which make it possible. Environmental education and ESD are effectively about the same thing. Nevertheless the political attractions of policies based on sustainable development - the reference to development being the attraction rather than the sustainable element which some see as easily fudged - and the continuing idea of environmental education as being primarily about protecting nature, have led to some administrators treating them as quite separate for funding purposes. Sadly the political implications of a name may outweigh the meaning.

Sustainable development is focused essentially on how people behave and has naturally attracted social scientists, whose approach is often different from that of environmental scientists. With its emotive undertones ESD could become a social science preserve while environmental scientists group themselves around ecological and biodiversity education, and talk to the others even less than they do now, a trend which current committee structures is likely to reinforce. This could

be seen as the antithesis of a holistic approach if allowed to go too far, driven to a great extent by disciplinary and professional divisions. It is probably a product of tidy administrative minds parcelling out duties rather than an application of the maxim *Divide and Rule* but its effects could be the same. Policy-makers of education must resist this where it spreads beyond specialized tertiary education and training contexts.

Sustainable development still means different things to different people - a green light for continued development or a justification for social and economic reform, according to one's priorities. They could be using the same phrase with quite different meanings from opposite sides of a major argument, and this is bound to confuse. Its practice also remains a problem. It is often easy to say that something is not sustainable, but working out what is sustainable can be much more difficult. Shelves of books have now been written on this theme without resolving the practical problems which may face the educator.

The truth is that this is an ethical concept rather than a scientific one. Its definition by Brundtland emphasised the equity principle between generations; but at Rio it extended also to equity between continents and countries, races and classes, genders and ages. This raises a cluster of new political agendas which some supporters of ESD may not have expected, but which are now on the table. Concepts of quality of both life and environment need critical revisitation and educational policy-makers must now prepare to play their part in doing so.

Dissatisfaction with 'environmental education' may be a part cause of the use, as another alternative, of 'communication'. It might appear simple to argue that education is a long term process of guided development while communication is the means for transmission of ideas and information on which it depends, but this has not prevented some people from arguing that they are the same thing. The problem seems to lie in a deep-seated belief among many environmentalists (and others) that if a message about which they themselves are convinced is properly communicated then it is bound to be accepted and acted upon. This is a well-known fallacy, but it is encouraged by the visible successes of well-resourced professional communicators employed to sell goods and ideas for both commerce and government, and from whose talents the frustrated environmentalist would like to benefit. On the other hand it is widely considered important to make people critical of what they are told, in view of the quantity of misinformation now available. Here again we find division between people whose objectives are still close.

Other words and terms may give trouble of a less dangerous kind. In this field we are now particularly prone to use words because they are comfortable or righteous, words like 'sustainable' which are taken to indicate that the writer's heart is in the right place without much thought for its meaning. The answer frequently given to a complaint about such usage that 'everyone knows what it means' is all

too common as a let-out for failure to express or even to think through the meanings of words and phrases which are sensitive - like sustainability, sustainable development / living / futures / worlds / growth etc. etc. Here, alas, the truth is that many people:

- do not in fact know what it means (not yet being members of the club),
- think they know what it means but have a version which is quite different,
- don't want to know what it means because their interests are better served by confusion.

The first two may be nuisances but the third is dangerous. When such a phrase is simply used as a slogan or a symbol it may do no harm - it is signalling little more than the affiliations of the user. But when it is carried over into serious discussion or argument it becomes a liability - a soft spot which those out to sink the argument can fasten on. So people have to be alerted to the hazards of using words without thinking - and there are all too many instances of this around.

We are trying to manage a very complex system which we are getting to understand better but which is also dynamic, so that words which worked yesterday may miss the target today. We are in a multisectoral society where words acquire sectoral meanings and help to separate sectors from each other until they become the preserve of priesthoods. We are in a multiethnic society where words have to be translated into other thought systems and other languages and may become part of a different network of subtleties. We may even live in a society where fashions in literacy have moved and issues of this kind are apt to be dismissed as pedantic and boring; but there is a serious problem here, which was starkly illustrated by the misunderstandings, accidental and otherwise, which hampered progress during the June 1997 negotiations in New York.

A real problem confronts the whole field of education for sustainable whatever, when words lose meanings and become merely symbolic, and it is making the production of convincing arguments and cases more difficult. In a multilingual situation it has a whole new dimension of complexity. It needs to be given an airing.

THE STATUS OF EDUCATION

Increasingly educators have to look critically at their standing both at home and elsewhere. Agenda 21, to which governments signed up at Rio, was a far-reaching programme to reconcile global environmental sustainability with a need for continuing development, to overcome many gross inequalities in current

life-styles and a threat to those of future generations. Education was fully admitted to be essential to this programme, and the word 'education' appears in Agenda 21 second only in frequency to 'government'. In spite of this UNESCO, as task manager for Chapter 36, described it to the CSD in 1996 as 'the forgotten priority of Rio'. We have to ask why?

This international judgement reflects a common attitude to education. People are often glad to pass responsibility for remedial action on environmental issues to the formal education sector, although it will not generally have been party to the decisions, and expect it to do the rest. Formal education, however, securely held by entrenched academic disciplines, a long record of conventional success, a well-established system of rewards and some built-in inertias, is not easily told how to run its business by policy-makers from elsewhere. All too often nothing happens, and making something happen takes much careful work.

Cross-disciplinary elements, imposing administrative and assessment difficulties, discourage the formal sector, as does the holistic principle requiring an ability to handle large, complex systems for which the more reductionist training of most teachers is no preparation. The escape route has often been to expect students to do their own integration of different disciplinary inputs (unrealistic) or to pass over the whole business to the informal sector of education (dismissive). Neither route will do. Other qualities which tend to be second-rated by the education establishment include creativity, critical thinking, reflection, all important to the growth of environmental competence and good citizenship.

Agenda 21, Chapter 36 was received as non-controversial and presumably non-threatening. In view of the admitted urgency of the environmental threats which led governments to Rio it is strange that guidance of the learning processes which form people's behaviour towards their environment should be left so readily to others. Have educators, like many other professions, lost too much status in a business-dominated society? Is it because many decision makers do not understand education and only want efficient communication of current ideas and information to the workforce? Do we have to resist the ingredients of indoctrination? Is it that people are over-dependent on those sections of the media which are interested only in sensation, not sense?

Whatever explanations one favours, the low-key response of both governments and media to environmental education is clearly something which promoters of environmental education in many countries must now study seriously and work hard to overcome.

A WAY AHEAD

Three main lines of policy have emerged from the foregoing for consideration, from which other improvements might follow more readily than they do at present. They concern the status of education as a protagonist in the achievement of a sustainable future, the capacity of education as at present understood to meet these new demands on humankind, and the need to draw together all the agents of influence on people's learning into a shared framework of education. The following measures could be taken in pursuit of these policies.

1. The education community, in all its diversity yet sharing common concerns and responsibilities - teachers, lecturers, curriculum developers, administrators, examiners and quality controllers, education and training officers in industry, in parks, zoos and museums and in NGOs, countryside rangers, media correspondents, community educators, youth leaders and more - must receive more recognition as a major component in the process of designing and planning strategies, not just as implementers. This requires that:
 - the education community take action itself to establish a corporate identity which it currently lacks and which it should now develop vigorously;
 - consideration be now given in the UN system to the form of recognition given to the education community in relation to other identified groups.

An alliance of educators is a matter for the community itself. Organisations representing environmental educators in the broad sense, both in formal and non-formal sectors, already exist and their numbers are increasing both at national and at regional levels - examples are to be found in North America, Australia, South Africa, East Africa, India, several European countries and there are many more; there are also relevant international bodies in fields such as teacher education, countryside ranger and national park services, and bodies representing educators in more specific categories such as development, natural heritage, health, energy, peace, community and youth. Initial informal discussions have indicated much support in principle for such an alliance if there were a prospect of constructive collaboration and of high level attention to the outcomes. This initiative might be largely a responsibility of the organisations themselves but a lead body would have to be found to start it off.

2. At the same time the profile of education and educators as contributors to UN policies for a sustainable future needs to be raised, so the issue of Major Group status at the CSD has to be considered. There has been

some insistence that adding another major group would lead to other, and possibly detrimental, changes in existing agreements, although a suspicion remains among many supporters of the education lobby that this objection could be overcome if there were sufficient conviction of the need for such a move.

Questions have of course been raised about the whole concept of major groups, which some believe were too hastily thought out. Can 51% of the human population (women), for example, be realistically described as a group? On the other hand it may be only the word that is wrong: the existing major groups are all categories within society whose support and participation are essential to a sustainable future and whose views require special attention in the context of Agenda 21. But if so are not the views and participation of the education community equally essential in view of the emphasis placed on it by the UN programme? No doubt there are other social categories which might be able to sustain similar claims: can the relative importance of necessary consultant groups be properly graded in this way, even in the interests of practical management at meetings? The alternative course of abandoning major groups and dealing instead at annual meetings with selected issues in turn might have attractions but loses the benefit of drawing together groups (including educators) who should have something to contribute to every issue.

If major group status is not practicable what alternatives for education are there? Treating the education community as if it were a major group is only meaningful if it entails the same benefits of contact and exposure e.g. through the programming of meetings: submergence in a comprehensive NGO dialogue is not the same thing. The same reservation would have to be made about any alternative title such as enabling group. If CSD meetings are to attract educationalists of the high calibre and status necessary to make real impacts on the education establishment then the programme has to offer them real professional enticements and attract funding from whatever source to support them. A higher proportion of education representatives among government delegates would also raise confidence among other professional educators. The presence of both at CSD meetings may be the indicator we are seeking of the renewal of education as an active agent of progress towards sustainability.

3. It may well be time for a Convention or a Sub-convention on Education, specifically to review the quality of education as a means of guiding learning in preparation for the changed and changing relationship between humankind and its whole environment into the new millennium, and to foster the personal, social and environmental competences and attitudes supportive of sustainable development. The issue is big enough and

complex enough to justify it, and already established as important enough by Agenda 21 and its following conferences. We should not forget:

- that it implies very major changes in the philosophy of education and in the everyday thinking and behaviour of people, especially in the richer countries,
- that conventional formal education is deeply entrenched and difficult to move,
- that we are addressing all of education and not just some sub-set of it,
- that many different kinds of organisations and agencies, not all recognised as educational, have important influences on education for a sustainable future,
- that sharing between north and south is vital in education as elsewhere,
- that indicators of performance in providing for learning for sustainable living are still not well developed either in education in its widest sense or in the narrower context of formal education, and that they should be.

As a first step an expert Working Party, representing north and south, environmental and human society concerns, governmental and non-governmental organisations, formal and non-formal, and especially the ground-level practitioners of education (not just administrators and academics), should explore the issues and implications and report back before the end of the century. This would be entirely justified by the current state of affairs.

4. Development of an overarching programme for education, on a comparable model to Capacity 21 or Local Agenda 21 which it could usefully complement, to extend, enhance and focus the existing and desirable diversity of activities within the set of common objectives represented by Agenda 21. An Education 21 programme has been fully described elsewhere. It would not need to wait for any other, more complex measure, indeed if it were already in being it could help materially to define the contentious issues and main deficiencies in the system at present. On the other hand it could not be expected to achieve all the necessary reforms on its own: top-down and bottom-up influences have complementary functions and should both grow to meet each other.
5. Closer consultation and collaboration, sufficient to ensure compatibility of definition, objectives and evaluation systems, within the UN family and between it and other international bodies in the field was recommended

in Agenda 21. An international, interagency alliance such as that recently proposed by IUCN would help to implement this recommendation .

6. There are many more specific ways in which the provision of education can be made more supportive of a sustainable future. They are national rather than international concerns, so as to suit the particular characteristics of the country, but they could benefit from international encouragement. They include:
- More attention in education to systemic approaches to human/environment relationships requiring contextual thinking, the identification and relationships of structures and processes, control mechanisms and their application, an approach which needs not only strong encouragement but a wide range of well documented examples.
 - Far more attention to the acquisition of value systems, including more provision of opportunities for formative experience upon which it often depends. In this context there are many words and concepts which ought to be redefined -quality of life, personal fulfilment, standard of living, globalisation and many more- a task which even some very honest educators prefer to avoid. Value development may have to work against some features of our biological behavioural heritage, so it will not come easily.
 - A much higher priority given to environmental and sustainability issues in teacher education, and to the methods for dealing with them.
 - More explicit attention to the educational impact of commercial practices and environmental developments likely to influence learning by example (we are familiar now with environmental impact assessment), and to the cultivation of critical faculties to shift and interpret received information and experience, from political or commercial sources, advertising, the media, green campaigning bodies, best friends or whatever.

This list could easily be much longer but picks up points made earlier in this paper: others will emerge from other discussions.

CONCLUSION

It is tempting to conclude that if education even in its widest sense, and certainly in the narrower terms of formal education, is to provide the back-up needed for policies for a sustainable future then it will require a revolution. Here, however, there is another dilemma. A revolution generally entails rapid change and, as we recognised in the opening paragraphs, rapid change is stressful and damaging to complex systems and institutions. Stress tends to break up established structures with long term, conservative functions and open up both ecological and human systems to exploitation by opportunities with short term objectives and little regard for resource conservation. Are we proposing to make matters worse? The answer has to be some sort of velvet resolution which proceeds by achievable stages where the outcomes are predictable. But will it then be in time?

In a changing world the educative effects of public and private behaviour outside, and even inside, the education system can no longer be ignored. What we now do should be assessed as to whether it will improve behaviour towards achieving sustainability, or impair it, and then be treated accordingly: educational impact assessment may be as important as environmental impact assessment. Change is both inevitable and necessary, but if its progress is too rapid the consequences may make sustainability unattainable: planning and control may be needed to achieve small, achievable units of progress with less stress.

There are many other ways in which the promotion and practice of education in support of a sustainable future could be extended and improved, and many of these will no doubt be discussed at other sessions of this conference. We are thinking here of the education of educators in all their diversity - and diversity is as much to be valued in this game as in any other - and in the sense of this paper almost everyone is an educator in some context whether consciously or not. There can be no doubt that education by whatever means has its best chance of taking root if planted in well-prepared soil. The measures proposed above would give such preparation a better and wider-spread start than it has had before. As to the time, and perhaps the climate, we can only try to be optimistic.

There has never been a better time than this to move forward. All over the world there are educators at many different levels, formal and non-formal, anxious to make progress. The public in many countries is slowly becoming adjusted to appeals on behalf of their environmental quality even although their economic circumstances are still far below the level at which they can do much for themselves to improve it. If progress in this field since the Rio Summit has been slow then the familiar practice of calling for education to support policy and then leaving it to others to accomplish may have much to do with it. But many of the

programmes to achieve sustainability are tender plants and may have little chance of growing unless their soil is much better prepared than at present. It is time to take responsibility for education seriously and at every level of age, community and formality. Perhaps this conference can demonstrate to the world that educators, given the chance, can be powerful in the cultivation of a better and more sustainable world.

SUMMARY

Education, including Public Awareness and Training, has not achieved what it should have done since 1992 in spite of the importance given to it by Agenda 21 and the following UN Conferences as a means of pursuing policies for sustainable development. Educational policy-makers have not been prominent among those determining policy for sustainable development. Education needs a higher profile in the planning and implementation of sustainable development, an internationally adopted programme focusing on the objectives of Agenda 21, and clear agreement on the meanings of the terms in use to define them. Suggestions are made of ways by which to progress:

- Raise the status of education and educators to a planning as well as an implementing level;
- Develop an alliance of educators representing environmental and development education and related practitioners to represent their experience in these activities;
- Set up a Working Group to prepare a Convention on Education for presentation to the UN;
- Set up an Education 21 Programme as a focus for educational progress, which will work for a consensus on definitions and objectives and relate existing expertise to an agreed framework;
- Establish an Interagency Alliance comprising all the relevant international agencies to co-ordinate work at this level during the next five years;
- Encourage the further development at national level of systemic approaches to the environment in education, of values development, teacher and youth/community leader education, the influence of the environment of education, and other necessities for the pursuit of sustainability.

Self-cultivation or the Apprenticeship of Another Self

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"When the class which we continue to attend
despite our age truly comes to an end,
night falls.
What is the use of becoming enlightened,
of bursting into tears?"

René CHAR,
Praise of a suspicion.

The contribution of this reflection is inscribed in a precise context, that of a town which remembers, with all due deference to the person who would like to see it as the mirror of a monotonous and identity history, the testification of a "mosaic of communities". It remembers agreement, impairment and tolerance. In the old stones, contained in walls today, it has recognised that a town, like a culture, is made of the "crossings" or of the inter-retroactive cross-breeding: Hellenic Thessalonians, Ottoman Circle, "utopian Sephardic", in Thessalonian in short, a complex town.¹ One will bear in mind its creative complexity in history, which tells of the daily and vital exchange of the groups organised in different ethnic and religion, with an auto-eco-cultivation based on rich and varied civilizations, at the boiling cross-roads of western Europe, central Europe and the Near-East. It is therefore, whilst thinking of the historical complexity of this "planetary party", that I intend to examine the conceptual triad culture/ethics/equity. I hope to reflect these terms together in a "complex buckle", which is an operator put in its place by Edgar Morin. A reflection in "complex buckle" means, indeed, that one would not be able to isolate or make any of the terms or ideas to which a reflection is related hypostatic. "Each (of the terms or ideas) takes its sense in

relation to the others. They must be conceived together, that is to say as terms which are both complementary, concurrent and antagonistic", writes Morin.² In other words, in the inquiry with which we are dealing here, culture envisaged without ethics is only a make-up or mask for a frivolous spirit; just as without equity, it is only a luxury of an aesthete bored because of a minority furnished. As regards ethics, one would be unable to conceive them without a cultural context which demands a reflection on the part of the individuals regarding their conduct in sight, if not of the good, at least of the best, as Leibniz would say. These ethics reveal in an equitable act or judgement its very quality, that is to say justice. But equity does not exist without a culture which codifies and institutionalises a system of rules or principles, in order to constrain men to a minimum of equity, when their egoism, their indifference or their negligence leads to an action or a judgement; this is the case, for example, of the Universal Declaration of the Rights of man.

One hopes that this contribution will be able to lead in some way to the viability of the educational projects, which will always bear in mind the conception of their application in the equity of the means, in order that each person, without any prejudice, is able to find in the culture an emulation and not a barrier to reflection, to the understanding of oneself and of others. That anxiety regarding equity really only exists if all those who must have it, apply and/or control it, do so with the thought that their acts involve them as responsible persons, and that consequently, not only can they be, but they must be able to give an account of it without appealing to some principle of authority - or systemic disfunctioning-, which makes their action and their judgement undetermined.

I think that culture must be the constant and disinterested impulse to "cultivate oneself". In this *apprenticeship of another self* - where one perceives the impairment or one's other ego - lies the strongest link between culture and ethics; that is to say, the inclusion of the subject reflecting on the comprehension-appropriation which every individual must effect from a culture, if he or she wishes to grasp even a little of the spirit which animates this culture, which gives a sense to the world which it organises, and which reflects the different forms of life and of thinking, in which the subject reflecting on the matter expresses himself or herself, in order to find himself in it or be different from it. As the culture seems to have first of all the individual of all parts, the self-analysis of comprehension-appropriation of a culture needs a personal choice, ethics or self-criticism in view of the cultural whole of the crystallised dogmas, which always stipulate on the fundamental questions: what is the individual? Man? Society? Life? Truth? Every culture possesses "ready-to-take" answers to those questions. It would almost be a question of its survival. What is more rare, in return, is the finding in a culture of the liberty and emulation for answering by oneself. One could even say - hypothetically - naturally, that *the wealth of a culture is measured by the power of*

invitation which it generates, in order that an individual seeks to "cultivate himself" there, "to form himself" and above all "to reform himself". In other words, the more a culture leaves and gives the individuals the freedom of "cultivating themselves", the more it contributes to their process of humanisation.

But there is nothing over and above a process which can appear as something abstract or universal, there is above all the fact that "to cultivate oneself" is fully the singular, personal, ethics of "regulating the measure, the market value and the weight of things" (Nietzsche, in Schopenhauer educator). And this must not be related to the degenerated meaning of sophistry, according to which one would be "oneself the measure of everything". Only a solipsist, a tyrant, a madman or an egocentric person simply believes that "he is the measure of all things". And, at the opposite extreme, only an imbecile believes in the total "objectivity of the things". There is an equilibrium, certainly fragile and always recommenced, for a judgement to be equitable: neither too subjective, nor not objective enough.

To speak of culture as one of the fundamental data for the unfinished process of humanisation, mentioned above, is to suggest the capital role which culture has already played in the fact of becoming an *homo sapiens* in the "scenario of hominisation" (Morin). Culture would be there the *emergence* of a complex web of *auto-eco-reorganisation*, which is woven from the *meetings* and *interactions* between the individual and the society, nature and freedom and, above all, it would be the index of the real hope which we have of cultivating ourselves, that is to say, of reflecting on our own culture, taking into account the incompleteness of our being. The proof, if it is needed, that one can enrich it with new forms and enrich ourselves spiritually. Indeed, Rousseau, for example, had been able to vituperate a certain type of culture which, instead of enriching the human spirit, corrupts it. For this "*announcer of the next Revolution*" (the image is that provided by Jean Starobinski), it was in fact the matter of a culture deranged by the perverted values of a monarchical society, in which there was neither equality nor fraternity; that is why the unjust social order of this type of culture encourages egoism and iniquity. The culture of a society without equity was accused by Rousseau, scoffed and denounced by Voltaire; in this society, the culture appeared to be only a luxury, a voluptuousness and coloured porcelains. It did not invite the individual without social distinction to "cultivate himself, herself", to reflect by himself or herself and to be a free person. Well now, one must think about the cultural phenomenon as a living, moving, complex thing, and not as a structural cutting out which traces, in a group of data, fixed wittingly by some entity of power, "*the line separating the inside from the outside*"³; the line separating, I would say, the fine districts of the zones.

Envisaged as a living *emergence* of the human process of social genesis, the culture cannot be considered as an immovable substance which would give a

so-called foundation and authenticity to some *cultural identity*. It is the *emergence* of the *auto-eco-reorganising* processes⁴, which take part in the forming of the rules of identification and recognition for a certain society. But that which truly makes the specific and singular difference of a person remain irreducible to the simple cultural phenomenon. That is why all confusion between culture and identity contains in fact ideology and will of power. Moreover, it reduces the being to the culture, in order to establish a "cultural ontology", and can take the stiff attitude of a conceptual and ideological scarecrow. The reduction to the culture of that which makes the very meaning, the very quality - a person's ethics - his or her desirable and emulative difference even in the flapping of his or her eyelashes, forgets the fact that the culture is both the disposal for the integration, conservation and reorganisation and that which has been acquired, and the aptitude to "develop the human nature" (Morin)⁵. In other words, the culture cannot be the final instance of the sense or the foundation of the identity of the being, for it contains the impulse of its own overstepping. In short, the culture produces impairment by itself, in itself and for itself. This is one of the strong lessons which is printed in us if we cultivate ourselves.

It is true that the problem of identity is set up for a culture, when the questions related to such complex contexts as origin, being, foundation, recognition, are thought about in a disjunctive and simplifying manner, with basically only the disciplinary interest of locating the third, the alien, in order to mark that which some people call a "threshold of tolerance", that is to say, the frontier of exclusion. In short, the culture does not support alone the complex questions regarding the origin of beings and things, and consequently its own origin, indeed its process of identification, for the individual who reflects on that realizes immediately that he is not only cultural, not only spiritual (in the meaning of the assimilation of the German Romanticists: culture=spirit). Man is also natural, that is to say, he has a brain. Of course, we are not going to launch into a byzantine matter and return to the debate between materialism and spiritualism in this regard. Basically, Edgar Morin summarizes the sterile quarrel between nature/culture (brain/spirit), in a key paradox, in the form of an open question: "what is a spirit which can conceive the brain which produces it, and what is a brain which can produce a spirit which conceives it?"⁶. It is a man; not a countenance drawn on sand, but a cord woven from the contradictions to be solved and from the complexities which are to be thought about. That is why "to cultivate oneself" is not easy. And that is even "dangerous", Morin often says with the delicate smile of the Socratic irony. Because "to cultivate oneself" brings up not only the problem of the means and that of the equity regarding the access to these means, but also the ethical problem of the personal choice, with regard to an effort of thinking, which needs the courage to "think by oneself"; in other words, a dialogic critical sense and not only dialectical. The true critical sense breaks the vicious circles and replaces the reflexive in a "virtuous circle". In this sense there is creativeness,

complexity and dialogue. There is a complex thinking, because there is an understanding of different logics and an integration of a multiplicity of the diversity in a plural unit.

In the periods of opening and exchange, both inside and outside the town, Thessaly knew how to invent this *plural unit*, where different ethnical and religious groups auto-eco-reorganised themselves. If a lesson of things, of culture, of ethics and equity resounds in the memory without partisan manuals of this open town, it is that of knowing how fragile and how possible and how good it would be for the men to live together the agreement regarding the diversity and to build in common the future in impairment.

REFERENCES

1. Named for the year 1997 European capital of culture.
2. In *The method 1. The Nature of Nature*. Ed. Seuil, Paris, 1977 (p. 56, de. 1981).
3. see Hall, Edward T.. *Beyond culture*. Ed. Seuil, Paris, 1987, p.224.
4. The idea of emergence is the Gordian knot of every organization and the index of the latter's capacity to generate a new quality. See Morin, in *The method 1 (The emergences* P. 106, op. quoted).
5. See *The lost paradigm: the human nature*. Ed. Seuil, Paris, 1973 (p. 99, de. 1979).
6. in *The method 3. The Knowledge of Knowledge*. Ed. Seuil, 1986 (P. 69, de. 1992)

Health Promotion and Healthy Lifestyles

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There are a number of pressing issues that bear consideration in determining the future directions for education in support of sustainable development. This document will focus on public awareness and understanding in the context of health promotion and healthy life-styles, with particular reference to reproductive health issues.

VISION FOR THE FUTURE

The use of principles developed through many years of research in diffusion of innovation (i.e. the processes by which a person slowly or rapidly decides to adapt an innovative behaviour or practice) has shown that getting an idea adopted, even when it has obvious advantages, is often very difficult. There is a wide gap between what is known and what is actually put to use. Many innovations require a lengthy period, often of some years, from the time when they become available to the time when they are widely adopted. Therefore, a common problem for many individuals and organizations is how to speed up the rate of diffusion of innovation. Resistance to change is firmly entrenched; change occurs because there is a perception that it is rewarding. A single exposure to an idea or technique is rarely sufficient to advance adoption. Outside intervention to push for a change will only succeed if there are individuals who are empowered to become champions for the innovation; these are the people who demonstrate the value and practicality of a new way of doing things.

Therefore, to have a future that is supportive of sustainable development, educational efforts aimed at creating public awareness and motivation for action, particularly in the health arena, will have to promote action that in the public's

eye is interesting, attractive and in itself enticing so that people will be self motivated to adapt the behaviours, activities and technologies being promoted. Imposition from the outside does not have lasting impact. Additionally, success will depend a great deal upon the extent to which a blending of educational and promotional approaches are used, added to the mobilization of change agents from among the members of the community or its role models, in addition to community and national leaders.

ACTION

PRACTICE TODAY

The Behaviour Change/Social Marketing Model

Theories and models of behaviour change suggest that adoption of healthy behaviours is a process in which individuals progress through various stages until the new behaviour is routinised. The process is comprised of a continuum of learning which enables people to voluntarily make decisions, modify behaviours, and change social conditions in ways that promote sustainable conditions for development. Activities are developed based upon a needs assessment, sound educational principles, and periodic evaluation using a clear set of goals and objectives. Through education, underlying social, economic and environmental conditions can be taken into consideration in the building of life-styles and behaviours that promote future sustainable development.

Communication is another approach which attempts to change or reinforce a set of behaviours in a large-scale target audience regarding a specific problem in a predefined period of time. Multi-disciplinary by design, its principles and practices are grounded in diffusion theory, social marketing, behavioural psychology, anthropology (including ethnographic research), and instructional design. Diffusion of innovations contributes a theoretical approach concerned with how innovations, or new ideas, are communicated through channels over time among the members of a social system.¹ How do people create and share new information, and what makes them adopt or change a behaviour? The process is complex and involves entire social systems.

Social marketing is based on a set of proven principles drawn from commercial marketing. Foremost among these principles is adherence to the "4 P's": product, price, place and promotion. Marketers know that an offering must be designed based upon the target market's needs and desires, determined through sound research (e.g., focus group discussions, surveys, in-depth interviews). It must be

affordable in every sense. It must be positioned to appeal, and it must be accessible. Consumer preference, perception and satisfaction is paramount if a campaign is to be effective in bringing about an exchange. Key to social marketing efforts are sound audience segmentation, the use of integrated media, and qualitative research so that audiences' needs are understood.

Behaviour analysis provides a rigorous focus on the consumer, acting as a microscope to reveal what people are actually doing with regard to a specific problem, and why. It also helps to draw attention to environmental events that influence behaviour patterns. By exploring behavioural antecedents and consequences, researchers can explore the rewards and punishments of a particular action. The behaviour approach tries to identify existing practices that are compatible with new ones, to look for approximations to new practices, and to evaluate actual costs and benefits of adopting new practices.

It is important to understand the cultural context in which certain behaviours take place, and to consider the prevailing perceptions, beliefs and values of a programme's intended audience. Through observation, interview, and other methods of evaluation, it is possible to identify the traditions of the target audiences and develop programmes compatible with them.

With a basic behavioural model, external factors in the environment are seen to influence internal factors (e.g., people's perceptions) and then their behaviour. To develop effective interventions, then, one must understand both internal and external factors that contribute to behaviour.²

Use of the Mass Media

Newspapers, radio and television are often sources of information which are passively received. Nevertheless, carefully constructed information repeated frequently, especially at prime listening times for radio and television, can influence the opinions and even behaviours, particularly with respect to health. Radio, television, cinema and videos provide entertainment directly targeted to their audiences, and incorporate role models, for better or worse, with whom people identify.

This is a powerful channel for influencing and changing the behaviour of people in positive ways. In most developing countries, the effect of newspapers and television tends to be confined to the cities, due to a lower literacy level and the near absence of television receivers in many rural areas. However, this is beginning to change due to the increasing use of videos, which can carry the visual impact of television into the countryside and villages. A good example is the Mobile Cinema units of the Ministry of Information of Zimbabwe which, supported by UNICEF, reach out to an audience of about 4 million people in rural areas, using videos and film.

The visual aspect of television greatly enhances its interest and impact. This medium has been successfully used in most countries to inform young people and reinforce prevention practices against HIV/AIDS. Television has also provided a channel for popular soap operas addressing adolescent concerns in several African countries. As with radio, a single presentation can expect little result, and repetition over an extended period is essential to achieve a lasting effect on young people's opinions, and especially on their behaviours.

Radio is universally available, and programmes in local languages reach schools and young people as well as adult communities. A good example of the use of radio is the "Dehleez" radio drama in India, broadcast twice weekly in 52 episodes for a year. The drama is directly targeted at adolescents, and is reinforced by extensive mail feedback from its listeners, estimated at 800,000. As with all successful mass media programmes, it was preceded by a careful study of listener attitudes and opinions, and the essential information on sexual and reproductive health was integrated into the series and repeated frequently. The popular "Teen Chat" radio programme on Radio Botswana, which was part of the Botswana Peer Approach to Counselling by Teens Programme (PACT), was planned and implemented by the young people themselves. Similarly the serial radio drama activities ran by the Jamaica Red Cross Island-wide Youth HIV/STD Prevention Project has been equally successful in augmenting their peer education efforts.

The Enter-Educate Approach

Entertainment has always been used for teaching purposes, through which people of all cultures have passed their collective wisdom from one generation to the next in compelling stories, drama, songs, proverbs, narrative, dance, rituals and masquerades.³ Lyrics help us to remember and characters become real to us so that we care about what happens to them.

A growing number of public education projects are turning to story and drama as a meaningful way to link facts about and to teach individual, collective and environmental development. These stories have found their way into development work as popular theatre, village drama, folk media, and soap operas for social change. Such use of entertainment for education attracts attention while providing a way to reinforce existing behaviour if it is positive or to demonstrate new behaviour.

An example of what can be done to highlight the use of entertainment as an "educational tool was the initiation by the Centro de Orientacion para Adolescentes (CORA) in Mexico of a series of drama-writing contests by young people. The winners have often come from the most economically deprived sections of society, and their plays were performed in public with considerable

impact on audiences. Similar experiences are reported from many African countries, an example being in Ethiopia where a youth touring drama group reached 65,000 young people.⁴

Community-based Models

Community-based approaches tend to be implemented more in remote settings where there is little access to adequate formal services, although more recently they have also been undertaken successfully in urban and peri-urban areas. Participatory in nature, they are grounded in the premise that long-term, sustainable development depends on the capacity of community groups to determine local priorities, plan projects, acquire necessary resources and assume responsibility for the administration and coordination of development activities.⁵

Participatory Approaches to Information and Decision-making

The use of truly participatory approaches in all aspects of development has come strongly into vogue in recent years. Participatory rural appraisal (PRA) first evolved in the 1980s as a means of developing practical research and planning approaches for development projects that would support decentralised planning and democratic decision-making, work towards sustainability, and enhance community participation and empowerment.⁶ Like many innovations in development, it began primarily in the agriculture sector, diffusing then to other areas, most recently health. Its methods include such techniques as participatory mapping, matrices, well-being ranking, causal and linking diagramming. It focuses on facilitation, sharing, negotiation, and attitudes.⁷

Media Advocacy

Media advocacy is an approach aimed at using media strategically to apply pressure for changes in public policy. It provides a framework for moving discussion from a primary focus on the behaviour of the individual to the behaviour of policy makers and corporate executives whose decisions structure the environment in which individual decisions are made. Media advocacy makes explicit the conflict of values and the political nature of development that colour the issues. It employs tactics based on community organising in conjunction with appropriate media use. It looks not so much at information gaps as at power gaps, and through such techniques as framing (positioning facts in such a way as to appeal to the audience emotionally), creative epidemiology (the presentation of statistics and data in a dramatic way), and sound bites (short, pithy statements), it attempts to set an agenda, shape debate, and advance policy.⁸

Advocacy campaigns are political and for the most part, confrontational. While they often emphasise use of the media to mobilise audiences and to draw attention quickly and dramatically to issues, generically they may also be more focused on working with NGOs and/or civil society. Many organisations are currently struggling with ways to increase or improve advocacy efforts and the challenges can be formidable because advocacy often implies a shift in emphasis from outcome to process as well as a shift in resources to a more local base of action. Such a decentralisation of political power encourages action rather than reaction. It allows for initiative in goal setting and spontaneous group formation. Successful advocacy efforts need to be documented so that others can draw upon prior experience. Advocacy efforts, whether media based or not, must be carried out carefully and knowledgeably and they are not appropriate in all settings or for all issues. But when used well, they can be a highly effective way to influence public policy thus creating a more supportive environment for sustainable development.

Folk, Traditional, and Indigenous Media

Folk and traditional media are an important channel of communication, particularly for rural and nonliterate audiences. Frequently overlooked in the early days of mass media campaigns, planners are now returning to this non-threatening modality as a viable means of education. Traditional folk media includes theatre, dance, puppetry, song, storytelling, and textile arts. Through the use of local language, customs and symbols, folk arts are a special way of reaching populations with familiar, credible, accessible and entertaining information.⁹

Multimedia campaigns

One of the basic tenets of multimedia and mass media campaigns is that each channel has a unique function. Radio and TV can reach large numbers of people quickly, imparting new information. Print material can instruct, remind and reinforce. Folk media can make sensitive topics more comfortable to discuss and interpersonal communication can be critical in terms of persuasion and decisions to act. As this differentiation suggests, the effective use of mass media requires that more than one medium is used. A multimedia strategy can enhance message reception because each medium complements and reinforces the others.

School-based programmes for young people and adults

More successful school-based programmes have engaged students in participatory and exploratory activities, where they can actively be part of frank

discussions about their thoughts and their fears, they can be supported in clarifying their attitudes and values related to health, the environment and other development issues, and they can learn life skills that will help them to maintain the behaviours that will support their desired health and development outcomes, clearly addressing issues of self-esteem, assertiveness, gender and socio-cultural factors, while developing skills and access to services have been very effective. These types of approaches are much more effective than simply providing information and hoping it will somehow be understood and applied to daily behaviours.

Social learning theory relies on the use of attractive role models with whom the audience can associate. Conveying factual information is only one element of this approach. Peer education based in social learning theory might also involve modelling appropriate behaviour, teaching social skills, and rehearsing possible roles and situations. Sometimes this is translated into practice in terms of "peer pressure resistance training". Social inoculation theory is also concerned with resistance to pressures from peers. This may, however, take the form of providing peers with persuasive arguments and facts to counter pressures which are deemed undesirable by health educators, such as to smoking, using other drugs or having unprotected sex.

Peer counselors and educators may be used in many settings, such as in communities, youth clubs, schools or workplaces to provide one-on-one counselling or information, formally or informally; provide information or counselling in a group setting, formally or informally; facilitate outreach programmes for target audiences in the general population; reach audiences through a variety of interactive strategies such as small group presentations, role plays or games; staff outreach offices, hot lines and resource centres from which targeted peers can gain access to health information and participate in self assessments; and act in drama groups with role model problem solving skills woven into scenarios recognisable as real-life health risks to their peers.

MOBILIZATION OF KNOWLEDGE/EXPERTISE FOR CHANGE

Advocacy is a very effective tool for mobilising support for change in an environment or situation. One could consider the outcome of **ADVOCACY** as: attention and support are gained of policy and decision makers for health and development promotional efforts. Stakeholders are willing to introduce or reorient policies (including legislation and programme/financial priorities), strategies and programmes in support of health and development. Often for this to happen it is necessary to build partnerships, alliances and coalitions and to mobilise and negotiate with partners to arrive at a common approach or goal.¹⁰

There are a number of effective strategies that could be used to support advocacy efforts. One of these is *demonstrating the relationship between education*

and internationally recognised human rights instruments and health and development declarations. Most governments of the world have signed associated declarations, indicating their political commitment to guaranteeing such rights for their populations.

Another effective strategy is that of *indicating the cost-benefit of health and development interventions* for young people, such as by demonstrating how prevention rather than cure, particularly starting very early in life, pays off by having a lasting impact and reducing costs in the long run.

Policies and legislation related to young people are often contradictory and unevenly applied, as are social norms, messages and cultural expectations. *Consolidation of regulations, or at least collaboration among relevant agencies,* might reduce some of these problems. For example, coherent policies and legislation across sectors are needed to deal consistently with the requirements for consent, confidentiality, legal constraints, and adolescents' access to information, education, guidance, counselling, and clinical services to prevent unwanted and undesirable conditions, such as pregnancy and childbirth and sexually transmitted diseases.

One effective strategy to advocate for supporting a link between education and a sustainable future is to *establish a national policy focused on key development issues* that will affect the country's future. This will:

- Help to institutionalise the political commitment and vision of the government for healthy and sustainable development through education of young people and the country as a whole. It is a tangible reflection of what a nation thinks about young people and their productive development for the future.
- Help to create consensus and consistency between religious, cultural and other specialist organisations concerned with influencing people's development.
- Unite the objectives and services of a range of agencies and projects affecting people's lives towards common and co-operatively agreed upon principles and objectives for the healthy development of women and men.
- Provide a framework for identifying needs, drawing up detailed action plans, ensuring proper coordination, monitoring progress and measuring success at local, regional and national levels.
- Recognise that young people are a group with particular needs and a special perspective on their own development as individuals.
- Establish a wider perspective on people's health and development needs, *including more than the education sector, such as employment, health, family life and the media.*

An essential starting point for developing a national education Policy for sustainable development is *commitment at the highest level to support the educational development of the next generation*. The country acknowledges the unique nature of the relationship between education and sustainable development and it has a vision for the future that recognises the benefits of change for the whole country.

A national policy requires structures to implement that policy and ensure it is carried out in a consistent, coherent and coordinated way. These structures will vary from country to country but could involve the creation of inter-departmental or multi-sectoral committees; joint task forces on specific health and development policy issues; and the appointment of elected members or senior government officials to oversee the policy and to be accountable for its planning, implementation, monitoring, evaluation and further development.

INNOVATIVE SOLUTIONS

To maximise chances of future success, it will be important to merge the dichotomies of thinking and approaches to education.

One challenge for the future will be to merge educational approaches that focus on *individual behaviour change with those that address a systems approach* to education which is aimed at creating an enabling environment for social change. The behaviour change approach focuses on changing social norms one person at a time, suggesting that behaviour change occurs along a continuum and that the farther along that continuum a person travels, the more likely they are to demonstrate sustained behaviour change. When a critical mass has been reached in terms of behaviour adoption within a community, there will be an inevitable social change in support of the desired behaviour. On the other hand, the systems approach to education relates to creating substantial changes in social and community norms, promoting long range work in a participatory fashion within community infrastructures as a means of altering individual health behaviour.

A second related issue is that of balancing *community-based, participatory models* which rest philosophically on the social norms approach with more *large-scale, centralised programmes*. The former are more costly and time and personnel intensive which usually means limiting the number of communities where educational efforts can be oriented specifically to the population at hand, but they can be tailored to the individual needs, cultures, and priorities. The latter approach can at least ensure global coverage of the population in a more general way.

OPPORTUNITIES AND CONSTRAINTS

NEW COMMUNICATION TECHNOLOGIES

The most effective programmes combine mass media with community, small group, and individual activities which are supported by an "existing community structure, thereby using a "systems approach" to campaigns.

New electronic technologies, such as electronic mail (e-mail), satellite communication for teleconferencing, and CD rom disks for practical training opportunities all open new avenues for innovative ways of providing interactive educational activities.

It is becoming increasingly unusual for one information intervention to be used alone, and most health programmes use a *multi-channel approach*. It is clear that there is a large advantage to utilising multiple ways to reach people, especially when they can be directly involved. Repetition of such opportunities is important to maximise the chances of all people being reached, as well as driving home the learning. For example, existing data suggest¹¹ that a *classroom* course alone cannot be expected to change sexual behaviour in a direction that is in opposition to the adolescent's sexual world as molded by the television, motion pictures, music and advertising industries, as well as peer group and adult role models. In a community-wide sex education programme in the United States,¹² *parents, teachers, minister, community leaders and the media* were involved. Sex education in the schools was only a small part of an overall effort to postpone the age of first coitus, and to promote the consistent use of effective contraception. Central to the project was an educational programme to help adults improve their skills as parents and as role models in the community. It was found in that 2-3 years after the implementation of the programme, the estimated adolescent pregnancy rate declined by 35% compared with the preintervention period, and compared with 5.5-14% in non-intervention communities.

The *telephone hotline*, commonly organised by NGOs, provides a person-to-person service which is heavily utilised in many countries. Ensuring confidentiality, the counsellor (often a volunteer) is able to discuss sensitive problems with people, give advice and arrange referrals to health clinics (their own or others), private physicians or social services as appropriate. In countries, such as Indonesia and the Philippines, large numbers of telephone hotlines, usually in urban areas, furnish a valuable service by helping to defuse delicate issues and to resolve problems of individuals. Such services can be anonymous while tailoring help to personal needs. The anonymity makes the hotline more likely to be used by young people afraid to approach other potential sources, and by providing specific information and sometimes a certain amount of counselling it responds to each individual as appropriate. Although the hotline is essentially restricted to

urban areas, it can also be accessed even when phones are not readily available in homes, but where there are public telephones or phones installed in places frequented by young people such as factories and youth centres.

The *fotonovela* and *comic magazine* are very widely used throughout the developing world as a means of transmitting reproductive health information in an entertaining form. In many countries, comics are the main reading material used by adolescents, and NGOs and adolescent health programmes have designed comics and serial magazines which contain information about adolescent sexuality and reproductive health integrated into the storyline.

Interactive approaches in the mass media are recognized as valuable to learning. Although the mass media are often considered as a form of one-way communication, there are ways in which some form of interactivity can be incorporated. These include: telephone talk-ins to radio programmes; questions and answers in magazines and newspapers; discussion with or by people in debate on television or radio; and the computer kiosk, simulating the interaction between and among different people.

One valuable way of pursuing change is to conduct *single-issue campaigns*. These provide a focus on a particular area of health or development need that has a short-term impact on a priority problem. This can provide the foundations for longer term projects and initiatives.

NEW PARTNERSHIPS

In terms of organisational integration, which implies functional linkage rather than co-optation, it is important to build alliances with others working in the same community or delivering services to the same clients. By doing so, it is possible to maximise effort, expertise and resources while avoiding duplication of services and contradictions in information provided. However, developing partnerships is not easy, nor is it a static process that will progress without significant nurturing. It could therefore be helpful to envision developing and maintaining partnerships as a fluid process along a continuum which ranges from mere coexistence, to communication, cooperation, coordination and finally, to collaboration. During the process of achieving collaboration, conflicts inevitably arise. How these conflicts are resolved is critical, because the basis for moving forward rather than remaining static resides in that process. Alliances are formed when groups successfully negotiate beyond their differences to jointly accomplish a common purpose.

Use of the media is a very effective way of informing and educating the population. It is important to blend the use of *mass media with indigenous media*, and whenever possible have supportive interpersonal communication as a reinforce-

ment. Without the person-to-person communication, it is difficult to know how information is interpreted and applied in the daily lives of the people.

Non-governmental organisations (GOs) have become increasingly important to the implementation of community oriented health education programmes. They have the ability to reach areas of greatest need in both rural and urban areas and they concentrate on the poorest communities that have few basic resources or existing infrastructures. They promote local involvement, traditionally by enlisting community participation and frequently working with diverse local groups and organisations that have disparate interests. Therefore, they often command the respect of the local counterparts, which helps to involve local leadership. They are usually committed for the long term, thereby forming close bonds with the other support groups with which they work, developing partnerships and promoting self-help strategies and outcomes. Comparatively speaking, NGOs often operate at low costs, with staff working for very modest salaries, using low-cost technologies and approaches and streamlined services. Very often they are open to trying new approaches and innovative strategies, building upon existing services, infrastructures, and cultures with a focus on knowledge and technology transfer. For example, they might adopt innovative and multidisciplinary strategies in the development of HIV/AIDS programmes to link problems in gender inequity to condom negotiations in cultures where females have no autonomy or authority in sexual relations, or to link income generation to protective behaviours. They tend to be independent and relatively free from political entanglements and the outcomes produced by NGOs tend to be sustainable and not to rely on continuing external technical assistance and financing.

In *factories, hostels, armies and prisons*, most people are young and sexually active and probably have little access to information on sexual health, HIV and other STDs or prevention methods, or other health issues that will affect their future well being and development. In these single sex settings, men often have sex with other men and sexual health and HIV education programmes must recognise this. Working in these settings will involve discussion with employers and senior staff. Informal education programmes, union meetings, or organised activities provide an opportunity for sexual and other types of health and development education. They may also be a very good place to provide appropriate services, such as providing condoms or STD treatment.¹³

For young people in many countries, *youth clubs and scouts* provide an opportunity for the development of life skills which will serve them as future leaders and actors in their own and their country's development. In scouts the philosophy is to respond to issues identified in the community, and to tailor health interventions to fit local situations and cultures. Other youth organisations, such as Girl Guides, Boys and Girls Clubs, YMCAs and YWCAs, have also carried out programmes with a focus on skills development. Multi-component programmes, such as Ser-

vice Volunteered for All (SERVOL) in Trinidad and Tobago, Girl's Town and the YWCA in Jamaica, and the Human Resource Centre in Antigua, work to develop adolescents' self-confidence and self-esteem. They also offer job skills training as an alternative to formal education. Adolescents report that they are drawn to these centres primarily for this training, which gives them orientation in order to secure work, and skills needed to find and hold a job. Self-esteem, punctuality and personal health care are part of this training. In the Adolescent Development Programme, SERVOL strongly emphasized helping adolescents plan their futures, and what they need to get there. In a collaborative outreach initiative of the Ghana Red Cross and the Ghana Scout Association, "Action for Youth: Reaching Working Youth with HIV/AIDS Prevention", peer educators have incorporated skills training for negotiating safer sex, refusal, and assertiveness skills.

Partnership *between public and private sector* enterprises can provide a new avenue for joint activity as well. It will be important to balance the particular interests of each to ensure that the public good is the most present objective and outcome of such initiatives.

PEOPLE PARTICIPATION

The process of defining local and national health and development priorities should be a participatory one, including the development of an action plan that is tailored to the reality of each setting. Effective health promotion and education interventions should involve representatives of the target population in the initial assessment of the health and development situation, as well as in the planning, implementation, monitoring and evaluation of the health promotion and education activities. The health and development behaviours and conditions that are targeted for intervention should be defined based upon the priorities from the perspective of the community as well as from those of the service providers and policy makers. Influential community leaders those who can help affect reinforcement of the proposed changes and behaviours, and those in a position to make needed resources available should all be consulted and involved. These people can also bring efforts to a halt if they are not convinced it is a worthwhile initiative. It may be necessary to organise pressure groups and influential leaders to advocate for changes in current policies and legislation or encourage the development of new ones that promote and support healthy and productive behaviours.

Selection of the types of health promotion and education strategies, approaches and methodologies will depend upon what is most acceptable to the target population, what materials, methods and resources are available to the planners, and the effectiveness of each in arousing interest, communicating information, promoting attitudes and actions, and sustaining changes identified as prior-

ity areas for action. Repeated health promotion and education efforts, using multiple channels and media, with creativity and variation in the way messages are delivered and supported by others in the community and the health services, will have the best chance of success. The identification of key stakeholders as well as creative thinking about possible non-traditional alliances in partnership is an important first step in establishing a collaborative working relationship.

MAIN PRINCIPLES OF EDUCATION FOR SUSTAINABLE FUTURE

- Comprehensive strategies have the best chance of success. This means having clearly articulated objectives, keeping the client at the centre of what is being designed, conducting appropriate research, undertaking audience segmentation (i.e., the dividing and addressing of audiences by geographic, demographic and psychographic or life-style variables), carefully crafting and testing messages and knowing what are appropriate channel choices, and planning for monitoring and feedback.
- Programmes that seek to teach new behaviours work best when they *define through research* what the health and development problem really is, whom it affects, how those people understand and respond to the problem, what obstacles they are likely to encounter, and how the audience can be influenced to change.
- Sound programmes also use audience segmentation, marketing techniques, behaviour analysis, and anthropological research to *create messages and skill building that are salient, actionable and attractive*. They test those messages, integrate communication channels, monitor constantly, and commit to the long haul.
- Sometimes it is important to *anticipate trouble* and to develop a crisis communication plan if the intervention is considered controversial. It may be important to determine in advance who will act as spokesperson for the programme and she should be prepared. Centralising information for dissemination to the public may help to avoid problems. It is important to communicate to all key audiences and to maintain good relationships with them. Knowing who the possible opponents are and in so far as possible, building trusting relationships, will also help, as people respond best to facts. It may be necessary to make short-term sacrifices for long term gains.

- *Documentation* of programme inputs and implementation experiences is important for understanding successes and failures. Methods for doing this should be institutionalised as part of management information systems. Only the most important and pertinent information should be collected and analysed to avoid overloading programme implementers and evaluators with data that may never be used.
- *Phased training*, focusing first on skill building and then on skill transfer, is a successful model. It allows trainees to practice their new techniques (e.g., counselling) before actually becoming trainers of others in the same skill area. This enhances overall programme sustainability.
- *Well-designed and tested training modules can serve as reference points* for national and local training programmes. In designing materials for widespread use or for local adaptation, three strategies can help assure relevance and widespread use: involving a wide range of potential user organisations in identifying needs and issues; involving them in pretesting the materials in their respective programmes; and involving them in translation and publication of materials.
- Very rarely does a person make a decision alone. To make a lasting change in one individual, the *key influentials* must be identified and encouraged to support the changes in an individual.
- Mass media helps to create an agenda for public debate. It reaches many people and is not that expensive. However, to be effective, *mass media must be supported by interpersonal and group communication*.

REFERENCES

1. Rogers, E., *Communication of Innovations: A Cross-Cultural Approach*, 2nd edition. NY, The Free Press, 1971.
2. Joint Committee on Health Education Terminology Report of the 1990 Joint Committee on Health Education Terminology", *Journal of Health Education* March/April 1991, Vol. 22, No 2, p. 105-108.
3. Clift, E. and Freimuth, V. "Health Communications: What is it and what can it do for you?" *Journal of Health Education*, Vol. 26, No. 2, March/April 1995.
4. WHO/UNFPA/UNICEF, "Programming for adolescent health: discussion paper", unpublished, Nov-Dec 1995.
5. Academy for Educational Development (AED) "Partners against AIDS: Lessons Learned, AIDSCOM", WDC, 1993.
6. Academy for Educational Development, "A World Against AIDS: Communication for Behaviour Change", WDC, 1993.

7. Blair, J., "PSI/Project ACTION: Impact on Teen Risk Reduction", PSI, WDC, 1995.
8. Brooke, P., "Communicating Through Story Characters", Institute for International Research and University Press of America, inc., Lanham, MD, 1995
9. Center for Communication Programs, Johns Hopkins School of Public Health, "Promoting Sexual Responsibility in the Philippines Through Music: An enter-educate approach", Occasional Paper Series, No. 3, 1994.
10. Country Support Team Addis Abeba, "Lessons Learnt: 1993-1996", 1996.
12. Vincent, M.L.; Clearie, A.F. and Schluchter, M.D., "Reducing Adolescent Pregnancy Through School and Community-based Education". *Journal of the American Medical Association*, Vol. 257, p. 3382-3386, 1987.
13. AHARTAG and Hand-in-Hand Network, *Working with Young People on Sexual Health and HIV/AIDS: Resource Pack*, London, 1996.

Sustainable Development, Education and Human Values

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From the point of view of the global environment the present evolution of human civilisation is clearly not favourable. The important driving forces are - among others - the ever increasing demand for energy and materials, as it is documented by Figures 1 and 2. The data showing the development after 1990 prove continuation of the same trends which occurred up to that time (Brown 1995).

Some of the most industrialised countries stress that their economies are characterised by the "decoupling" of material demand and economic growth achieved by increased eco-efficiency. Indeed, such decoupling is an encouraging contemporary trend. However, even if the material input per a GDP unit of these countries is decreasing, the overall material consumption expressed in absolute terms is growing (Fig. 3).

No wonder that the physical state of the global environment is deteriorating, as documented by very many data. Two illustrations quoted from the last IPCC Report are in Figures 4 and 5.

We should ask: What is wrong? What is the reason that despite all the local work and global effort, international conferences, treaties and many other instruments the situation is not improving?

According to Ms Dowdeswell, UNEP's Executive Director, one reason is that the urgency of a clear environmental message was during recent years diluted by a far less concrete notion of sustainable development. The relatively successful cause for environmental protection was engulfed by a fashionable but less successful goal of sustainability. But the evolution from the focused but relatively isolated stress on the environment to the broader concept of sustainability was not only inevitable but also welcome. Here, the care for the environment finds its proper place. The problem of the term of sustainable development is not its fustiness but its enormous challenge.

As Ms Brundtland put it, the global transition to sustainable development is comparable to the agricultural and industrial revolutions of the past. (Fig. 6) Contrary to these great historical changes, the contemporary shift should be accomplished only by a deliberate and truly global effort and in a relatively short period of time. Nobody yet knows exactly what to do and how to do it, but among several things that seem to be certain is the unique role of education in this process.

Everybody agrees that education for sustainable development is absolutely crucial but only very few concrete and at the same time generally acceptable principles for it are available. Therefore I am extremely pleased that this Workshop is taking place and eager to hear the recommendations of the eminent persons present here. Let me suggest some basic elements of such an education.

To my understanding, education for sustainable development should contain three essential constituents (see Figure 7).

As for the "smallest common denominator" or the universally plausible explanation of sustainability the situation is very difficult. It seems that no commonly acceptable definition of sustainability or sustainable development exists. Indeed, even the slightly different terms themselves as coined by different authors and used by different institutions are witness to many interpretations (Fig. 8). Also, the translations into languages other than English reveal a certain divergence.

I propose to rely on the internationally agreed documents like Agenda 21 and especially the Rio Declaration on Environment and Development. As the well known Principle 1 of the Rio Declaration states, the focus of sustainable development is on humans (Fig. 9). That inevitably implies that this concept is based not only on objective scientific knowledge but that it has its strong normative elements and therefore is generally bound to human values. I will not attempt to define precisely what the term "human values" means but I insist that whatever the meaning is, values have an extremely strong influence on all definitions and conceptions regarding any aspects of sustainable development. The "smallest common denominator" reflects the minimum on which the international community is able to agree as it is reflected in the above - mentioned documents.

I hope that we all may agree that sustainability encompasses a long-term and global perspective and that it represents an integration of four basic constituents (Fig. 10).

As for the environmental part, the main factors are given in Figure 11.

Economic dimension is captured in Figure 12.

Figure 13 contains the elements of the societal part.

The important aspects of institutions are given in Figure 14.

I understand the "global minimum" as a portrait of "our global village" again from the points of view of environment, economy, society and institutions. An attempt to capture the environmental part is given in Figure 15.

The most important constituent of my proposed "sustainability package" is what I call the local maximum. Analogously to the global minimum this part could be shaped along the E-E-S-I scheme and in this way the local situation should be expressed. Here, the value dependent character of the concept of sustainable development is most visible. Only a very few human values are shared by all the people of the world but most of them are locally very different.

The main determinants of the human values are in Figure 16.

An illustration of a distinct perception of goals for a sustainable city development is in Figure 17.

Finally, an example of the geoenvironmental dimension is given in Figure 18.

The relationship between sustainability and human values is not unidirectional. Not only values shape the concept. On the contrary, a very important aspect of the cause for sustainable development is a deliberate attempt to shape human values in such a way that they should respond more adequately to the necessary global transition. Here lies an even more challenging appeal for education and indeed also upbringing.

REFERENCES

- Briguglio, L.: Small island developing states and their economic vulnerabilities. *World Development*, Vol. 23, No 9, pp. 1615-1632, 1995
- Brown, L.: *Vital Signs*. Worldwatch Institute, Washington, D.C., 1995
- Brundtland, G.H.: Statement to UNCED, Rio de Janeiro, June 3, 1992. (A/Conf.151/126/Rev.1, Vol.II, p. 58)
- Fischer-Kowalski, M.: Tons, joules, and money: Modes of production and their sustainability problems. Paper presented at the SCOPE Workshop on indicators of sustainable development, Wuppertal (Germany), November 15- 18, 1995
- Goldsmith, E., *et al.*: *A Blueprint for Survival*. The Ecologist, 1972
- IPCC Second Scientific Assessment of Climate Change, Geneva, 1995
- IUCN-UNEP-WWF: *Caring for the Earth*. Gland, 1991
- Meadows, D.H., Meadows, D.L., Randers, J.: *Beyond the Limits*. Chelsea, Post Mills (Vermont, USA), 1992

Moldan, B.: Geobiosphere load A tentative proposal set of policy-relevant indicators. Paper presented at the SCOPE Workshop on indicators of sustainable development, Wuppertal (Germany), November 15-18, 1995

UNDP: Human Development Report 1992

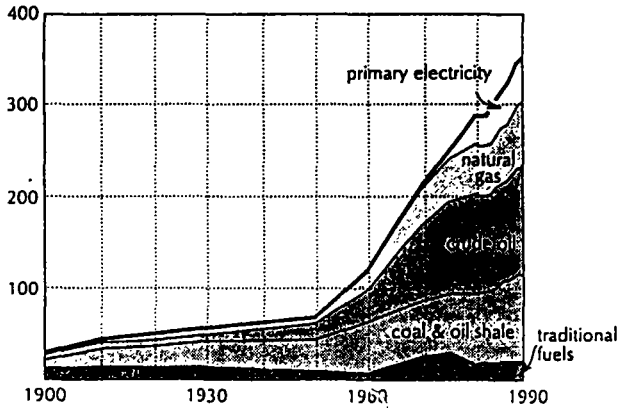
Wang, R.: Sustainability indicator in China - A theoretical and practical concern. Paper presented at the SCOPE Workshop on indicators of sustainable development, Wuppertal (Germany), November 15 - 18, 1995

WCED: Our Common Future. 1987

World Bank Conference on Environmentally Sustainable Development, Washington, D.C., September 1993

Figure 1 World Energy Use

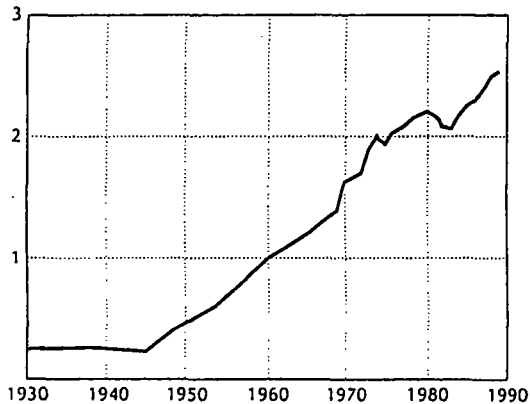
Millions of terajoules per year



Source: Meadows et al, 1992

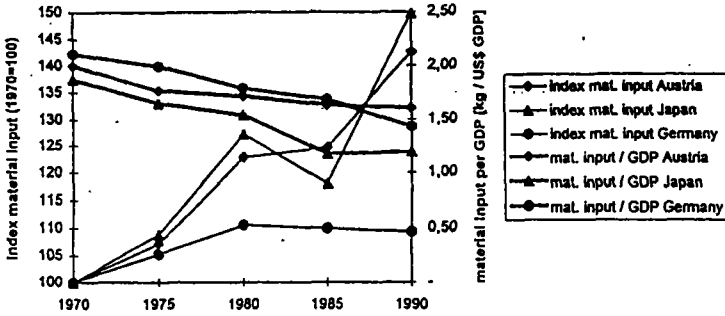
Figure 2 World Metal Consumption

Billion metric tons per year



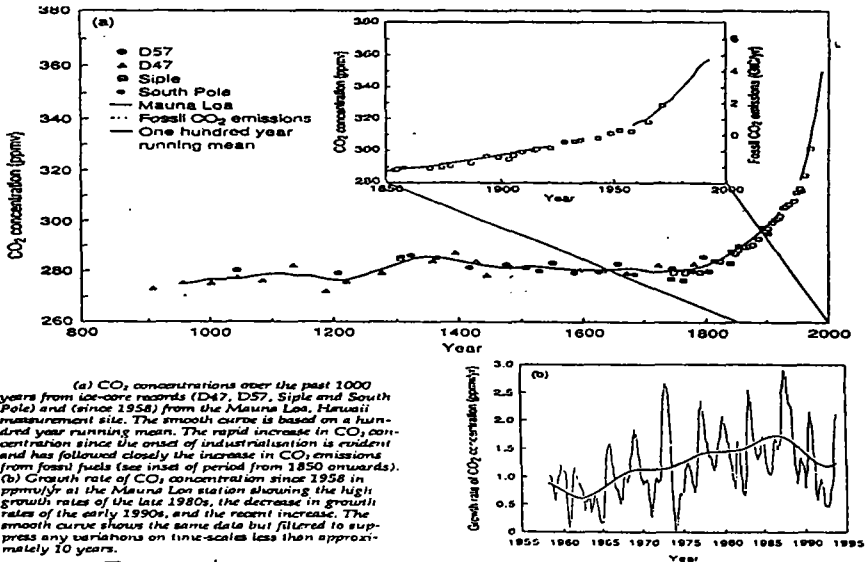
Source: Meadows et al, 1992

Figure 3 Comparison of Material Input and Material Intensity for Austria, Germany and Japan, 1970-1990



Source: Fischer-Kowalski, 1995

Figure 4



Source: IPCC, 1995

Figure 5

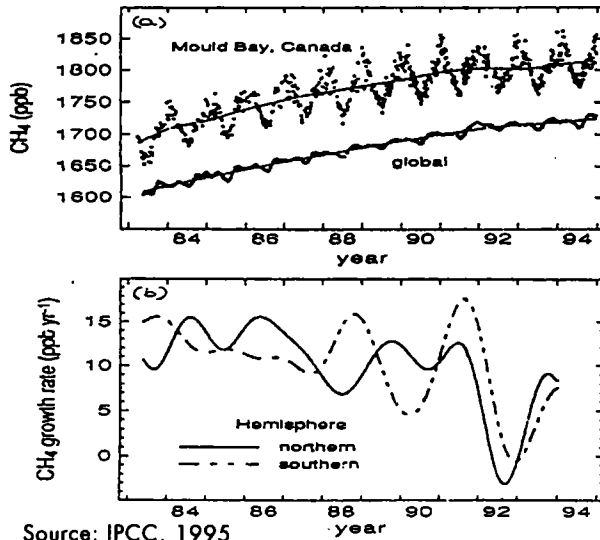


Figure 6

Source: IPCC, 1995

We are compelled to manage the most important global transition since the agricultural and industrial revolutions - the transition to sustainable development.

Gro Harlem Brundtland, Rio de Janeiro, June 3, 1992

Figure 7 Essentials of Education for Sustainable Development

- "Smallest common denominator"
- "Global minimum"
- "Local maximum"
- Sustainable society (The Ecologist: 1992)
- Sustainable development (WCED, 1987, UNCED, 1992)
- Sustainable living (IUCN, 1991)
- Human sustainable development (UNDP, 1992)
- Environmentally sustainable development (World Bank, 1993)

Figure 9 Rio Declaration on Environment and Development

Principle 1

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

Figure 10

Environment	Economy
Society	Institutions

Figure 11 Environmental Dimension of Sustainability

- Living in harmony with nature (1)
- Proper use of natural resources (2)
- Responsibility towards other societies (2) X
- Responsibility towards future generations (3)
- Common but differentiated responsibilities of individual countries (7)
- Precautionary principle (1 5)

Number in parentheses denote Principles of the Rio Declaration

Figure 12 Economic Dimension of Sustainability

- Integration of environmental protection into the process of development (4)
- Change in the unsustainable patterns of production and consumption (8)
- New technologies (7,9)
- Open economic system, fair conditions for international trade (12) .
- The special situation of developing countries (6)
- Internalization of environmental costs and use of economic instruments (16)
- Polluter pays principle (16)

Number in parentheses denote Principles of the Rio Declaration

Figure 13 Social Dimension of Sustainability

- Human development (1)
- Concern for human health (1)
- Eradication of poverty(5)
- Appropriate demographic policy (8)
- Equity among people and countries (5, 6)
- The special situation of developing countries (6)
- The role of citizens and states, public awareness and participation (10)
- Concern for indigenous people and major groups (2023)
- International cooperation and peace (2427)

Number in parentheses denote Principles of the Rio Declaration

Figure 14 Institutional Dimension of Sustainability

- Environmental legislation at the national level (11, 13)
- Environmental impact assessment (17)
- *International law: cooperation among states* (11, 12, 13, 14, 18, 19)
- Information, science and capacity building (9,10)

Number in parentheses denote Principles of the Rio Declaration

Figure 15 Geobiosphere Services

- Interface with and shelter against cosmic interactions
- Stable geophysical conditions
- Physical and chemical climate
- Water cycle
- Geobiochemical cycles of chemical elements
- Recycling and detoxification of wastes
- Space on the earth's surface
- Soil fertility Source of useful materials
- Source of energy Biodiversity
- Bioenvironment

Source: Moldan, 1995

Figure 16 Main Determinants of Human Values

- Spiritual and cultural heritage
- Sociopolitical system
- Level and distribution of wealth
- Economy and landuse
- Population density
- Geoenvironment

**Figure 17 The Goals of Sustainable City
Development in China**

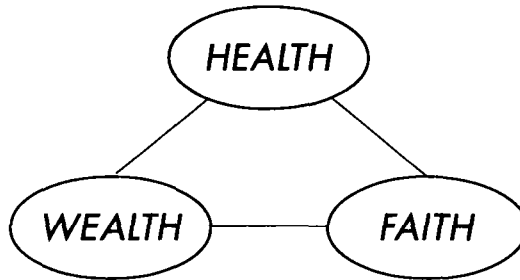


Figure 18

Small island developing states are more vulnerable than other countries according to vulnerability index composed by the following variables:

- (i) Exposure to foreign economic conditions
- (ii) Remoteness and insularity
- (iii) Disaster proneness
- (iv) Other

Source. Briguglio, 1995

UNEP Activities

*Alicia Bárcena,
Senior Advisor
UNEP*

UNEP believes that the future depends on environmental awareness, both among those whose jobs affect the environment, and those whose impact is less direct. Governments in Africa, Asia and the Pacific, Latin America and the Arab world have expressed their concern through regional programmes of action for environmental education and training, prepared with UNEP's assistance.

During the past 25 years, UNEP has championed both formal and informal education with a good measure of success, therefore it has a strategic role in environmental training and education. Its support for environmental capacity building, including human resources development, is achieved, in part, through partnerships. These include those with UNESCO at the international level and those with many key players at the regional and national levels.

In this context, in 1975, UNESCO and UNEP launched the International Environmental Education Programme (IIEP), to promote environmental education for all age groups, both within and outside the formal education system. This Programme has been working globally through UNESCO's extensive network of educators, and became a landmark in capacity building for curriculum development.

Other notable successes achieved under the aegis of the Environment, Education and Training Unit were curriculum development at all levels of formal education, including post-graduate, and partnerships in programme development with tertiary institutions like Tufts University.

During the Conference in Tbilisi, USSR, appointed by UNEP, guidelines and programmes urging schools and universities to promote environmental studies were developed.

The United Nations Conference on Environment and Development (UNCED), better known as the Earth Summit, that took place in Rio de Janeiro in 1992, was

the first time when two concepts, development and environment, were put together around the concept of sustainable development. The main document of the Earth Summit was the Agenda 21, and it has a chapter 36 entitled "Promoting Education, Public Awareness and Training".

UNESCO has been appointed as task manager for chapter 36 of Agenda 21, in accordance with arrangements agreed to by the Inter-Agency Committee on Sustainable Development (IACSD). They prepared the background paper "Overall progress achieved since the United Nations Conference on Environment and Development, that is the result of consultation and information exchange between United Nations agencies, international and national organisations, interested government agencies and a range of other institutions, individuals and major group representatives.

In line with paragraph 22 of this document, UNEP has refocused its relationship with UNESCO.

As stated in paragraph 23, UNEP is contributing to the objectives of chapter 36 by mobilising and broadening networks to deliver education, public awareness and training, particularly at the grass-roots level. There has been significant progress during the last three years and emphasis has been placed on reinforcing and introducing educational concerns into existing networks related to sustainable development in different activities as described below.

GLOBAL ENVIRONMENTAL CITIZENSHIP PROGRAMME

UNEP has been promoting several initiatives linked to informal education so as to provide information to the public. This information has not only raised levels of awareness, but has also been inspirational to engage society in specific actions. An example of this are events such as World Environment Day and the Clean Up the World Campaign, which have promoted environmental programmes at the community level.

In this way UNEP has also published recently a book entitled "Taking Action. A guide for you and your community".

On the other hand, the significant changes in the world's social and political order during the last decade, as well as the fact that our world has become more interconnected, and therefore the citizens can be more aware about environmental problems, have raised the need of people to organise themselves and act collectively to influence social change.

Due to this reason, the United Nations Environment Programme decided to launch a new programme in 1996 called Global Environmental Citizenship (GEC) building on the outreach initiative developed with NGOs for more than 20 years. GEC seeks to raise awareness about the ethical responsibilities of individuals, organisations, countries, communities, corporations and others to create new forms of solidarity to protect all life on earth.

In this regard, UNEP has refocused its traditional forms of environmental education and outreach around the concept of Global Environmental Citizenship by promoting attitudinal and behavioral changes and by anchoring its messages for various target groups. UNEP is re-designing its public awareness strategy by incorporating a demand-side approach that focuses more on the needs and concerns of different audiences.

Global Environmental Citizenship (GEC) aims to assert the differentiated rights and responsibilities of various sectors of society and promote informed actions to protect life on Earth. GEC seeks to play a significant role in facilitating the participation of major groups and non-governmental organisations of international influence in the environmental agenda.

The Environmental Citizenship Programme recognises that, in accordance with the role each subject plays in society, each social actor has different responsibilities with regard to environmental management. Being a minister is not the same as being a member of parliament, a local authority, consumer, producer or member of a religious group; each has different ethical obligations which, as a whole, represent the aspirations of society regarding the environment. At the present time, we have organisations that mobilise values such as mass media, educators and regional groups. Other groups mobilise knowledge or information, such as universities, intellectuals, academic groups and modern media, including Internet and others. There are groups that mobilise capital and labour such as rural and urban producers, industrialists and financial organisations, among others; and groups in society that are political activists for specific causes, such as organisations for human rights, environment, consumer defence and the representation of minorities. Still others represent citizens before the State, such as parliament members and local authorities, as well as other political and social leaders. All these groups represent different interests and values.

Environmental citizenship includes the ethical obligations that link us both with society and with the natural resources of the planet, in accordance with our social role and from the perspective of sustainable development.

At the global level, important strategic alliances have been established with global networks representative of groups with social and political influence, such as GLOBE (Global Legislators Organisation for a Balanced Environment); CI (Consumers International); ICLEI (International Council of Local Environmental Ini-

tatives) and IULA (International Union of Local Authorities); World Council of Churches; ACCC (Association of Community Schools) and AMARC (World Association of Community Radiobroadcasters). Each of these networks has consulted with its members to define a joint environmental agenda based on an understanding of their priorities and interests. It is an attempt to initiate joint programmes aimed at forming environmental citizens who recognize their rights and responsibilities regarding environment.

Even though the nature of the programme is global, it has been decided to focus on regional environmental citizenship strategies that will more accurately respond to the different social, economic and environmental realities. In each region, a proposal is being prepared for work with regional networks of the principal social actors with whom debate and an eminently participatory joint programme can be initiated.

UNEP is developing public awareness, environmental education and outreach, which are critical for improving the capacity of the people to address environmental issues, through the following activities:

- Creation of a strategy of environmental citizenship.
- Improving the image of UNEP as an authoritative environmental voice in media, meetings and other global/regional fora.
- Promoting environmental education and training.
- Formulation of global and regional projects including the GEF projects on environmental citizenship
- Development of a better understanding of emerging environmental issues and support to UNEP activities by public at large.
- Raise the popular support to UNEP's mission and raised awareness on general environmental issues.
- Creation of a youth programme that involves youth and children in environmental activities and support to UNEP programme activity.
- Formulation of a global strategy on sport and environment.

On information and public affairs, UNEP recognises that Agenda 21 stressed the need to improve access to environmental data and information world-wide. UNEP in its role as the voice of the environment, must ensure that the world community has unfettered and co-ordinated access to its information resources, as well as to environmental information in general. UNEP should maintain its leading role in enhancing access to unique sources of data and information, and in leveraging the refilling of data and information gaps.

CAPACITY BUILDING ON ENVIRONMENTAL LEGISLATION

UNEP's effective operation requires the provision of legal advice to administrative offices, substantive programmes and Conventions Secretariats.

UNEP's Environmental Law and Institutions Unit has the task of drafting and negotiating international agreements that balance the interests of rich and poor, large and small nations with those of coming generations.

The legal department also promotes international guidelines, principles and goals, which provide a basis for future treaty negotiations and for a common approach to environmental issues.

An important component of the Unit's work involves assisting developing countries with national environmental legislation and institutional framework.

In-service training for young lawyers under the interns or junior professional officers programmes is also provided, as education and training must be present in every unit of UNEP:

To continue with UNEP's capacity-building efforts, some ongoing activities are:

- Assist developing countries and countries with economies in transition in formulating national environmental legislation (both cross-sectorial and sectorial) for the implementation of international environmental agreements and establish an institutional framework for the implementation of this legislation.
- Provide environmental law training, education and legal information.
- Promotion of the incorporation of environmental law into national education curricula and public awareness building.
- Collection, review, analysis, production and dissemination of environmental law information through publications and other appropriate means.

To give special attention to specific priorities and needs of the regions, the global work of UNEP must be translated into specific regional actions and will be strongly supported by its six regional offices and specialised offices around the world.

At the regional level, the following are the most relevant activities on education, public awareness, environmental citizenship and outreach:

INDUSTRY AND ENVIRONMENT OFFICE IN PARIS

When UNEP opened its Industry and Environment Office in Paris in 1975, it was breaking out of the adversarial mould which had shaped relationships between industry and environmentalists in the past. IEO offered the old antagonists a chance to work together on the basis that "pollution prevention pays".

Besides this work IEO publishes detailed guidelines, reports and technical reviews on the environmental impacts of different industrial sectors and on such cross-sectorial issues as environmental impact assessment. In addition, the office maintains databases on national pollution standards and on publications related to industry and the environment. It runs a query-response service and its quarterly review, *Industry and Environment*, is read in over 140 countries.

In Paris a global programme on sustainable production and consumption is under development.

Current trends in population growth and industrialisation cause increased accumulation of wastes and pollutants, as well as the unsustainable use of natural resources, in particular energy and water. If sustainable development is to be achieved, production processes, products and services, and consumption patterns have to be modified.

To this end, the development and use of environmentally sound technologies, with a focus on cleaner and safer production that prevent pollution and use raw material efficiently, as well as the creation of awareness among the society on the importance on building sustainable consumption patterns to the achievement of sustainable development, is one of UNEP's objectives.

Through its Regional Offices and always in co-ordination with the IEO, UNEP also organises training workshops for industries on Cleaner Production, CFC s, ISO 14000 and the utilisation of certain chemicals.

FORMAL ENVIRONMENTAL EDUCATION AND TRAINING

Since the Earth Summit the Environmental Education and Training Unit of UNEP has been the focal point for UNESCO and assisted governments in building internal capacity to train their own people in the environmental field

through advisory services. EETU has also, in collaboration with the Regional Offices, developed the environmental training networks in the different regions. The objectives of these networks have been to enable training institutions to exchange experiences and material, as well as to train trainers on specific environmental issues to build national capacities.

The small windows programme was a small grants programme in education and training activities in order to enable grass roots organisations to carry out projects in the field of environmental education and training.

REGIONAL OFFICE FOR ASIA AND THE PACIFIC

The Network for Environmental Training in Asia-Pacific (NETTLAP) was designed to enhance the capacity of tertiary institutions in the Asia-Pacific region to meet the education and training demands to achieve sustainable development in the region. By "training the trainers" of both the current and future environmental managers, NETTLAP capitalises on an opportunity with a large cost-benefit ratio.

One of the first and ongoing achievements of NETTLAP is the establishment of a regional network involving both institutions and individuals who are associated to environmental training at tertiary level, therefore it plays a role in co-ordinating and facilitating regional co-operation in environmental training and other aspects of human resources development.

Recently UNEP's Regional Office for Asia and the Pacific has taken the initiative to use the regional umbrella provided by NETTLAP to catalyse national-based programmes to strengthen environmental education and training in tertiary institutions in selected countries. The intention is to establish a large number of National Partnerships in environmental training.

The activities of NETTLAP also relate to individual empowerment. This is achieved in part through providing environmental trainers with an enhanced awareness of the needs and opportunities related to their profession.

A project on environmental citizenship is being developed for Asia involving major groups of social relevance.

REGIONAL OFFICE FOR AFRICA

In Africa, UNEP's work in education has been particularly strong in the area of capacity-building in the government sector. However great strides have also been made in environmental education programmes and activities with decision-makers, policy-makers and opinion-shapers. Lately there have been concerted efforts to build partnerships with major groups under the Global Environmental Citizenship initiative.

Sustainability in developing countries increasingly depends on the ability to tackle key issues such as poverty and equity in sharing the benefits derived from sustainable use of natural resources. Communities must be empowered through education and training to participate fully in the provision of health and other social services so that they may ensure a good quality of life.

There is also the need to tackle issues of governance, democratisation and human rights. Transparency and accountability are central to the pursuit of these ideals. Ultimately, there is the need to end conflicts, and build a culture of peace. Education, formal and non-formal, is crucial to this end.

The activities that ROA will be carrying out this next biennium are above all aimed at enhancing knowledge and increasing awareness of all those environmental issues of relevance to Africa, and about UNEP's programme, activities and outputs.

- Promote regional groups training actions on waste management.
- Promote subregional group training in desertification control in the IGAD region.
- Promote subregional group training in coastal areas management in the UMA region.
- Promote dissemination of information on UNEP's programmes, activities and outputs.
- Provide environmental policy and technical advice to African Governments.

REGIONAL OFFICE FOR LATIN AMERICA AND THE CARIBBEAN

ENVIRONMENTAL TRAINING NETWORK *Tierramérica*

One of the instruments UNEP/ROLAC has developed in public awareness and outreach is *Tierramérica*.

The construction of a sustainable society is made possible by the full participation of its citizens. Therefore enabling people to understand the relationship between economic processes and the environment, the impact of these relationships on their health and well being, and the action each can take, individually and as a part of major groups, is fundamental if we are to achieve an environmentally and socially sound economic development.

To satisfy this need, the United Nations Environment Programme (UNEP), in association with Inter Press Service (IPS) and the United Nations Development Programme (UNDP), set out in late 1994 to produce a region-wide communications platform for Latin America and the Caribbean. The publishing of a newspaper supplement called *Tierramérica*, was a first step in this programme.

Tierramérica is a bimonthly environmental supplement inserted in twelve important newspapers of the following Latin American countries: Argentina (*Página Doce*), Bolivia (*La Razón*), Brazil (*Correio Braziliense* and *Estado de Minas*), Chile (*La Epoca*), Colombia (*El Espectador*), Costa Rica (*La República*), Ecuador (*Hoy*), México (*Reforma*), Perú (*La República*), Uruguay (*La República*) and Venezuela (*El Universal*). 300,000 Latin American people from all the walks of life read *Tierramérica*.

Each issue is dedicated to a specific topics. The topics we have dealt with so far are: biodiversity, water, cities, women, energy, consumers' power, health, economy, sustainable development, clean industry, and Rio + 5. The next two issues are going to deal with the ozone layer and woods.

Important personalities from all over the world have shared their views from the political, scientific and artistic perspectives. Among them, we have had Al Gore, Maurice Strong, César Gaviria, Paul Kennedy, Rigoberta Menchú, Noam Chomsky, Stephan Schmidheiny and Jacques Cousteau.

At present *Tierramérica* has been successful so far to:

- Develop a first class award winning editorial product.
- Establish the operational networks with newspapers, media agencies and independent contributors.

- Expand its circulation to one of the largest of its kind in Latin America.
- Create a market potential for corporate sponsors and commercial advertisement.

MISSION: RESCUE PLANET EARTH.

With the intention of creating responsible behaviour, through motivation, information, understanding and involvement, as well as to promote the empowerment of selected groups to the advancement of the environmental agenda, UNEP has created another awareness project besides the Global Environmental Citizenship Programme and Tierramérica named "Mission: Rescue Planet Earth".

Mission: Rescue Planet Earth is a children's version of the Agenda 21. It was translated and adapted into Spanish by Ediciones Larousse, S.A. de C.V and the Regional Office for Latin America and the Caribbean of UNEP.

When this book went on sale, ROLAC began receiving letters from children expressing their concerns about environmental degradation, and in this way, a club was formed.

Later, and since "Rescue Mission" does not reach everyone, and taking into account the importance of participation of children of rural communities and indigenous groups, ROLAC decided to prepare a national contest.

Children from 5 to 15 years of age may participate with drawings and/or written contributions. The awarding ceremony was chaired by Dr. Ernesto Zedillo Ponce de León, President of Mexico, and forty-six children were awarded.

ENVIRONMENTAL CITIZENSHIP IN LATIN AMERICA: A GEF PROJECT

In response to the urgency of expanding the environmental commitment to develop solidarity among social movements and to strengthen citizen activities, at the Ninth Meeting of Ministers of the Environment of Latin America and the Caribbean, held in Havana, Cuba, in 1995, the ministers decided to convene, for the first time, a citizen forum in which representatives of society in general, as well as non-governmental organisations, would participate in order to establish a dialogue revolving around the regional environmental agenda agreed to by their Governments.

Pursuant to the above-mentioned decision, the UNEP Environmental Citizenship Programme organised a Citizen Forum on Regional Environmental Management in Buenos Aires, Argentina, in 1996, in close co-ordination with the Ministers of

the Environment of the region. The forum included the participation of regional networks of parliamentarians, local authorities, industrialists, peasants, workers, religious groups, consumers, mass media, universities and ecologist organisations.

As a result of this important experience, the Ministers of the Environment decided to support a pilot experience in environmental citizenship in the region and to convene a citizen forum each year to continue the dialogue with the most important political and social actors of the region. The next citizen forum will be held in April 1998 in Lima, Peru, in conjunction with the Eleventh Ministerial Meeting.

In 1997, the pilot experience in environmental citizenship in Latin America and the Caribbean was initiated in order to identify the social groups with greatest influence for encouraging participatory and effective environmental management. Six principal groups were selected:

1. **Parliamentarians** are the legitimate representatives democratically elected by the people with three fundamental responsibilities: approval of environmental laws and international agreements provided for in the legal framework for environmental management; approval and supervision of public spending; and, in broader terms, representation of the legitimate interests that arise from the diverse sectors of society.

2. **Local authorities**, also elected through democratic procedures, play a crucial role in municipal environmental management and in solving everyday problems such as the management of garbage, water, and local and forestry resources handled locally. They are responsible for linking global priorities to the local realities through activities, works and services that make such campaigns workable in the sphere of each community, neighbourhood and street. The location in which local authorities are situated in the political and social organisation of our countries provides them with an invaluable opportunity and role to incorporate citizens into local environmental management.

3. **Organised consumers** exert significant influence on consumer preferences and play a role of social power much more important than that played by labour organisations in the past. Consequently, conscientious and active consumer organisations have the responsibility to use their power not only to provide information on green products, labels or seals, but also to change the way in which we produce, distribute and consume goods and services and the ways in which we manage and share resources.

4. **Religious groups** have an outstanding responsibility in the generation of civic environmental awareness. They should promote ethics and values opposed to irrational production and consumption, encourage the recovery of social solidarity based on the equitable and sustainable management of natural resources, and protect environmental rights as an essential aspect of human rights.

5. **Educators** have numerous responsibilities in environmental management. Since they mobilise knowledge, information and values, educators are basically the social instigators of ecological awareness and culture that will change polluting practices and customs for growing social participation in which individuals, aware of their rights and responsibilities, will mobilise to defend the environment and life.

The current globalised economy seeks to make us compulsive consumers and tends to view education as just another product in its efforts to reduce the education system to a reproducer of the values that the market requires. Consequently, there is a need to reappraise the critical role played by educators in instilling humanist values and ideas, in order to build a change from the current development style to one of sustainable development, working upward from communities on the basis of strong environmental citizenship.

6. **Broadcasters** play an important role in promoting citizen participation and in disseminating specific consumption models, since their coverage of environment-related topics generates, strengthens and guides the environmental awareness of society.

Technological development has brought about a revolution in communications: television, radio, the printed press and Internet offer greater and more rapid information on what is occurring world-wide, which confirms the enormous influence of the media in shaping opinion and behaviour in relation to social, political and economic events. This has prompted large communication firms to become involved in informal education, generating habits and mechanisms in interpersonal relations.

Change for sustainable development involves broad awareness with ethics that reconstruct the relationship among human beings and between them and nature, in a perspective of collaboration and shared responsibility regarding the preservation of the planet.

While the environmental question is of general interest, and it affects and is the responsibility of society as a whole, each social group has a special responsibility in the discussion and implementation of specific global and regional environmental priorities. Through work with these groups, efforts are being made to identify their different responsibilities in relation to environment, and how to exercise their environmental rights and duties in their daily social lives.

These responsibilities of social groups and actors should be viewed in the light of:

- their spheres of competence, by subject area;
- their degree of representation;
- their management capacity (economic, political, social, informational, etc.);

- their relations to natural resources and environment.

In relation to the first point, environmental responsibilities should be assessed by area or subject that justifies the formation of groups: for example, parliamentarians have various responsibilities both in monitoring public spending in environmental matters and in legislative work to move forward in the environmental legal framework; local authorities should facilitate citizen participation in local environmental management and link global priorities and international agreements to the local realities; religious groups should assume the responsibility of participating in the building of civic environmental awareness; consumers should contribute to the debate on unsustainable production and consumption patterns that the economies in our region have produced; educators should strengthen the strategic role they play in educating children and young people, incorporating humanist and environmental values; and broadcasters should strengthen the role they play in shaping opinion and reinforcing and guiding the environmental awareness of society.

The other points are considered common to all the groups, and are intended to measure their responsibility in relation to their degree of social representation, their physical, economic and political capacity to influence the sustainable management of natural resources, and their direct or indirect relationship with the environmental resources administered.

In principle, alliances have been established with the most representative regional networks of these groups, such as PARLATINO (Latin American Parliament); IULA (Latin American Chapter of Local Authorities); CLAI (Latin American Council of Churches); CIROLAC (Latin American Chapter of Consumers International); IPS (Inter Press Service); and important contacts have been initiated with two education networks, which are CEC-IUCN (Commission on Education and Communication of the World Conservation Union) and ILPEC (Latin American Institute of Education in Communications) and with broadcasters such as: Canelo de Nos, AMARC-Latin American Chapter and International Radios (Germany, Canada, the Americas, the Netherlands and Havana, among others).

In the case of the Caribbean, preliminary consultations have been conducted with the Caribbean Conservation Association and with the Action Plan for the Wider Caribbean since the social realities of the islands and the composition of the networks of key groups for purposes of this programme vary significantly with regard to what is occurring on the continent of Latin America.

The strategy has been designed jointly in a participatory manner with the principal groups and, for that purpose, each network has prepared a two-year, medium-term strategic plan.

In close co-ordination with the aforementioned regional networks, six workshops have been held to identify the needs and interests of the members of each of the

networks regarding global environmental issues, such as: biodiversity, climate change, depletion of the ozone layer and international waters.

On the basis of the workshop conclusions, each network has prepared a two-year work proposal using the global environmental topics as co-ordinating backbones. Each proposal is based on and fully reflects the priorities of each network; and, linked to their programmes under way, it proposes methods commonly used and tested by the network, as well as information and discussion mechanisms with which they are familiar. The infrastructure, knowledge and experience of each network is what provides enormous social value and legitimacy to the Environmental Citizenship Programme.

An interactive mechanism has been established among the six networks to:

1. Discuss the work proposals and set of ethical responsibilities (duties and obligations) of each group/network in relation to the environment, with emphasis on the four focal areas of the Global Environment Facility (GEF).
2. Open up interactive debate among the representatives of the six regional networks in order to formulate bases for the Environmental Citizenship Programme to be presented to the Global Environment Facility (GEF).
3. Propose areas of linkage and collaboration among the six regional groups/networks convened and to examine possible synergy and areas of consensus to achieve environmental citizenship that will encourage greater Latin American integration.

Public Awareness and Sustainability

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RECOMMENDED ACTIONS TO INCREASE PUBLIC AWARENESS:

ADOPT A GLOBAL CURRICULUM FOR SUSTAINABILITY

All UN member states should adopt a *global curriculum for sustainability*, by the year 2000. As Task Master for Chapter 36 of Agenda 21, UNESCO should put this project at the top of its agenda and present its recommendations at the gathering of the Ministers of Education during the International Conference on Education (ICE) in Geneva in 1998. Such a curriculum should integrate basic principles of general systems theory and cybernetics at the primary level, teach them in more detail at the secondary level, and promote their adoption in greater depth in universities.

CREATE COMMUNITY-BUILT VISIONS OF SUSTAINABILITY

Implementation of Agenda 21 requires a community-built vision of sustainability at the regional, national and local levels. As the *Local Agenda 21 Planning Guide* (published by ICLEI, UNEP and IDRC) points out, "experience shows that the development of sustainable cities and the indicators used to measure progress in that direction are most effective when they are 'owned' by community stakeholders, i.e. when the process of their creation has been *agreed upon by the whole community*. Only when they are thus legitimised, will they be actively used as the basis for planning and action." The *Local Agenda 21 Planning Guide* provides an excellent approach to building such community visions through stakeholder participation, issues identification, assessment of problems and priorities, agreement on action goals, formation of a strategic plan, and implementation and evaluation thereof. Details may be found on the Web at www.iclei.org.

DEVELOP COMPUTER SOFTWARE FOR SUSTAINABLE CITIES

An international collaborative research endeavour is underway to develop *Sustainable City*, an innovative GIS computer software application that will enable any town or city to see itself - and its surrounding environment - as a whole system. By making it possible for urban centres to simulate their metabolism and footprint, the software will enable stakeholders (municipalities, the private sector, schools and universities, NGOs, and farmers) to understand the hidden costs they pay for urban unsustainability, discover the magnitude of untapped economic and social benefits which sustainability could bring, and empower them to discover what they can do to implement Agenda 21 at the local community level. Sponsorship of US \$200,000 is needed to complete the R&D. Please visit the Global Vision web site at www.global-vision.org/city/ for details.

POSITION THE CONCEPT OF SUSTAINABILITY AS A GLOBAL GOAL

UNESCO, UNEP, UNDP, UNICEF, UNFPA, WHO, WWF International, and the International Institute for Sustainable Development (IISD) have provided seed money to launch the *Global Vision Project*, an international educational media campaign to "sell" the concept of sustainability as a *global goal*. The project is designed to provide UN agencies, NGOs, institutes, universities, schools, socially-responsible corporations, professional associations, religious groups, and leading thinkers with a means to combine our insights, integrate our outreach, and communicate our message of a positive future more effectively to the global public. Media products now in development include a *Sustainability film / TV series* of 100 short clips, a CD-ROM, a Web site, and a feature film. Sponsorship of US\$ 5m is needed to complete the first phase by the year 2000. Please visit the Global Vision web site at www.global-vision.org/sustainability/ for details.

THE POWER OF PUBLIC OPINION

"The problem of how to transmit our ecological reasoning to those whom we wish to influence - in what seems to us to be an ecologically good direction - is itself an ecological problem". -

Gregory Bateson

The world's leading experts in all the relevant fields agree that Humankind now has the resources, technology, and knowledge to develop a way of living that could be economically healthy, socially equitable, and ecologically sustainable.¹ But implementation of the political, economic, technological and social changes required to develop a sustainable civilisation now requires a level of action and co-operation without precedent in history. It indicates a profound lack of political realism to suppose that such co-operation could possibly occur without widespread *prior agreement on the goal*. For when people share a common goal, their natural tendency is to co-operate in realising it.

This paper argues that the United Nations, NGO's socially-responsible corporations, and the international educational community have utterly failed - for strategic reasons - to convince public opinion that sustainability is more important than short-term financial profit.

In the five years since the Earth Summit, some progress has been made to put the concept of "sustainable development" on the global agenda. But "sustainable development" is something of an oxymoron, and the progress falls dramatically short of the level of action that is needed.² Consider the facts. Various International Treaties and Conventions have been agreed to conserve biodiversity, to protect against climate change, to ban cross-border toxic waste dumping, to outlaw trade in endangered species, and to emphasise the rights of future generations. Many countries now have national Agenda 21 plans in place: more than 1,800 local authorities from 31 countries have developed local Agenda 21 action plans for sustainable development.³ And some transnational corporations have significantly reduced their levels of waste and pollution.⁴

But let us be realistic. The headlong rush to sign the World Trade Agreement overlooks many of its negative ecological and social consequences;⁵ most of the consumption and development now underway is more unsustainable than ever before; a billion peasants driven off the land are migrating to overcrowded cities in search of homes and jobs that don't exist;⁶ the promises of additional development aid agreed at Rio have not been kept; the long-awaited Peace Dividend has failed to materialise; the world still spends 800 billion dollars per annum on defence; the population explosion continues unabated; climate change, ozone

depletion, tropical deforestation, and desertification are increasing; loss of biodiversity continues at a hectic pace; water is becoming scarce; inequity, unemployment and homelessness are increasing;⁷ the former USSR and much of the developing world have fallen into a state of crime and anarchy;⁸ fundamentalist violence and racism are increasing; and the genie of genetically modified living organisms is being unleashed from its bottle, threatening the stability of our planet's delicately balanced ecosystem with a whole new level of risk. So while battles are being won, the war to achieve sustainability may yet be lost.⁹

In order to win this historic struggle, those of us in the sustainability movement need to adopt a *strategic* approach which recognises the *systemic* nature of the crisis and which takes public opinion into account. Public opinion is the single greatest influence on our collective behaviour, and right now the most influential part of public opinion is more interested in so-called free trade and short-term profits than in sustainability. Sustainability is still perceived as an extra burden, a sacrifice we can't afford. But sustainability is no sacrifice: it is the greatest historical opportunity of all time!

To achieve sustainability while the window to do so remains "open", the UN / NGO community, educational institutions and socially-responsible corporations need to catalyse a shift in public awareness. This requires that we ourselves adopt a new way of *seeing*. Rather than reacting to the symptoms of the crisis as they come up in a piecemeal way, we must address the underlying cause. We need to adopt a proactive, strategic approach which takes public awareness squarely into account.

This paper provides a brief rationale of this approach, and describes the GLOBAL VISION PROJECT,¹⁰ an international educational media campaign now being launched with support from UNESCO, UNICEF, UNEP, UNDP, UNFPA, WHO, IISD and WWF International.

The purpose of the GLOBAL VISION PROJECT is to "sell" the concept of sustainability as a *global goal*. It is designed to provide leading thinkers and organisations working on solutions to global problems with a means to join forces, combine our insights, integrate our outreach, and communicate our vision of a sustainable civilisation more effectively to the global public. The project is targeted especially to the global teenager. The potential audience is 1 billion viewers world-wide.

ADAPT OR PERISH

The challenge of making our human species ecologically sustainable is, in biological terms, a question of *adaptation*. If we fail to adapt to the reality of our new global environment, then we shall perish, as U. Thant observed, "if not with the *bang* of nuclear holocaust, then with the *whimper* of a species which ran out of air, water, resources and food."

Biology teaches us that any species which destroys its environment eventually becomes extinct. But since the origin of the first towns and cities 7,000 years ago, urban civilisation has never had to be *ecologically* sustainable. As long as these urban centres could expand the territory from which they took their resources, civilisation could survive and prosper (albeit at the expense of the surrounding ecosystem). This type of adaptation was an *addictive* relationship.¹¹

This expansion of our ecological life-support system gradually spread beyond the flat-earth horizons of local city-states, kingdoms, empires, and colonies, to super-powers and transnational corporations whose global frontier has now returned upon itself to envelop the entire planet. What's new is that we are the first generation in all of history to be confronted with the fact that our ecologically imbalanced urban way of life is no longer viable, as the consequences are now becoming visible on a global scale. The point is that the 50% of humankind who live in cities has little understanding of what sustainability really means, because it has never been part of its mythology, its history, or its experience.

It is therefore no exaggeration to say that the public relations challenge of "selling" the concept of sustainability to the global public is one of truly mythological proportions. But what is mythology? Ultimately, it is a story that relates the individual to his fellow human beings, to history, to nature, and to the universe itself. The story is the glue that binds the society's world-view together in a way that empowers its individual members to perceive mutual issues of collective concern, to share agreement about their perceptions, to orient themselves in relation to them, and to form co-operative interpersonal and social relationships for mutual advantage, development and success. Let us then consider the story of our human species in terms of ecological adaptation.

The evidence from paleontology shows that for the first three million years of primate evolution, our hominid ancestors adapted very well to their changing environment.¹² Archaeology and anthropology indicate that for the first three hundred thousand years of our existence as *homo sapiens*, our hunting and gathering life-styles were also well-adapted to our surrounding environment.¹³ Apart from the gradual extinction of a few species of megafauna such as the woolly mammoth and the sabre-toothed tiger, our ancestors were masters of the art of living - as indigenous peoples still do - in a harmonious relationship with Nature.¹⁴

But this relationship changed suddenly wherever and whenever urban civilisation first appeared. This was a completely new form of adaptation, in which - paradoxically - the urban centre managed to prosper while simultaneously destroying the environment on which its survival depended. This was made possible only by the historical expansion of the territorial "footprint" from which cities extract their resources and into which they dump their pollution and waste. So long as these cities could expand their ecological footprint, this new type of adaptation was - for them - a great success.¹⁵

If you have read Homer's *Odyssey*, you may remember that the landscape of Greece and the other Mediterranean lands visited by Ulysses were mostly forested. Homer lived in the 8th century BC. Only a few short centuries later, after the Greek colonies in Italy spawned the Roman Empire, most of the Mediterranean basin was deforested. In order to keep its cities, fleets and legions supplied with timber, fuel and food, the Empire then expanded beyond the Alps to conquer most of Europe and much of the Near East. Having also deforested the North African coast from Egypt to Morocco in order to meet the Empire's growing demand for grain, topsoil erosion soon turned that region into the desert which still remains today. As Clive Ponting has shown in his book, *A Green History of the World*,¹⁶ the same tragedy of deforestation, topsoil erosion, water depletion, salination, and desertification caused the collapse of most of the great civilizations of antiquity, including Sumer, Mesopotamia, and Meso-America.

Urban civilisation is like a seven-thousand year credit card binge. So long as you can keep on borrowing from the future, everything in the short-term appears to be OK. Just as a heroin addict can lead a reasonably normal life so long as he can get his next fix, the addiction only becomes a problem when the supply runs out. In terms of our story, this is where we stand today.

For this reason, one of the things we need to do in order to mobilise the level of action that is needed, is to make public opinion aware of the size of our addiction.

ECOLOGICAL FOOTPRINT ANALYSIS

William Rees, Professor of Regional and Community Planning at the University of British Columbia, defines the ecological footprint as *"the corresponding area of productive land and aquatic ecosystems required to produce the resources used, and to assimilate the wastes produced, by a defined population at a specified material standard of living, wherever on Earth that land may be located."*¹⁷

Rees' ecological footprint analysis of his home city of Vancouver, Canada, indicates that this city appropriates the productive output of a land area nearly 174 times larger than its political area to support its present consumer life-style. Other research shows that the aggregate consumption of wood, paper, fibre and food by the inhabitants of 29 cities in the Baltic Sea drainage basin appropriates an area 200 times larger than these cities themselves. Herbert Girardet author of the *Gaia Atlas of Cities*¹⁸ and a co-founder of Sustainable London Trust,¹⁹ has calculated that the ecological footprint of London (with only 20% of Britain's population) covers 98% of the productive land in the UK!

It thus becomes quickly obvious that the developed countries have a global footprint. For example, William Rees estimates that the footprint of the Netherlands - for food production alone - appropriates between 100,000 and 140,000 square kilometres of agricultural land, mostly in the third world.²⁰ He goes on to say:

"This "imported land" is five to seven times larger than the area of Holland's domestic arable land... It is worth remembering that Holland, like Japan, is often held up as an economic success story and an example for the developing world to follow. Despite small size, few natural resources, and relatively large populations, both Holland and Japan enjoy high material standards and positive current accounts and trade balances as measured in monetary terms. However, our analysis of physical flows shows that these and most other so-called 'advanced' economies are running massive, unaccounted ecological deficits with the rest of the planet... Even if their land area were twice as productive as world averages, many European countries would still run a deficit more than three times larger than domestic natural income. These data emphasise that (most developed countries) are over-populated in ecological terms - they could not maintain themselves at current material standards if forced by changing circumstances to live on their remaining endowments of domestic natural capital. This is hardly a good model for the rest of the world to follow!

Ecological deficits are a measure of the entropic load and resultant 'disordering' being imposed on the ecosphere by so-called advanced countries as the unaccounted cost of maintaining and further expanding their wealthy consumer economies. This massive entropic imbalance invokes what might be called the first axiom of ecological footprint analysis: *On a finite planet, not all countries or regions can be net importers of carrying capacity.* This, in turn, has serious implications for global development trends.

The current objective of international development is to raise the developing world to present first world materials standards. To achieve this objective,

the Brundtland Commission argued for 'more rapid economic growth in both industrial and developing countries' and suggested that 'a five to ten-fold increase in world industrial output can be anticipated by the time world population stabilises some time in the next century.'

Let us examine this prospect using ecological footprint analysis. If just the present world population of 5.8 billion people were to live at current North American ecological standards (say 4.5 ha/person), a reasonable first approximation of the total productive land requirement would be 26 billion hectares (assuming present technologies). However, there are only just over 13 billion hectares of land on Earth, of which only 8.8 billion are ecologically productive cropland, pasture, or forest (1.5 ha/person). In short, we would need *an additional two planet Earths* to accommodate the increased ecological load of people alive today. If the population were to stabilise at between 10 and 11 billion sometime in the next century, *five additional Earths would be needed*, all else being equal - and this just to maintain the present rate of ecological decline.

While this may seem to be an astonishing result, empirical evidence suggests that five phantom planets is, in fact, a considerable underestimate (keep in mind that our footprint estimates are conservative). Global and regional-scale ecological change in the form of atmospheric change, ozone depletion, soil loss, ground water depletion, deforestation, fisheries collapse, loss of biodiversity, etc., is accelerating. This is direct evidence that aggregate consumption exceeds natural income in certain critical categories and that the carrying capacity of this one Earth is being steadily eroded. In short, the ecological footprint of the present world population / economy already exceeds the total productive land area (or ecological space) available on Earth.

This situation is, of course, largely attributable to consumption by that wealthy quarter of the world's population who use 75% of global resources. The WCEDs 'five to ten-fold increase in industrial output' was deemed necessary to address this obvious inequity while accommodating a much larger population. However, since the world is already ecologically full, sustainable growth on this scale using present technology would require *five to the additional planets.*"

This is an apt indicator of the size of our addiction and of the massive shift in public awareness that will be needed to kick the consumption habit.

THE PROBLEM OF CITIES

Being unsustainable has been the economic *modus operandi* of urban civilisation for the past 7,000 years. What's new is the realisation that it is no longer possible to continue operating in this way. In cultural terms, developing a sustainable civilisation therefore requires that we make our cities sustainable. This need is clear, for most urban centres - as presently structured - are not sustainable. Unless they become so, all our efforts to achieve a sustainable civilisation will fail, as the ecological impact of the world's rapidly growing urban population wreaks increasing havoc on the biosphere.

In 1900, only 15% of humankind lived in cities. 50% do so now. There are already 213 cities of more than one million inhabitants, and 23 mega-cities of more than ten million.²¹ Today's urban population is expected to double in the coming century. Since the City Summit in Istanbul in 1996, some 1,800 local authorities around the world have begun to implement Local Agenda 21 programmes. But this has not stopped the urban juggernaut. Urbanisation is happening faster than ever before, and not only in the developing countries, but in the developed countries as well.

So long as the inhabitants of cities do not understand what sustainability means and why it is not a soft option, they will continue to perceive it as some kind of extra burden; a sacrifice they can't afford, utterly failing to comprehend the magnitude of untapped economic and social benefits it offers.

Try to imagine what it would be like to live in a world where the population was stable, every country was self-reliant in terms of energy and food, where climate change, deforestation, desertification, hunger, poverty, illiteracy, human rights violations and easily preventable diseases had been eliminated, and where we did not have to waste 800 billion dollars every year to feel safe. Of course this is very hard to imagine, but that is precisely the point.

PERSONAL RESPONSIBILITY

Another cultural consideration we should not overlook is the issue of personal responsibility. The archeological and artistic evidence - as comparative mythologist Joseph Campbell has shown in his excellent book and TV series *Power of Myth*²² indicates that during 30 millennia of prehistory, the mythological world-views of our pre-urban ancestors were universally expressed through metaphors of animism, pantheism and the Goddess immanent in Mother Earth²³ Emphasising a profound awareness of human *partnership* with nature, these

versions of the story highlighted the importance of personal responsibility. The Iroquois Confederacy in North America, for example, prohibited any behaviour which might jeopardize the welfare of their descendants and of their fellow-species for seven generations into the future.

As psychiatrist John Weir Perry points out, this indigenous tradition of personal responsibility for the common good collapsed when the old metaphors of partnership were replaced by those of domination in the form of authoritarian male gods.²⁴ These autocratic rulers made their first appearance in the Story when the first cities appeared upon the land in India, Mesopotamia, China, Egypt, Greece, and the Americas. The Old Testament Yahveh is a classic example. Bursting on the scene when Jewish pastoralists first settled into cities, he is an absolute ruler, the only one who is responsible. Everyone else's job is just to follow orders.

While this political arrangement suited the needs of God-Kings, Pharaohs, and Emperors intent upon expanding empire, it was achieved at a price - the abdication of personal responsibility. But as the Dalai Lama observed during the Earth Summit at Rio, "universal responsibility is the key to human survival."²⁵

In historical and anthropological terms, we should not forget that most of the human race are descended from conquered peoples. Centuries of socialisation have robbed us of our traditional dignity, repressed our natural sense of personal responsibility, and conditioned us to expect our leaders - and the experts through which our societies manage our collective affairs - to do our thinking for us and take responsibility on our behalf.²⁶

Such a statement may sound far-fetched until one looks at the way in which our society's world-view became so fragmented that we have forgotten that the world is a whole system, in which what we do depends on what we see, and what we see depends on our own way of seeing.

WAYS OF SEEING

"We can't even think of solutions without correctly recognising the problem, and it is now commonplace to pose our problems incorrectly. We tend to focus on what's seen, rather than on our way of seeing... Instead of focusing on how we produce and consume, we must focus on how we perceive and on how we communicate".

- Gene Youngblood

'The "industrial" world begins by making splits, then drawing boundaries, then solidifying these boundaries. Then we fool ourselves into believing what we have made ourselves see. Solidifying boundaries is very comfortable, because it allows us to deny our experience... We miss the whole system.'

Gregory Bateson

Fragmentation of the urban world-view occurred both vertically and horizontally.²⁷ Instead of the coherent cosmology that was shared by all members of pre-urban societies, the information explosion associated with increased eco-social complexity triggered a multilevel splitting of the world-view, corresponding to each of the social classes into which the body-politic stratified itself at the onset of the urban revolution. But this division was unequal. Whereas members of a tribal society had more-or-less equal access to knowledge and responsibility, this was no longer the case by the time the tribe became a kingdom or empire.

The stratification of the world-view was arranged hierarchically in such a way that the higher up, the more information you have. Whether in Tutankhamun's Egypt, Caesar's Rome, Shogun's Japan, or Queen Victoria's British Empire, the illiterate peasant could not understand the complex world of the village squire, the landed gentry that of the city bourgeoisie, and so on through the upper classes to the aristocracy. Only the King, Pharaoh, or Emperor was the ruler of all he surveyed. This centralisation of the social-decision making process moved responsibility away from the individual towards the ruler. Whether people abdicated their personal responsibility willingly, or it was taken from them by conquest, the result is the same: now only the ruler is responsible: the duty of his subjects is to do as they are told.

It seems hard to imagine how the historical expansion of the eco-social territory could have happened without such vertical stratification of the world-view. But as the urban centres grew and appropriated more and more territory to supply themselves with vital resources, there came a point when even the wisest Emperors eventually found themselves overwhelmed by the complexity of their empires.

SPECIALISATION

Here we find the need for the horizontal fragmentation of the urban society's world view. Beyond a certain level of growth, both the territory and social environments became so complex that individual ruler was no longer capable of making collective decisions in his own. This is the point where individual common sense finally yielded to the pigeon-holed tunnel vision of profes-

sionally-qualified specialist expertise. From here on in, specialists are seen as the indispensable answer to a whole new kind of problem: for now that the fragmented world-view had de-coupled the individual common sense of the people from effective participation in the process of societal self-regulation, it is the very core of the society's self organising function which turned itself off. The metabolic parameters of the system environment relationship then began to slip from dynamic equilibrium down exponential curves toward chaos. Even though the basic problem of ecological maladaptation was pushed back by impressive feats of science and technology, it cascaded down through the centuries and multiplied itself in unimaginable dangers that thrive unseen, beyond the range of the world-view, like the accumulating ecological resource deficits that are all but invisible from the boardroom and the stock market trading floor.

As the urban/industrial transformation gathered momentum, the fragmentation of the world view thus produced a corresponding fragmentation of the body politic into specialised professions. Accordingly, these mono-disciplinary compartments became the new focal points around which urban civilisation organised itself. The sacred and the secular became separated; economic activity was split off from learning; upcoming generations were sent off to "university" departments to become "qualified" for specialised 'jobs' in the "marketplace". The resulting experts then attacked the symptoms. We delegated "inflation" to "economists", "unemployment" to "politicians", "disease" to "doctors", "crime" to the "police", "neurosis" to "psychiatrists", "enemies" to the "army", "security" to "intelligence agencies", and "pollution" to the "environmentalists."

But taken as a whole, the underlying maladaptation did not improve. On the contrary, much precious time, effort and resources must be expended to reinforce these piecemeal solutions that our fragmented world-view still delegates to the specialised institutions through which we attempt to manage our collective affairs.

Until the late 20th century, however, society's internal stability still appeared to rest on the pillars of government, industry, banking, medicine, law, education, advertising, the military, and the media. But token tinkering with symptoms does not cure a disease. As Socrates observed before his own great civilisation collapsed, the people "will appear to be omniscient, but will generally know nothing!"

In this way, the fragmented structure of the urban world-view came to prevent people from applying their own common sense to the social issues at hand. The ensuing loss of confidence in ourselves and our institutions fosters routine irresponsibility, rules, regulations, loopholes, bureaucracy, institutional rigor mortis, official paranoia, militaristic posturing, and greed. Consider the average inhabitant of London, New York, Moscow, Rio, Cairo, Mexico City or Beijing: he or she often feels utterly impotent to deal with inflation, unemployment, the arms

race, cancer, terrorism, repression, radioactive wastes, drug abuse, crime, resource depletion and mental stress. It then becomes commonplace for individuals - who are perfectly well endowed with common sense - to completely abdicate their responsibility for their own part of the problem, hoping, perhaps in a magical way, for ready-made solutions and quick fixes from more "powerful" experts or from some great leader, to whom they have unwittingly given away their own ability to respond.²⁹

But the addiction to linear thinking and the abdication of personal responsibility - the inevitable result of the fragmented world-view - is then the heart of the problem: a vicious circle, a positive feedback loop that might eventually push our species over the brink of self-annihilation, so long as we continue to project the disorder we create outside ourselves, and fail to recognise the pattern that each one of us plays in the problem and its possible solution.

So how can humankind recover that lost sense of personal responsibility that must be mobilised for our species to become ecologically sustainable?

In this regard, the advent of the personal computer linked to the Internet and the World Wide Web is rapidly making its users aware of interconnectivity on a global scale.³⁰ There can be no doubt that this technology is the greatest advance since the invention of the printing press. By giving anyone with access the ability to search, find, and browse the latest information on any subject matter he may choose, the Web certainly has the potential to stimulate a massive shift in public awareness. But we must beware of technological fixes. The question still remains: will the consumption junkie be able to control his habit?

CYBERNETIC ASPECTS

The science of communication and control is called cybernetics.³¹ The name comes from the Greek for helmsman - the one who steers a ship. The science has two branches. The first one deals with the control systems of inanimate machines such as computers, spacecraft and smart missiles. This does not concern us here. The second branch concerns itself with the problem of how living systems - biological organisms and human societies - regulate and govern themselves. Perhaps the most brilliant thinker in this field was the late anthropologist and biological philosopher Gregory Bateson.³² An Englishman who lived in America, he was married to Margaret Mead and wrote a number of books including *Steps to an Ecology of Mind*, and *Mind and Nature: A Necessary Unity*. Bateson, who chose his words very cautiously, claimed that "Cybernetics provides the means of achieving a new and perhaps more human outlook, a

means of changing our philosophy of control, and a means of seeing our own follies in wider perspective".

Bateson was a very wise man, and he did not make this claim lightly. What fascinated him was the way living systems maintain homeostasis. He pointed out that whereas mechanical machines are designed along principles of linear control, living systems are based on non-linear feedback loops. Linear control can be illustrated by the input-output system of a mechanical typewriter. You press a key, the consequences travel along a series of levers, and the corresponding letter is printed on to the paper at the other end of the machine.

The non-linear control system immanent in living systems, on the other hand, can be illustrated by the predator/prey relationship. Imagine a small island inhabited by rabbits and foxes. If the foxes maximise their appetite for rabbits, their consumption will soon outstrip the reproductive rate of rabbits. The resulting decrease in the available food supply will bring down their own population, allowing the rabbits to increase theirs. Here we see that the output is fed back into the system as a new input. This negative feedback loop ensures that the whole is a self-organising-self-governing system. Bateson pointed out that whereas the spiritual or religious metaphors of our ancestors reminded people of the larger whole within which they were embedded, the modern way of thinking which developed especially during the Renaissance and the Enlightenment, tends to overlook this essential fact. He also observed that most of the systemic problems which now threaten our modern civilisation are the direct result of human attempts to apply *linear control* to natural and social systems which are essentially *non-linear*. In international relations, for example, we see the victors of the first world war trying to control Germany through the war tax reparations stipulated in the Treaty of Versailles. This produced precisely the opposite effect than was intended, as the massive economic hardship which resulted in Germany drove them to embrace Hitler as a new Messiah. The Nazis' attempt to "control" the Jewish population by the death camp method produced exactly the opposite effect: the creation of the state of Israel. Similarly the Israeli government's present hard-line policy towards the Palestinian people will most likely result in the creation of a sovereign Palestinian state.

The point, as Bateson remarked, is that life on Earth is a self-organising system, and "no part of such a cybernetic system can have unilateral control over the whole or any other part."³³ This cybernetic truth applies not only to human attempts to control nature, but also to individuals and groups such as the United Nations and the NGO community, who might like to change the behaviour of others, if only we had enough power to do so. But as Bateson said:

"The myth of power, is of course, a very powerful myth; and probably most people in this world more or less believe in it... But it is still epistemological lunacy and leads to inevitably to all sorts of disaster... If

we continue to operate in terms of a Cartesian dualism of mind versus matter, we shall probably also come to see the world in terms of God versus man; elite versus people; chosen race versus others; nation versus nation; and man versus environment. It is doubtful whether a species having both an advanced technology and this strange way of looking at the world can endure...

The whole of our thinking about what we are and what other people are has got to be restructured. This is not funny; and I do not know how long we have to do it in. If we continue to operate on the premises that were fashionable during the pre-cybernetic era, and which were especially underlined during the Industrial Revolution, which seemed to validate the Darwinian unit of survival, we may have twenty or thirty years before the logical reductio ad absurdum of our old positions destroys us. Nobody knows how long we have, under the present system, before some disaster strikes us, more serious than the destruction of any group of nations. The most important task today is, perhaps, to learn to think in the new way".³⁴

Now consider the United Nations, all its specialised agencies, the governments of its 185 member states, and the international NGO community. And consider the world-wide movement for sustainability, in the larger meaning of the term, including all the concurrent efforts for democracy, education, peace, health, human rights, human potential, gender equality, fair trade, religious pluralism, and social justice. Insofar as our way of thinking is limited to attempts to control the symptoms of our global dis-ease, all we are really doing is trying to modify the behaviour of those whom we may perceive to be responsible for the various problems we would like to solve! This pre-cybernetic way of thinking reinforces the perceptual splitting of Humankind into opposing groups: the ecologists versus the polluters, pacifists versus the arms industry, human rights activists versus totalitarians, progressives versus conservatives, political party A versus political party B, religious fundamentalists versus religious pluralists, terrorists of the left versus terrorists of the right, people versus the corporations, "us" against "the system" - and vice-versa! Enormous amounts of resources, money, effort and time are wasted by both sides in a mutual self-cancelling process of complementary antagonism, which changes nothing while the symptoms continue to worsen.

But the global problems we face are not really separate from each other nor from the global public which needs to resolve them within the coming generation... That's 5.8 billion people, each one of whom is part of the whole human / environment system in question, and this includes you and me and all of our unconscious assumptions, expectations, and beliefs as well. As Bateson said: *"To want control is the pathology! Not that person can get control, because of course you never do... Man is only a part of larger systems and the part can never control the whole..."*

Gregory Bateson put it in a nutshell: *"The problem of how to transmit our ecological reasoning to those whom we wish to influence - in what seems to us to be an ecologically good direction - is itself an ecological problem."* Carl Jung made the same observation in psychological terms: *"To know where the other person makes a mistake is of little value. It only becomes interesting when you know where you make the mistake, for then you can do something about it. What we can improve in others is of doubtful utility as a rule, if, indeed, it has any effect at all."*³⁵

So, how does this whole systems approach translate into practical action? There is a precedent. 2,600 years ago in China, the philosopher-poet Lao Tsu recognised the self-organising principle immanent in nature, which he named the Tao. Eloquently described in his poem, the Tao Te Ching,³⁶ this essentially cybernetic idea became the general systems theory of Chinese cosmology. The cybernetic principles of Taoism were implemented in government, medicine, agriculture and religion. Adapted by Confucius and Buddha they went on to influence the whole of Asian culture for thousands of years. Another Taoistic insight comes to us in the Chinese ideogram for crisis, which as you know is a combination of the signs for "danger" and "opportunity".

Today, standing at the threshold of the global age, a whole systems approach to the global crisis reveals the opportunity for a new Cybernetic strategy which has far greater potential for healing the underlying source of our dis-ease than the piecemeal efforts at controlling the symptoms currently underway.

This optimistic-sounding premise is based on the emergent scientific paradigm of the self-organising universe,³⁷ including the conscious and unconscious beliefs of those human beings whose behaviour many of us in this conference would like to change. It leads to a realisation which may seem naïve until we understand the reason for it: namely, that individual common sense is now the largest untapped resource on the planet! The real naïveté, however, is to imagine that our existing political and legislative modes of action are going to be able to solve our crisis for us. Political action as we know it today - in the age of the Internet - too often remains stuck in the organised attempt to obtain linear control over non linear eco-social organisations, and is therefore structurally obsolete.

By describing the cultural problem of how to adapt to our new global environment in cybernetic terms, it appears that rather than attempting to control the symptoms of the world problematique in a piecemeal and adversarial way, it will be far more efficient, cost-effective, and fun to empower people to see for themselves what they can do to make a difference. This requires a strategic approach to the use of information.

GLOBAL STRATEGY

Can humankind really develop a sustainable civilisation while the window of opportunity to do so remains open?

As mentioned earlier, we still have the resources, technology, and knowledge to develop a way of living that could be economically healthy, socially equitable, and ecologically sustainable. But the progress that has been made since Rio falls dramatically short of the level of action that is needed. So while battles are being won, the war to achieve sustainability may yet be lost. In order to win, those of us in the sustainability movement urgently need to adopt a whole systems approach which recognises the systemic nature of the crisis.

This is a strategy that deals with the underlying cause rather than attacking the symptoms, because tinkering with symptoms does not heal a disease. It is a strategy which takes public opinion into account, because public opinion is the ultimate shaper of collective behaviour. And it is a strategy which recognises that public opinion is determined by various psychological and cultural assumptions, including unconscious feelings and beliefs about the world situation and about human nature itself.

We must not forget that in terms of our story, the psychological dimensions of the myth of progress cast a long shadow in the form of the Apocalypse.³⁸ This ancient metaphor of world destruction-and-renewal is found in all cosmologies. As Jung and others have shown, it is a symbol of transformation that relates to the process of personal growth.³⁹ But its expression in the vision which St. John obtained on the Grecian isle of Patmos, immortalised in the Bible's *Book of Revelations*, has been interpreted literally for two millennia as an historical prophecy. Now that humankind has reached the point where we ourselves have the capacity to make the world unfit for our own survival, the image of Apocalypse has come to haunt the collective unconscious. Overlayered by negative assumptions about the population explosion, resource depletion, climate change, poverty, inequity, and the risk of ecological catastrophe, the notion of Apocalypse has acquired renewed potency and suggests that if we are doomed anyway, why bother trying to save the earth?

Many individuals and corporations certainly behave as if this were the case.⁴⁰ But as the Dalai Lama pointed out, of all the threats we face, the greatest danger is that people lose hope for the future.

From this perspective, it is clear that our strategy should focus public awareness on the magnitude of untapped economic and social benefits which a sustainable civilisation can bring for all of humankind. If the United Nations, NGO's, universities, and other stakeholders committed to sustainability mean to succeed, we

need to co-operate in a massive educational campaign to foster the public awareness and action that is needed. From a whole systems point of view, the most effective strategy is to promote the idea of a sustainable civilisation as global goal.⁴¹

The international public has little understanding of the dividend that a sustainable civilisation has to offer, for the economic and social benefits almost defy description. To "sell" the idea and empower people to find out what they can do to make a difference, we need to foster the development of a new way of seeing that recognises the integrity of Humankind and the Biosphere as a whole system.

As Al Gore said, *"this is perhaps the most difficult and the most important challenge we face. If a new way of thinking about the natural world emerges, all of the other necessary actions will become instantly more feasible - just as the emergence of a new way of thinking about Communism in Eastern Europe made feasible all of the steps toward democracy that had been 'unthinkable' only a few months before."*⁴²

Mikhail Gorbachev expressed the same idea: *"No existing ideology or philosophy can claim success in addressing the global crisis... We need to make a transition to a new civilisation. The whole paradigm of civilisation will have to change... The fatalistic approach is not acceptable. We have to begin to think about how to guide the process of global change."*⁴³

This proactive strategy will be far more cost-effective than attacking the symptoms as they come up in a piecemeal way, which is all that we have been doing so far. As British futurist James Robertson said:

*"The same alternative will be a future that comes about by its own momentum, once enough of us decide that it is possible and decide to make it happen... Many of us see this breakthrough as the central project, the historic task for the two or three generations living at the present time."*⁴⁴

Promoting sustainability as a global goal will indeed help to make the transition come about in a self-organising way, as more and more people realise that sustainability is in everybody's self-interest. As Worldwatch Institute Director Lester Brown put it, *"at first the changes are slow, but they are cumulative and they are accelerating. Mutually reinforcing trends may move us towards a sustainable society much more quickly than now seems likely."* Lester Brown points out the mythological dimension:

"Taking part in the creation of a sustainable society will be an extraordinarily satisfying experience, bringing a sense of adventure that our ancestor did not have. In effect, we have embarked on a shared adventure, the building of a society that has the potential to be an enduring one. This awareness could begin to permeate almost everything we do, imbuing it with a sense of excitement - one

*that derives, in part, from full knowledge of the risks and consequences of failure, as well as from the scale of the undertaking, which has no precedent... The development of a sustainable civilisation will require the most massive adult education programme ever launched. This, in turn, will shift part of the responsibility for education from the formal educational system to the communications media."*⁴⁵

As Systems Theorist Erich Jantsch emphasised: *"learning is not the importation of strange knowledge into a system, but the mobilisation of processes which are inherent to the system itself."*⁴⁶

In their book *Seven Tomorrows*, Global Business Network Chairman Peter Schwartz, economist Paul Hawken, and Senior SRI International researcher James Ogilvy observed:

*"Humanity stands at an unique point: simultaneously our problems are so acute and our communications network so widespread that, for the first time in world history, genuinely collective and democratic decisions are both demanded and possible. In order to choose intelligently, we need a sufficiently widespread consciousness of our condition and of our capacity to alter it through the decisions of enough people. We need a collective intelligence of a kind that may not have characterised the human species in the past; but we see no reason to believe that, given the highly developed nervous system of an advanced communications network, a whole population cannot reach a stage of mature self-consciousness much as an individual does."*⁴⁷

Since our target audience is global, this presents an educational challenge without precedent in history. It requires a whole-systems approach that is deeply informed by political savvy, multi-disciplinary insight, democratic values, and an anthropological sensitivity to the cultural diversity of Humankind. In effect, we need to articulate a new world-view, a mythology for the global age. And we need to express this in symbolic forms that can transcend ideological, religious, and cultural boundaries and be widely shared through the mass media.

UNLEASHING THE IMAGINATION OF THE GLOBAL TEENAGER

As we cross the threshold into the global age, half the world population is under the age of 20. As *Whole Earth Review* magazine put it, *"along the way these billions of teenagers will listen to the same music, watch the same*

movies, wear the same clothes, and perhaps study the same things in school. There is a global teenager emerging, global in both proportion and perspective".⁴⁸ It goes without saying that it would be tragic if such globalisation were to wipe out the rich diversity of their local cultures. But as Nobel Laureate Rigoberta Menchu Túm put it, "the solutions will come when people become educated about global community values."

Community values are traditionally expressed through religion. Although, as Joseph Campbell said: "There is no conflict between mysticism and science, but there is a conflict between the science of 2000 AD, and the science of 2000 BC. The three-level universe of the Bible is of no use to us. We have to have poets, we have to have seers who will render to us the experience of the transcendent through the world in which we are living."⁴⁹

Cultural historian William Irwin Thompson explains: "The transformations of culture do not take place in history, they take place in myth. It is because the individual cannot perceive in the limits of his own lifetime such transformations as the Neolithic or Industrial Revolutions that we have need of myth. A model, a hypothesis, or a myth is a way of rendering the invisible. Because the unconscious is outside of time, it can perceive transformations beyond the limits of the ego. These unconscious perceptions are expressed in art or mythologies. We ourselves are living in an age of cultural transformation, but if you went to the experts to ask for a description, they would tell you nothing. You have to go to those who are at home in the unconscious and in the subconscious, the artists and prophets: through myth and symbol in art, science fiction or religion, they will describe the present by speaking about the future."⁵⁰

As James Joyce said in *A Portrait of the Artist*, the task at hand is "to forge in the smithy of my soul the uncreated conscience of my race." This strategy requires an artistic approach to the use of information. Marshall McLuhan put it in a nutshell: "The new age of education is programmed for discovery rather than instruction... Art as radar feedback, early warning system, the antennae of the race.

CONCLUSION

ADOPT A GLOBAL CURRICULUM FOR SUSTAINABILITY

All United Nations member states should adopt a global curriculum for sustainability, by the year 2,000. As Task Master for Chapter 36 of Agenda 21, UNESCO should put this project at the top of its agenda and present its recommendations

at the gathering of the Ministers of Education during the *International Conference on Education* (ICE) in Geneva in 1998. Such a curriculum should integrate basic principles of general systems theory and cybernetics⁵¹ at the primary level, teach them in more detail at the secondary level, and promote their adoption in greater depth in universities.

CREATE COMMUNITY-BUILT VISIONS OF SUSTAINABILITY

Implementation of Agenda 21 requires a community built vision of sustainability at the regional, national and local levels. As the *Local Agenda 21 Planning Guide*⁵² points out, "experience shows that the development of sustainable cities and the indicators used to measure progress in that direction are most effective when they are 'owned' by community stakeholders, i.e. when the process of their creation has been *agreed upon by the whole community*. Only when they are thus legitimised, will they be actively used as the basis for planning and action." The Local Agenda 21 Planning Guide provides an excellent approach to building such community visions through stakeholder participation, issues identification, assessment of problems and priorities, agreement on action goals, formation of a strategic plan, and implementation and evaluation thereof. Details may be found on the Web at www.iclei.org .

DEVELOP COMPUTER SOFTWARE FOR SUSTAINABLE CITIES

An international collaborative research endeavour is underway to develop *Sustainable City*, an innovative GIS computer software application that will enable any town or city to see itself - and its surrounding environment - as a whole system. By making it possible for urban centres to simulate their metabolism and footprint, the software will enable stakeholders (municipalities, the private sector, schools and universities, NGO's and farmers) to understand the hidden costs they pay for urban unsustainability, discover the magnitude of untapped economic and social benefits which sustainability could bring, and empower them to discover what they can do to implement Agenda 21 at the local community level. Sponsorship of US \$200,000 is needed to complete the R&D. Please visit the web site at www.global-vision.org/city/ for details.

POSITION THE CONCEPT OF SUSTAINABILITY AS A GLOBAL GOAL

UNESCO, UNICEF, UNEP, UNDP, UNFPA, WHO, WWF International, and the International Institute for Sustainable Development (IISD) have provided seed money to launch the *Global Vision Project*, an international edu-

cational media campaign to "sell" the concept of sustainability as a global goal. The project is designed to provide UN agencies, NGO's, institutes, universities, schools, socially-responsible corporations, professional associations, religious groups, and leading thinkers with a means to combine our insights, integrate our outreach, and communicate our message of a positive future more effectively to the global public.

Media products now in development include a *Sustainability film / TV series* of 100 short clips, a CD-ROM, a Web site, and a feature film. Sponsorship of US\$ 5m is needed to complete the first phase by the year 2000.

Please see pages 13-18 for more information. For complete details, please visit the Global Vision web site at www.global-vision.org/sustainability/.

THE GLOBAL VISION PROJECT

The GLOBAL VISION PROJECT is an international educational multi-media campaign to promote the idea of a sustainable civilisation as a *global goal*. It is designed as a means for individuals and organisations working on global issues to join forces, combine our insights, integrate our outreach, and deliver our message of a positive future more effectively to the global public.

The Project is being produced by GLOBAL VISION CORPORATION - a Non Governmental Organisation accredited to the UN Commission on Sustainable Development - in co-operation with a network of International Partners. These include UNESCO, UNEP, UNDP, UNICEF, UNFPA, WHO, FAO, the UN Centre for Human Rights, WWF International - World Wide Fund for Nature, IUCN - World Conservation Union, the International Institute for Sustainable Development (IISD), Peace Child International - Rescue Mission Planet Earth, the Megacities Project, the Sustainable Development Initiative at Columbia University Graduate School of Business, Columbia University Department of Religion, University of British Columbia School of Regional and Community Planning, the Environmental Simulation Centre at the New School for Social Research, TVE - Television Trust for the Environment, WETV, and the European Broadcasting Union (EBU).

The Project was conceived by GLOBAL VISION Director Michael O'Callaghan, as a giant work of *information-art*. It involves the production of a cumulative series of media events designed to help the global public find out what a sustainable civilisation is, and why we need it now on a global scale. It is intended not only to inspire people with a positive vision of the future, but also to provide them with a means to participate in its unfolding.

The project takes a multi-disciplinary, whole systems approach to the global crisis. It is pro-active, solution-oriented, and involves a participatory planning process that taps the creative design input from leading thinkers and organisations around the world.

The project's concern is universal: to foster an understanding of our relationship to each other and to the biosphere on which our survival depends. The Project promotes no political or religious ideology, nor does it seek to further the interests of any particular group. It is moved primarily by an awareness of what all people stand to gain from the development of sustainable civilisation, and of what we all stand to lose if we fail.

The project is designed to create a context of information that can attract the attention of the global public, empower individuals and organisations to find out what they can do to make a difference, and provide them with a pathway for action. The project itself does not presume to be a solution: it is designed as a catalyst to stimulate people to discover what they can do to make a difference.

MEDIA PRODUCTS

The project involves the production of various media products, including *Sustainability* (a film / TV series and CD-ROM about solutions to global problems); *Global Vision* (a musical feature film conceived as a Collective Self-Portrait of Humankind and the Biosphere); and the *Global Vision Expo* (a completely new kind of bioregionally-based, decentralized world's fair proposed for early in the 21st. century).

PARTICIPATORY PLANNING

The project is based on a transcultural, transdisciplinary, participatory planning process involving creative design input from leading thinkers in the arts, the sciences, and the humanities. To facilitate this process, Global Vision has completed the second draft of a 200 page Participatory Planning Manual for project participants. The manual contains a conceptual framework for the project, based on a new model of the way self-organising biological and social systems process information in order to adapt to the environment on which their survival depends. This framework has been especially designed to empower participants, who may sit on either side of various political, religious, and ideological dividing lines, to discuss the controversial issues associated with the development of a sustainable civilisation in a non-adversarial way that can reveal alternative means to reach mutual ends. It was heavily influenced by the cybernetic ideas of Gregory Bateson. This Manual was described by development policy analyst Hazel Henderson, as "one of the most succinct statements of the societal

transformation of human cultures now underway, and why this new world-view must be fostered."

THE GLOBAL VISION NETWORK

Individuals and organisations can now get creatively involved in the design and implementation of the project on a variety of different levels. Participants may include UN agencies, NGO's, universities, institutes, socially-responsible corporations, professional associations, religious groups, leading thinkers, and the general public.

THE GLOBAL VISION WEB SITE

Creative planning input is now available on-line through the Global Vision web site at www.global-vision.org. This site contains 150 documents about the project, including details of how to get creatively involved.

SPONSORSHIP

Seed money to develop the project was provided by UNESCO, UNICEF, UNEP, UNDP, UNFPA, WHO, and IISD. A US\$5.3m (UK £3.2m) fund-raising campaign is now underway to launch the Project in 1998.

PHASE 1: SUSTAINABILITY FILMS, TV SERIES AND CD-ROM

The GLOBAL VISION PROJECT is being launched through *Sustainability*, a film / TV series, and CD-ROM of 100 short clips about solutions to global problems, seen through the eyes of leading thinkers and organisations around the world. The series is aimed at the global teenager, with theme music by Peter Gabriel, donated by Martin Scorsese. Now in development, the project will be shot in 35mm film in approximately 50 countries, and is intended for international release as part of the Millennium celebrations in the year 2000.

DISTRIBUTION

The European Broadcasting Union, WETV, and TVE -Television Trust for the Environment have offered distribution for broadcast in 100 countries. The potential audience is 300 million to 700 million viewers. The series will be released in a 60 second format for TV broadcast, and a 10-minute format for theatrical release, and on videocassette for educational use by schools, universities and NGO's. The CD-ROM and Web site will include further educational materials and electronic links to thousands of organisations with which the viewer can get creatively involved.

Sustainability intends to convince its audience that humankind has the resources, the technology, and the information to develop a form of civilisation that could be economically healthy, socially equitable, and ecologically sustainable - if the viewer takes action! In a visually-exciting MTV-style format targeted to young people, each film will show why sustainability is necessary, focus on the benefits it offers, and demonstrate a specific solution to a global problem which can be implemented today.

The TV series will take its viewers on a trip around the world to meet 100 leading role models for the 21st century. These are visionary individuals who have made sustainability their life's goal. Just as someone who embodies some extraordinary knowledge or skill is considered a national treasure in Japan, these leading thinkers and activists may be thought of as world treasures, for they truly embody humankind's best hope for the future. Some are internationally famous, some virtually unknown. This project will empower them to communicate their vision to a global audience.

Sustainability will explore the larger meaning of its title by showcasing recent breakthroughs and promising approaches in ten subject areas: Environment; Economics and development; Population; Health; Human potential; Human rights; Religious pluralism; "Women's issues"; Disarmament and peace-building; Education and communications. Its aim is to evoke the magnitude of untapped economic and social benefits that a sustainable civilisation can create. It's meant to surprise, inspire and empower the viewer to action.

The directorial style will be upbeat and very visual, with original and stock footage, interview clips, voice-over, computer graphics, animation, and music. The series will be released in English, Chinese, Arabic, Russian, French and Spanish versions.

The first pilot clip received rave reviews at its premiere screening at UN headquarters in New York. This video asks the question: "How much of an annual investment would it take to achieve sustainability in ten years?" The answer - 250 billion US dollars - is less than a third of what the world spends every year for defence!

Sustainability has enormous appeal for today's global television audience. The turn of the millennium is one of those crucial moments in history, as we cross the threshold into the global age. This TV series, CD-ROM and world wide web site will form an historical record of the time when Humankind first became aware of itself - and the Earth's biosphere - as a whole system, and an integrated overview of the world-wide effort now underway to create a form of civilisation that does not deplete the resources needed for future generations.

HOW YOU CAN PARTICIPATE

GLOBAL VISION invites you to help select the 100 subjects for the SUSTAINABILITY project by nominating leading thinkers, organisations, projects and/or ideas which embody the most promising solutions to global problems. We're looking for innovative solutions on the cutting edge, as well as traditional ones that should be more widely known. You can find the selection criteria and a nomination form on the Global Vision Web site at www.global-vision.org/sustainability/.

SPONSORSHIP

The budget for the first 10 films is US 5.3m (UK£3.2m). We want to raise these funds as soon as possible in order to complete the project for release in the year 2000. This is a good proposition for sponsorship. The series is relatively inexpensive and is designed for a large international viewing audience. If the 100 films were broadcast one a day, five days a week, the total series would run for five months! This means a continuous TV presence that can link a sponsor's name with some of the best minds on the planet.

GLOBAL VISION is a non-profit organisation with federal tax-exempt status in the USA and Registered Charity status pending in the UK. Contributions from within the EU are now being accepted via the J. L. Jopling Charitable Trust - UK Registered Charity no. 1024681.

PHASE II: THE GLOBAL VISION FEATURE FILM

Global Vision will be an impressionistic musical feature film conceived as a collective self-portrait of humankind and the biosphere - a concept without

precedent in art or motion-picture history. This will be an epic, mythopoeic sales pitch for a sustainable civilisation, designed for multi-cultural impact.

Intended for release in the year 2001, the film will be shot in 70mm on location around the world, with spectacular cinematography and a soundtrack by leading musicians from different cultures. *Global Vision* international partners are being invited to help design the information content of the film through a participatory planning process explained in our Participatory Planning Manual. This process has been carefully designed to ensure that the film will represent the global crisis in its true historical and evolutionary context, emphasise the responsibility of the viewer to save the planet, and do so in a way that will be meaningful to a global audience.

The film will be produced and directed by Michael O'Callaghan who says "it will be a fast-paced, fun-to-watch, information-packed experience of Humankind, technology, the ecosystem, and the collective unconscious. It's also a picture of the inner self, and a metaphor about the pattern that connects the global crisis to our own way of seeing it."

Perception - as process - is the central subject matter. This film will form an artistic vision of humankind coming to see itself as a whole - both in the external sense of what is seen, as well as in the inner sense of the process of human perception itself.

From an objective scientific point of view, *Global Vision* will present a non-adversarial, transcultural, transdisciplinary overview of issues of collective concern such as the destruction of the environment, the international debt crisis, and the economic drain of military expenditures. By re-framing these issues in a McLuhanesque montage that makes their mutual interactions become explicit, the film will form a meta-context of information designed to involve the viewer in a psychological experience that turns one's attention back upon the process of one's own perception.

In artistic terms, the aim is to create a situation that brings into focus the part each one of us subconsciously plays in shaping external reality through our own way of seeing it. This Pirandellian stratagem is intended to evoke the magnitude of the untapped potential for a sustainable global civilisation, which is normally disregarded simply because our fragmented world-view defines it outside of what is already within reach.

Global vision will be more than a Gaian declaration of the unity of life on Earth, however: it will also form a mythological road map for the all-important inner aspects of the transformational journey ahead - a picture of the inner Self and of the psychological process of decomposition and renewal. This dimension of the film will be rendered metaphorically, through a James Joycean audio-visual extravaganza designed to evoke the viewer's innermost subconscious feelings, as-

sumptions and beliefs about human nature and the nature of life itself. The film will thus also be a symbol about the individuation of the Human psyche: a multi-level metaphor of transformation, evoking evolution, historical development, and the inner psychological process involved in coming to identify ourselves as a whole.

A guiding premise that informs the film is the recognition that if we intend to develop a sustainable civilisation on this planet, we will have to co-operate on a global scale. To co-operate, we need to identify with what we have in common. In order to identify, we must experience an expanded sense of our inner Self that transcends all the obsolete divisions received from the world-views of our separate voyages through history. As 'collective self-portrait' therefore, the film will attempt to present the viewer with a transcultural looking-glass that evokes a global vision of his or her identity.

The film takes place in the "Dreamtime". Its story brings the viewer through the transformative journey of evolution, history and the personal life-cycle, and comes to a climax in a shamanic voyage through the depths of the collective unconscious, where we look the Apocalypse in the eye and realise the hidden psychological meaning of this ancient myth of death and rebirth. In process and in product, the film is a transpersonal metaphor, a collectively-created work of art that expands the cultural envelope of our interbeing to its proper planetary proportions.

Global Vision is thus a celebration of life, a manifesto, a mythopoeic sales pitch for personal commitment to the fate of the earth, a symbolic flare sent out to illuminate the path ahead in the dark hour before the dawn... The story outline has been completed, but this is only the overall metaphorical structure: the details of the film's content will be fleshed out through its multidisciplinary participatory planning process involving creative input from leading thinkers around the world.

A NEW STYLE OF CINEMA

Global Vision will inaugurate a completely original style of cinema. This will be made possible by a new technology called Image Resonance™ which is being developed especially for the film. This is a non-linear music-driven computer-editing system that will make it possible to control the editing of the film's visual sequences directly from the acoustic structure of its musical soundtrack. The resulting rhythmical integration of sound and image will create an impressionistic, pulsating montage of interweaving visual sequences that dance before your eyes like music. The result will be as different as Van Gogh was from Raphael, or as rave music is from Beethoven. It will swallow you up, dazzle your senses, and leave you dreaming for days. The estimated budget is US\$ 50 m. the film is now in development.

PHASE II: THE GLOBAL VISION EXPO

The proposed long-range goal of the Global Vision Project is to produce a completely new kind of decentralized, bioregionally-based, very large scale educational multi-media experience called the GLOBAL VISION Expo, to be held simultaneously in about a dozen major world cities early in the 21st. Century.

This is conceived as a learning-oriented context of information designed to empower individuals and organisations to discover local solutions to global problems, and to find out for themselves what they can do to implement them within their own communities.

The Global Vision Expo would create a space-age planetary festival atmosphere on the overall theme of "Adapting to our Global Environment."

The design of the Expo is distinguished from that of previous world fairs principally because of its special information structure. Instead of the usual aggregate of isolated pavilions (each containing the compartmentalised exhibits of separate nation-states or transnational corporations), this Expo would involve all of its partner organisations in the planning and production of an Integrated Information Environment (IIE) specifically designed to help the public comprehensively inform itself about - and implement solutions to - global issues of collective concern.

The Expo would address global issues through a learning-oriented, user-friendly, computerised, interactive, state-of-the-art multimedia information interface. This would be designed in co-operation with GLOBAL VISION's network of International Partners.

In terms of content, the Expo would feature a global level of information shared in common by all the sites, and a local level unique to - and created by - local partners at each site.

Each Expo site would be located bioregionally. A bioregion is a territory defined by natural geographical and ecological parameters (such as ocean basins, watersheds, mountain ranges, tropical rainforests, and deserts) rather than by political boundaries arbitrarily imposed on the planetary biosphere. Because each bioregion shares a common renewable resource economic base that can be tapped with similar appropriate technologies, the bioregional approach is indispensable for sustainable development, and will be taken into consideration in the site selection process.

A small-scale prototype would be produced ahead of time to test and showcase the multimedia display systems, and to secure the necessary agreements from its sponsors, participants, production teams and hosts.

The Global Vision Expo is a very ambitious undertaking. But building on the expansion of the Project's network of International Partners and contacts in Phase I and on the publicity, name-recognition, and box-office revenues resulting from the feature film in Phase II, there is a very good chance that our strategy could prove to be an outstanding success.

PRINCIPAL DESIGN SPECIFICATIONS:

Bioregional location

Multiple simultaneous expo sites in select urban centres of strategic bioregions around the world.

Information environment

State-of-the-art, multimedia-displayed, computerised, user-friendly, two-tiered (local/global) information system providing an integrated overview of the state of the planet and solutions to global problems. Use of large high-definition video screens, world wide web links, live satellite video feed between sites, and on-line interactive computer modelling of local bioregions, with a particular emphasis on cities.

Thinking globally

A global level of information shared in common by all the sites. This would include an up-dated version of the Global Vision feature film and the CD-ROM, together with other multimedia products overviewing solutions to global problems in 10 thematic areas: Environment, Economics & development, Population, Health, Human rights, Human potential, "Women's issues", Religious pluralism, Peace-making & peace-keeping, and Education & communications.

Acting locally

The local level of information would express the unique ecological, technological, economic and cultural aspects of each bioregional area. These modules would be created in collaboration with local partners, and would thus reflect a rich cultural diversity from site to site.

Public interaction

Public involvement would be encouraged throughout all phases of design and production. Cultural elements could include the arts, the sciences,

and the humanities. The overall aim is to create a high media-visibility “rapid cultural learning opportunity” for individuals and organisations to explore and discover ways to implement the transition to a sustainable civilisation at the local, regional and global community levels. The Expo is conceived as a work of information-art which includes the viewer as the most creative part of its content. The international audience’s resulting experience of itself and the biosphere would complete the work as a whole.

Participatory planning

The planning process will be initiated during Phase I of the Project, through a conference on the World Wide Web. The Expo is now in development.

INTERNATIONAL PARTNERS

Columbia University Graduate School of Business Sustainable Development Initiative • United Nations Educational, Scientific & Cultural Organization • TVE Tve - International Television Trust for the Environment • Princeton University Center of International Studies • United Nations Food and Agriculture Organization • International Institute for Sustainable Development • WWF International - World Wide Fund for Nature • United Nations International Children’s Fund • United Nations Environment Programme • United Nations Development Programme • The European Broadcasting Union • IUCN-World Conservation Union • United Nations Population Fund • World Health Organization • Peace Child International • Devlin Video Services • The J.M. Kaplan Fund • Martin Scorsese • Godfrey Reggio • The Image Bank • Peter Gabriel • Stable Films • WETV

GLOBAL VISION CORPORATION

GLOBAL VISION is a non governmental organisation accredited to the United Nations Commission on Sustainable Development (CSD). Its purpose is to promote the development of a sustainable civilisation based on renewable resources and common sense. GLOBAL VISION is supported by an international network of United Nations agencies, NGO’s, universities, institutes, foundations, and corporations. Since its inception in 1982, GLOBAL VISION has been carry-

ing out interdisciplinary research and development for the Global Vision Project, involving the creative input of leading scientists, thinkers, artists, film makers, and musicians from around the world.

Apart from the media products mentioned in this Paper, GLOBAL VISION programmes currently in development include *Sustainable City™*, a computer simulation programme for any town or city to see itself -and its surrounding environment - as a whole system; and the *Centre for Science and the Sacred*, an interdisciplinary institute to promote religious pluralism. GLOBAL VISION was a member of the Planning Committee for the Annual DPI/NGO Conference organised by the United Nations in 1996/97, and an Affiliate of the Sustainable Development Initiative at Columbia University Graduate School of Business.

The following leading thinkers have participated in the GLOBAL VISION PROJECT since its inception: Futurist Hazel Henderson; Paleontologist Richard Leakey; Medical Anthropologist Joan Halifax; Princeton University Centre of International Law Professor Richard Falk; Psychiatrists Stanislav Grof, John Weir Perry, and R.D. Laing; Nobel Peace Laureate Rigoberta Menchú; Economist David Korten; Ecological footprint analyst William Rees; Computer simulation expert Michael Kwartler; Megacities Project Director Janice Perlman; World Business Forum Chair Marcello Palazzi; Eco-Philosopher Thomas Berry; Anti-nuclear Activist Helen Caldicott, Centre for Defence Information Director Rear Admiral Gene LaRocque; Educator Elaine de Beauport; Sustainable Development expert Helena Norberg-Hodge; Bioremediation specialist Paul Mankiewicz; World Game Institute Director Medard Gabel; Inventor Buckminster Fuller; and Amnesty International Co-Founder Seán Mac Bride.

TV programmes produced and/or directed by members of GLOBAL VISION staff have aired on ABC, CBS, NBC, European Broadcasting Union, Discovery Channel, A&E, RAI, Television of Spain, TV Globo (Brazil), Portuguese TV, New Zealand TV, and other networks around the world.

GLOBAL VISION is a non-profit educational organisation with federal tax-exempt status in the USA and Registered Charity status pending in the UK.

Contributions from within the EU are also being accepted on our behalf via the J. L. Jopling Charitable Trust - UK Registered Charity no. 1024681.

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REFERENCES

- I. For an authoritative overview of the prospects for sustainability, see *Beyond The Limits: Confronting Global Collapse, Envisioning a Sustainable Future.* by Donnela H. & Dennis Meadows and Jorgen Randers. Chelsea Green Publishing Company, Post Mills, Vermont, USA. 1993. The authors summarise the facts as follows:

"A. Human use of many essential resources and generation of many pollutants have already surpassed rates that are physically sustainable. Without significant reductions in material and energy flows, there will be in the coming decades an uncontrolled decline in per capita food output, energy use and industrial production.

B. This decline is not inevitable. To avoid it two changes are necessary. The first is a comprehensive revision of policies and practices that perpetuate growth in material consumption and in population. A second is a rapid drastic increase in the efficiency with which materials are used.

C. A sustainable society is still technically and economically possible. It could be much more desirable than a society that tries to solve its problems by constant expansion. The transition to a sustainable society requires a careful balance between long-term and short-term goals, and an emphasis on sufficiency, equity, and quality of life rather than on quantity of output. It requires more than productivity and more than technology; it also requires maturity, compassion, and wisdom." (28)
2. See *Earth Summit Ends With Disappointment and Hope.* by Martin Khor, in *Rio Reviews, Centre for Our Common Future*, Geneva. 1992. Khor, who heads the Third World Network pointed out that the Secretariat of the UN Conference on Environment and Development (*Earth Summit*) "estimated that US\$600 billion [of additional annual development aid] is

required by the South alone, of which the external aid component is US\$ 125 billion. But the actual commitments from the North are not forthcoming. . Without the commitment of the industrialised countries, which hold all the important levers of world economic and political power, it would be difficult, if not impossible, to tackle the causes of environment or development problems."

Maurice Strong, the Secretary General of the UNCED Conference, made the following statement during a press conference immediately after the Earth Summit:

"Whilst the Conference was successful as a meeting, not a single thing has changed regarding our civilisational behaviour. We didn't succeed 20 years ago at the Stockholm Conference (the first international environment meeting), and we don't have another 20 years to waste. Here we have got agreement without sufficient commitment [from governments]... We can't sustain our current life-style. We have got to get through to people the absolute need to change our economic system... The evidence is very powerful that the present course of economic behaviour will lead to tragedy, the economy will not survive. We have got to get this message through to people and they must hold their governments accountable. Because governments took decisions that add up to a significant change of course at Rio, it is a shift in direction. But we can't be complacent. We leave Rio without satisfying commitment for that concern. We've got the basis for change, but we must keep pushing like hell."

Five years later, the Rio + 5 extraordinary session of the United Nations General Assembly, attended by 60 heads of state and 2,000 NGOs, was widely considered to have been a failure. The USA, Canada and Japan categorically refused to agree to a binding reduction in greenhouse gas emissions. The European countries, which proposed a mandatory reduction of 15% by the year 2000, accused the Americans of failing their responsibility as a superpower. European Commission President Jacques Santer said "I am frankly disappointed. The future of our planet is at stake." German Chancellor Helmut Kohl, visibly furious, promised tough negotiations at the next conference on climate change in Japan. The French President Jacques Chirac said "the debate with the Americans was very difficult" and accused them of being "the biggest polluters on the planet."

Another example of disagreement is the Earth Summit promise of 0.7% of GNP for development aid, which is now less than 0.3%. In 1995, the US development aid contribution was only 0.1% of its GNP. Greenpeace representative Cliff Curtis said the failure of the Rio process "represents the abdication of responsibility by the world's governments... The governments are saying: we admit our failure to deal with the environment, but we are incapable of reaching agreement on the solution and have therefore decided to postpone any decisions for another five years."

3. Regarding Agenda 21 at the local level, we recommend The Local Agenda 21 Planning Guide: An Introduction to Sustainable Development Planning, International Council for Local Environmental Initiatives (ICLEI) and the International Development Research Centre (IDRC), Toronto, Canada, 1996, ISBN: 0-88936-801-5. This excellent book is available from ICLEI at www.iclei.org. Phone: + 1 416 392 1462. Although 1800 cities, towns and villages have adopted Local Agenda 21 initiatives as of 1997, this is far less than was hoped for.

An excellent children's version of Agenda 21 has also been published (in many languages) by Rescue Mission Planet Earth, The White House, Buntingford, SG9 9AH. UK (tel: + 44 (0)176 327 4459, fax: + 44 (0)176 327 4460; they have a number of web sites including: www.freenet.hut.fi/partneritorni/YM/kestava-kehitys/ and www.shs.net/rescue.National). To facilitate the implementation of Agenda 21 at the local level, Rescue Mission also publishes a Sustainability Indicator pack for secondary level teachers and students to measure the indicators of progress towards sustainability within their own village, town or city.

4. Of the 200 largest economies in 1997, over half were corporations and less than half were nation states. The greening of corporations is now a fashionable trend, although one must beware of disinformation. Notable efforts include the US President's Council on Sustainable Development, the World Business Council on Sustainable Development, The Forum for the Future in the UK, the Prince of Wales Business and the Environment Programme at the University of Cambridge Programme for Industry, and the Global Environment Programme at the Leonard N. Stern School of Business, New York University, and the work of sustainability, a strategic management consultancy and think tank based in London (website: www.sustainability.co.uk).
5. See Claude Julien, Régimes Globalitaires (Globalitarian Regimes) in *Le Monde Diplomatique*, No. 514, January 1997, where he makes the following observation: "More and more countries, which have massively sold off their public enterprises to the private sector and deregulated their market, have become the property of large transnational corporations. The latter dominate whole regions of the economy in the South; they use local States to pressure international fora so as to obtain the political decisions most favourable to their pursuit of global domination. These phenomena of globalisation of the economy and of concentration of capital destroy social cohesion. They aggravate economic inequalities everywhere, which are increasing as fast as the supremacy of the market... Is it not time to demand the establishment, on a global scale, of a new social contract?"

He then goes on to say:

"By favouring, over the past two decades, monetarism, deregulation, free trade, the free flow of capital and massive privatisation, the political leaders have allowed the transfer of major decisions (regarding investment, employment, health, education, culture and environmental protection) from the public sector to the private sector. Because of this, over half of the two hundred largest economies in the world today are no longer countries but corporations."

See also Julien, Claude, *Le Libéralisme Contre La Société*, in *Le Monde Diplomatique* No. 477, December 1993.

The anti-North American Free Trade Agreement (NAFTA) graffiti by Mayan indigenous people during the New Year's Day 1994 Zapatista uprising in Mexico protested the fact that their country is now legally obliged to import cheap grain from the USA. The low cost of the imported grain results from the unsustainable agribusiness methods used to grow it, which subsidise the production costs by depleting the topsoil and water needed for future growing seasons, whilst externalising the social and environmental costs of dealing with water pollution from insecticides, fungicides and fertiliser runoff, plus the cost of salination of lands from excessive irrigation, onto both US and Mexican taxpayers. This undercuts the more realistic market price of grain grown by traditional Mayan techniques, and destroys their economy overnight. That such trade is called "free" illustrates the wisdom of the Native American proverb "White man speaks with forked tongue."

6. The greatest migration in history of the human species is happening now: the migration of peasants in the developing countries, forced off their lands by the effects of globalisation to move to cities in search of homes and jobs that don't exist. For a devastating indictment of this, see *The Trap*, by James Goldsmith, reprint Edition. Carroll & Graf. 1995. ISBN: 078670263X. See also the George Soros article in *Atlantic Monthly* magazine. Boston. 1997.
7. According to the Human Development Report 1997, published by UNDP, "In 1994, the income ratio between the richest 20% of the world's population and the poorest 20% was 78 to 1, considerably more than in 1960 when the ratio was only 30 to 1." The net worth of the richest Mexican was 6.6 billion dollars in 1995, equal to the combined net worth of

17 million of his poorest fellow-citizens; "It is possible to eradicate extreme poverty between now and the beginning of the next century: this would require an investment of 80 billion dollars per annum, i.e. less than the combined net worth of the seven richest people on Earth."

8. See Robert D. Kaplan, *The Coming Anarchy: How Scarcity, Crime, Overpopulation, Tribalism, And Disease Are Rapidly Destroying The Social Fabric Of Our Planet*; in *The Atlantic Monthly* magazine, Boston, February 1994. After extensive travels in developing countries -especially Africa and Central Asia - Kaplan foresees the following scenario for the first decades of the twenty-first century: "Nations break up under the tidal flow of refugees from environmental and social disaster. As borders crumble, another type of boundary is erected - a wall of disease. Wars are fought over scarce resources, especially water, and war itself becomes continuous with crime, as armed bands of stateless marauders clash with the private security forces of the elites."

On the same subject, see *War and Anti-War: Survival at the Dawn of the 21st. Century*, by Alvin and Heidi Toffler, Little, Brown and Company, New York, 1993. These leading international futurists foresee "a new dark age of tribal hate, planetary desolation, and wars multiplied by wars."

For a report on the situation in the former USSR, see *Compost of Empire*, by Bruce Sterling, in *Wired* magazine, April 1994. This excellent magazine about the on-line communications is also available on the Internet (call *Wired Online Services* on + 1 415 904 0660 for details.)

9. For an excellent critique of neoliberal ideology and globalisation, see *When Corporations Rule the World*, by David C. Korten. Berrett-Koehler Kumarian Press, 1996, ISBN: 1887208011. Squarely addressing the controversial issue of modern corporate power, this excellent book explains how economic globalisation has concentrated the power to govern in global corporations and financial markets, detaching them from the human interest. Korten presents a policy for restoring democracy and rooting power in people and communities. Nobel Peace Laureate Archbishop Desmond M. Tutu described Korten's book thus: "This is a 'must-read' book - a searing indictment of an unjust international economic order, not by a wild-eyed idealistic left-winger, but by a sober scion of the establishment with impeccable credentials. It left me devastated but also very hopeful. Something can be done to create a more just economic order." John Cavanagh, Fellow of the Institute for Policy Studies, and co-author of *Global Dreams* said: "If you can read only one book on how to understand and address the enormous challenges of our time, when Corporations Rule the World is it!"
10. Complete information on the Global Vision Project may be found on the web at www.global-vision.org.
11. As Gregory Bateson (see note below) points out "addiction is a way to make life comfortable for one's symptoms.... Things like warfare, armaments, or atom bombs are addictive phenomena... Addiction is the training of parts of your body to expect certain sorts of things." For a sobering historical account of the consequences of urban civilisation's addiction to natural resources, see *A Green History of the World: the Environment and the Collapse of Great Civilisations*, by Clive Ponting. New York, St. Martin's Press, 1991.
12. See *Origins*, by Richard Leakey, (check details).
13. Re. successful adaptation of early humans, see for example, (check details).
14. See *The Gaia Atlas of First Peoples: a Future for the Indigenous World*, by Julian Burger, London; Gaia Books, Ltd., 1990. See also *Endangered Peoples, a Future for the Indigenous World*, by Art Davidson (check titles). Foreword by Rigoberta Menchú, with photographs by

Art Wolfe and John Isaac, San Francisco; Sierra Club Books, 1994. See also *Voices of Forgotten Worlds: Traditional Music of Indigenous People* (a book and two compact discs), compiled and edited by Larry Blumenfeld, forewords by Julian Burger & David Lewiston, Roslyn, New York; Ellipsis Arts, 1993.

15. While territorial expansion was a stop-gap solution to urban civilisation's need for more resources, the effect on the inhabitants of the conquered territories was (and continues to be) devastating. For a close-up historical account of the impact of "civilisation" on Indigenous People, see the *Journal of Christopher Columbus* edited by Bartolomé de las Casas, quoted in Kirkpatrick Sale's excellent book *The Conquest of Paradise: Christopher Columbus and the Columbian Legacy*, Alfred A. Knopf, New York, 1990. For a contemporary account of the same behaviour in the 20th century, see *Year 501: The Conquest Continues*, by Noam Chomsky, South End Press, Boston, 1993.
16. Re. Clive Ponting's book, see note 11 above.
17. Quoted with permission from William E. Rees, *Revising Carrying Capacity: Area-Based Indicators of Sustainability*, in *Population and Environment: a Journal of Interdisciplinary Studies*, Volume 17, Number 2, January 1996. © 1996 Human Sciences Press Inc.
18. *The Gaia Atlas of Cities: New Directions for Sustainable Urban Living*, by Herbert Girardet, foreword by Dr. Wally N'Dow, Gala Books Limited, London, 1996, ISBN 1 85675 0973.
19. *Creating A Sustainable London*, published by Sustainable London Trust, 7 Chamberlain St, London NW1 8XB. Tel + 44 (0)171 722 3959. For more on this initiative, see the Sustainable London Trust web site at www.greenchannel.com/slt.
20. See also *The Netherlands and the World Ecology: Cas Besserlink*, Netherlands Committee for IUCN, Amsterdam, 1994. (Tel + 31 20 626 1732.)
21. Twenty world cities with populations over 10 million are now participating in the Mega-Cities Project, a collaborative multi-sectoral endeavour to share solutions to their common eco-social problems. As of 1995, this network includes Accra, Bangkok, Bombay, Buenos Aires, Cairo, Calcutta, Delhi, Jakarta, Karachi, Lagos, London, Los Angeles, Manila, Mexico City, Moscow, New York, Paris, Rio de Janeiro, Sao Paolo, and Tokyo. Expected to grow to 23 Megacities by the year 2000. Contact: Janice Perlman, Executive Director, The Mega-Cities Project, Inc., 915 Broadway, Suite 1601, New York, NY 10010. Tel: + 1 212 9797350. Fax: + 1 212 9797624.
22. *The Power of Myth*, by Joseph Campbell (with Bill Moyers), Doubleday, New York, 1988; there is also an excellent television series of the same name, available as a best-selling six-part boxed set of videotapes from Mystic Fire Video at PO Box 422, New York, NY 10012-0005, USA. You can order these tapes by credit card by sending an e-mail message to mysticfire@echonyc.com, by fax to + 1 212 941 1443, or by calling 800 292 9001 toll-free in the USA.. You may also wish to browse their web site at www.mysticfire.com.
See also Joseph Campbell, *The Hero With A Thousand Faces*, first published in 1949, and later by Bollingen University, Press, New York, 1968.
23. For a richly illustrated archaeological study of the Goddess tradition in Europe, see *The Language of the Goddess*, by Marija Gimbutas, with a foreword by Joseph Campbell, Harper and Row, San Francisco, 1989. For a psychological overview, see *The Great Mother: An Analysis of the Archetype*, by Erich Neumann, translated from the German by Ralph Manheim, Bollingen Series XLVII, Princeton University Press, Princeton, 1955. For a poetic and literary tour de force on the same subject, see *The White Goddess: A Historical Grammar of Poetic Myth*, by Robert Graves, Farrar, Straus and Giroux, New York, 1948.
For a good anthropological study of the Celtic spiritual tradition, carried out in Ireland, Scotland, Wales, Cornwall and Brittany in 1908, see *The Fairy Faith in Celtic Countries*, by

W.Y. Evans-Wentz, with a new introduction by Terrence McKenna; library of the Mystic Arts, Citadel Press, published by Carol Publishing Group, 1990. (Originally published in Oxford, 1911.)

For a transcultural overview of pre-urban mythologies, see "The first Storytellers", and the "Love and the Goddess" sections of Joseph Campbell's book *The Power of Myth*, Doubleday, New York, 1988.

24. For a fascinating psychological study of the projection of individual responsibility onto the authority figure of the King or Emperor, which seems to have occurred in every culture whenever urban civilisation first appeared, see *The Heart of History: Individuality in Evolution*, by John Weir Perry, State University of New York Press. Albany, 1987.
25. From a speech given by H. H. the Dalai Lama, June 7 1992. United Nations Conference on Environment and Development (Earth Summit), Rio de Janeiro, Brazil.
26. For a devastating critique of how alienated people are easy prey for media manipulation (based on observations of Americans during the 1991 Gulf War), see *Media Control*, by Noam Chomsky, 1991. See also: *Comments on the Society of the Spectacle*, by Guy Debord, translated by Malcolm Imrie, Verso, New York and London, 1990.
27. For more on this, see *Global Vision: Cognitive Process in Self-Organising Systems*, by Michael O'Callaghan, published on the Global Vision web site at www.globalvision.org/gvmanual/
28. See note 24 above re John Weir Perry.
29. Regarding personal responsibility for future generations, see for example: Theodore Roszak, *Person / Planet: the Creative Disintegration of Industrial Society*, Doubleday, 1979, ISBN: 0385000820; *Ecopsychology: Restoring the Earth, Healing the Mind*, by Theodore Roszak (Editor), Mary E. Gomes, Allen D. Kanner (Editor), Sierra Club Books, 1995, ISBN: 0871564068; and Joanna R. Macy, *Dharma and Development*, in *Dharma Gaia: A Harvest Of Essays In Buddhism and Ecology*, Alan Hunt Badiner ed., Parallax Press. Berkeley. 1990.
30. Re. all aspects of the Internet see *Wired* magazine, an excellent monthly review of the current communications revolution (also available on-line at www.wired.com)
31. For a good introduction to Systems Theory, see Stafford Beer, *Platform for Change: A Message from Stafford Beer*, (Stafford Beer Classic Library), John Wiley & Sons, 1995, ISBN: 0471948403. See also George T. Land, *Grow or Die: The Unifying Principle of Transformation*, Delacorte Press, 1974, ISBN: 0385283733. See also *The Web of Life: A New Scientific Understanding of Living Systems*, by Fritjof Capra, 1 Anchor Edition, Anchor Books, 1996. ISBN: 0385476752.

For a good overview of Cybernetics, see Norbert Wiener. *Cybernetics*, MIT Press, Cambridge, Massachusetts. 1961 and John Wiley and Sons, New York, 1961. See also Gregory Bateson, *Steps to an Ecology of Mind*, Ballantine Books / Random House, New York, 1972. See also Erich Jantsch, *Design for Evolution: Self Organization and Planning in the Life of Human Systems* (The International Library of Systems Theory and Philosophy). George Braziller, 1975, ISBN: 0807607576.

32. Gregory Bateson (1904-80) was an English anthropologist and biological philosopher. Educated at Cambridge, he did early work on pattern and communication in New Guinea and Bali. He then carried out research in psychiatry, schizophrenia, and dolphins. He played a major role in the early formulation of Cybernetics, and helped introduce Systems Theory and Communications Theory into the work of social and natural scientists. His influence is most strongly felt in the fields of education, family therapy and ecology. He was married to the anthropologist Margaret Mead for many years, sat on the Board of Regents of the University of California, and was Scholar-in-Residence at Esalen Institute in Big Sur. He rose to international prominence through his book *Steps to an Ecology of Mind*. (Ballantine Books

/ Random House, New York, 1972), and is widely regarded as one of the giants of twentieth century thinking. See also his book *Mind and Nature: a necessary unity*. E. P. Dutton, New York, 1979.

33. For the most succinct definition of this, see *Autopoiesis: a characterisation of the living system*, Francisco Varela, Humberto Maturana, and Uribe. Could also be from *Principles of Biological Autonomy*, North Holland, New York, 1979 (also published by Appleton & Lange, 1979, ISBN: 0135009502) - (to be checked).

On the Earth as a self-organising system, see James E. Lovelock, *Gaia: A New Look at Life on Earth*, Reprint Edition, Oxford University Press, 1987, ISBN: 0192860305. See also his *The Ages of Gaia: A Biography of Our Living Earth*, (Commonwealth Fund Book Program), Updated Revised Edition, W. W. Norton & Co., 1995, ISBN: 0393312399. See also his *Gaia: The Practical Science Of Planetary Medicine*, Gaia Books, ISBN: 1 85675040X(HB).

34. Gregory Bateson, *Steps to An Ecology of Mind*, Ballantine Books / Random House, New York, 1972.
35. Carl Gustav Jung, re mistakes
36. Lao Tsu, *Tao Te Ching*, 6th. century B.C.E.; translated from the Mandarin by Gia-Fu Feng and Jane English, Wildwood House Ltd., London, 1972.
37. Peter Schwartz and Jay Ogilvy, *The Emergent Paradigm*, Centre for the Study of Social Policy, SRI International, Menlo Park, 1978. For an outstanding investigation of the effect of unconscious assumptions and beliefs on everyday personal and societal behaviour, see *Changing Images of Man*, Policy Research Report no. 4, Centre for the Study of Social Policy, Stamford Research Institute, Menlo Park, 1974. This seminal interdisciplinary paper was commissioned by the Charles F. Kettering Foundation and co-authored by Joseph Campbell, Duane Elgin, Willis Harman, Arthur Hastings, O. W. Markley, Floyd Matson, Brendan O'Regan, and Leslie Schneider. See also include reference to Erich Jantsch, *The Self Organising Universe*.

For a brilliant synthesis of the emerging paradigm in science, see Fritjof Capra. *The Tao of Physics*, Wildhood House, London, 1973; in society, see Fritjof Capra. *The Turning Point*, Wildhood House, London, 1982; in economics, see Paul Hawken, *The Next Economy*. (New York: Random House, 1983) and *The Ecology of Commerce* (New York: Harper Collins, 1993); in economics and politics, see Hazel Henderson, *Building a Win-Win World: Life Beyond Global Economic Warfare* Berrett-Koehler Pub, 1996, ISBN: 1881052907. Alvin and Heidi Toffler, authors of *The Third Wave* said "At a time when conventional economics is tottering into senility, a handful of thinkers are forging imaginative alternatives. Hazel Henderson is among the most eloquent, original-and readable-of the econo-clasts."

38. For more on this, see *When The Dream Becomes Real: the Inner Apocalypse in Mythology, Madness and the Future*, by Michael O'Callaghan, published on the Global Vision website at www.global-vision.org/dream/.
39. Regarding the therapeutic function of death/rebirth imagery at the individual level, see *The Far Side of Madness*, John Weir Perry, MD. Prentice Hall, Englewood Cliffs, 1974. See also: Perry, John Weir, *The Self In Psychotic Process: Its Symbolisation in Schizophrenia: with an introduction by C.G. Jung* (Los Angeles: University of California Press, 1953). Also: Jung, Carl Gustav: *Über Wiedergeburt*. (Zürich: Eranos Jahrbuch (1939), 1940). Regarding the function at the cultural level, see Perry, John Weir. *The Heart of History: Individuality in Evolution*. (Albany, NY, USA: State University of New York Press, 1987.) For more on the psychology of death and near-death experiences, see Stanilav Grof and Joan Halifax, *The Human Encounter With Death*, E.P. Dutton, New York, 1977.

40. See for example. *Géopolitique du Chaos* (The Geopolitics of Chaos), by Ignacio Ramonet, Galilée, coll. "Espace Critique", Paris, 1997. In the chapter entitled "The Rise of the Irrational", Ramonet (the Publisher of Le Monde Diplomatique) points out that:

"The current economic crisis, in its brutality, provokes here and there effects of panic and confusion. In the societies that are in principle dominated by reason, when the latter slides or becomes dislocated, citizens are tempted to find recourse in pre-rationalist forms of thought, and relapse into superstition... More and more citizens who feel threatened by a brutal and forced technological modernisation are subject to anti-modernist feelings of resentment. And one can observe that the current economic rationalism, which so despises human values, breeds a rising tide of social irrationality... Indeed, many citizens believe that the alliance of capital, industry and science have betrayed the ethics of the latter, and that the commercial conception of progress is in large part responsible for our most serious global ills. While the planet drifts towards world-wide ecological catastrophe, apathetic compromises and innocuous recommendations merely delay the inevitable and the moment of truth. For the citizens, with feelings of rage in their hearts, continue to witness the disappearance of the forests, the devastation of the meadows, the erosion of the land, the spreading of the deserts, the dwindling supplies of fresh water, the corruption of the oceans, the population explosion, and the spreading of pandemic diseases and of poverty. More and more people are convinced that science no longer has any solutions to offer either for the planet or for themselves, and that progress, when driven only by the interests of commerce, is 'the mother of all crises.'

During previous economic crises in the highly industrialised countries, one could see massive movements towards irrationality. In the great depression of the thirties, the Old Continent thus witnessed a moment when archaic myths resurfaced with a dynamic force that was essentially instinctive and emotional. The failure of modernism, the economic crisis, social despair and the aspirations of identity then provoked a kind of disenchantment of the world and led, particularly in Germany, to a fascination with the irrational which the far right seized upon. 'Many German citizens', according to the historian Peter Reichel, "sought escape from a present which they could not understand, by plunging into the abyss of a trompe-l'oeil universe..."

In the Germany of the 20s. military defeat followed by hyperinflation and bankruptcy provoked a fascination with the occult, the supernatural, and make-believe... As early as 1930, Thomas Mann warned his fellow citizens... about the political dangers... Traumatized by the complexity of the crisis, impoverished and disoriented, German citizens gave up their will, their common sense, their faith in reason, and gradually succumbed to obscurantism and the cult of the leader... "The stage was set", said Thomas Mann, 'for belief in Hitler.'

Nazism took root when Germany was in the throes of despair, it took advantage of the impact of the economic depression, of the convulsive mutation of capitalism, and of the national trauma. This is the explosive mix that now confronts Europe once again. Will the citizens be able to mobilise themselves to prevent a reoccurrence of the nefarious precedent?"

41. See *Global Strategy: Promoting the Concept Of Sustainability as a Global Goal*, NGO paper for the United Nations Commission on Sustainable Development, by Michael O'Callaghan, Global Vision, New York, 1994. This text examines contemporary fears about the future -reflected in various assumptions such as entropy, resource-scarcity, the threat of eco-social collapse, and the image of Apocalypse - which are implicit in the modern world-view and stand as the shadow of the Myth of Progress. These fears influence perception, shape public opinion and affect social, economic and political behaviour in ways that are not always conscious. The paper points out the UN/NGO community's capital failure to take this psychocultural reality into account and emphasises the need to express a positive vision of the future in artistic ways that transcend cultural boundaries, fire up the collective

- imagination, and inspire the level of action that is so urgently needed. Published on the Global Vision web site at www.global-vision.org/un/strategy/.
42. Al Gore, *Earth in the Balance: Ecology and the Human Spirit*. Plume, Penguin, New York, 1993.
 43. Mikhail Gorbachov, *quoted in International Green Cross flyer*, 1993.
 44. James Robertson, *The Sane Alternative*. River Basin Press, 1980.
 45. Lester R. Brown, *Building A Sustainable Society*. W.W. Norton, New York, 1981.
 46. Erich Jantsch, *The Self-Organising Universe: Scientific and Human Implications of the Emerging Paradigm of Evolution*, Pergamon, New York, 1980 (re-issued by Pergamon Press 1980, ISBN: 0080243126).
 47. *Seven Tomorrows*, Paul Hawken, James Ogilvy. Peter Schwartz, (check)
 48. Whole Earth Review re teenagers
 49. Joseph Campbell, quote check with sheldon
 50. William Irwin Thompson - check source: may be from *The Time Falling Bodies Take to Light*.
 51. See note 31 above re. Systems Theory and Cybernetics.
 52. *The Local Agenda 21 Planning Guide: An Introduction to Sustainable Development Planning*, International Council for Local Environmental Initiatives (ICLEI) and the International Development Research Centre (IDRC), Toronto, Canada. 1996. ISBN: 0-88936-801-5. Available from ICLEI: Tel: + 1 416 392.14.62, e-mail: 75361.3043 @compuserve.com

BIBLIOGRAPHY

- Bateson, Gregory. *Steps to an Ecology of Mind*. Ballantine Books / Random House, New York, 1972.
- *Mind And Nature: A Necessary Unity*. E. P. Dutton, New York, 1979.
- Beer, Stafford. *Platform for Change : A Message from Stafford Beer*. Stafford Beer Classic Library, John Wiley & Sons, 1995. ISBN: 0471948403.
- Besserlink, Cas. *The Netherlands and the World Ecology*. Netherlands Committee for IUCN, Amsterdam, 1994.
- Brown, Lester R. *Building A Sustainable Society*. W.W. Norton, New York, 1981.
- Brugmann, JEB (editor). *The Local Agenda 21 Planning Guide: An Introduction to Sustainable Development Planning*. International Council for Local Environmental Initiatives (ICLEI) and the International Development Research Centre (IDRC), Toronto. Canada, 1996. ISBN: 0-88936-801-5.
- Burger, Julian. *The Gaia Atlas of First Peoples: a Future for the Indigenous World*. Gaia Books, Ltd., London, 1990.
- Campbell, Joseph (with Bill Moyers). *The Power of Myth*. Doubleday, New York, 1988
- *The Hero With A Thousand Faces*. Bollingen University, Press, New York, 1968.
- see also under HARMAN, Willis.
- Capra, Frijof. *The Web of life : A New Scientific Understanding of Living Systems*. 1 Anchor Edition, Anchor Books, 1996. ISBN: 0385476752.

- The Tao of Physics, Wildhood House, London, 1973.
- The Turning Point, Wildhood House, London, 1982.
- Chomsky, Noam. Year 501: The Conquest Continues. South End Press, Boston, 1993.
- Media Control. (check publisher) 1991.
- Columbus, Christopher. Journal. Edited by Bartolomé de las Casas, quoted in Sale, Kirkpatrick: The Conquest of Paradise: Christopher Columbus and the Columbian legacy. Alfred A. Knopf, New York, 1990.
- Davidson, Art. Endangered Peoples, a Future for the Indigenous World. With a foreword by Rigoberta Menchú- and photographs by Art Wolfe and John Isaac. Sierra Club Books, San Francisco. 1994.
- Deboro, Guy. Comments on the Society of the Spectacle. Translated by Malcolm Imrie, Verso, New York and London. 1990.
- Evans-wentz, W.Y. The Fairy Faith in Celtic Countries. With a new introduction by Terrence McKenna. Library of the Mystic Arts, Citadel Press, published by Carol Publishing Group, 1990. (Originally published in Oxford, 1911)
- Graves, Robert. The White Goddess: A Historical Grammar of Poetic Myth. Farrar, Straus and Giroux, New York, 1948.
- Gimbutas, Marija. The Language of the Goddess. With a foreword by Joseph Campbell. Harper and Row, San Francisco. 1989.
- Girardet, Herbert. The Gaia Atlas of Cities: New Directions for Sustainable Urban Living. With a foreword by Dr. Wally N'Dow. Gaia Books, London, 1996. ISBN 1 85675 097 3.
- Girardet, Herbert: and JOPLING, John. Creating A Sustainable London. Pamphlet published by Sustainable London Trust. 7 Chamberlain St. London NW1 8XB.
- Goldsmith, James. The Trap. Reprint Edition. Carroll & Graf. 1995. ISBN: 078670263X.
- Gore, Al. Earth in the Balance: Ecology and the Human Spirit. Plume, Penguin, New York. 1993.
- Gorbachov, Mikhail. Quoted in International Green Cross flyer. 1993.
- Grof, Stanilav Grof and HALIFAX, Joan. The Human Encounter With Death. E.P. Dutton, New York. 1977.
- Gyatso, Tenzin (H. H. the XVth Dalai lama). Spech given on June 7, 1992. United Nations Conference on Environment and Development, Rio de Janeiro, Brazil.
- Harman, Willis (ed.). Changing Images of Man: Policy Research Report no. 4, commissioned by the Charles F. Kettering Foundation and co-authored by Joseph Campbell, Duane Elgin, Willis Harman, Arthur Hastings, O. W. Markley, Floyd Matson, Brendan O'Regan, and Leslie Schneider. Centre for the Study of Social Policy, Stanford Research Institute, Menlo Park, 1974.
- Hawken, Paul. The Next Economy. Random House, New York, 1983.
- The Ecology of Commerce. HarperCollins, New York, 1993.
- Hawken, Paul; OGILVY James; and SCHWARTZ, Peter. Seven Tomorrows (check)
- Henderson, Hazel. Building a Win-Win World: Life Beyond Global Economic Warfare. Berrett-Koehler Pub, 1996. ISBN: 1881052907.
- Jantsch, Erich. Design for Evolution: Self-Organisation and Planning in the Life of Human Systems. The International Library of Systems Theory and Philosophy, George Braziller, 1975. ISBN: 0807607576.

- The Self-Organising Universe: Scientific and Human Implications of the Emerging Paradigm of Evolution. Pergamon, New York, 1980 (re-issued by Pergamon Press 1980, ISBN: 0080243126).
- Julien, Claude. Régimes Globalitaires (Globalitarian Regimes). *Le Monde Diplomatique*, No. 514, January 1997.
- Le libéralisme contre la société. *Le Monde Diplomatique*, No. 477, December 1993.
- Jung, Carl Gustav. *Über Wiedergeburt*, Eranos Jahrbuch 1939. Zürich, 1940.
- Kaplan, Robert D. The Coming Anarchy: How Scarcity, Crime, Overpopulation, Tribalism, And Disease Are Rapidly Destroying The Social Fabric Of Our Planet. *The Atlantic Monthly* magazine, Boston, February 1994.
- Khor, Martin. Earth Summit Ends With Disappointment and Hope. *Rio Reviews*, Centre for Our Common Future, Geneva, 1992.
- Korten, David. C. *When Corporations Rule the World*. Berrett-Koehler / Kumarian Press. 1996, ISBN: 1887208011.
- Land, George T. *Grow or Die: The Unifying Principle of Transformation*. Delacorte Press. 1974, ISBN: 0385283733.
- Lovelock, James E. *Gaia: A New Look at Life on Earth*. Reprint Edition, Oxford University Press, 1987. ISBN: 0192860305.
- The Ages of Gaia: A Biography of Our living Earth*. Commonwealth Fund Book Program. Updated Revised Edition, W. W. Norton & Co. 1995. ISBN: 0393312399.
- Gaia: The Practical Science Of Planetary Medicine*. Gaia Books, London. ISBN: 1 85675040X(HB).
- Macy, Joanna R. *Dharma and Development*, in *Dharma Gaia: A Harvest Of Essays In Buddhism and Ecology*, Alan Hunt Badiner ed. Parallax Press. Berkeley, 1990.
- Maturana, Humberto R., Varela, Francisco J.; and PAOLUCCI, Robert (translator). *The Tree of Knowledge: The Biological Roots of Human Understanding*. Shambhala Publications, 1992. ISBN: 0877736421.
- Maturana, Humberto R.; VARELA, Francisco J. *Autopoiesis and Cognition*. D. Reidel Publishing Co. 1980. ISBN: 9027710163.
- Meadows, Donella H. & Dennis and RANDERS, Jorgen. *Beyond The Limits: Confronting Global Collapse. Envisioning a Sustainable Future*. Chelsea Green Publishing Company, Post Mills, Vermont. USA. 1993.
- Neumann, Erich: *The Great Mother: An Analysis of the Archetype*. Translated from the German by Ralph Manheim. Bollingen Series XLVII. Princeton University Press, Princeton, 1955.
- O'Callaghan, Michael. *Global Vision: Cognitive Process in Self-Organising Systems*. Global Vision Corporation, London. 1997. Published on the web at www.global-vision.org/gvmanual/
- *Global Strategy: Promoting the Concept of Sustainability as a Global Goal*. NGO Position Paper for the United Nations Commission on Sustainable Development (CSD). Global Vision Corporation. New York. 1994. Published on the web at www.global-vision.org/un/strategy/
 - *When the Dream Becomes Real: the Inner Apocalypse in Mythology, Madness and the Future*. Global Vision Corporation. New York and London, 1997. Published on the web at www.global-vision.org/dream/.

Promoting Public Awareness and Understanding

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INTRODUCTION

Why the need to develop public awareness and understanding
Agenda 21 places people and nature as the centre of development initiatives.

- The people - local communities, institutions and individuals are the key players and their needs as well as their active participation are essential in achieving sustainable development.
- Sustainable development and related issues are technical and difficult to understand; they have to be simplified and translated into a language that people can understand.
- A programme on public awareness and understanding must take a comprehensive approach. It is not enough to provide adequate and understandable information. Such information must be relevant to their needs. Appropriate attitudes must be instilled and knowledge gain must be applied in specific areas of day-to-day life. A public awareness programme must be built around community groups which share common concerns.
- Accountability must be instilled among all key actors.

GOALS/OBJECTIVES OF A PUBLIC AWARENESS PROGRAMME

GOALS

- Advocate for the recognition and adoption of Sustainable Development (SD) as the new development paradigm which recognises the synergy

and reconciliation of environment management and economic development;

- Broaden and mobilise an active SD constituency from various sectors and at all levels of society; and
- Institutionalise environment management and sustainable development concerns in development structures, policies, and programmes in all sectors - national and local government, business and industry, civil society, and media organisations, among others.

COMMUNICATION OBJECTIVES

The following are suggested communication objectives:

- To promote, catalyse and effect the systematic integration of environmental management and sustainable development principles into socioeconomic policies strategies;
- To encourage the multimedia process documentation of successful, innovative and indigenous sustainable development strategies and measures which could be used as Sustainable Development Models in area- and resource-based development planning and implementation;
- To create awareness, understanding and acceptance of the goals, objectives, programmes, and strategies of Agenda 21 among various sectors like government line agencies, local government units, civil society, business and industry, and academe;
- To understand and appreciate the worldview (value orientation, beliefs and perceptions, psychosocial needs, future expectations) of intended audiences or sectors on the relationships of environment management with economic development and sustainable development;
- To increase knowledge and strengthen positive values, attitudes, practices, and technologies on environmental management and sustainable development among the intended priority audiences;
- To overcome resistance to environmental management and sustainable development values, attitudes, practices, and technologies among priority audiences; and
- To mobilise multisectoral support and participation in the integration of environment management and SD in total community concerns and local and national development policies and programmes.

THE HOW TO'S IN CREATING PUBLIC AWARENESS AND UNDERSTANDING

GENERAL STRATEGIES

Social mobilisation

Social mobilisation refers to the process of generating total, active, and sustained involvement and participation of all sectors of society at various levels (i.e. policy and decision-makers, implementers, and participant/beneficiaries) towards the attainment of a common goal, in this case, sustainable development.

Advocacy

Advocacy refers to the creation of an enabling environment, through appropriate policies and structures in government, business, NGOs, and other sectors, which would promote, pursue or strengthen sustainable development.

Social marketing

The objective of social marketing is to influence the acceptability of social products and ideas or an institution by using marketing strategies. It has been successfully used in health and commercial population/family planning projects.

Legal marketing

Legal marketing as a general communication strategy aims to create awareness and adherence to environmental laws. These laws range from international agreements to barangay ordinances and resolutions.

Networking

No one agency/organisation can effectively reach all our intended audiences/sectors. The lead agency (e.g. UNESCO) can "multiply" itself by networking with other agencies which can effectively and efficiently do and complement the communication work.

Visioning

Visioning as a communication process involves inculcating shared values, beliefs, and practices related to SD. Once it is fully defined, the vision

becomes the catalytic force, the organising purpose of everything the members of a society do.

Visioning strategies which can be used for communicating SD include role modelling, values clarification, environmental scanning, and use of symbols and slogans.

MESSAGE DEVELOPMENT STRATEGIES

Theme

Agenda 21 may adopt general themes which will provide a framework of common direction in developing specific messages.

The following are some possible themes for a public awareness campaign for Agenda 21:

- Environmental management and economic development are reconcilable and synergistic concepts
- Environmental considerations are integral components of socioeconomic development policy planning and decision-making
- Sustainable development and environmental management are urgent issues requiring priority and immediate attention and action. Messages should be highlighted by a sense of urgency
- Sustainable development is a "win-win" or non-zero sum game.
- Everybody wins with sustainable development. The gains made by the individual, organisation or sector will be made not at the expense of others. Business and industry will gain profit without exploiting workers and destroying the environment.
- SD interventions need to be cost-effective
- The benefits derived from SD interventions far outweigh the costs involved (or investing more in SD will have a high payoff).

Core messages

Unless they are specific by themselves, themes still have to be translated into core messages. These are the basic and urgent messages the programme wants to convey to various audiences.

Core messages should be concrete, that is, they are built around real-life cases, problems, examples, and experiences. Being so, they are very understandable or comprehensive to an average audience.

Messages are best presented in quotable sound bites (i.e., easy to recall).

Message appeals

There are four types of appeals which may be used in crafting messages - rational, emotional, motivational, and moral. Their use will depend on (a) intended audience (b) theme or content, and (c) intended effect or impact.

Rational appeals use logic in messages and may either be persuasive or coercive. As such, they may be more appropriate and effective for policy-makers and businesspersons.

Persuasive appeals use rewards and incentives and tend to be most effective if cost-benefit effectiveness is highlighted.

Coercive appeals may refer to the use of threats and negative scenarios.

Political appeal is a form of rational appeal. Here, elective officials are encouraged to act or behave in a particular manner with the prospect of political gain as a reward, such as popularity among constituents and, therefore, greater chance of being re-elected.

Economic (profit) appeal. The message highlights the economic gains one may achieve through higher profit, return on investment, cost-savings, tax subsidies and breaks or debt swap.

Culture as framework for message development. IEC strategies should contain value-based messages which reinforce or revive our sense of communal ownership of our natural resources and reaffirm people's harmony with nature and their environment.

Sectoral messages vs. Integrated messages

Sectoral messages refer to those which are industry- or programme- or project-specific. Integrated or comprehensive messages, on the other hand, take a systems approach and, therefore, highlight the inter-relationships of various SD concerns.

Most sustainable development IEC materials have sectoral approach in message development despite the fact that environmental and sustainable development operate within the systems context.

Language and image sensitivity

IEC materials should emphasize visual and language sensitivity to gender, ethnic background, socio-economic class, and age, among others.

ISSUES AND CONCERNS IN SD REQUIRING PUBLIC AWARENESS

- Ecosystem approach
- Integrated development approach
- *Interrelationship between resource systems - water, energy, land, population*
- Balance between resource management and economic development
- Cultural, social, political factors and trends, science and technology
- Role of new information and communication technology
- Role of media in mediating between government, business and civil society
- Elements of shared vision
- Human development shared goals and objectives

OUTCOMES OF PUBLIC AWARENESS CAMPAIGN

- Translation and popularisation of SD issues and concepts
- "Multi-stakeholdership" of environment and SD issues
- Consensus building
- Networking and alliance-building among SD advocates
- Sensitivity to SD life-styles and work-styles
- Public accountability, responsibility and participation
- Public mobilisation and resource generation

Maximising Investment in the 21st Century. Education for a Sustainable Development. Reasons Why and a Contribution to How...

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THE OVERALL CONTEXT

- The big story of the world economy since the 80s has been increasing integration through the unleashing of market forces. *But there is also another story: social and economic divisions among, and within, countries are widening .*
- Social investments such as education are being crowded out of governments' budgets to pay for pensions and health benefits for the elderly. *The ideology of inclusion is withering away, to be replaced by a survival of the fittest capitalism.*
- To ignore the social aspects of mankind is to design a world for a *human species that does not exist.*
- In an era of man-made manpower industries, individual, corporate, and national economic success will all require both new and much more extensive skills than have been required in the past. By themselves skills don't guarantee success . They have to be put together in successful organisations. *But without skills there are no successful organisations.*
- Human capital is the *dominant factor of production.*
- What may seem irrational investments for individuals can be very rational social investments.

- The present "international order" is still woefully deficient in creating a "culture of justice for human needs". The vital E's of good international society are still underdeveloped: *Equality, equity, education, employment, energy, ethnic equilibrium, ethics, equanimity, ecological and environmental enlightenment, ecumenism, enterprise and economic elan.*

THE INTERNATIONAL COMMUNITY. IS IT AWARE ?

- The 1997 World Development Report by the World Bank reviewed "*The state in a changing world*". It presented a number of challenging thoughts about the evolving role of the State, how to refocus on its effectiveness and the challenge of initiating and sustaining reforms. The Report clearly recognizes that "social and institutional fundamentals are equally important to economic fundamentals to avoid social disruption and ensure sustained development". This means that a strong case can be made for *education for sustainable development* to become a priority where *means available* may converge with the clear goals that will be outlined by the Conference.
- The United Nations Development Programme Human Development Report for 1996 presented "Balance Sheets" of Human Development both for developing and industrial countries. Interestingly enough, concerning Education it recognised progress in both:
 - Between 1960 and 1991 net enrolment at the primary level increased by nearly two thirds (developing countries)
 - Between 1960 and 1990 the tertiary enrolment ratio more than doubled (industrial countries).

On the other hand it made it clear that:

- *Millions of children* are still out of school- 130 million at the primary level and 275 million at the secondary level (developing countries)
- More than a third of adults have less than an upper-secondary education (industrial countries)
- In "Shaping the 21st. Century: The Contribution of Development Cooperation" (May 1966) the O.E.C.D. proposed a global development partnership effort to achieve, within other: a reduction by one-half of people living in extreme poverty by 2015 and *universal primary education in all countries* by 2015.
- UNESCO's *medium term-strategy 1996-2001* has re-confirmed the organisation's willingness to pursue the challenge, outlined by UNCED's

"Agenda 21", of fostering environmental and population education and communication.

It is time for action. We all know what needs to be done. How can we do it better???

PROPOSALS FOR CHANGE/COOPERATION WITH DEVELOPING COUNTRIES

The following ideas assume that the changes in policy recently outlined by International Financial Institutions (priority to social sectors lending, human resources development, environmental protection and promotion of the role of women in development) are being reflected in more resources available for programmes where education for sustainable development is a critical component. Comments that follow will thus concentrate on a substantial increase in the efficiency of use and consequent impact of major programmes financed jointly by governments, international financial institutions and potential new actors in the development financing arena (e.g.. new philanthropists).

- *Deliver more effectively.* -Give more time to project/programme preparation. Use resources available from "classical" sources (e.g.. UNDP) for " preparatory assistance " that ensures quality design, ample participation and " management-team building " prior to launching major activities.
- *Change the mix of delivery modes*- The model of the resident expatriate expert has proven to be deeply, irreparably flawed. Programmes/projects should thus make greater use of short term advisers and coaching arrangements. Local consultants should become the prime human component of major operations. Institutional twinning (the pairing of organisations with similar operational functions) should be a favoured instrument to assure continued and systematic access to people and know-how.
- *Strengthen local management of technical and financial cooperation*- "National Execution", "Programme Approaches", and other processes that introduce procedures and build national organisational capacities to manage technical and financial cooperation should continue to be enhanced.
- *Improve the work environment*- Without an appropriate work environment cooperation for capacity building operates against heavy, probably insurmountable obstacles.

All of the above and other complementary actions have to be an integral part of the State Reform processes. This means *time*. So what can be done in the interim?

Lets consider first *what needs to be avoided*. Fundamentally, the preparation and prompt approval of major programmes which can not be implemented and consequently generate an *even heavier burden* to the recipient country. In other terms the international community in general and UNESCO in particular, when it comes to education for sustainable development, should ensure that mechanisms are in place to facilitate the effective implementation of major development operations which, if not delivered as per the originally agreed schedule, generate additional expenditures (commitment fees) and strengthen the position of the many who still oppose change. This means *presence from the inception; privileging quality, team-building and strong local commitment*.

WHAT CAN BE DONE

International development agencies in general, and UNESCO in particular, should consider taking the initiative, jointly with recipient governments, to assist in obtaining and coordinating the utilization of technical and financial resources necessary for the implementation of selected development programmes (those in education for sustainable development in the case of UNESCO). The new profile should thus be one of a *development manager* (a scenario that has already been developed with UNDP by a number of countries, particularly in Latin America) .

The new profile proposed includes Country Offices of international organisations operating as Development Services Centres providing high-quality, knowledge-based and customer oriented services to develop national capacity. Their staff would offer management assistance to development programmes and projects. The key would be a PARTNERSHIP founded in the respective comparative advantage of development cooperation participants (external and local). Government contributions should include political willingness, commitment to change, whatever financial resources it has available and local capacity. International organisations (UNESCO in the case of Education for Sustainable Development) can offer management know-how, technical capacity and commitment to results (*global empathy in a global world*). The basis for a *new alliance* are all there. The alternative is to muddle through.

The Conference could well serve to identify opportunities to proceed in the above manner, on a pilot basis, opening the way for the development of a new international cooperation standard for the 21st. Century.

Education for Sustainability: A Priority for the Commission on Sustainable Development

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INTRODUCTION

The adoption by the Commission on Sustainable Development (CDS)¹ in 1996 of a Work Programme on Promoting Education, Public Awareness and Training, was a reaffirmation of the role of education as a fundamental basis for promoting sustainable development and for capacity building for Agenda 21 implementation. The Work Programme called, among others, for the promotion of partnerships, and integrated implementation of recommendations of all major UN conferences and post-Rio conventions, the encouragement of best practices and the forging of linkages to the programme of work on changing production and consumption patterns. It is understood that the Work Programme on Education needs further elaboration in terms of specific tasks to be undertaken, before it can be fully implemented. This work is of particular importance in providing a common framework and understanding to various actors concerned with education issues who are actively carrying out their respective lines of activities as follow-up to UNCED and to subsequent decisions of the CSD.

The Programme for the Further Implementation of Agenda 21² adopted at the 19th session of the special session of the General Assembly in June 1997, noted education accessible to all as a decisive factor in enabling people to become productive and responsible members of society, and as a fundamental prerequisite for sustainable development. It emphasised the core themes of lifelong learning, interdisciplinary education, partnerships, multicultural education and empowerment. Priority is to be given to ensuring equal access to all, to the training of teachers, youth leaders and other educators. A new vision of education for a sustainable future requires reorientation of traditional approaches so as to promote widespread public understanding, critical analysis and support for sustainable development through engagement of a wide spectrum of institutions and

sectors. The special Session carried the work programme on education forward by calling for the preparation of sustainable development education plans and programmes and for further development of the concept of education for a sustainable future itself.

The CSD IV in April 1998 will again consider, among other cross-sectoral themes, education and awareness raising. 1998 will be the first of the second five-year cycle of the Commission's Multiyear Programme of Work adopted at the Special Session. What would be different in approach this time compared to the first five years is the emphasis on an integrated consideration of linkages, both among sectors and between sectoral and cross-sectoral issues of Agenda 21. The other cross-sectoral themes to be considered in 1996 are: technology, science and capacity building; the sectoral theme is freshwater management; and the sector/major group to be considered is: industry. It is also important to keep in mind that the overriding issues for all the sessions in the next five years are to be poverty, and consumption and production patterns.

The close linkage between education/training/awareness raising and capacity building is clear. Without education, training and/or awareness raising, capacity building cannot be realised; and thus they are or should be integral part of any capacity building process. There are also linkages to science and technology that need to be strengthened. Science and engineering education is essential to building up a critical mass of skilled human resources in a country. Also needed is popularisation of science and technology for the decision-makers as well as for the public, so as to have them understand the value of science and technology and their applicability to the social and economic development. In relation to technology transfer issues, the transfer of know-how through demonstration, extension services and training, is essential, as well as awareness raising on the part of the recipients concerning potential consequences. For enhancing co-operation between science and technology sector and education sectors, collaborative research and development or teaching programmes, exchange of personnel and other means should be promoted.

When the CSD adopted the Work Programme on Education, it referred to relevant linkages with the work programme on changing production and consumption patterns. The latter being recognised as an overriding issue, it is all the more appropriate to seek such linkages and to explore ways for mutual reinforcement. Another priority issue of poverty is very much linked to the education theme. Education is a key for people to get out of the miserable cycle of poverty, as it could open up opportunities for employment at a higher scale of salaries or improve current methods of subsistent production and consumption. On the other hand, poverty could be an obstacle to education when the tuition or the time taken away from daily drudgery is unaffordable for some families.

The Agenda for Development adopted by the General Assembly in June 1997, aims at a renewed and strengthened partnership for development, building on the outcome of recent UN conferences. Regarding education, it states that:

"Investments in health, education and training are particularly critical in the development of human resources and should be pursued in such a way that everyone, both women and men, are given an equal opportunity to participate actively and productively in the development process... Quality education is critical for enabling people to develop their full capacities in health and dignity. It is crucial for achieving the objectives of economic development, the key to higher productivity, allow faster and easier adaptation to technological and economic change. They are vital for job creation and combating unemployment and sustained growth... Not only should the importance of higher education and scientific research be emphasised, but also of broadening the means and scope of basic education, of enhancing the learning environment and of promoting lifelong learning".

INTEGRATED FOLLOW-UP TO MAJOR UN CONFERENCES

Education, training and awareness raising have been identified as important prerequisites and agents for advancing the overall goals and objectives of sustainable development in the contexts of the action plans of all the major United Nations conferences from UNCED to date. Box 1 below provides excerpts from these and the comparable phrases relating to changing consumption and production patterns as points of reference.

Box 1. Excerpts from Action Plans of post-UNCED UN Conferences

Education and Public Awareness (Chapter 36 of Agenda 21)

Population and Development (Cairo, 1994): Education is a key factor in sustainable development. It is an indispensable tool for the improvement of the quality of life. Education is also a means to enable the individual to gain

Changing Consumption and Production Patterns (Chapter 4 of Agenda 21)

Population and Development: To achieve sustainable development and a higher quality of life for all people, Governments should reduce and eliminate unsustainable patterns of

access to knowledge, which is a precondition for coping with today's complex world. It is essential to promote a harmonious development of educational systems and economic and social systems conducive to sustainable development.

Fourth World Conference on Women (Beijing, 1995). Investing in formal and non-formal education and training for girls and women, with its exceptionally high social and economic return, has proved to be one of the best means of achieving sustainable development and economic growth that is both sustained and sustainable.

Habitat II (Istanbul, 1996): Provide equal access to basic education, paying special attention to people living in poverty and to youth living in rural areas and addressing constraints created by distance, lack of educational facilities and social or economic barriers.

Social Summit (Copenhagen, 1995): establishing well-defined educational priorities; new and revitalised partnerships; promoting life-long learning, beginning with basic education and continuing with opportunities for further education, training and skills development.

production and consumption and promote appropriate demographic policies.

Fourth World Conference on Women: Poverty and environmental degradation are closely related. While poverty results in certain kinds of environmental stress, the major cause of the continued deterioration in the global environment is unsustainable patterns of consumption and production, particularly in industrialised countries.

Habitat II: Consumption patterns in human settlements should be adjusted to the needs of resource protection, with more attention given to strategies for a life-cycle economy.

World Food Summit (Rome, 1996): Individuals and households have a key role in decisions and actions affecting their food security. They must be enabled and encouraged to participate actively, both individually and collectively, through producers, consumers, and other organisations of civil society.

All three Rio-Conventions (on Climate Change, Biodiversity and Desertification) stressed the importance of developing and implementing educational and public awareness programmes and exchange of education and training materials while mentioning slightly different aspect, as reflected in Box 2.

Box 2 Excerpts from Rio-Conventions

Climate Change Convention

Promote and facilitate public access to information on climate change and its effects, public participation and training, strengthening of national institutions and the exchange or secondment of personnel to train experts in this field.

Convention on Biodiversity	Encourage understanding of the importance of and the measures required for, the conservation of biological diversity, as well as its propagation through media, and the inclusion of these topics in educational programmes
Convention on Desertification	Encourage, <i>inter alia</i> , innovative ways of promoting alternative livelihoods, including training in new skills, and by training of decision makers, managers and personnel responsible for early warning information; encourage the establishment of associations that contribute to public awareness; assess educational needs in affected areas, elaborate appropriate school curricula and expand educational and adult literacy programmes as needed; develop interdisciplinary participatory programmes integrating desertification and drought awareness into educational systems and in non-formal, adult, distance and practical educational programmes; establish/strengthen networks of regional education and training centres

There is a conscious effort to develop and strengthen co-operation and co-ordination among relevant environmental conventions, particularly those signed at UNCED or as a result of it. The Programme for the Further Implantation of Agenda 21 recommends that the conferences of the parties to the UNCED-related conventions co-operate in exploring ways and means of collaborating in their work to advance the effective implantation of the conventions. The Programme also underlines the role of UNEP in the development of coherent interlinkages among such conventions in co-operation with their respective conferences of the parties or governing bodies. The Expert Meeting on Synergies among the Conventions³ examined capacity requirements for the countries who are parties to different conventions to fulfil their commitments in a synergistic way. A common challenge among those countries is to develop, through education, training and awareness raising, the institutional and human resource capacities needed to translate the international agreements into action at national and local levels.

LINKING TO CHANGING CONSUMPTION AND PRODUCTION PATTERNS

Unsustainable consumption and production patterns are a major cause of global environmental degradation. The underlying driving forces of these patterns are individual and collective norms and values. Thus, changing consumption patterns is about changing attitudes and lifestyles of citizens towards sustainability within the wider context of ethical values and social equity.⁴ The working definition of *sustainable consumption* adopted at the "Oslo Symposium"⁵ is as follows.:

"The use of services and related products that respond to basic needs and bring a better quality of life while minimising the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardise the needs of future generations".

Patterns of production and consumption are driven by demand, competition, innovation and financial flows. Demand, in turn, is driven by the purchasing choices of consumers (i.e. individuals, public entities, businesses, etc). Meeting consumer demands sets in motion a flow of materials and products, generating wastes and leading to environmental degradation. Changing such unsustainable patterns of consumption and production patterns needs to be tackled from both ends. To influence the industrial sector to change its practices, Governments have been trying various policy measures of command & control, incentives and disincentives, etc. Moreover, the international business community represented, for example, by the World Business Council and the International Chamber of Commerce, have been encouraging voluntary measures by the industries to take an integrated life-cycle approach, aimed at progressively reducing ecological impacts and resource intensity throughout the product life cycle: i.e. increasing the eco-efficiency in production and services.

On the consumer side, the connection between the consumer movement and the general concern for environmental damage has been noted since 1972 at the time of the Stockholm Conference on the Environment. The general policy concern has traditionally been to protect health and economic interests. UNCED accentuated the need to enhance public awareness regarding the environmental impact of consumption habits and lifestyles as well as the life-cycle effects of different product choices consumers could make. The CSD subsequently recognised public awareness campaigns, education and community-based voluntary action as essential policy instruments to foster changes in consumer behaviours, attitudes and lifestyles. Active players for this challenge have included local authorities, international, national and local consumer organisations and other community-based organisations.

Since UNCED, progress has been made in several areas of Chapter 4 of Agenda 21⁶. In the context of the five-year review undertaken in 1997, one of the promising developments observed was the increased participation of non-governmental organisations, business, trade unions, local authorities and academic communities to promote sustainable lifestyles and cleaner production.

The CSD Work Programme on Changing Production and Consumption Patterns outlined in Box 3, is in its second year of implementation with many partners contributing to it. OECD'S work programme on sustainable consumption and production⁷ also adopted in 1995, for example, is contributing directly to the CSD work programme. Activities are underway in a number of areas reflected in the work programme including: the identification of a "core-set" of indicators to measure changes in

Box 3 CSD Work Programme on Changing Production and Consumption Patterns (adopted in 1995)

- a) Identifying the policy implications of projected trends in consumption and production patterns;
 - b) Assessing the impact on developing countries, especially the least developed countries and small island developing States, of changes in consumption and production in developed countries;
 - c) Evaluating the effectiveness of policy measures intended to change consumption and production patterns, such as command-and-control, economic and social instruments, governmental procurement policies and guidelines;
 - d) Eliciting time-bound voluntary commitments from countries to make measurable progress on those sustainable development goals that have an especially high priority at the national level;
 - e) Revising the guidelines for consumer protection adopted by the General Assembly in 1985.
-

Consumption and production patterns, the development of a database on new and innovative instruments intended to make consumption patterns more sustainable, and the revision of the guidelines for consumer protection to incorporate sustainable consumption considerations.

Design and implementation of Sustainable Development Indicators is the main objective of another work programme of the CSD. The current working list of SD indicators⁸, organised by chapters of Agenda 21, was developed through a

series of inter-agency and expert consultations. Those related to changing production and consumption patterns are so far one-sided; i.e. representation is limited to the production side. A whole process of additional consultations and preparation of methodology sheets is being planned to develop more balanced set of indicators for Chapter 4, particularly to provide a stronger focus on consumption clusters and life-styles.

**Box 4 Current Working List
of Sustainable Development Indicators
(published Aug. 96)**

Chapter of Agenda 21	Driving Force Indicators*	State Indicators*	Response Indicators*
Chapter 36: Education	<ul style="list-style-type: none"> - Rate of change of school-age population - Primary school enrolment ratio - Secondary school enrolment ratio - Adult literacy rate 	<ul style="list-style-type: none"> - Children reaching grade 5 of primary education - School life expectancy - Difference between male and female school enrolment ratios - Women per hundred men in the labour force 	<ul style="list-style-type: none"> - GDP spent on education
Chapter 4: Changing Consumption and Production Patterns	<ul style="list-style-type: none"> - Annual energy consumption - Share of natural resource intensive industries in manufacturing value added 	<ul style="list-style-type: none"> - Proven mineral reserves - Proven fossil fuel energy reserves - Lifetime of proven energy reserves - Intensity of material use - Share of manufacturing value-added in GDP - Share of consumption of renewable energy resources 	

* The next official working list of SD Indicators will be published in the year 2000 while the updating and revision of indicators will be done on an annual basis.

Note: In the framework of the CSD work programme on indicators of sustainable development, Driving Force indicators represent human activities, processes and patterns that impact on sustainable development. State indicators indicate the "state" of sustainable development, and Response indicators indicate policy options and other responses to changes in the state of sustainable development.

The work on developing a data base on innovative instruments aimed at changing consumption patterns, is a collaborate project between the International Institute for Sustainable Development (IISD), UN/DESA and the Government of Norway. An Internet "compendium" of innovative instruments is being built and is accessible through the IISD homepage (<http://iisd.ca/susprod>). This online database will provide a wide range of examples on what governments are doing to enhance, facilitate, regulate and inform about sustainable production and consumption. Some of the representative methods used to better inform and influence the consumers include: eco-labelling schemes, incentives to promote eco-efficiency in households as well as in industries, eco-taxes in a limited number of cases, such as for the use of leaded fuel, etc. Organisations active in promoting education for sustainable development could contribute examples of innovative educations and public awareness campaigns aimed at consumers.

As regards revising the UN guidelines for consumer protection, the work underway involves drafting proposals for incorporating sustainable consumption issues to be included in the existing guidelines. An expert consultative meeting will be held early 1998 to examine proposed revisions. The topic will be further considered by the CSD during its intersessional working group in February 1998 in connection with its consideration of the theme on industry and sustainable development. Once approved, the revised guidelines for consumer protection should be widely disseminated including through the education channels.

The Programme for the Further Implementation of Agenda 21 of the Earth Summit + 5^o recognised Changing Production and Consumption Patterns as an overriding issue in the second five-year work programme of the CSD that all other sectoral and cross-sectoral themes to be reviewed each year should relate to. In addition, upon reviewing the progress made so far, the Programme identified specific areas for further action in advancing the Work Programme on Changing Production and Consumption patterns. Those related directly to education and public awareness are:

- Encouraging the development and strengthening of educational programmes to promote sustainable consumption and production patterns;
- Encouraging the media, advertising and marketing sectors to help shape sustainable consumption patterns;
- Giving balanced consideration to both the demand side and the supply side of the economy in matching environmental concerns and economic factors, which could encourage changes in the behaviour of consumers and producers.

The role of advertising and the media, in particular, is a common issue for both education/public awareness and for changing consumption patterns. The Brasilia Workshop on Sustainable Production and Consumption Patterns and Policies¹⁰

recommended that the international community apply the resources of the media to induce behaviour changes to avoid waste, inefficient resource use and conspicuous consumption. It stated further that positive messages of how individuals can live in a sustainable manner, are required instead of promoting unsustainable products. Further work is needed to study existing practices in advertisement, including voluntary code of ethics of industries, in terms of its effects on changing consumer behaviour. This is where a linkage could be found between education and public awareness on one side and changing consumption patterns on the other.

Last but not least, education and awareness-raising for sustainable consumption and production patterns should not only be targeted to the public. The mind set of the policy makers needs to be changed, so that they can serve as role models themselves by demonstrating more sustainable patterns of government procurement (so-called "green procurement") and by leading the recycling movement of used paper and metal products.

EDUCATION AND MAJOR GROUPS

Another dynamic of the CSD that should be reflected in the consideration of education and awareness raising relates to the major groups. The CSD encouraged the development of new partnerships involving such major groups as youth, NGOs, business and industry and others. Women and local authorities are also important partners in getting sustainable development messages across through education and public awareness. The level of interest of these groups in the work of the CSD has been quite high: for example, there were close to 1500 individual participants representing various major groups registered at the GA Special Session of June 1997. They organised themselves into 100 caucuses of different themes and held a large number of side events. The education caucus has been an active one, bringing together a wide range of interested participants from governments, international and non-governmental organisations, youth and others.

YOUTH INVOLVEMENT

UNCED has been a turning point for the participation of youth in United Nations processes. Chapter 25 of Agenda 21 on the role of children and youth focused on their access to sustainable development decision-making and on their empowerment. Youths have taken an active part in the CSD pro-

cess. They have created a CSD Youth Working Group, and a joint project called "Youths Intersessional" was carried out by youth organisations together with UN agencies concerned and the CSD Secretariat during 1995-1996. This project led to the largest number of young participants in the CSD particularly at its fourth session in 1996. During the high-level segment of this session attended by more than 40 ministers from different countries, a Youth Panel was held where youth representatives presented their challenges and commitments and engaged in dialogue with the ministers. It was significant that the partnership with youth was particularly highlighted in the context of the CSD work programme on education by encouraging governments and other relevant stakeholders to "strengthen tools for youth empowerment and to provide skills and training to prepare youth for decision-making roles and sustainable livelihoods". The current Bureau of the CSD is keen on giving a special place for youth in relation to the education theme of the next CSD by encouraging a specific side event on education involving youth.

NGO'S AS AGENTS FOR CHANGE

Challenges of making Agenda 21 meaningful to the general public and to involve them actively in its implementation requires popularisation of many issues related to sustainable development through education, training and public information campaigns. NGOs *inter alia* are and can be both facilitators for promotional activities in this regard, advocates for citizen's needs and demands, and welcomed or unwelcomed critiques of official policies and actions.

Through the dynamic processes of preparing for, participating in and following up the results of UNCED, NGO involvement has increased both quantitatively and in substance. After attempting several ways to co-ordinate various positions during these processes, NGOs decided to set up an NGO steering committee for the CSD inclusive of representatives from Major Groups, regions, and Agenda 21 themes. The steering committee was to serve as a pipeline between the CSD and NGOs facilitating information and communication flow. Common positions, however, were to emerge out of issue-based caucuses open to all eligible organisations.

NGOs have many examples of innovative practices in education, training and awareness raising. They have a lot to offer from their actual experiences. They must be full partners in the implementation of the CSD work programme on education. A task at hand may be to define the nature and modality of such partnership for maximum impact at the field level.

LOCAL AUTHORITIES

Local Agenda 21s¹¹ have become a global movement since UNCED. The preliminary results of the first world-wide local Agenda 21 survey, carried out jointly by the International Council for Local Environmental Initiatives (ICLEI) and the secretariat of the CSD, confirmed nearly 1,500 local Agenda 21s, with hundreds more in the making. The survey also showed that Agenda 21 follow-up by local authorities is most successful when a national association of local authorities exists, when it has launched a national campaign supporting local Agenda 21 efforts and when those actions are supported by the existence of a national Agenda 21 campaign launched by the national Government. Following up on this survey, ICLEI and DESA are conducting a study of national supportive mechanisms for facilitating the implementation of Local Agenda 21s. The results of this study will be submitted to the CSD VI.

PROPOSALS FOR ACTION

The CSD at its sixth session in 1998, is expected to give special attention to proposals for further elaboration and implementation of its work programme on promoting education, public awareness and training. The Thessaloniki Conference will make a direct and important contribution in this regard, by providing elements for further elaboration of the CSD education work programme in its expected outcome and objectives. The following proposals relate to different elements of the work programme adopted in 1996, for further consideration and discussion at the Thessaloniki Conference.

Strengthening partnerships and networks on education and training for sustainable development

The fact that the Conference brings together different actors concerned to discuss common issues and exchange views and experiences, is a step in the right direction. One concrete suggestion to facilitate not only the future interaction and exchange of information among these actors concerned but also accessing key information sources for education for sustainable development by the public, governments and others, would be to build an interactive web-site on the theme. Initial work is underway by DESA to develop a home page to eventually cover all issues related to Agenda 21, each with linkages to other relevant UN and non-UN web sites. On the education issue, the DESA home page will develop a link to the planned UNESCO web-site on Chapter 36, as well as to other relevant organisations to be identified.

Integrated follow-up to major conferences and conventions regarding education

The action plans and Rio conventions contain general recommendations on education and awareness raising. The implementation of these recommendations in an integrated manner requires certain guidelines. These guidelines would also be a tool to translate the concept of education for sustainable development into practice. Based on the compendium of the relevant sections of the action plans, a small inter-organisational task force led by UNESCO might work on developing such guidelines.

Integration of education and training for sustainable development into national educational policies and strategies

The initial survey of national sustainable development strategies conducted in preparation for the Thessaloniki Conference was based on the country reports submitted to the CSD. The next step suggested is a thorough study of the original national education policies and strategies to assess the extent to which the sustainable development concept has been integrated, identify essential elements that are covered or missing. The study could lead to drafting a manual or recommendations for national and regional workshops on the subject.

Promoting training for sustainable development

The established training institutions should incorporate the concept of sustainable development in their existing programmes. UNESCO could establish dialogue and provide guidance to relevant institutions at national, regional and international levels in this regard. Such institutions within the UN system include: the Economic Development Institute of the World Bank in Washington, D.C., the International Training Centre of the ILO in Turin, Italy, the UN Centre for Regional Development in Nagoya, Japan, etc.

Actions to link education with changing consumption patterns

Some specific areas where education and public awareness campaigns could help in changing consumption patterns for sustainability with reference to both work programmes include: a) raising awareness of the implications of current unsustainable consumption and production patterns and of the impact of changing them; b) dissemination of the revised guidelines for consumer protection to raise consumer awareness of the issues related to sustainable development; c) use of the media and advertisement for these purposes; d) making use

of education tools and consumer feedback mechanisms to facilitate policy-making and e) developing and promoting social instruments through the means of education and training intended to change consumption and production patterns. Workshops and expert meetings should be organised to examine these opportunities in depth and to develop concrete recommendations.

Youth empowerment

Specific ways to promote the participation of youth in Agenda 21 implementation have been suggested by the youths who have taken part in the CSD process, as well as by some delegates. These include: keeping youth informed of the national and international developments in sustainable development; inviting their representative as an equal partner in the National Sustainable Development Council of each country; having a youth member among official delegation to the CSD; and allowing them to give feedback to the government and education authorities regarding curricula for sustainable development. CSD VI 1996 is an opportunity to address the issue of education and youth. Concrete proposals should be developed to promote future activities to ensure youth involvement in national and local implementation of Agenda 21 as well as in decision-making processes which affect their sustainable livelihoods.

REFERENCES

- 1 See Annex for its establishment, composition, functions and modes of operation
- 2 Programme for the Further Implementation of Agenda 21 (S-19-2); see annex for further reference.
- 3 Expert Meeting on Synergies among the Conventions on Climate Change, Biological Diversity, Desertification and the Forest Principles was organized by UNDP from 17 to 20 March 1997 hosted by the Government of Israel in Sede Boqer, Israel.
- 4 Changing Consumption and Production Patterns: Unlocking Trade Opportunities, UED, 1997.
- 5 Symposium on Sustainable Consumption. Oslo, Norway, January 1994.
- 6 Chapter 4 of Agenda 21 on Changing Consumption Patterns has three broad objectives. I) to promote efficiency in production processes and reduce wasteful consumption in the process of economic growth, taking into account the development needs of developing countries, II) to develop a domestic policy framework that will encourage a shift to more sustainable patterns of production and consumption, and III) to reinforce both values that encourage the transfer of environmentally sound technologies to developing countries.
- 7 The OECD Work Programme has three elements i) clarifying the conceptual framework; ii) identifying trends, policy options and tools, and iii) monitoring and evaluating progress.
- 8 The next official working list of SD indicators will be published in the year 2000 while the updating and revision of indicators will be done on an annual basis.

- 9 See Annex for further reference.
- 10 Workshop on Sustainable Production and Consumption Patterns and Policies, Brasilia, Brazil, November 1996.
- 11 "The concept of Local Agenda 21s was launched at UNCED by the International Council for Local Environmental Initiatives. They involve efforts of cities and towns to adapt Agenda 21 goals to their needs, developing a local framework for sustainable development.

BIBLIOGRAPHY

- Addendum to the report of the Secretary-General on Overall Progress Achieved since the United Nations Conference on Environment and Development: Changing Consumption Patterns. (E/CN.17/1997/Add.3)
- Addendum to the report of the Secretary-General on Overall Progress Achieved since the United Nations Conference on Environment and Development: Role and Contribution of Major Groups (ECN.17/1997/2/Add.2)
- Background paper of Working Group 5: "Youth, Environment and Sustainable Development" (WYF/UNS/1996/14) prepared for the World Youth Forum, second session, 25 November 1996.
- Changing Consumption and Production Patterns: Unlocking Trade Opportunities, IIED, 1997.
- Implementing Agenda 21: NGO Experiences from Around the World, UN Non-Governmental Liaison Service, 1997.
- Monitoring Changes in Consumption and Production Patterns (draft), UN/DESA, 1997
- Programme for the Further Implementation of Agenda 21 (A/S-19/2), June 1997.
- Report on the third session of the Commission on Sustainable Development (E/1995/32)
- Report of the Secretary-General on Changing Consumption and Production Patterns (E/CN.17/1995/13)
- Sustainable Consumption and Production OECD, 1997

ANNEX

Basic Facts about the Commission on Sustainable Development and Agenda 21

UNCED

The United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro in 1992 emphasised integrated strategies to promote human development through economic growth based on sustainable management of the natural resource base.

Three key documents were adopted at the Rio Summit:

Agenda 21, a comprehensive plan for global action in all areas of sustainable development, with 40 chapters ranging from oceans to freshwater to atmosphere, from health and human settlements to integrated land management, agriculture, deserts, forests; from hazardous waste to toxic wastes, and including cross-cutting economic and social dimensions, such as combating poverty, education and awareness-raising and changing consumption patterns.

Rio Declaration on Environment and Development, 24 principles defining the rights and responsibilities of States.

Forest Principles, guidelines for the sustainable management of forests worldwide.

As a result of the Rio Summit, the United Nations:

Established, by the ECOSOC decision 1993/207 of 12 March 1993, the UN Commission on **Sustainable Development (CSD)**, as an inter-governmental body, to monitor and guide implementation of Agenda 21 and other Rio Commitments.

Commission on Sustainable Development

The CSD is composed of 53 member states, a third changes every year. The CSD receives substantive and technical services from the Division for Sustainable Development of the Department for Economic and Social Development (DESA). The CSD reports to the Economic and Social Council and, through it, to the General Assembly. Non-CSD member states, United Nations organisations, accredited inter-governmental and non-governmental organisations can attend sessions of the CSD as observers. The Chairman is selected at the beginning of each session and presides over that session and the intersessional period that follows.

The Commission on Sustainable Development (CSD) was created to monitor and report on implementation of the Agenda 21 and other Earth Summit agreements, by elaborating on policy guidance and options for future activities to follow up UNCED, and promoting dialogue to build partnerships for sustainable development.

The CSD meets once a year for two weeks with a high-level ministerial segment of usually two days. The CSD process is also characterised by an inter-sessional dynamism, including its own *ad hoc* inter-sessional working groups and many inter-sessional activities organised by governments, agencies and major groups, which makes the monitoring process of the UNCED commitments an on-going process all year long.

The CSD was not established as an executing agency or research institution. Instead, its task is to enable dialogue among the parties to build global consensus on sustainable development issues. It tries to assess what governments (at the national, regional and local level), intergovernmental actors and non-governmental actor have achieved or failed in the different areas of sustainable development, and identifies priority areas for further actions.

CSD work programmes

In terms of designating priorities in its future work and outlining specific tasks to be undertaken, the Commission was particularly effective in adopting work programmes for the transfer of environmentally sound technology (chapter 34), for changing consumption and production patterns (chapter 4) and for indicators for sustainable development (chapter 40) in 1995 and a work programme on education, public awareness and training (chapter 36) in 1996.

Major group participation

The CSD has opened up UN sustainable development debate to participants other than National governments - major groups organisations, including women, youth, indigenous peoples, non-governmental organisations, local authorities, workers and trade unions, business and industry, the scientific community, and farmers. It has established a unique and dynamic process that has allowed to incorporate their inputs in the monitoring and decision-making process. The CSD spotlights the roles of these major groups by giving them the opportunity to make presentations during officials sessions, as they did with the "Day of Local Authorities" at the 1995 Session, the "Day of the Workplace" at the 1996 Session and the "Dialogue Sessions" with all 9 major groups, as identified by Agenda 21, at the 1997 Session.

Local authorities have been instrumental in promoting the implementation of Local Agenda 21 in more than 1,812 Municipalities from 64 different countries. Local Authorities are working to reorganise themselves and change their practices to become more effective agents of sustainable development. Local level strategies and plans have demonstrated to be highly effective in terms of making significant impact.

A multitude of public and private initiatives took place, not only in response to the urgency of action but also thanks to the open, transparent, accessible and participatory way the CSD has been conducting its work, acting as a platform for consensus building. More needs though to be done, in order to increase, support and further engage this partnership with all actors of civil society.

Inter-agency co-ordination

The work of the CSD is supported by the UN system as a whole in a well co-ordinated fashion. This has been possible through the establishment, in 1992, of the UN Inter-Agency Committee on Sustainable Development. (Examples of Agencies are: UNCTAD, UNFPA, UNESCO, HABITAT, WHO, FAO, UNIDO...) The UN Agencies act as Task Managers for different chapters of Agenda 21, based on their area of expertise. The Task Managers are responsible for taking lead on activities involving the UN system and beyond, in implementing Agenda 21 on particular chapters of their responsibility and reporting on progress.

Earth Summit + 5

A five year review of Earth Summit progress was conducted from 23 to 27 of June 1997 by the United Nations General Assembly meeting in Special Session. This Special Session of the UN General Assembly, namely Earth Summit + 5, conducted an assessment of how well countries, international organisations and sectors of civil society have responded to the challenge of the Earth Summit, what gaps remain to be filled in achieving goals of sustainable development, and what further action needs to be taken to realise a "common future". The focus of the Earth Summit + 5 was to accelerate the implementation of Agenda 21 in a comprehensive manner and not to renegotiate its provisions.

The outcome of the Earth Summit + 5 were:

- *Statement of Commitment*, which reaffirmed that Agenda 21 remains the fundamental programme of action for achieving sustainable development, as well as all the principles contained in the Rio Declaration on Environment and Development and the Forest Principles.
- *Programme for the Further Implementation of Agenda 21*, including the Multi-year Programme of Work for the Commission on Sustainable Development, 1998-2002. Poverty and Consumption and Production Patterns were identified as overriding issues in this multi-year programme of work. A comprehensive ten-year review is planned in the year 2002.

UNESCO Chairs on Sustainable Development

UNESCO

Terms of Reference

Short version

"The challenge of finding sustainable development paths ought to provide the impetus - indeed the imperative - for a renewed search for multilateral solutions and a restructured international economic system of co-operation. These challenges cut across the divides of national sovereignty, of limited strategies for economic gain, and of separated disciplines of science."

Gro Harlem Brundtland

Oslo, 20 March 1987

The UNESCO chairs on Sustainable Development are designed to foster the advancement, transfer and sharing of knowledge and to facilitate its application to the search for new solutions which will improve the social and natural environment. Emphasis is placed on creating synergies between the exact and natural sciences and the social and human sciences with a view to nurturing an ethics of sustainable development which will respect both 'species' and the 'spaces' they live in.

Since 1992, some 40 Chairs and 12 networks have been established. The inter-university partnerships thus developed have led to the updating of training and research activities and the creation of new interdisciplinary degree courses. First quality information and documentation on the links between environment and development is systematically reinforced through the connection with international research networks and data bases. This is in line with UNESCO's mis-

sion to assume a clearing house function in its fields of competence, and to promote dissemination of research products and exchange of experiences.

A new thrust is given to capacity-building in research and policy formulation, in close co-operation with the Intergovernmental Programme "Management of Social Transformations (MOST)"; and its spelled out research priorities on (1) Multi-Culturalism; (2) Cities; and (3) Globalisation.

OBJECTIVES

Around concrete environment and development issues, the UNESCO Chairs aim at successfully linking the different scientific disciplines to promote the knowledge base for policy formulation in the field of sustainable development. The articulation between research, intensive training courses for policy-makers and specialists, and documentation and information activities addressed to different clienteles are a major concern. Furthermore, the Chairs are taking action towards providing students from different faculties and disciplines with a basic culture of sustainability. They also are geared to direct community action and advocacy planning, by including a strong outreach component in their curricula.

The major objective of academic networking with developing countries is the consolidation of the local scientific capacities for sustainable development. Without doing so, the mechanisms and means of international co-operation would be largely inoperative.

ORGANISATION

In a necessarily prospective and interdisciplinary approach, UNESCO Chairs on Sustainable Development are a unique opportunity to establish links which the existing scientific and educational institutions often prevent.

The Chairs are located in universities, research institutions or other relevant institutions of public or private character. They assume focal point functions for university twinning arrangements under the UNITWIN label.

Besides the classical activities of staff and student exchange, visiting professorships, development of new teaching curricula and the upgrading of information links through communication technologies, a special characteristic of

the UNESCO Chairs on Sustainable Development are the outreach components of their programmes. Community servicing, social "imagineering", and assuming the function of a platform for fruitful dialogue between different societal stakeholder groups, are priority tasks taken up by these Chairs. They shall enhance the University's potential to play its societal role fully.

CLIENTELES

These postgraduate programmes are designed to accommodate graduates of the exact, natural and social sciences. They are also focusing on the specific information needs of decision-makers, government officials, industrial leaders, engineers, non-governmental organisations, unions, communicators, and the media to further the sense of responsibility towards integrated environment and development strategies and to strengthen policy dialogue between all the stakeholders.

STRATEGIES

UNESCO Chairs for Sustainable Development are designed according to local ecological, economic and socio-cultural conditions and will promote action-oriented research and specific priorities for decision-making concerning sustainable development, be it a question of educational strategies or scientific research, technological development strategies or negotiation processes concerning the environment, or information and communication strategies related to these issues.

By their very nature the Chairs have to develop interdisciplinary tools to provide a conceptual and methodological framework for dealing with the specific local components of the biosphere, technosphere and sociosphere. The so trained individuals should be endowed with the necessary skills to venture out of their original disciplines, thus creating a new profile of intellectual responsibility towards research and decision-making.

This also includes the strengthening of a communication component to be built into scientific sectoral languages. Skills to communicate on scientific risk and uncertainty are still largely inexistent and will be a subject of special attention. Highly qualified scientists are trained to assume their share of responsibility in the

necessary social negotiation processes for achieving sustainable development. Decision theory and the acceptability of its options to the public will play a key role within these programmes. Further focus also will be on conflict theory and the monitoring and costing of policy options.

The UNESCO Chairs especially are promoting means for achieving scientific and technological goals within the context of a given society. They will do so through the strengthening of the conception of policies, of strategic planning and of technical and professional training. The modalities of social appropriation and diffusion of technical capacities will also be thoroughly studied with a view to implement a full range of articulation strategies between social sub-systems.

In developing countries, specific attention has to be given to social identification of the objectives of scientific and technical development. Within this context, the fundamental difference between technological transformation and local and social mastery of technical change cannot be stressed enough. The Chairs will further studies en appropriate decision parameters relating to area, scale and timeliness of where research, information and action are needed.

UNESCO CHAIRS AND UNITWIN NETWORKS ON SUSTAINABLE DEVELOPMENT

Interdisciplinary post-graduate programmes dealing with transformations of the socio-sphere, bio-sphere, and techno-sphere. Responsible Programme Officer: C.V. Furstenberg. Focal point UNITWIN/UNESCO Chairs, Division of Social Sciences, Research and Policy, Sector for Social and Human Sciences.

LATIN AMERICAN AND CARIBBEAN REGION

Argentina

La Plata

The UNESCO/FLACAM Chair

(Facultad latino-americana de ciencias ambientales) on **Sustainable**

Development;

Focus on urban sustainable development.

Start: early 1994

The FLACAM Network on Sustainable Urban Development:

Focal point and permanent secretariat: UNESCO Chair at La Plata. (mentioned above):

FLACAM North-South Network Link:

Spain: U. de Valencia

FLACAM South-South Network Links:

Bolivia: IIDEMA. La Paz

Brazil: U&A. Porto Alegre

Colombia: U. Externado de Colombia. Bogota.

Cuba: U. Pinar del Rio

Chile: PUC. Santiago

Mexico: Inst de Ecologia. Xalapa

Paraguay: AlterVida Asuncion

Peru: OACA. Lima

Uruguay: IFCA. Montevideo

Venezuela: CIDIAT, Mérida

National Sub-Networks:

FLACAM –Argentina, Centres:

Buenos Aires Norte,

Catamarca, Cordoba, Jujuy,

Mendoza, Neuquén, Parana,

Rio Negro, Rosario, San Juan,

Salta, Santa Fé, Tucuman.

FLACAM-Brazil, Centre:

CEAU, U. livre do Meio

Ambiente. Curitiba

FLACAM-Chile Centre: Concepcion

Brazil:

Federal University of Rio de Janeiro

UNESCO Chair on Sustainable Development

EICOS Programme (Interdisciplinary Studies on Communities and Social Ecology),

UFRJ Institute for Psychology;

Start: March 1994

Network Links:

University of La Habana, Cuba:

Dep. of Sociology: UNESCO Chair en Social Development.

Federal University of Parana

Curitiba

UNESCO Chair on Sustainable Development

Focus en social dynamics and dynamics of eco-systems

Start: autumn 1994

Network Links:

U de Paris-VII. Jussieu. France

U Bordeaux-II. France

Ecole d'Architecture de

France Paris-La Villette.

Colegio do Brasil

ORDECC (Organizacao para o Desenvolvimento de Ciencia e da Cultura)

Rio de Janeiro

UNESCO Chair on "City and Environment"

Start: 1994

Federal University Fluminense UFF

Niteroi, RJ

under consideration:

UNESCO Chair in Global Economy,

Economic Integration and Sustainable Development

Network Links:

United Nations University
CELA UNAM, Mexique
Fernand Braudel Centre SUNY,
New York.
U. de Paris VII et VIII
MEMO, Moscow
Academy of Social Studies, Beijing
Ritsumeikan University, Kyoto
Starnberg Institute, Allemagne
Third World Forum, Cairo

Bolivia

*Universidad Mayor San Simon.
Cochabamba*

***UNESCO Chair for the Environment
and Sustainable Development***

Start: 1995

Network Links:

UNESCO Chair in Planning, New
Technologies and Sustainable
Development:
University of La Laguna. Tenerife,
Canary Islands. Spain

Chile

Pontificia Universidad Catolica de Chile
Santiago

***UNESCO Chair in Development and
Integrated Territorial Management***

(Institute for Geography)

Start: 1995

Network Links:

UNITWIN Network of the French
National Commission for
UNESCO (see France)

University of Chile

Santiago

***UNESCO Chair in Public Policies and
Sustainable Development***

Centro de Analisis de Politicas Publicas
(CAPP)

Start: December 1995

Venezuela

*Central University of Venezuela
CENDES (Centro de Estudios de
Desarrollo)*

Caracas

***UNESCO Chair in Development
Studies***

Start: 1997

Trinidad & Tobago

University of the West Indies

Under consideration:

***UNESCO Chair in International
Economy***

Network Links:

Warwick University
University of Toronto

EUROPEAN AND NORTH AMERICAN REGION

Belgium

Université d'Anvers (UFSIA)

Under consideration:

UNESCO Chair for Social Development

Network Links:

- U de Kinshasa, Democratic Republic of the Congo
- U de Managua, Nicaragua

Canada

Université Laval, Québec

UNESCO Chair on Sustainable Development

Start: 1993

Network Links:

- Shanghai International Studies University, China
- Unationale de la Côte d'Ivoire, Abidjan
- U fédérale du Sergipe, Aracaju, Brésil
- U de Tunis
- U Guisqueya, Haiti
- U Ciudad Mexique
- U Cheikh Anta Diop, Dakar
- U de l'Etat de Paraiba, Brésil
- U fédérale de Ceara, Fortaleza, Brésil
- U rég. du Rio Grande do Norte, Mossoro.
- U féd du Rio Grande do Norte, Natal, Brésil
- Jawaharla Nehru University, New Delhi, Inde
- Tokyo University, Komaba, Japon
- U féd d'Algoas, Brésil
- U féd du Pernambuco, Brésil
- National Autonomous University of Mexico (UNAM)

France

Commission nationale française pour l'UNESCO

Chaire UNESCO du développement et aménagement intégré des territoires

Chaire itinérante entre

- Institut national agronomique de Paris-Grignon
- U de Toulouse-III-Paul Sabatier
- U de Montpellier
- fonctionne depuis nombre d'années partenaire: Pontificia Universidad Catolica Santiago du Chili

Germany

University of Trier

UNESCO Chair for European Studies

Centre for European Studies

Start: 1993

Netherlands

University of Utrecht

UNESCO Chair for African Studies

Focal point of the UNITWIN-Southern-African

Network:Links:

- U. of Harare, Zimbabwe
- Eduardo Mondlane University, Mozambique
- U of Namibia
- U of the Western Cape

Spain

University of Barcelona

UNESCO Chair for the Environment and Sustainable Development

Start: 1995/96

University of Deusto

UNESCO Chair for Human Resource Development

Focal point of an inter-regional network including Europe and Latin America
Start: 1994

University of Extremadura

UNESCO Chair on Sustainable Development

Start: 1994

University of Granada

UNESCO Chair on Sustainable Development

Start: 1992

*University of La Laguna,
Tenerife. Canary Islands*

Chaire UNESCO in Planning, New Technologies and Sustainable Development;

Start: 1992

Network Links:

UNESCO Chair for the Environment and Sustainable Development

U Mayor de San Simon
Cochabamba. Bolivia

University of Las Palmas de Gran Canaria

1. **UNESCO Chair in Environmental and Marine Resource Management in Coastal Zones;**
Start: 1992
2. **UNESCO Chair on Tourism Planning and Management**
Focal point. together with University of La Laguna of the "UNITWIN Network of Island Universities of Luso-Hispanic Language and Culture dealing with Tourism and Sustainable Development"

Network Links:

Federal University of Para.
Brazil

U de Santa Catarina. Brazil

U de Matanzas. Cuba

U. de Playa Ancha. Chile

U. Americana. Nicaragua

U del Pacifico, Peru

U dos Açores. Portugal

U de Puerto Rico

PUC Madre y Maestra,

Dominican Republic

U de Oriente, Venezuela

Start: 1996

Polytechnical University of Catalunya
UNESCO Chair in Technology, Sustainable Development, Desequilibria and Global Change
Start: 1996

Network Link of "GENIE" (Global -
problematique Education Network
Initiative)
launched by Case Western Reserve
University (see United States)

Polytechnical University of Madrid

1. **UNESCO Chair for Education, Information and Prospective Studies in the fields of "Society and Environment for Sustainable Development"**
2. **UNESCO Chair for Management Techniques in Business Administration**
Twinning arrangement with:
U de La Habana. Cuba
Start: 1995

University of Salamanca

1. **UNESCO Chair for Socio-Political, Economic and Employment Organisation**

2. **UNESCO Chair for the
Environment and Sustainable
Development**

*University of Santiago de Compostela
(USC)*
UNESCO Chair on Migration
Start: 1996/97

University of Valencia
**UNESCO Chair in Development
Studies**
Start: 1994

United Kingdom

University of Oxford
Refugee Studies Programme, Queen
Elizabeth House
Secretariat and Focal Point of the
UNITWIN Network
on Forced Migration
Network Links:
for the Middle East:

Palestine
Jordan for North Africa:
Morocco
Algeria
Tunisia

for East Africa:
Kenia
Tanzania

for Southern Africa:
Mozambique
South Africa (see references)

United States

Columbia University, New York
**UNESCO Chair in Information and
Resources**
Start: 1996

Case Western Reserve University
Cleveland, Ohio
Focal Point of the "GENIE" Network
(Global-problematique Education
Network Initiative)

Network Links:

UNESCO Chair in Technology,
Sustainable Development,
Desequilibria and Global Change
at the Polytechnical University of
Catalunya;
UNESCO Chair for European
Studies, Trier, Germany;
UNAM Mexico
C. Mendes University, Brésil
Chiba Inst. of Technology, Japan
Tsinghua University, Beijing, China
Jawaharlal Nehru Univ., New
Delhi, India
U of Lagos, Nigeria
St. Petersburg Technical State
University, Russia

CENTRAL AND EASTERN EUROPEAN REGION

Azerbaijan

Baku State University
under consideration:
UNESCO Centre for Advanced
Social Science Training and Research
**UNESCO Chair on Social
Transformations**

Hungary

Eötvös Loránd University
Budapest
UNESCO Chair in Minority Studies
Start: 1997

Poland*University of Varsovia,*

1. UNESCO Chair on Sustainable Development
Start: autumn 1994

2. UNESCO Chair on Women, Society and Development
Institute for Sociology

Rumania*Universit  d'Oreada*

under consideration:

UNESCO Chair in Health and Medical Anthropological Research

Russian Federation

*Novosibirsk State University**UNESCO Chair for Sustainable Development, Environmental Sciences and Social Problems*

Start: 1997

*Russian Academy for Sciences**UNESCO Chair for Social Sciences*

Institute for Social Research and Policy (ISRP)

Slovakia*University of Zvolen*

Banska Stiavnica

UNESCO Chair on Sustainable Development and Ecological Awareness-Building

Start: 1994

ARAB REGION**Jordan**

Unitwin Network on Forced Migration

Link of the Middle East:

Yarmouk University,

National Co-ordinator for the Universities of Jordan and Al-Al Beyt;

Start: 1994

Sub-Regional Link:

An Najah National University, Nablus, Palestine

Further Links:

University of Oxford-RSP: focal point
Moi University, KeniaUniversity of Dar es Salaam,
TanzaniaEduardo Mondlane University,
Mozambique

U of the Western Cape, South Africa

Hassan II-University, Casablanca.
Morocco**Lebanon**

R seau UNITWIN/AUPELF (Agence francophone pour l'enseignement sup rieur et la recherche) liban:

Mise en place d'un D.E.A. (Dipl me d'Etudes approfondies) en Agriculture durable

Partenaires libanais:

Universit  libanaise

Universit  Saint-Joseph

Universit  du Saint-Esprit Kaslik

Partenaires fran ais:

INAPG (Institut national agronomique
Paris Grignon)INRA (Institut national pour la
recherche agronomique)

D but activit s: octobre 1996

R seau en pr paration, partenaires:

CIHEAM Ban, Italie

U de Hania, Gr ce

U de Saragoze, Espagne

U de Tunis

Morocco

University Hassan II - Ain Chock
 Research Group on Human Rights and
 Population Movements (GREDOHMP)
 Faculty of Law
 UNITWIN Network on Forced Migration
 Link of North-Africa

Palestine

UNITWIN Network on Forced Migration
 Link of the Middle East:
 An Najah National University
 National Co-ordinator for the
 Universities of
 -Bir Zeit.

-Bethlehem, and

-Gaza Islamic

Start: 1994

Sub-Regional Link:

Yarmouk University, Jordan

Further Links:

Université d'Oxford-RSP: focal point

Moi University, Kenya

University of Dar es Salaam.

Tanzania

Eduardo Mondlane University.

Mozambique

U of the Western Cape. South Africa

Hassan II-University, Casablanca,
 Morocco

AFRICAN REGION**Ivory Coast**

Université d'Abidjan

under consideration:

UNESCO Chair in Inter-Cultural Sciences

(under the UNITWIN-SANTANDER
 Framework Agreement)

Links:

Legon University, Ghana,

Erasmus University, Rotterdam,

Netherlands

U of Bayreuth, Germany

U of the Western Cape

U of Namibia

U of Harare

UNITWIN Network on Forced Migration
 Southern-African Link at Eduardo
 Mondlane:

Start: 1994

Sub-Regional Link:

U of the Western Cape, South Africa:

Further Links:

University of Oxford-RSP: focal point

Moi University, Kenya

University of Dar es Salaam.

Tanzania

Hassan II-University, Casablanca.

Morocco

Yarmouk University, Jordan

An Najah National University,

Palestine

Senegal

University of Dakar

under consideration:

**UNESCO Chair on Transport and
 Development** (under the UNITWIN-
 Santander Framework Agreement)

Links:

U du Havre France

U of Las Palmas de Gran Canaria,
 Spain

ASIAN-PACIFIC REGION:**Indonesia**

Technology Institute of Bandung.

*UNESCO Chair on Sustainable
Development*

Start: 1994

UNITWIN Australia-Thailand-Network
on Environmental Management
Agreement signed with *Prince of Songkla
University* (Thailand), and *Griffith University*,
Australia
Itinerant Study Programme since 1993

Education for a Sustainable Future: from International Consensus to Action

PREAMBLE

IUCN expresses its appreciation for the work being done by UNESCO to draw together global thinking on education for a sustainable future.

IUCN supports the comments made in the paper prepared for CSD, April/May 1996 on the background to education for sustainable development, constraints to implementation and the main trends.

The following paper represents a first contribution of IUCN/CEC to the meeting in Greece, December 1997. The CEC network will further develop this paper.

A number of people commented on the draft that they did not like the term "sustainable future" as the future is too abstract and distant; and anyway the future is always coming...it is sustainable! One liked the term.

Some addressed the scientific reductionist approach to education as a cause of the current situation, and many emphasized the need for an ethical and values based education.

EDUCATION FOR A SUSTAINABLE FUTURE: FROM INTERNATIONAL CONSENSUS TO ACTION

VISION

Agenda 21, signed by 178 heads of state in 1992, is the international consensus on the interlocking issues facing humanity and the steps that must be

taken by the global community to achieve a sustainable future. *Agenda 21* is also the first international consensus on a strategy for education outlined in chapter 36 and reaffirmed throughout all chapters of the text. Subsequent to UNCED, UN conferences have expanded on the agenda for education in relation to other social development issues, including population, women and the urban environment.

The term "education for a sustainable future" implies a vision both of a sustainable future and of a process to make it a reality. To envision a sustainable future, we must identify the interlocking present trends in society, economy and environment, identify those elements of each that are unsustainable and must be changed, and plan the processes and actions to bring change about. A sustainable future implies a sustainable environment capable of maintaining the diversity of all life; a sustainable economy based on wise and equitable use of resources and a sustaining society whose life-style, aspirations and values are in harmony with the capacity of the natural environment.

Reaching the sustainable future is not a journey with a finite end in sight, but a continuing process of questioning, discussion, cooperation, planning and commitment to appropriate action involving all sectors of society. This process is the essence of a new paradigm for education.

The challenge for education is, firstly, to engage the global community in recognising and participating in this common search for stability and sustainability, and secondly, to identify and transmit the knowledge, skills and values needed for present and future generations to bring about appropriate change. The two strands of the challenge can be summarised as 'communication' and 'education', calling for somewhat different strategies, but they are interdependent aspects of the concerted movement towards education for a sustainable future.

CONSTRAINTS AND OPPORTUNITIES

Education for a sustainable future is a profound shift in the objectives, content and methodologies of formal education and as such, will demand innovative approaches to implementing it, involving in-depth consultation with every sector of the educational community, from government to classroom teachers and students, and every aspect from curriculum planning and policy making to teacher education and to new school and community linkages. The chief constraint is in gaining the acceptance and participation of educators and the support of their communities.

On the other hand, the opportunities have never been greater. Educators recognise the challenges facing their students and accept that education must be relevant to the present and future needs of society. The methodologies for implementing

education for a sustainable future in formal systems—inquiry, discussion, planning, cooperation and appropriate action—are well-established elements of creative education and the essence of education for a sustainable future. Educators readily understand that this is not an additional, imposed curriculum burden, but a perspective which permeates all disciplines and creates a context for integrated and creative learning.

Education for a sustainable future, in its objectives and methodologies, reflects the most advanced thinking in education, focused on critical thinking, creativity, new emphasis on values and a congruity with the processes of content identification and data collection of the computer age.

Moreover, this over-arching context for education builds on, incorporates and extends the long-established and successful work of educational movements such as environmental education, global education, peace and development education, among others, to present a coherent and clear rationale that links education with the real world.

At the tertiary level education for a sustainable future is being constrained by an increasingly market-driven approach with a decline in orientation to education based on values or ethics.

The increasing influence of the private sector on global and national development, which in capital investment swamps the contributions from development assistance, and often that of governments, suggests an opportunity to urgently stimulate attention to education for a sustainable future in the private, corporate and industrial sector.

Since education for a sustainable future can provoke critical reflection on current unsustainable development or activities, challenging business as usual, benefits for the corporate sector engaging in this educational process need to be identified and marketed.

MOVING INTO ACTION

A more concrete framework for education for a sustainable future is required. This would be derived from the issues and recommendations from the international level at UN meetings. As yet the values, issues, content and approaches suggested in these forums have not been extracted, organised and promoted as a basis for education for global citizenship. This framework, produced in a user-friendly form and communicated to those involved in education, such as religious groups, consumer societies, formal education sector, NGOs, businesses, unions, technical and professional training institutes, could be used to stimulate educational programmes in various sectors. A review of the Canadian

environmental citizenship initiative and the UNEP environmental citizenship approach could provide constructive lessons in such an approach.

Strategic Alliance

As called for in the CSD work plan, a strategic alliance could contribute to mobilising education for a sustainable future. The contribution of many organisations to developing an international educational framework, for adults as well as children, would build a sense of ownership and commitment to promoting education for a sustainable future. Using this framework to develop or refine existing policies to support education for a sustainable future, international organisations could also develop a strategy to most effectively mobilise their constituencies and networks.

A broad strategic alliance amongst UNESCO, UNEP, the World Bank, UNDP, UNICEF, WHO, ILO, and NGOs such as the World Council of Churches, World Travel and Tourism Council, World Business Council for Sustainable Development, the International Federation of Environmental Journalists, World Resources Institute, Peace Child International, WFF and IUCN, and regional organisations & national and local governments should be stimulated by UNESCO as Task Manager.

This model could be stimulated at international, regional and national levels as a means to drive or lead the process.

Such an alliance could be responsible for raising the status of education and communication on the government's political agenda, develop its basis and framework, stimulate and support action plans at the appropriate level - national, provincial, local council, develop inter-linked means of sharing progress and work to increase the amount of funds allocated to support education and communication.

The alliance could agree on a work programme to be most strategic in its approach and using the relative strengths of the organizations.

The work plan would define performance criteria and report on its achievement to CSD.

Funding

Implicit for policy implementation of education for a sustainable future will be funds. This means long-term financing and investment in education, requiring the economic and social benefits of education to be developed. In addition encouraging responsibility by different sectors for education programmes for their workers distributes the financial load. An international strategic alliance could play a role in the following way:

- a) Advocate for commitment for long-term financing of education for a sustainable future both by governments and international institutions.
 - b) Advocate in OECD, ODA, GEF Foundations for priority consideration for funding education for a sustainable future and as an integral part of all projects.
 - c) Seek national and international support for the integration of education for a sustainable future to be a part of investments in education by the banks, in curricula as well as in construction.
 - d) Negotiate debt swaps for education for a sustainable future
 - e) Suggest innovative means to fund education such as taxes on tourism and benefits from lottery, pooling funds from different sectors to provide incentives for innovation in education.
- The strategic alliance could encourage at the national level:

Policy commitment & action plans for ESF

The importance of awareness, education and training has been repeated at subsequent United Nations conferences and in different conventions. General government commitment needs to be translated into national policy and practical action and be central to all efforts deployed by government and non-governmental organisations.

Undertakings will require that every country include in their political agenda the necessary steps for the implementation of a sustainable development framework as well as dedication of monetary and professional resources to the achievement of sustainable development education and communication.

Initial steps include:

- a) Review the progress being made from national reports to UNGASS,
- b) Share examples of national approaches, particularly strategies for marketing to influential Ministries such as Finance, Prime Minister;
- c) Define the benefits to governments and opposition parties of including ESF in their policy priorities;
- d) Provide advice about the steps and mechanisms countries can use to engage a broad spectrum of international, national and community stakeholder groups in preparing a national policy and action plan for ESF;
- e) Involve international and development agencies in the action planning, so that a more coordinated and demand-based use of services can be provided for education for a sustainable future.

- f) Give examples of performance criteria need to be identified in order to measure the progress for the policy and action plan;
- g) Reports on the progress should be made to the highest national authority and included in reports to CSD, UN and Biodiversity Convention, etc;
- h) Financial and human resources must be allocated; an example is to pool funding from many different government sectors programmes in order to promote a more inter-disciplinary approach and to stimulate and foster efforts by corporations, by consumer groups, church and recreational groups, by local government as well as the formal system;
- i) Provide for regional opportunities to share information and coordinate efforts where appropriate in order to minimise duplication of cost and efforts

Mobilising action through partnerships and networks

Resources are limited so it makes sense to share in the attainment of a common goal. Partnerships expand capacity to provide services and to mobilise action. By involving key implementers of policy in the planning phase their involvement becomes more likely. International business and national corporations need to be involved. This applies equally to ODA and international agencies as to national organisations. An action plan can use the strengths of each to the best capacity.

Initial steps include:

- a) Support and encourage alliances and partnerships of a broad range of groups and organisations, nationally and internationally, to promote consistency in policy-making and implementation of education for a sustainable future by setting up mechanisms for discussion, consultation and leading the process including:
 - Inter-institutional organisations for sustainable development education and communication, such as national councils, regional commissions and municipal committees to drive the process;
 - Open new channels of discussion to facilitate the integration and participation of all sectors of society in the planning and implementation of policy and an action plan and programmes of ESF and communication on a local basis.
- b) Provide funding to stimulate collaborative effort;
- c) Develop education for a sustainable future and communication policies, plans and programmes with groups and organisations representing the different national cultures
- d) Establish regional mechanisms to share experience in strategies.

Development of Capabilities

Mobilising action will require a certain critical mass and steps to enhance capacity to facilitate the process.

- a) Provide funds for enhancing the capacity of facilitators of the process at national and local level
- b) Collect or inventory points of access to relevant information and experience in environmental education and development education.
- c) Review what has worked and lessons from failures or part success as a basis for developing the next phase.
- d) Provide opportunities to access this analysis and updated material on education for a SF for the formal and non-formal education using Internet as well as traditional hard copies
- e) Provide information on current activities to meet the needs of those working in the field.
- f) Provide regular forums for exchange and analysis on implementation involving a broad range of groups.

REORIENTING FORMAL EDUCATION

Education for a sustainable living should be included in formal education systems with the involvement of teachers unions, trade unions, media, private business, women, first nation or indigenous groups and youth along with the education sector.

Amongst the skills suggested for the future are complex problem solving skills, critical reflection and creative thinking, synthesis, how to manage projects, interpersonal expression, information management, consensus building and conflict resolution. These skills are also those needed for the world of work and requested by industry.

Opportunities & Constraints

Information technologies will provide rapid access to a broad amount of information. Learning facts will be outmoded. More important will be skills of finding and analysing complex information, solving problems and being able to plan and manage action programmes.

The disciplinary approach to education means that the student is required to make the interdisciplinary connections. Ideally interdisciplinary approaches based on real community issues and problems can be scheduled as well as disciplinary

ones. If such approaches are incorporated, the school can become more integrated in the community as students learn from a broad array of community contacts, apply skills and play a role in community action.

MOVING TO ACTION

Defining the content, skills and values presented by the education system is a national / or state decision and should reflect national policy for a sustainable future. Guidance can come from the internationally agreed agenda .

- a) Establish a mechanism to stimulate a review of education for the modern age and addressing sustainability.
- b) Include teacher unions, workers and professional unions, business and community groups as well as education experts in defining changes to formal education policies and curricula to address the concepts of human, social and economic development and environmental protection within an interdisciplinary conceptual framework. Include all levels from kindergarten and continuing through university and professional levels.
- c) Challenge tertiary education to address sustainability / biodiversity / social aspects in fields such as business management; economics to address ecological sustainability and green accounting; and forestry to account for biodiversity and social issues, and agriculture to mainstream environment.
- d) Develop shared meaning and educational language to
- e) Define shared objectives, concepts, knowledge, skills, attitudes and values as well as methodologies and approaches for national needs.
- f) Incorporate this new learning into professional development (in-service and pre-service)
- g) Encourage new approaches that integrate community enterprise and services with formal education and make use of the information available on Internet.

PUBLIC AWARENESS / UNDERSTANDING: THE FUEL FOR CHANGE ...SHIFTING TO SUSTAINABLE LIFE STYLES

ISSUES

Awareness does not necessarily lead to action though it is a recognisable first stage. In fact what is being addressed is public education in

the non-formal area with the idea of engagement, mobilising support and responsibility for sustainability. We need to have an action oriented concept.

Since education usually means school education, a better term may be public education or "communication" as a policy and project instrument; with the idea of communication being used to guide an overall learning and mobilisation process using many approaches according to the situation from marketing to instruction, information, public relations, networking and education.

Communication is based on two way exchange and therefore also encompasses the notion of involving stakeholders in policy and programme formulation and implementation thereby facilitating bottom up processes. It needs to be an integral part of all phases of the policy cycle and projects from conception to evaluation, involving stakeholders in all phases.

Constraints & Opportunities

Many policies, projects and programmes fail, wasting money, and not making progress towards sustainability because of a lack of effective communication. Communication is an integral part of developing shared meaning, or understanding essential for conflict resolution and building consensus.

In the public domain, the new information technologies will provide fast access to a vast amount of information, but also with little quality control. The consumer will have to judge what is accurate or important. It will be possible to mobilise social action on policy issues cheaper and more rapidly. However there will be competition for attention.

Learning by distance provides opportunities for individuals to enhance their education more easily and provides opportunities for continuing education, professional development and education for sustainable development to be provided more widely. The down side is information technologies will also favour marketing and make consumption easier.

MOVING TO ACTION

- a) IUCN would like to stress to governments, development assistance agencies, and project developers from international organisations to NGOs, the importance of integrating and incorporating communication aimed at increasing awareness and involvement in the planning stages of policies and projects in the field of sustainable development. This step means that policies and actions are built on reality at the national and local government level. Advocacy and building capacity for communication as a policy instrument is needed at government and project management level.

- b) To be more effective, encourage governments and international agencies to combine communication / public education with other policy instruments, such as regulations and financial incentives at the national and local government level. Similarly communication / education that is seeking change in practice can work only if options for alternative action are provided, otherwise the educational efforts can be wasted.
- c) Co-ordination and co-operation between various sectors of government, NGOs and media will enhance the impact of public education and awareness strategies.
- d) Communication management should be directed to mobilising corporations to take responsibility for reviewing the production process and introducing sustainability principles in worker education.
- e) Engage local governments in their responsibility for community education for sustainability. One idea is to support community facilitators at the local government level to stimulate community debate on their vision of a sustainable future and plan how to take action. Facilitate links between communities so each can learn from one to another.
- f) Recognise that communication is not always about using mass media. An important way of learning and influence is based on relationships. Use traditional and community networks as a means to stimulate new thinking and action; these approaches will be more apparent if the target groups are also involved in planning the communication.
- g) Developing key messages is not possible without relating the issues to target groups and placing them in the national/local context. The formulating of messages should therefore be done at the appropriate level in partnership with all of the stakeholders.
- h) Encourage public participation by extensive dissemination of information relating to various spheres of life (work, private, and community). Provide funding / incentives for this to be adapted and used by partners: trade unions, corporate sector, media, women, consumer, religious, youth, First Nations, etc.
- i) Increase public service and public access to radio and TV for SD by including requirements for this to be provided in prime time as part of broadcast license agreements.
- j) Increase public access to information as it relates to sustainable development by using weather and news broadcasts..
- k) Develop and support computerised information networks that will increase access to information, technical expertise, collaborative strategies, and existing successful initiatives.
- l) Support sustainable development initiatives in communities.

ANNEX I

International Conference on Environment and Society: Education and Public Awareness for Sustainability

(Thessaloniki, Greece, 8-12 December, 1997)

Final Report

INTRODUCTION

The International Conference on Environment and Society: Education and Public Awareness for Sustainability was held from 8 to 12 December 1997 in Thessaloniki, Greece, the Cultural Capital of Europe for 1997. Organised by UNESCO and the Government of Greece, the conference brought together nearly 1200 experts from 84 countries.

The Conference was held at an important juncture, five years after UNCED and the Toronto ECO-ED Conference and twenty years after the Tbilisi Conference on Environmental Education. The Conference was undertaken as an intersessional activity contributing to the work of the UN Commission on Sustainable Development (CSD) on chapter 36 of Agenda 21 ("education, public awareness, and training"), for which UNESCO is Task Manager. It was designed to contribute to implementation of the work programme of the CSD on chapter 36 initiated in 1996 at its fourth session.

The objectives of the Conference were to:

- ❖ highlight the critical role of education and public awareness in achieving sustainability;
- ❖ consider the important contribution of environmental education;
- ❖ provide elements for the further development of the work programme of the CSD;
- ❖ mobilise action at international, national and local levels.

The Conference was opened by the Mayor of Thessaloniki, Mr K. Kosmopoulos, and by the Greek Minister for the Environment, Physical Planning and Public Works, Mr K. Laliotis,

Minister of National Education and Religious Affairs, Mr G. Arsenis, and Minister of Culture, Mr E. Venizelos. Mr Federico Mayor, Director-General of UNESCO delivered the keynote address during which he emphasised the commitment of UNESCO to taking up its responsibilities as Task Manager to promote education and public awareness for sustainability. He explained the great importance that the UN system was giving to promoting the integrated follow-up of the major UN Conferences, particularly at country level. He pointed to the fact that recommendations concerning education and public awareness appeared in each of the action plans and conventions, and that therefore this theme was clearly a cross-sectoral area for collaboration at all levels. Ms Yolanda Kakabadse, President of the World Conservation Union (IUCN) also addressed the Conference as well as representatives of UN-DESA, UNEP, FAO, CCD, IFAD, OAS, OECD.

The work of the Conference was conducted principally through an Issues Forum and an Innovative Practices Forum, which ran simultaneously. Numerous workshops, poster sessions, an international youth forum, an exhibition, and several cultural events also took place. Daily news bulletins containing summaries of discussions, interviews with participants and other news was prepared by a team of youth from the Students Commission/TG Magazine of Toronto, Canada.

The closing address was delivered by Mr G.O.P. Obasi, Secretary-General of the World Meteorological Organisation (WMO). The rapporteurs presented oral reports summarising the discussions during the various segments of the Conference. Mr Gustavo López Ospina, Secretary of the Conference and Director of the UNESCO Transdisciplinary Project Educating for a Sustainable Future made a concluding speech on behalf of the Director-General. Mr Michael Scoullios, President of the Conference and Chairman of the Greek Organising Committee, also made concluding remarks.

The officers of the Conference are provided in Annex 1. The programmes of the Issues Forum and Innovative Practices Forum are provided in Annexes 2 and 3.

A TRANSDISCIPLINARY VISION FOR CONCERTED ACTION

The conference took place against the backdrop of the new vision of the role of education and public awareness in achieving sustainability, which had emerged during the last few years. Education was no longer seen as an objective in and of itself but as a means to bring about changes in behaviour and lifestyles, to disseminate knowledge and develop skills, and to prepare the public to support changes towards sustainability emanating from other sectors of society.

This vision had been reflected in the new international consensus and framework for action which had emerged from the series of conferences organised by the United Nations, beginning in 1992 with environment and development in Rio, and followed by population in Cairo (1994), social development in Copenhagen (1995), women in Beijing (1995),

and human settlements in Istanbul (1996). Also relevant were the conventions on biological diversity, climate change, and desertification.

In an attempt to clarify the concept of education for sustainability as requested by the CSD, UNESCO, in its function as Task Manager for chapter 36, prepared a document entitled "Educating for a Sustainable Future: A Transdisciplinary Vision for Concerted Action". This document served as the main background paper for the Conference, intended to provide a stimulus to discussion rather than as a document for discussion per se. The document was written based on a wide variety of source materials, including background papers prepared by experts at the request of UNESCO. Participating in the preparation of the document were a host of experts and institutions, including FAO, IUCN, OECD, UN-DESA, UNDP, UNEP, UNFPA, WHO and the World Bank, as well as the Greek Organising Committee for the Conference. The executive summary of the document is reproduced in Annex 4.

MAIN CONCLUSIONS

ISSUES FORUM

This segment of the Conference was devoted to the treatment of six issues which had been selected to reflect the priorities laid down by the CSD in its decision in 1996 to initiate a special work programme on chapter 36. Overall, it was the conclusion of the participants that, while much had been done, there was so much more that needed doing, and that the pace needed to be accelerated. Participants felt that they themselves needed to change in order to better influence others. The Thessaloniki Conference was seen as helping participants understand each other better, and understand the different conditions prevailing in countries and regions. The Conference was considered instrumental in strengthening the resolve of the participants to move forward with greater force, not only in their own actions but also in prompting others to become involved.

The Conference also made headway in clarifying the still emerging concept of education for sustainability, in response to the call by the CSD to UNESCO to take leadership in developing a common conceptual vision, which would serve as a framework for concerted action. The complexity of the concept was apparent during the Conference, as well as the need to allow for diverse groups to come together despite the difficulties posed by traditional disciplinary and organisational barriers that had isolated these groups hitherto. Education for sustainability was seen as an indispensable instrument for achieving a sustainable future, touching on and integrating the notions of population, poverty, environmental degradation, democracy, human rights and peace, development and interdependence.

It was recognised that many lessons could be learned from the experience of environmental education in developing the broader notion of education for sustainability. In its brief twenty-five year history, environmental education had steadily striven towards goals and outcomes similar and comparable to those inherent in the concept of sustainability. For

some, the term "environmental education" was virtually synonymous with the term "education for sustainability". Others preferred other terminology better suited to their own local needs.

The main conclusions of discussions concerning each of the six issues are summarised below.

Issue 1: Educating for a sustainable future: international consensus as an impetus for action

- ❖ Interdisciplinarity is required to deal with education in the perspective of sustainability.
- ❖ An intersectoral approach is needed in order to implicate all sectors of society in the educational enterprise, which, seen from the perspective of sustainable development, yields benefits for the whole of society.
- ❖ Cooperation at the national level is of particular relevance to bringing about the changes required in education.
- ❖ Diverse efforts and expertise need to be coordinated and integrated in order to move forward together efficiently and effectively. There is a role for each actor, and each needs to recognise the validity and place of the others.
- ❖ The conclusions of the major international conferences concerned with sustainable development organised by the UN (the major UN conferences of the 1990s) and with environmental education by UNESCO (Tbilisi, Moscow in 1977 and 1987) remain valid for action in the future.

Issue 2: Reorienting formal education towards sustainability

- ❖ There is a need to reorient education towards sustainability. Adjustments or additions to existing educational systems will not be sufficient.
- ❖ Curricula need to be reappraised, as well as teaching modalities and methods of assessment. All three of these areas need to be modified, as they are mutually supportive.
- ❖ There is a need to work together - in contrast to the isolation of different disciplines in the past - in order to bring together the different elements inherent in the notion of education for sustainable development. Actors from the different streams need to help and complement one another.
- ❖ There is a need for a holistic approach in curriculum planning and design. This is particularly important in order to integrate social and cultural aspects and in particular values and ethics.
- ❖ Education for sustainability should permeate the entire curriculum.
- ❖ Greater efforts are required to prepare teachers and teacher trainers.
- ❖ Non-formal education is as important as formal education.
- ❖ There needs to be greater commitment to the post-primary level of schooling.

Issue 3: Public awareness and understanding

- ❖ There is a real danger of environmental education and education for sustainability being perceived as a threat by the profit-seeking sector.

- ❖ There is a need to capture the widespread attention of the general public. The concept of sustainable development is not widely known or appreciated. Communication about sustainable development needs to be understandable to a general audience, and closely related to the local needs and interests of various groups in society.
- ❖ Where public awareness currently centres on economic development, a holistic approach needs to be introduced in order to highlight the many other dimensions related to economic considerations. This point was reiterated by nearly all speakers.
- ❖ It is vital to stress the relationships between sustainability and the notions of partnership, poverty alleviation, and achieving greater equity in society including with regard to women, youth, and other groups.

Issue 4: Shifting to sustainable lifestyles: changing production and consumption patterns

- ❖ Many see the problems associated with sustainability as being due to the behaviour of others rather than themselves. People need to realise how individual behaviour contributes to both the creation of problems and their solution.
- ❖ An enormous challenge to governments is to utilise taxation and regulatory action to encourage change. It is vital that governments increasingly take action to support sustainable lifestyles.
- ❖ Communication strategies are critical.
- ❖ We need to “educate the heart as well as the head”. The issues we are addressing are related as much to ethics and social justice as they are to scientific knowledge-based considerations. We should move towards the progressive internalisation of new principles into our educational culture.

Issue 5: Investing in education: contributing to a sustainable future

- ❖ Governments and international, regional and national financial institutions, as well as the productive sectors should be encouraged to mobilise additional resources and increase investments in education and public awareness.
- ❖ An independent fund for education for sustainability needs to be considered. This fund would encourage contributions from the public at large, from business, and from governments. It would give high visibility to these issues.

Issue 6: Ethics, culture and equity in achieving sustainability

- ❖ The knowledge of indigenous populations and its enormous potential need to be recognised. Such people provide numerous examples of harmonious equilibrium of human and natural systems.
- ❖ The role of youth, particularly at the local level, needs to be recognised, and their contribution and participation facilitated.
- ❖ Children should be considered not only as recipients of education but also as actors. A two-way link between teachers and students needs to be created. Children should be given the opportunity to learn through concrete projects.

- ◆ Ethics, culture and equity are inseparable in any context. They may have different meanings in different societies, which need to be carefully considered in the educational process.
- ◆ There are certain dangers in some of the information made available to the public today. The question arises as to whether "processed" information is ethical.
- ◆ Cultural and environmental protection needed to be linked.

INNOVATIVE PRACTICES FORUM

The Innovative Practices Forum ran parallel with the Issues Forum, in an attempt to give high visibility and importance within the Conference to the review of examples of what was being done in different countries and in different aspects of education and public awareness related to sustainability. In all, 17 innovative practices were presented. They included examples related to primary and secondary education, higher education, teacher training, training of specialists, computer-assisted learning, public awareness campaigns, media projects, and public action initiatives.

The emphasis on examples and sharing of experience had been stressed by the Commission on Sustainable Development in its decision to launch a work programme on chapter 36. The sharing of experiences and the exchange of views among those facing similar challenges were seen by the CSD as an important means to promote more effective and widespread action towards sustainability, which inevitably requires innovative ways of thinking and acting.

A number of general points were raised during the ensuing discussions, including the following:

- ◆ Funding for education for sustainable development is a problem as funds in general are in short supply, and generally accorded only on completion of an activity rather than at its inception.
- ◆ It is an error to think that certain environmental solutions necessarily entail trade-offs or sacrifices.
- ◆ The infusion process has proved far more successful in informal than in formal educational settings.
- ◆ Education for sustainability should include environmental education.
- ◆ Projects need to be addressed to specific target groups.
- ◆ The examples presented demonstrate that the integrated approach described in the literature can be put into practice.

UNESCO presented a mock-up for an "international registry of innovative practices supporting education, public awareness and training for sustainability" which it was developing as Task Manager for chapter 36, with the support of the Government of the United States. This system was being designed to utilise the most recent advances in technology to create a "second generation" Web site on the Internet. Once fully developed, the system would be available for use at both national, international, and institutional levels, including by countries without satisfactory access to the Internet.

WORKSHOPS

Numerous workshops were held on a variety of topics within the following general areas:

- ◆ Networking/community and local action
- ◆ Ethics/concepts/principles
- ◆ Natural science, conservation and marine education
- ◆ Environmental education research and country overviews
- ◆ Tourism/teacher training/adult education.

Three recurring comments were identified from the diverse discussions that took place. First, the essence of the programmes treated emphasised the need for a sustainable way of life, although this concept represented different things to different people. Second, environmental education was the focus of most of the presentations, with particular success having been observed in community-based educational activities. Third, environmental education was seen to have a critical role to play in promoting sustainable lifestyles.

POSTER SESSIONS AND EXHIBITION

The exhibition hall proved to be a centre for discussion and exchange of views throughout the Conference. The various stands and poster presentations concerned the following subject areas:

- ◆ Training
- ◆ Educational materials
- ◆ Means of dissemination
- ◆ Co-operation
- ◆ Strategies, policies and action plans
- ◆ Educational systems
- ◆ Role of NGOs and foundations
- ◆ Studies and research.

DECLARATION AND PROCEEDINGS

At the conclusion of the Conference, participants adopted by consensus a declaration, reproduced in Annex 5. The Government of Greece was invited to ensure that the results of the Conference were transmitted to the CSD at its sixth session in April 1998.

It was announced that the proceedings of the Conference would be published by the Greek Organising Committee in 1998.

ANNEX 1 OFFICERS OF THE CONFERENCE

President	<i>Michael J. SCOULLOS</i> (Chairman of Greek Organising Committee)
Secretary	<i>Gustavo LOPEZ OSPINA</i> (UNESCO)
Vice Presidents	<i>Xu JIALIN</i> (China) <i>Bedrich MOLDAN</i> (Czech Republic) <i>Jacqueline NKOYOK</i> (Cameroon) <i>John SMYTH</i> (United Kingdom) <i>Ziolo ZANOTTO MALHADAS</i> (Brazil)
Co-ordinator, Issues Forum	<i>Eduardo GUTIERREZ</i> (Uruguay)
Co-ordinator, Innovative Practices Forum	<i>Doris D'SOUZA</i> (India)
Co-ordinator, Workshops/Oral	<i>Douglas KNAPP</i> (USA)
Oral presentations	
Co-ordinator, Poster Sessions/Exhibition	<i>Abbas ZAHREDHINE</i> (Lebanon)
Special Representatives	UN-DESA; UNEP; FAO; IFAD; OECD; OAS; IUCN; CCD

ANNEX 2 PROGRAMME: ISSUES FORUM

MONDAY, 8 DECEMBER 1997

INAUGURATION-OPENING PLENARY

Welcoming Remarks by the Mayor of Thessaloniki:

Konstantinos KOSMOPOULOS, President of the Organisation for the Cultural Capital of Europe-Thessaloniki 97

Address by:

Michael J. SCOULLOS, Co-ordinator of Co-ordinating Organising Committee (C.O.C.), Greece

Welcoming Remarks by the Government of Greece:

Kostas ALIOTIS, Minister for the Environment, Physical Planning and Public Works
Gerasimos ARSENIS, Minister of National Education and Religious Affairs
Evangelos VENIZELOS, Minister of Culture

Keynote Address: "Educating for a Sustainable Future"
 Federico MAYOR, Director General, UNESCO

Issues Forum 1: Educating for a sustainable future: international consensus as an impetus for action

Messages by

Michael PAPAPOPOULOS, Rector of the Aristotelian University of Thessaloniki, Greece;
 Ioannis DRAKOPOULOS, Vice Rector of the National and Kapodistrian University of Athens, Greece

Presentation of the Conference's background document:

Gustavo LOPEZ OSPINA, UNESCO, Secretary of the Conference

Interventions by:

Yolanda KAKABADSE, President of the World Conservation Union (IUCN)
 Enrique LEFF, on behalf of the Executive Director of the United Nations Environment Programme (UNEP)

Remarks by representatives of intergovernmental organisations:

- ◆ Hiroko MORITA-LOU, United Nations Department for Economic and Social Affairs (UN-DESA)
- ◆ Tito CONTADO, Food Agricultural Organisation (FAO)
- ◆ Elysabeth DAVID, Interim Secretariat of the Convention to Combat Desertification of the United Nations (CCD)
- ◆ Margaret BRUSASCO-MACKENZIE, Commission of the European Union (CEU)
- ◆ Kathleen KELLEY-LAINÉ, Organisation for Economic Co-operation and Development (OECD)
- ◆ Beatrice EDWARDS, Organisation of American States (OAS)

Conclusions of major relevant conferences and pre-meetings held in 1997:

- ◆ Arturo CURIEL BALLESTEROS, Iberoamericano Conference, Guadalajara, Mexico
- ◆ Peter CORCORAN, North American Association for Environmental Education Conference 1997, Vancouver, Canada
- ◆ Desh BANDHU, V Global Conference on Environmental Education, New Delhi, India
- ◆ Maria Teresa de JESUS GOUVEIA, Brazil National Conference on Environmental Education, Brasilia, Brazil
- ◆ Rupert MACLEAN, UNESCO-Bangkok, Thailand
- ◆ Alain PELISSIER, Planet-ERE, Montreal, Canada
- ◆ Vassilis PSALIDAS & George FARANGITAKIS, Report of Greek pre-conference meetings, Greece

- ◆ Emad ADLY, Report of meetings held in the Mediterranean Region, Egypt
- ◆ Ulrich ANDERSEN, UN & Tatsuya AOKI, Tokyo Metropolitan Government, World Conference on International Co-operation of Cities and Citizens for cultivating Eco-Society, 26-29 May 1998, Tokyo

TUESDAY, 9 December 1997

Issues Forum 2: Reorienting formal education towards sustainability

Chair: Michael J. SCULLOS, President of the Conference

Co-chair: Harjit SINGH, Senior Adviser, Ministry of Environment & Forests, India

Rapporteur: John SMYTH, Professor Emeritus, UNED-UK

Speakers:

- ◆ Charles HOPKINS, President of Info-Green, Canada
- ◆ Enrique LEFF, Co-ordinator UNEP/ROLAC, Mexico
- ◆ John FIEN, Griffith University, Australia
- ◆ Douglas KNAPP, University of Indianapolis, USA
- ◆ Eugenia FLOGAITI, National and Kapodistrian University of Athens, Greece
- ◆ Radyastuti WINARNO, Institute of Teachers' Training and Education, Indonesia

Responders:

Solly MOSIDI, Department of Environment Affairs, South Africa

Issues Forum 3: Public awareness and understanding: the fuel for change

Chair: Raymond van ERMEN, Executive Director of European Partners for the Environment (EPE), Belgium; Co-chair: Desh BANDHU, President of Indian Environmental Society, India

Rapporteur: Lucien CHABASON, co-ordinator UNEP/MAP, Greece

Speakers:

- ◆ Mahmoud OUANES, Ministry for the Environment and Physical Planning, Tunisia
- ◆ Dalia MAIMON, GLOBO TV, Brazil
- ◆ Emad ADLY, Chairman of the Arab Network for Environment and Development (RAED) and President of the Arab Office for Youth and Environment (AOYE), Egypt

- ❖ Francisco FERNANDEZ, Director, Commission of the European Union, DGXIII, Luxembourg
- ❖ Ricardo MELENDEZ ORTIZ, Executive Director International Centre for Trade and Sustainable Development (ICTSD), Switzerland
- ❖ Vassilis KONSTANTAKOPOULOS, President of the Hellenic Marine Environment Protection Association (HELMPEPA), Greece
- ❖ Stephen STERLING, World Wildlife Fund-UK
- ❖ Darlene CLOVER, International Co-ordinator LEAP, Canada

Responders:

Riitta WAHLSTROM, Jyväskylä University, Finland

WEDNESDAY, 10 December 1997

Issues Forum 4: Shifting to sustainable lifestyles: changing consumption and production patterns

Chair: H.E. Mario OJEDA GOMEZ, Ambassador, Permanent Delegate of Mexico to UNESCO

Co-chair: Aldo MANOS, Forum for the Venice Lagoon, Italy

Rapporteur: Genevieve VERBRUGGE, Ministry for the Environment, France

Speakers:

- ❖ Sappho HARALAMBOUS, Programme Development Officer, International Fund for Agricultural Development (IFAD)
- ❖ Hans Christian LILLENHAGEN, Project Manager, Foundation for Business and Sustainable Development (FBSD), Norway
- ❖ Domingo JIMENEZ BELTRAN, Executive Director of European Environment Agency (EEA), Denmark
- ❖ Jeremy EPPEL, Counsellor, Environment Directorate, OECD
- ❖ Jit PETERS, Director, International Environment Policy, Ministry of the Environment, The Netherlands

Responders:

- ❖ Charalambos BARBOUNAKIS, President, Association of Local Authorities of Greater Thessaloniki, Greece
- ❖ Mirghali TAG EL SEED, University of Khartoum, Sudan

Issues Forum 5: Investing in education: contributing to a sustainable economy

Chair: Sylvi OOFSTAD SAMSTAG, Deputy Director, General Ministry of Environment, Norway

Co-chair: Katerina TZITIKOSTA, President of UNESCO Balkan Centre for Women, Greece

Rapporteur: Fergus O'GORMAN, Director of National Conservation Education Centre, Ireland

Speakers:

- ◆ Eduardo GUTIERREZ, Uruguay
- ◆ Gerit VONKEMAN, University of Utrecht, Director of Institute for European Environmental Policy (IEEP)-Brussels, The Netherlands
- ◆ Simeon NEDIALKOV, University of National and International Economics, Bulgaria
- ◆ Paul EFMORFIDIS, Director, Coco-Mat S.A. (Green Industry), Greece
- ◆ Jose DA SILVA & Sergio PHILIPPI, University of Santa Catarina, Brazil
- ◆ John C. SMYTH, UNED-UK & Pam J. PUNTENNEY, University of Michigan, USA
- ◆ Trevor HARVEY, Farnborough College of Technology, UK

Responders:

- ◆ Xu JIALIN, Beijing Normal University, China
- ◆ Manfred OEPEN, Appropriate Communication in Development (ACT), Germany

FRIDAY, 12 December 1997

Issues Forum 6: Ethics, culture and equity in achieving sustainability

Chair: Michael MODINOS, Greece

Co-chair: Dan Gabriel MANOLELI, Member of Parliament, Romania

Rapporteur: Mohamed FTOUHI, Club Marocain d' Education en matière de Population et d' Environnement (CMEPE), Morocco

Speakers:

- ◆ Dimitri COTJI, UNICEF, Guatemala
- ◆ David WOOLLCOMBE, Peace Child International, UK Rescue Mission, UK

- ◆ Doris D'SOUZA, A.C., Patna Women's College, India
- ◆ Nelson VALLEJO, General Secretary of Association pour la Pensée Complexe (APC), France
- ◆ Stella CHRISOULAKI, Ministry of Culture, Greece

Responder:

- ◆ Dorte BENNEDBAEK, Head of Department, Danish Ministry of the Environment and Energy, Denmark

Closing Plenary

Closing address:

G.O.P. OBASI, Secretary General, World Meteorological Organisation (WMO)

Oral Reports: co-ordinators of the Issues Forum, Innovative Practices Forum, Workshop Session, Poster Session, Youth Forum

Adoption of the "Thessaloniki Declaration"

Conclusions:

- ◆ Gustavo LOPEZ OSPINA, UNESCO, Secretary of the Conference
- ◆ Michael J. SCULLOS, President of the Conference

ANNEX 3 PROGRAMME: INNOVATIVE PRACTICES FORUM

TUESDAY, 9 DECEMBER 1997

SESSION 1

Chair: George S. SPYROU, Commission of the European Union DG XVI, Brussels

Rapporteur: Rosanne FORTNER, The Ohio State University, USA

- ◆ "The Nature of the Landscape" by Marcos DIDONET, Director of the Centre for Culture, Information and the Environment (CIMA) & Daniel LOBO FILHO, CIMA, Brazil

- ◆ "Education, Culture and Ethics in Developing Countries" Mimoun HILLALI, Association Femmes et Jeunesse dans l' Environnement Maghrébin (AFJEM), Morocco
- ◆ "Educating on Eco-citizenship" by Maryse CLARY, Centre Universitaire de Formation des Maîtres (IUFM), France
- ◆ "European Education Projects in the Field of Environment" Dioni VARDAKAS-SOTIROPOULOU, European Environmental Bureau (EEB) Consultant, Belgium

SESSION 2

Chair: Michel TISSUT, University of Grenoble, France

Rapporteur: Manos DASENAKIS, University of Athens, Greece

- ◆ "The Globe Programme: an open classroom for the environment" by Kostas KARTALIS, University of Athens, Greece and Christos MICHALOPOULOS, The GLOBE Program, USA
- ◆ "The school as neighbourhood. The school of the future" by Christos FRANGOS, Aristotelian University of Thessaloniki, Greece
- ◆ "Presentation of the Ecowatch program" by Adam FENECH, Bureau de coordination de la surveillance scolaire, Canada
- ◆ "Education for a changing world" by Dr Pamela J. PUNTENNEY, University of Michigan, USA and John SMYTH, Professor Emeritus, UNED-UK

WEDNESDAY, 10 December 1997

SESSION 3

Chair: Valery S. PETROSYAN, Open Ecological University, Russia

Co-chair: Sergei Y. PESHKOV, UNESCO Professor-President of International Centre of Educational Systems (ICFS-UNDP), Russia

Rapporteur: Dileep BHAGWUT, Editor of Connect-UNESCO, France

- ◆ "Infusing education for sustainable development into formal education: practical examples" by Peter CORCORAN, Florida Gulf Coast University, USA and Charles HOPKINS, President, Info-Green, Canada
- ◆ "Strategies and Adaptation processes to develop EE Materials with global contents at the International level" by Isabel CASTILLO DE RAMOS and Mary PADEN, World Resources Institute, USA
- ◆ "The Role of Teachers' Capacity Building in Education for Sustainability" by Xu JIALIN, Beijing Normal University, China
- ◆ "Integrated Interdisciplinary training of specialists for sustainable development

of regions" by Sergei I. PESHKOV, UNESCO Professor-President of ICES-UNDP, Russia

- ◆ "Computer aided learning (CAL) in Meteorology" by G.V. NECCO, Director of Education and Training Department of WMO, Switzerland

SESSION 4

Chair: Thomas BUCHER, Ministry of Interior, Switzerland

Co-chair: Orlando HALL ROSE, UNESCO

Rapporteur: Kirtida MEKANI, Coordinator Agiorius, Singapore

- ◆ "The Springs Project: WWF-Belgium-The other outlook on water" by Jo Van CAUWENBERGE and Luc MICHIELS, WWF-Belgium
- ◆ "Public awareness in rural Greece. An integrated programme for sustainability in wetlands" by Myrto PYROVETSI, Aristotelian University of Thessaloniki, Greece
- ◆ "Investigative Environmental Journalism Programme" by Mason BRYANT HOWARD, Director ECOFACT, Chile
- ◆ "Youth as communicators for sustainable development" by Christy ALLAN, Denise CAMPBELL, Stéphane DELISLE, Bindu DHALIWAL and Maureen SHERMAN, Youth Communications Team of TG Magazine, Canada

FRIDAY, 12 December 1997

SESSION 5

Chair: Ioannis PANTIS, Aristotelian University of Thessaloniki, Greece

Rapporteur: Rodica MATIES, UNESCO Centre for Women and Peace in Balkan Countries, Albania

- ◆ "Report of Environmental Education for Sustainability activities realised by the Ministry of Gabon" by Jean-Pierre MENGWANG-ME NGYEMA, Minister of National Education, Gabon
- ◆ "Applied Environmental Education: Youth Action to Combat Desertification" by Ameer JERIDI, Cabinet of the Minister for the Environment and Physical Planning, Association for the Protection of Nature and Environment-Kairouan (APNEK), Tunisia
- ◆ "The role of women in achieving sustainability" by Genevieve BRO-GREBE, Cote d' Ivoire Ecologie, Ivory Coast
- ◆ "A review of Australian and South East Asian Environmental Education Initiatives" by Ian ROBOTTON, Deakin University, Australia

ANNEX 4

UNESCO BACKGROUND DOCUMENT EDUCATING FOR A SUSTAINABLE FUTURE: A TRANSDISCIPLINARY VISION FOR CONCERTED ACTION*

EXECUTIVE SUMMARY

This document was prepared by UNESCO in its function as Task Manager for chapter 36 of Agenda 21 to serve two purposes. First, it is the main background paper for the International Conference on Environment and Society: Education and Public Awareness for Sustainability to be held in Thessaloniki, Greece, from 8 to 12 December 1997. Second, it is a contribution by UNESCO to the implementation of the special work programme on chapter 36 of Agenda 21 of the UN Commission on Sustainable Development (CSD) which "calls upon UNESCO to refine the concept and key messages of education for sustainable development".

The document is based on a wide variety of source materials, background papers prepared by specialists, and a preparatory meeting held in September 1997. It is to be considered the beginning of a process of discussion and debate, not a conclusion. Among the international institutions contributing to its preparation were: FAO, IUCN, OECD, UN-DESA, UNDP, UNEP, UNFPA, WHO and the World Bank, in addition to the Greek Organising Committee for the Thessaloniki Conference.

Beginning with a preface by the Director-General of UNESCO, the paper addresses priority issues reflected in the work programme of the CSD. Part I ("What is 'Sustainability'?") examines the emerging vision of "sustainability" or "sustainable development", including consideration of its interrelated components such as population, poverty, environmental degradation, democracy, human rights and peace, "development", and interdependence. The role of education seen in this perspective is discussed, no longer as an end in itself but as a key instrument for achieving sustainability in the future.

Part II ("Public Awareness and Understanding: the Fuel for Change") takes up the topic of public awareness and understanding as indispensable to support change towards sustainable development. Problems of vested interests, the difficulties of communicating science, the inherent complexity of the issues, and the tendency of the media to focus on extreme positions and controversies are considered. It is suggested that the most effective communication strategy for building awareness and understanding is to focus on problems which the public experiences in everyday life.

Part III ("Reorienting Education to Support Sustainability") emphasises the importance of the concept of lifelong learning in a rapidly changing world, as well as the need to give high priority to basic education in the developing world. The need to reform curricula and educational policies and structures at all levels is also discussed, with an example given of recent reform of the curriculum in Toronto, Canada. The importance of teacher education

and training as well as higher education in general is stressed. The valuable experience and role of environmental education is reviewed, and the need to develop interdisciplinary studies and programmes at all levels emphasised.

Part IV ("Shifting to Sustainable Lifestyles: Changing Consumption and Production Patterns") notes that the effectiveness of awareness raising and education for sustainable development must ultimately be measured by the degree to which they change the attitudes and behaviours of people as both consumers and citizens. Changes in lifestyles as reflected in individual behaviour, households and at community level must take place. Particular emphasis is given to wasteful consumption patterns.

Part V ("Ethics, Culture, Equity: Sustainability as a Moral Imperative") evokes some ethical principles of sustainability such as the "ethic of time", complexity as an ethical issue, the ethical link of past, present and future. The overriding importance of culture in achieving sustainability is discussed, and a parallel drawn between the loss of biological diversity and the loss of cultural diversity. The role of education in communicating the moral imperative of sustainability is emphasised.

Finally, Part VI ("Mobilising for Action") highlights the international framework for action and the new vision of education; public awareness and training, which have emerged from the series of UN conferences beginning with Rio in 1992. The umbrella role of chapter 36 of Agenda 21, the work programme of the CSD adopted in 1996, and the reaffirmation of the importance of education by the Earth Summit + 5 are explained. Information is provided about the preparation, by UNESCO as Task Manager, of an expanded work programme for consideration by the CSD in 1998, working together with the UN system and other key international partners. Action at the national and local levels is discussed as the most effective and appropriate way to bring about the required change.

This document is obviously far from complete in terms of all that could be said on this vast subject. It is therefore intended as the beginning of a process and debate not a conclusion, as an attempt to stimulate discussion not direct it, and as an action-oriented paper not an action plan. This first attempt to articulate the key messages of education for sustainable development and to consider its many components will need to be refined over time, with the widest possible discussion and participation to which UNESCO is committed.

In embracing the broad scope of chapter 36 and in addressing the priorities laid out in the CSD work programme, there are naturally some areas which are more advanced than others. It is for this reason that UNESCO anticipates that strategy papers on the different topics dealt with in this paper and for different regions of the world will need to be prepared in the future.

ANNEX 5 DECLARATION OF THESSALONIKI

1. We, the participants from governmental, intergovernmental, non-governmental organisations (NGOs) and the civil society at large from 83 countries present at the International Conference on Environment and Society: Education and Public Awareness for Sustainability, organised in Thessaloniki by UNESCO and the Government of Greece, from 8 to 12 December 1997, unanimously adopt the following Declaration.

We take note that:

2. The recommendations and action plans of the Belgrade Conference on Environmental Education (1975), the Tbilisi Intergovernmental Conference on Environmental Education (1977), the Moscow Conference on Environmental Education and Training (1987), and the Toronto World Congress for Education and Communication on Environment and Development (1992) are still valid and not fully explored.
3. Insufficient progress has been made five years after the Earth Summit in Rio as it has been recognised by the international community.
4. The Thessaloniki Conference has benefited from the numerous international, regional and national meetings held during 1997 in India, Thailand, Canada, Mexico, Cuba, Brazil, Greece and the Mediterranean region *inter alia*.
5. The vision of education and public awareness has been further developed, enriched and reinforced by the major UN Conferences: on Environment and Development (Rio, 1992); Human Rights (Vienna, 1993); Population and Development (Cairo, 1994); Social Development (Copenhagen, 1995); Women (Beijing, 1995) and Human Settlements (Istanbul, 1996), as well as the nineteenth special session of the United Nations General Assembly (1997). The action plans of these conferences, as well as the special work programme of the UN Commission on Sustainable Development adopted in 1996, are to be implemented by national governments, civil society (including non-governmental organisations, youth, enterprises and the educational community), the United Nations system and other international organisations.

We reaffirm that:

6. In order to achieve sustainability, an enormous co-ordination and integration of efforts is required in a number of crucial sectors and rapid and radical change of behaviours and lifestyles, including changing consumption and production patterns. For this, appropriate education and public awareness should be recognised as one of the pillars of sustainability together with legislation, economy and technology.
7. Poverty makes the delivery of education and other social services more difficult and leads to population growth and environmental degradation. Poverty reduction is thus an essential goal and indispensable condition for sustainability.

8. A collective learning process, partnerships, equal participation and continuous dialogue are required among governments, local authorities, academia, enterprises, consumers, NGOs, media and other actors in order to raise awareness, search for alternatives and change behaviours and lifestyles, including consumption and production patterns, towards sustainability.
9. Education is an indispensable means to give to all women and men in the world the capacity to own their own lives, to exercise personal choice and responsibility, to learn throughout life without frontiers, be they geographical, political, cultural, religious, linguistic or gender.
10. The reorientation of education as a whole towards sustainability involves all levels of formal, non-formal and informal education in all countries. The concept of sustainability encompasses not only environment but also poverty, population, health, food security, democracy, human rights and peace. Sustainability is, in the final analysis, a moral and ethical imperative in which cultural diversity and traditional knowledge need to be respected.
11. Environmental education, as developed within the framework of the Tbilisi recommendations and as it has evolved since then, addressing the entire range of global issues included in Agenda 21 and the major UN Conferences, has also been dealt with as education for sustainability. This allows that it may also be referred to as education for environment and sustainability.
12. All subject areas, including the humanities and the social sciences, need to address issues related to environment and sustainable development. Addressing sustainability requires a holistic, interdisciplinary approach which brings together the different disciplines and institutions while retaining their distinct identities.
13. While the basic content and action framework for environment and sustainability is largely in place, the translation of these parameters into action for education will need to take into account particular local, regional or national contexts. The reorientation of education as a whole called for in chapter 36 of Agenda 21 must involve not only the educational community, but also governments, financial institutions, and all other actors.

We recommend that:

14. Governments and leaders around the world honour the commitments already made during the series of United Nations conferences, and give to education the necessary means to fulfil its role in achieving a sustainable future.
15. Action plans for formal education for environment and sustainability with concrete targets and strategies for non-formal and informal education should be elaborated at national and local levels. Education should be an integral part of local Agenda 21 initiatives.
16. National councils for sustainable development and other relevant bodies give education, public awareness and training a central role for action including better co-ordination among the relevant national ministries and other entities, including major groups.
17. Governments and international, regional and national financial institutions, as well as the productive sector, be encouraged to mobilise additional resources and

- increase investments in education and public awareness. The establishment of special funds for education for sustainable development should be considered as a specific way to increase support and visibility.
18. All actors reinvest a portion of the savings from the greening process into strengthening of environmental education, information, public awareness, and training programmes.
 19. The scientific community play an active role in ensuring that the content of education and public awareness programmes is based on accurate, up-to-date information.
 20. The media be sensitised and invited to mobilise its know-how and distribution channels to diffuse the key messages, while helping to translate the complexity of the issues into meaningful and understandable information to the public. The full potential of new information systems should be used properly for this purpose.
 21. Schools be encouraged and supported to adjust their curricula to meet the needs for a sustainable future.
 22. Non-governmental organisations be given adequate institutional and financial support in order to further mobilise people on issues of environment and sustainability, within communities and at national, regional and international levels.
 23. All actors - governments, major groups, the education community, the United Nations system and other international organisations, the international financial institutions, *inter alia* - contribute to the implementation of chapter 36 of Agenda 21, and in particular to the work programme on education, public awareness and training of the UN Commission on Sustainable Development.
 24. Special emphasis should be given to the strengthening and eventual reorientation of teacher training programmes and identification and sharing of innovative practices. Support should be given to research in interdisciplinary teaching methodologies and in assessing the impact of relevant educational programmes.
 25. The United Nations System, including UNESCO and UNEP, in co-operation with international NGOs, major groups and all other actors, continue to give priority to education, public awareness and training for sustainability, in particular at national and local level.
 26. A Thessaloniki International Award under the auspices of UNESCO be established to be given every second year for exemplary educational projects for environment and sustainability.
 27. An international conference be held in 2007, after ten years, in order to assess the implementation and the progress of the suggested educational process.

We thank

28. the Government of Greece for having joined with UNESCO to organise the International Conference in Thessaloniki.

We request

29. the Government of Greece to transmit the outcome of this Conference to the Commission on Sustainable Development at its Sixth Session in April 1998.