

# EDUCATION FOR SUSTAINABLE DEVELOPMENT IN 21<sup>ST</sup> CENTURY

Thematic Study by Kay Muir-Leresche

## Acknowledgements

This document arises from the increasing recognition that education needs to adapt to the *information age* and to include environmental issues into both formal and informal education. The ideas synthesised are, part of a world trend towards developing more relevant education systems. The concepts do not necessarily originate with the author. They are an accumulation of the ideas and exchanges taking place at environment, development and education workshops, in the literature, in tea-rooms, staff-rooms and gatherings throughout the world.

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## SUMMARY

There is an urgent need to prioritise education. An educated population is able to demand more accountability and contribute to good governance. It is able to access knowledge and participate in debates and to make informed choices in order to promote sustainable growth. Education and the wider dissemination of information promotes greater respect for other cultures, ideas and people and promotes a more cosmopolitan and less fundamentalist approach to resolving conflicts. Education can reduce the gaps between the rich and the poor by giving them the tools to become self-sustaining (where they have access to resources). It contributes to world peace, sustainability and prosperity.

Conventional education is no longer relevant in an era where knowledge and information are constantly expanding and are widely available. Teachers need to become facilitators and education a process of discovery, experimentation and application. The paradigm must change from one where knowledge is transferred to one where learners are shown how to access and effectively use available knowledge. They need to understand what to include and what to leave out and teachers need to be trained in how to educate when not directly transferring knowledge. Experiential learning and the use of indigenous knowledge will assist in making education relevant to local communities in the real world. The importance of a holistic approach to problem solving and the value of the environment should be incorporated in curricula.

Ethics, values and the development of responsible citizens willing to serve their communities need to receive a higher profile in education systems. Creativity, initiative and flexibility should be encouraged in order to produce people capable of adapting to globalisation and rapidly changing technology. Critical analysis and questioning minds are important to ensure progress and accountability. More emphasis should be given to sport and leisure which develop teamwork, confidence, loyalty and reliability. Cultural activities and staff/student exchanges help to broaden minds, develop pride and strengthen communication and analytical skills through literature, dramatics, debating, music, art and dance. Developing countries do not have, or do not allocate, the resources required to attract and retain the best teachers. They need to find ways to provide incentives and resources to ensure that education is able to change. Human capital and knowledge are becoming primary sources of wealth and education systems should produce citizens who will be agents of change in rural and poor communities, as well as on the national and international arena.

A culture that encourages innovation, and which is environmentally and socially progressive, is needed to contribute to the sustainable and effective use of resources.

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## List of acronyms and abbreviations

AAU	Association of African Universities
CAMPFIRE	Communal Areas Management Programme for Indigenous Resources, Zimbabwe
EARTH	South American University of Agricultural Sciences in Costa Rica
EIA	Environmental Impact Assessment
GIS	Geographic Information Systems
NGO	Non government organisation
NORAD	Norwegian Aid Agency
NORAGRIC	Agricultural University of Norway, Centre for International Environment and Development Studies
PROPER	Communities Resource Management and Control Programme, Indonesia
SADEG	Société Africaine d'Etude, d'Exploitation et de Gestion
UNDP	United Nations Development Programme
WWF	World Wide Fund for Nature

# EDUCATION AND SUSTAINABLE DEVELOPMENT IN THE NEW MILLENIUM

*“How can we reform educational systems so strongly handicapped by a conservative culture, lack of infrastructure and teachers? ... Very simply by asserting the absolute pre-eminence of education and by adapting education to enhance critical thinking ... and, in general, the qualities that engender progress: imagination, dissent, creativity, professionalism and competence, a sense of responsibility and duty, love for a job well done”.*

Daniel Etounga-Manguella<sup>1</sup>

President and founder of the Société Africaine d'Etude, d'Exploitation et de Gestion (SADEG)

## INTRODUCTION

Capacity 21 has piloted the implementation of Agenda 21 principles in more than 75 developing and emerging economies. With the support of Capacity 21 many countries have adopted innovative capacity-building approaches to meet the challenges of environmental degradation, social inequity and economic decline. Reflecting on the experiences and lessons emerging from national Capacity 21 programmes, it has become evident that a key component in building effective capacity is the education system. This includes all education from basic literacy to advanced skills and life-long learning, from pre-primary to tertiary. This Approaches to Sustainability publication addresses the generic issues relevant to these aspects internationally, although it focuses on the formal education system and, in particular, the changes required at the tertiary level in developing countries. It recognises the importance of emphasising our common humanity and encouraging practical and effective service to society in a new approach to education.

*The greatest challenge we face in many parts of the world today is how to assist poor people to enhance their livelihoods in a sustainable way. Education relevant to local situations and international realities can provide the gateway.*

Chris Igodan, South Africa, 2000<sup>2</sup>

It is essential that countries improve not only their literacy levels and knowledge base but increase productivity by effective use of that knowledge and develop the capacity to continue to learn and adapt. The education systems should contribute directly to school leavers and graduates who are able to use their initiative to solve problems and think innovatively and critically. Scholars need to be encouraged to create employment opportunities and to actively protect the

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<sup>1</sup> Etounga-Manguella, Daniel. Does Africa Need A Cultural Adjustment Program? in *Culture Matters: How Values Shape Human Progress*. Edited by Lawrence E. Harrison and Samuel P. Huntington. USA, 2000.

<sup>2</sup> Prof. Chris Igodan from Nigeria was then Dean, Agriculture University of Fort Hare, South Africa and is now Director, Agricultural Technical Institute, Ohio State University

environment. Education must include developing social responsibility, environmental awareness and a respect for a diversity of viewpoints, encouraging cosmopolitan tolerance and people able to interact internationally.

The new technologies provide many opportunities for developing countries to participate in a global increase in economic, social and environmental well-being, but they could equally result in an increasing gap between industrialised and developing countries. It is imperative for world security and prosperity that this does not occur and that every effort is made to reduce the gap and identify opportunities for equitable participation in globalisation. Investment in human capital is essential. Both literacy levels and high level competence must be rapidly improved. The education systems in the developing countries should reflect the changing access to knowledge and produce graduates capable of applying that knowledge within their own cultural and environmental context.

*“Deep and widespread poverty is arguably the greatest threat to humankind today....Education has an irreplaceable role in sustainable development and poverty reduction”*

Olav Kjørven, Kampala, May 2002<sup>3</sup>

Education is a necessary condition for world security. Human capital is a critical cornerstone of growth and equity. An educated population is in a better position to understand the environmental and social systems that must be managed and sustained to avoid war and hunger. Attitudes, values and ethics need to be rooted in local cultures and norms but open to diversity and the recognition that we all share the underlying ethic of a sustainable and better world for all. The returns on investment in improving livelihoods in developing countries are more likely to provide greater security to people in industrialised countries than defence expenditure designed for a clash of super-powers.<sup>4</sup>

*“It will cost money but...it’s a lot cheaper than going to war”.*

Bill Clinton, January 2002<sup>5</sup>

Investment in education is essential if we are to achieve the world’s sustainable development goals. Education needs to change to achieve these goals and must encourage creativity, initiative and teamwork. The changes are important for rich countries, but they are essential for poor countries. Rich countries need to build awareness about the impacts of ‘progress’ so that innovation in the North does not mean devastation in the South. Developing countries need to eradicate illiteracy while at the same time investing in the contemporary skills these countries must have to effectively enter the world economic stage. Thus, they

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<sup>3</sup> State Secretary for International Development, Norway speaking at the opening ceremony of Session III “Sustainability, Education and the Management of Change in the Tropics”, Makerere University

<sup>4</sup> The US budget for Defence in 2003 was increased significantly. If the major threat to the world comes from disaffected communities and ignorance, investment in reducing the gap should be a priority.. International aid budgets account for less than 1% of GDP in most wealthy countries. Education receives even less attention accounting for under 5% of World Bank lending 1999-2001 (World Bank Annual Reports, 2000 and 2001)

<sup>5</sup> “The Struggle for the Soul of the 21<sup>st</sup> Century” The Richard Dimpelby Address, BBC January 2002

have to provide for both basic education and at the same time direct some resources to advanced, high quality education to ensure they become competitive. Education planning and curricula also need to take account of the impact of HIV/Aids and its role in reducing the spread of the disease.

*"It is important that we have a vision of education that fully recognises that education is our biggest protection against fear of change and prejudicial ignorance"*

Dr. Brendon Nelson, Minister of Education, Australia, 2002<sup>6</sup>

### **Objective of the study**

- To produce a thematic paper which will provide readers with an overview of the importance of investing in education, and of ensuring that this education meets the economic, social and environmental needs of the *information age*.

Education could significantly increase welfare in the poor countries, contributing to both political and environmental sustainability.

The paper is written within the context of mobilising the creativity, ideals and courage of the youth in order to achieve sustainable development (Principle 21, Agenda 21).

The author draws on the country studies and other documentation already produced by UNDP and Capacity 21. The author also uses the work produced by the EARTH/Salzburg Seminar series and other relevant information from educational institutions and development agencies.

The paper specifically incorporates the following elements:

- The changing global environment.
- The needs of this new environment.
- The essential characteristics that should be encouraged to meet these needs.
- Strategies to address these needs.

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<sup>6</sup> Quoted in The Australian newspaper 25<sup>th</sup> March 2002.

# 1. THE CHANGING GLOBAL ENVIRONMENT

*“The close of the twentieth century saw very rapid, sometimes drastic, changes in the political, socio-economic, scientific, technological, philosophical and ethical domains of human life”.*

Rueben Umaly, Thailand 2000<sup>7</sup>

What are the major forces that will shape society in the 21st Century? While these issues are covered in depth in many *fora*, it is instructive to briefly review these here as they determine the education systems that will best meet the challenges of the future. The most obvious is the importance of developing technologies as well as economic and social systems that maintain or enhance our biological capital (the environment). The need to change both our production and consumption processes and patterns requires innovation, understanding and incentives.

New technologies provide opportunities to address these changes. Education plays an essential role in the process. Education can encourage changes in demand in order to give priority to sustainability in rich countries. It can provide the impetus for encouraging international responsibility. In developing countries, education needs to go beyond literacy. It must empower children and adults to participate in, and share responsibility for, development. A population that considers itself able to affect the course of life is more likely to take steps to ensure that development is politically, socially and environmentally sustainable. Recent initiatives in Africa have shown that when people have control over their own resources and make their own decisions, supported by an enabling governance framework, it is possible to improve both livelihoods and the environment.<sup>8</sup>

Education provides with the ability to adapt traditional knowledge and use modern technology. It develops capability and inspires the will to create solutions to dilemmas. It provides people with the confidence and information to challenge authorities for their rights and demand control over their resources. If they have access to knowledge and have a secure stake in their future, they can invest in the environment and learn to demand accountability from their governments and the business world.

Education, and in particular environmental education, has featured as a priority in some national strategies for sustainable development but it has not been a major component of any of the strategies. The main thrust of this paper is to emphasise the importance of economically, environmentally and socially relevant education in developing countries, ensuring both widespread literacy and some internationally competitive graduates able to interact globally. Education systems in richer countries need to promote better North-South co-operation and

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<sup>7</sup> "Globalisation, Information Technology, Distance and Virtual Education" presented at EARTH University Salzburg Seminar *Sustainability, Education and the Management of Change in the Tropics* Seminar, Costa Rica, August 2000.

<sup>8</sup> A review of some successful African initiatives in sustainable development can be found at <http://www.cdr.dk/sscafrica>.

understanding. Throughout the world, education, as knowledge-transfer is no longer appropriate. In both industrialised and developing countries there is an immediate and urgent need to develop approaches to education to suit the new technological and global era.

## 1.1 Scientific Advances

### Increased knowledge base and accessibility<sup>9</sup>

The *information age* is how the last two decades of the 20<sup>th</sup> Century have been described by many commentators. It refers to the explosion of available knowledge as a result of the speed and ease with which computers have allowed knowledge to be communicated and explored.

Whereas education was once viewed as the transfer of knowledge, it now has to change its orientation. In any field, there is far more knowledge than any one individual can ever accumulate. It has become much more important to teach only the basic principles underlying a discipline and to concentrate on enabling students to better access and utilise knowledge. It is more important for students to be able to distil and synthesise information into useful components than to learn any one technique. Methodologies are changing constantly and students have to be able to continually update their approach and adapt to changing situations.

The teacher or professor is no longer the “font of all wisdom” transferring precious jewels but is rather a facilitator providing students with the inspiration to explore these ever-expanding oceans of knowledge for themselves. Their role is to promote analytical skills, self-esteem, a sense of personal competence, the capacity to participate in community and national affairs, and build interpersonal trust and satisfaction.

*"I see the teacher's role to be more of an educator-facilitator-mentor. No idea, interpretation or position is `sacred`; students are encouraged to identify and critique underlying assumptions"*

Sam Leong, 2001<sup>10</sup>

### The importance of indigenous knowledge

It is clear that local commodities, production systems, knowledge and institutions have an essential role and contribution to make to the sustainable development of many emerging economies. Indigenous knowledge is particularly important to sustainable development since effective knowledge of the preservation, use and potential of natural resources is built over time and is only possible with the active

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<sup>9</sup> Knowledge refers to proven facts and tested information. Computer technology has resulted in exponential increases in available information on all topics. This means that it is not possible to “know” everything or even most things about any topic. At the same time, computers make it possible to access information very easily so that the value of “knowing” the facts is reduced and the need for learning how to access them takes precedence. The proliferation of knowledge through modern technology has become known as the “information age”.

<sup>10</sup> Sam Leong, University of Western Australia, chosen by students for the Excellence in Teaching Award for 2001.

participation of local populations. The capacity of indigenous peoples to develop resource use strategies that are more sustainable than conventional systems is recognised. Indigenous knowledge needs to be better understood and efforts stepped up to incorporate it centrally in the development process.

It is important to document genetic resources, establish property rights and to understand the value of traditional systems and cultures without romanticising them. Traditional attitudes and values bring new angles to innovation. The education system can play an important role in both preserving and adapting these traditional systems so that they contribute to and participate in the global economy. They also play an important role in promoting self-worth and confidence. At the practical level, indigenous values and knowledge can be incorporated into the syllabi, resource materials and most importantly in extra-curricula drama clubs debating societies, sport and other activities. Western societies have begun to appreciate and incorporate some of this knowledge into their health systems, management styles and other aspects. Local societies themselves need to understand their traditional systems so that they can use them to add value to and develop relevant and effective technological and organisational systems.

### **Technological Advances**

Key technological advances over the past two decades have occurred in a number of fields, including:

- Solar power
- Telecommunications
- Computers (hardware and software)
- Internet
- Transport
- Satellites (including radio and TV, GIS mapping and weather predictions but especially communications potential)

These innovations have considerably enhanced many aspects of the lives of people in rich countries and they are the means through which it is possible to reduce the differential between rich and poor. If isolated communities can access the internet through solar power and satellites, even though they have no electricity and few roads, they have access to knowledge. Technology exists for simple wind-up radios so that wealthy countries (or national governments) can provide even the poorest and most isolated people with information and knowledge.

### **Constraints and Potential for Developing Countries**

*“Development cannot be said to be sustainable if it is not equitable, or if it does not meet the pressing needs of the majority of the inhabitants of the globe”.*

Our Common Future, Brundtland Commission, 1987

Technological advances provide opportunities for developing countries to advance rapidly. Through the use of computers and the internet, students can access knowledge, training, each other and develop links with the outside world. Graduates can be employed by companies in industrialised countries for data processing while based in their home countries. The possibilities are endless.

The danger is that this technology will not spread equitably to developing countries; or that where it does, it reaches only a small minority. Access to technology could create even greater differentials within and between countries unless mechanisms are found to spread these benefits. Widespread investment to ensure that poor communities can access modern technology and opportunities will contribute to the future security of the world.

National policies need to change. Many developing countries are cut off from the technological advances because of institutional rigidities resulting in monopolies and state controlled communications.<sup>11</sup> Massive investment in spreading access to the information age needs to be encouraged at both national and international levels. The challenge is greater than just providing access to internet. It is to provide useful access. People need to be encouraged and shown how to use the new technologies in service to society. The Omardengo Foundation in Costa Rica has been successful in providing computers, internet access and training to rural schools so that children are using them for effective learning and not simply for entertainment.

## 1.2 Globalisation

*“Globalisation is a savage process but it is also a beneficial one, in which the winners far outnumber the losers”.*

Micklethwait and Wooldridge, 2001<sup>12</sup>

*“In a globalising world, where information and images are routinely transmitted across the globe, we are all regularly in contact with others who think differently and live differently than ourselves”.*

Anthony Giddens, 2000<sup>13</sup>

Cosmopolitans appear to welcome and understand the complexity of globalisation while fundamentalists seem to find it disturbing and dangerous. Greater integration promotes human freedom by spreading information and increasing choices. Education has a key role to ensure that developing countries are active players and not passive recipients.

As a result of

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<sup>11</sup> Only 10 telephone lines per 1000 in Africa compared to 500 per 1000 in rich countries. In 22 African countries in 1998, 60 out of 100 lines were out of order. Mobile phones have revolutionised access in recent years, where their entry has not been blocked.

<sup>12</sup> J. Micklethwait and A. Wooldridge, *A Future Perfect* Crown Business Press, 2001

<sup>13</sup> "Runaway World" 2000 quoted in Yolanda Moses "Diversity, Globalism and Democracy: Higher Education's Imperative" President, American Assoc. of Higher Education, Salzburg Seminar website ([www.salzburgseminar.org](http://www.salzburgseminar.org)) February 2002.

- increased communication
- increased economic integration
- increased social integration

the world has grown smaller. People are more aware of what happens, are more affected by what happens and are more interested in what happens. There is a much stronger demand for national governments to engage in the international community on behalf of their constituents while meeting priorities and needs at home. Even where particular countries, religions or attitudes emphasise isolationism, it is no longer possible without denying people access to information. As a result, globalisation has brought positive impacts for accountability and governance.

Education can contribute directly to these positive impacts while helping people to manage cultural differences, language barriers and the overwhelming diversity that characterises (and often threatens) humanity. [Education can contribute](#). We can encourage and promote local cultures and languages through education. We can promote the value of difference.

### 2.3.1 Environmental and social realities

*“What hope is there for this planet if the countries of the South start to consume resources as the North does today? They are not only entitled to do so under any concept of fairness and justice but are also encouraged to by the forces of the global market.”*

Ashok Khosla, Development Alternatives (India, 1997)<sup>14</sup>

If the effects of environmental degradation are left unchecked, they could undermine the future of the human race. This will occur because of the scarcity of the biological resources needed to sustain life, and/or because of the political and social instability and conflicts that frequently arise with the increasing divergence between rich and poor. Education that develops people who are able to address both the causes and effects of environmental degradation is essential. People who are able to create and implement systems over the long term which reduce the disparities and promote mutual understanding, are a key in the effort to ensure sustainable development at all levels – local, national, regional and global.

Poverty and environment issues are closely linked given problems with weak and insecure institutions combined with the immediacy of the needs of the poor that lead to high discount rates.<sup>15</sup> Education contributes directly to reducing poverty and to increasing awareness of the environment.

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<sup>14</sup> From a paper presented at the World Conservation Congress in Montreal, September 2000

<sup>15</sup> The average income of poorest 10% in America is greater than two-thirds of the world’s population (Milanovic, World Bank). Property rights, market and other institutions tend to disempower people in many developing countries. People who do not have security of the future of their control over resources are not likely to invest in them. People who are fighting for survival cannot invest in the future. These factors mean that many poor communities are unlikely to put a high value on future returns. They are concerned with current income.

Agricultural and rural development are the key to reducing poverty with 75% of the world's 1.2 billion poor with livelihoods linked to the agricultural sector. Most education systems are designed to produce competent, obedient servants for government and corporate systems. They remove students from their rural focus and most school-leavers and graduates aspire to urban employment. Education systems need to make it possible for graduates to create rural opportunities so that they are attracted to working in these areas.

Developing countries continue to lose human capital from endemic diseases such as malaria which they have always had to contend with. They are now faced with the scourge of HIV Aids and its impact on social systems, families, productivity and the increased burdens associated with the disease. Sex education and information campaigns are the principal tool used to reduce the spread of the disease. It is essential to recognise the impact of the disease both in formulating education strategies and in developing appropriate curricula. Education systems which emphasise values, develop personal skills and build confidence and self-worth will help students to act responsibly. It is also important that the systems discourage discrimination and encourage students to be proactive in helping the people and communities most affected.

Multilateral and bilateral development agencies have long recognised the need to establish delivery mechanisms that do not ultimately work against the best interests of the beneficiaries. The migration of educated Africans to industrialised countries also needs to be addressed. Educational assistance programmes could be designed to provide local opportunities and to encourage students to return to their countries and the rural areas. The reality, however, is that most aid efforts continue to strengthen central systems or undermine effective existing systems at the expense of the people they are designed to help. Temporary relief may be obtained but as the people have to increasingly rely on the goodwill of the centralised state, district or NGO agencies controlling access to resources and aid, their ability to hold the authorities accountable is diminished. An educated population would be in a much better position to challenge the status quo.

This is particularly important with respect to gender and to equity in all its forms. There are some areas where women receive little or no education and in most countries, women are in the minority in tertiary education. Women are intimately involved in natural resources use and are closely linked to the environment. The role of educating women in population management is recognised but its potential for stimulating environmentally sound growth is still not fully appreciated.

*"We need to get our women involved at all levels. They are the key to Africa's strength. Until we provide them with opportunities for education at all levels, Africa will be leaving a principal resource untapped"*

Mandivamba Rukuni, Zimbabwe 2001<sup>16</sup>

The emphasis on structural adjustment, the movement towards market-based allocation and the pressure for sound fiscal management, have a profound effect

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<sup>16</sup> Former Dean, Faculty of Agriculture, University of Zimbabwe and currently directing the Kellogg Foundation programme in Southern Africa.

on education. Governments in many developing countries have cut expenditure by reducing investment in social services. The cuts in expenditure in education have reduced the capacities of those countries to meet the challenges of sustainable development. There is much that is positive in encouraging demand-driven education, particularly with the new technology that allows for much greater flexibility in delivering education and training. However, investment in developing the human capital of the world is one way to bring returns to all humanity. The World Bank and various development agencies have shown that the poor spend a far greater proportion of their income on educating their children than the rich. There is a limit to the resources they have to invest and society obtains high returns from investing in improving its human capital.

National governments and international agencies should be given the mandate and allocate the resources to eradicate illiteracy. They need to put into place institutions and systems that allow for the full development of human potential. We need to respond to development challenges with imagination and use technological advances to change our traditional approach to education so that it is better able to contribute to rapid human resource development.

We need to use new market-based institutions to target the areas and people they are best able to serve, thus releasing resources for those areas which are true public goods.<sup>17</sup> This affects both rich and poor countries as cuts are made for state funding of education, particularly tertiary education. The land grant universities in the USA are increasingly turning towards business for support, reducing their ability to fulfil their original public service mandates. Government investment in education is important and it should be higher than it was in the past but it should be more carefully targeted so that private individuals and companies are mobilised to pay for those aspects that have private benefits, releasing more resources for the areas of public benefit.

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<sup>17</sup> A public good is where the full benefits of the activity to society are not captured by the individual

## 2. THE NEEDS OF THE NEW ENVIRONMENT

*“As knowledge supplants land, labour and capital as the main sources of wealth, the quality of knowledge generated within higher education institutions, increasingly becomes critical to economic development and material well being for any nation.”*

M.Gibbons, C. Limoges, H. Nowotny, S. Schwartzman, P. Scott, M. Trow, 1994<sup>18</sup>

### 2.1 The application of knowledge and innovation

*“...the new paradigm of global competitiveness requires the ability to innovate rapidly”.*

Michael Porter, 1995<sup>19</sup>

The economic actors in this new global environment need to be able to access knowledge and apply it. They need to be creative, innovative and independent. In the industrialised countries and in the elite systems in some developing countries, where access to knowledge is widespread, it is the ability to apply that knowledge that is required. Modern technology has reduced the need for absorbing knowledge and for methodical and repetitive ability and increased the need for creativity. It is more important for an engineer to be able to develop new approaches than to be a precise calculator. The precision can be achieved through the computer; the new ideas cannot. In the past the education system had to stress precision with innovation as a bonus.

In the current era, innovation is imperative and precision is a bonus, but education systems have not yet changed to reflect these new demands. There needs to be a paradigm shift in education – the objective should no longer be

*how much knowledge has been acquired,*

it should be

*how effectively and responsibly can available knowledge be used.*

#### Changes for industrialised countries

Formal education must adapt to the changing demands of the market. Where years of education, training and experience were once necessary to succeed, they are increasingly seen as less relevant, even sometimes a liability as shown in various interviews in the USA.

*“Forget the experience curve.... If you want your company to think outside the box, why not learn by working with people who don't know there is a box”.*

Fast Company Magazine, 2000

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<sup>18</sup> *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies* Sage Publications, London 1994.

<sup>19</sup> Michael Porter and Claas van der Linde "Green and Competitive: Ending the Stalemate" *Harvard Business Review* Sept/Oct pp120-34, 1995

Self-taught technical skills are more adaptable. Technology is changing so rapidly skills and analytic techniques quickly become obsolete and society places a premium on change. Thus, professionals no longer seek stability and slow progression but have become independent. Education must adapt and produce students who are flexible and able to learn new methods.. Large corporate structures are less relevant technically and young professionals prefer work places with more flexibility and freedom. In many countries, the future belongs to smaller, innovative companies or 'crack' units within larger multi-nationals. There is a movement towards self-employment and more flexible work arrangements. In Japan, the old education system is still suited to the mass-manufacturing industries, but the Japanese education ministry has recognised the need to change. The Economist reported that significant changes will be implemented in 2002 from a rigid, uniform school system to more independent school and staff curriculum choice and more emphasis on enriching children's lives outside the classroom.

The poor within advanced countries are in danger of becoming increasingly marginalised if they do not have the opportunities to work with the new technologies and be part of the new creative environment. As the corporate world changes, jobs and rewards for loyalty, diligence and obedience will shrink. The system will favour the creative and adaptable. These qualities are only obtained in schools where inspiration and faculty dedication are the norm.<sup>20</sup>

The experience of older generations needs to be recognised or societies will not effectively adapt and respond to new technologies. Technology changes the relationship between young and old. In societies going through rapid technological evolution the older generation have less to offer because their technical knowledge is not relevant. The strengths of the older generation lie in greater understanding of ethics, social systems and life skills. The danger is that society considers recently acquired technical skills a substitute for education.

There is a need to reinforce value systems and cultural norms and highlight the rewards from service to society. At the same time, societies need to provide learning systems for adults to acquire the technical skills. Many people are able to work ten to twenty years longer than in the past. They may not be at the creative edge of the new technologies, but they need to understand them so that their organisational and networking skills are relevant.

Current corporate practice is moving away from the hierarchical company structure and many countries, for example China, are moving away from collective enterprise, assigned jobs, promotion based on political loyalty and moving to self-directed, flexible employment. In the old system, employees were valued for following orders. Today, knowledge workers are valued most for their ability to think for themselves. Managers need to avoid undermining employees'

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<sup>20</sup> In the United States of America, there is bipartisan support for reducing educational inequality, which is recognised as a serious problem. There is some demand for conservative methods (accountability and competition) to achieve liberal goals (closing the gap between rich and poor children). The focus on security should enhance this goal but the reality may be to distract from it. (*The Economist* Survey of the Young, Dec 2000)

ability to find creative solutions. They need to concentrate on providing enabling team environments, resolving conflicts and motivating people. Thus, in addition to creativity, effective motivational, communication and people skills need to be developed.

There is a role for the education system in promoting “emotional intelligence” – the ability to recognise, understand and handle emotions. Pupils need to learn to risk failure, understand criticism, set targets and how to work in teams. Education systems need to adapt to these new realities. They need to use new technologies to allow educators to channel the advantages of youth in directions that promote sustainable development and global understanding.

### **Changes for developing countries**

In developing countries, it is essential to design education systems, which will provide for dualistic societies.<sup>21</sup> Dualism cannot be wished away. It needs to be acknowledged while every effort must be made to provide the poor with opportunities to increase their welfare. The reality, however, is that education will need to be designed to serve the needs of these dual societies. Thus, resources must be devoted to the teaching of basic literacy skills to most of the population who will continue to operate in a world without computers. At the same time, it is important to ensure that there are people in poor countries who are able to compete internationally. These countries cannot afford to rely entirely on importing innovative skills. They will have to invest in developing leaders, even where resources and skills may initially restrict advanced education to the few. Deliberate efforts should provide marginalised people with entry opportunities.

The massive investment by India in computer access and advanced training has enabled it to play a leading role in software development and for its nationals to be internationally recognised. This has already meant a significant expansion in economic opportunities for India.<sup>22</sup> Developing countries need to ensure that they maintain a core group of specialists and policy-makers who are able to compete in the international world. At the same time, they must ensure that their education systems provide the poor, who have only limited access to international communications and markets, with the skills to improve their lives at the local level. South Korea invested heavily in education and returns to the investment were estimated to be 30%. All children are registered in primary school (up from 56% in 1960) and most in secondary school.

There is an urgent need to combine indigenous and contemporary knowledge and to apply both traditional and modern low-cost technologies in the transfer and application of knowledge. This is a two-way process; much of the undocumented knowledge in isolated communities would benefit the world community. The

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<sup>21</sup> Societies where a large proportion of the income generated is concentrated in a very small, capital-intensive and modernised formal sector, the success of which impacts upon the majority of the population found in the largely informal, poor urban and rural sectors which rely on traditional low-input technologies.

<sup>22</sup> Although India lost skills from migration, it also resulted in growth. The IT-enabled services exports from India to America are forecast to grow from an estimated \$200 million in 2000 to US\$4-5 billion in 2005. One forecaster from MIT has estimated that India could earn US\$1 trillion. NASSCOM estimated that the IT-enabled services industry would employ 1.1 million people and earn \$17 billion by 2008.

importance of adapting advanced technology to impoverished realities is a challenge that the education system can contribute to.

In order to meet the demands of the dual society, most developing countries will have to make difficult choices in allocating scarce resources. One approach may be to develop targeted secondary and higher education institutions that deliberately encourage different skills. This may not be as negative for equity as it appears. Results from Northern Ireland show that although it started from a lower base in 1960, both the strongest and the weakest performed better than those in the comprehensive English system in the 1990s. Part of the explanation may be the ability to target educational programmes to the special needs of the different groups when the system is not comprehensive. If a selective system is established, it will be essential to provide opportunities for students to change. The Swiss system may provide a useful example for high school education in developing countries. Although their system is three-tier, there are entry points at later stages to allow pupils to change their orientation if appropriate.

The increase in high school graduates in most developing countries has placed pressure on tertiary education institutions and the job market. Selection systems and criteria and the need to establish institutions which serve different needs is essential. A key factor in the success of EARTH University, Costa Rica is its very rigorous selection process.<sup>23</sup> The selection includes students' attitudes to social and environmental service, commitment to rural areas, leadership and abilities broader than strictly academic. The process is adapted to ensure that gifted students from disadvantaged backgrounds are encouraged. The reality is that in all systems some form of selection is necessary. These systems need to ensure that they can be accessed by women, the poor and late-developers.

The increased demand for secondary and tertiary education and the simple expansion of existing universities and colleges to meet this demand has strained resources, reduced quality and will have negative impacts on sustainable development.

There needs to be a radical change in the provision of tertiary education so that it is more relevant to both the needs and available resources. Countries must maintain investment in excellence to ensure the continued supply of highly skilled, internationally competitive graduates. However, they must also plan for the massification of secondary and tertiary education. New approaches to post-school education are essential if the ever-increasing demand for higher education is to be matched by resources.

## **2.2 Sustainability**

Sustainable development implies not only efficient and ecologically sound management of resources, but also the need to establish social equity and political empowerment. We need to develop creative niches and instruments to improve the welfare of people in poor countries or

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<sup>23</sup> EARTH University has faculty members personally interview all prospective graduates. They take into account social service, environmental interest and social background, in addition to academic criteria in making selections.

*“Civil society and conservation will soon go the way of other endangered species over the next decade”*

Ashok Khosla, Development Alternatives

*“Environmental progress demands that we innovate to raise resource productivity. We need to develop our environment as an asset so we live off the income and not the capital”.*

Porter and van der Linde<sup>24</sup>

For poor countries, the emphasis should be on finding solutions to environmental protection that do not involve trade-offs with growth and equity. Education is one of those areas where it is possible to promote environmental integrity while at the same time directly contributing both to growth and to equity.

*“When searching for a sustainable pattern for development in emerging economies, education and training are a clear and visible priority for any serious project. Experience has shown that education is the safest mechanism to promote vertical social mobility and greater equality in any society” ... “An educated society is more conscious of its impact on natural resources and environment”.*

Sylvia Pinal, Brazil<sup>25</sup>

We need to move away from thinking of education in terms of purely cognitive development and find ways to incorporate social skills, identify values and, where possible, use practical situations to expose students to the real world. It is important to enable both those living in the formal and informal economies with the skills to access knowledge and the ability to adapt it to best advantage. Both groups need to be more systematically exposed to the importance of environmental integrity to their own prosperity and for the world community.

An environmental focus in the adult literacy classes held mainly for illiterate women as part of the Capacity 21 supported programme in Nepal, known as Sustainable Community Development Programme was most successful:

*“Teachers to generate environmental awareness among students” and the “multi-purpose nursery close to the school... has helped to mobilise communities”.*

Gobind Bahadur Thapamagar, Nepal 2000<sup>26</sup>

There needs to be more effective civic engagement in the process of linking education, the environment and development. Capacity 21 has been active in assisting countries preparing their National Agenda 21 programmes and many of these have included specific components to promote environmental education as

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<sup>24</sup> Michael Porter and Claas van der Linde "Green and Competitive: Ending the Stalemate" *Harvard Business Review* Sept/Oct pp120-34, 1995

<sup>25</sup> Sylvia Pinal, World Business Council for Sustainable Development, Latin American Office, Nueva Leon, Mexico, February 2000.

<sup>26</sup> Farmer in Nepal quoted in Maoj Badnyat, H. Bahadur-Gurung and H. Stewart *Made in Nepal: Nepal's Sustainable Community Development Programme* Approaches to Sustainability Series, Capacity 21, UNDP 2000

in those developed by Lebanon, the Gambia and El Salvador. Many examples of adult literacy and environmental education programs have successfully led the way but there needs to be much greater focus and support for these initiatives.

Education needs to contribute to the basic value systems of a society while encouraging its youth to become actively involved in addressing the issues facing the world.

*“African universities must strive to create an institutional environment that fosters the development of the mind and the ennobling of the spirit, inculcating responsible citizenship and the will to serve”.*

Declaration of African Universities at the 10<sup>th</sup> General Conference Nairobi February 2001, 1st Resolve:

Education can play a leading role in promoting world peace by improving mutual understanding, by reducing the gap between the rich and the poor and by developing responsible world citizens. If advanced education remains the preserve of the rich, the world will follow a path to self-destruction. Education is a necessary condition for the environmental, social and economic sustainability of world progress. *It was the forgotten priority at Rio and needs to be firmly placed on the agenda in South Africa.*

Education holds the key to reducing the growing divide in perceptions of what is most important for environmental sustainability. While the industrialised countries are focused on global warming and species diversity, the developing world is most concerned with reducing poverty and establishing sustainable development of resources. Education can inform people from rich countries why poor people are more concerned with sustainable use of resources and at the same time inform people in poor countries why global warming and species diversity are important.

### 3. WHAT SKILLS ARE NEEDED?

*“Critical thinking and, in general the qualities that engender progress: imagination, dissent, creativity, professionalism and competence, a sense of responsibility and duty, love for a job well done. We need to promote systems that cultivate tolerance and emphasise merit; individual initiative and the right of the individual to enjoy the fruits of their labour ... more self-confidence, more trust in one another and a commitment to progress that benefits all and a move towards regional integration away from nationalism – that’s how to maintain African humanism while progressing.”*

Daniel Etounga-Manguella

#### 3.1 Sustainability, Education and the Management of Change in the Tropics<sup>27</sup>

The findings on the most relevant skills for graduates to serve society are synthesised from three international Sessions and two African workshops of the EARTH/Salzburg Seminar/Noragric initiative. The findings put forward by participants were also reinforced by the requirements highlighted by representatives from large multinational food companies and financiers as well as by local farmers, entrepreneurs and micro-financing organisations which made presentations to the meetings. This seminar series is directed at tertiary agricultural education in tropical countries. It is international with strong representation from developing countries: the findings are relevant to the ongoing work of UNDP in the field of education and environment. Capacity 21 is working in partnership with this seminar series in Africa and has contributed to the process.

The series is directed at widening the debate on the need to produce graduates who are effective change agents. Through seminars, meetings, list-serves and networking, the series is gathering a broad understanding of the essential characteristics needed to encourage graduates to go out into the field and make a contribution to improving the lives of the poor and to ensuring sustainable use of resources. The series is focused on how to produce the change agents necessary to ensure sustainable agricultural development and ecologically sound use of tropical resources.

*“Enhancing the capacity to manage change amidst this myriad of problems requires a new cadre of change agents who are capable of visioning, strategizing, empathising, mobilising, training and empowering people to take charge of their destiny. These are qualities best provided during both informal and formal education.”*

Daouda Toure, UNDP Representative, Kampala, Uganda<sup>28</sup>

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<sup>27</sup> A seminar series convened by the Salzburg Seminar and EARTH University in association with NORAGRIC. The findings from the seminars and workshops held to date can be found in Appendix Two

<sup>28</sup> from the Opening Address at "Sustainability, Education and the Management of Change in the Tropics: The case of Africa" workshop, Makerere University, March 2001.

In August 2000 in Costa Rica, participants of diverse ethnic origins, disciplines, sectors, occupations, gender and ages were asked to rank the most important attributes for change agents and those ranked first were:

- Creativity
- Initiative
- Adaptability
- Social and environmental consciousness
- Entrepreneurship

Ranked predominantly in the next tier were:

- Problem-solving
- Courage
- Empowerment
- Empathy and the ability to work with rural communities
- Ability to multi-task
- Teamwork

Also considered essential, but ranked less important by all participants, were financial and technical skills, scientific bases, indigenous knowledge, English proficiency, emotional balance, common sense, joy of service and political awareness.

The findings from the Costa Rica session were confirmed by presenters and participants at the workshops in Kampala and Dakar in 2001 and at the Third Session in Jinja, Uganda in 2002. Small-scale and commercial farmers and business representatives from Uganda and South Africa highlighted the importance of graduates being able to communicate with and understand the conditions of the farmers. They also stressed the importance of reliability and time management. It was reported that agribusiness surveys on required skills and attributes for success for entry-level managers carried out independently in Canada, Uganda, USA, Australia and South Africa, all ranked personal, leadership and communication skills above technical skills.

The rationale given for ranking the technical and scientific skills less highly was that the new world is changing so fast that it is more important to equip students with how to use and access knowledge than it is to transfer this knowledge. To take up the challenges of globalisation, graduates need to be able to think quickly and adapt their knowledge to particular circumstances, often operating under severe constraints. The agents of change will need to be confident, flexible and innovative.

### **3.2 Other perspectives on important skills**

There are many initiatives assessing the changes needed for education to be relevant and most of these identify critical skills. While some of the meetings still

stress technical competence as a key, most gatherings recognise that particular skills change so rapidly that only the underlying principles are important. Students need to be shown how to access and use knowledge and be encouraged to develop their own skills.

Tolerance, a respect for differences and a cosmopolitan view of the world are essential. Graduates need to be able to take pride in their own heritage, while welcoming diversity and being open to new ideas. They need to be able to think, create and communicate on a global scale to take advantage of the new technologies.

*“We have to make sure that our students understand and develop a healthy respect for the diversity of viewpoints ... in their role as global citizens, at home or abroad”.*

Yolanda T. Moses, President, American Association of Higher Education<sup>29</sup>

At a Rockefeller Foundation meeting of African Deans of Agricultural Faculties in Bellagio Italy in November 2001, discussing changes to curricula to reflect these new realities, it was proposed that the Universities should be designing programmes to produce “*ideapreneurs*”. Thus, they would be involved not only in developing entrepreneurs but graduates who are able to develop new ideas with the ability to implement them in ways which are environmentally and socially acceptable.

Kikuyu mothers in central Kenya when asked what they considered the most important characteristics for success in life, selected “*confidence, inquisitiveness, cleverness and bravery*” as character traits important for success at school, and “*good-heartedness, respectfulness, obedience and generosity*” were stressed for social harmony.<sup>30</sup>

*“We need a fundamental shift... from preparing technical specialists to the formation of innovation specialists, able to continuously adapt their practices in response to new challenges and/or restrictions”.*

Engel and van den Boor<sup>31</sup>

In summary, we need to revolutionise education so that graduates will, as Gandhi taught

*“Be the change you are trying to create”*

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<sup>29</sup> "Diversity, Globalism and Democracy: Higher Education's Imperative" on Salzburg Seminar Listserve, February 2002.

<sup>30</sup> Results of a study by c. Edwards in Weisner, Bradley and Kilbride *African Families and the Crisis of Social Change* Greenwood Press, Connecticut 1997

<sup>31</sup> P.G.H. Engel and W. van den Bor "Agricultural Education from a Knowledge Systems Perspective: from Teaching to Facilitating Joint Inquiry and Learning" *Journal of Agricultural Extension* Vol 1:4 pp1-24.

## 4. WHAT NEEDS TO BE DONE?

*“We have seen that value systems favourable to development nurture the formation of individuals who are innovators, heretics. Education is the principal instrument of this nurturing. However, this must be a form of education that ... develops a questioning mind ... not one that transmits dogma, producing conformists and followers”.*

Mariano Grondona, Argentina, 2000<sup>32</sup>

The future economic success of developing countries depends heavily on education. The World Economic Forum identified a direct relationship between the effectiveness of the education system with productivity and competitiveness. Conventional education systems are not relevant to this new world. They tend to reinforce the status quo and do little to encourage independence and develop the confidence necessary to be proactive.

Among the myriad cultures that differentiate us, there are characteristics that bind us into regions and by which we define ourselves: humanism in Africa; the work ethic in Asia; South America’s joie de vivre. Within each continent and country there is a diversity of characteristics that are intrinsic to different cultures. The question is how to develop education systems that enhance the characteristics needed to take a firm place on the world stage, without giving up the characteristics that define us.

We need to adapt our educational institutions to enhance and reinforce the differences while celebrating and promoting the common values. These values establish the dignity of all individuals and empower them to take control of their own lives, to take responsibility for their actions and to demand responsibility from their social, political and economic institutions.

We need to:

- **Invest in those aspects of education that promote creativity, confidence and teamwork.**
- **Develop materials that incorporate environmental issues, cultural diversity and equity.**
- **Transform teachers into educators and agents of change at all levels.**
- **Provide the poor with access to technology in support of access to knowledge.**

It is important that initiative and dynamism are not condemned. It is necessary to promote those activities which inspire students to excel and advance and at the same time to work for society, to understand the rewards of working in a team. These are all concepts that can be built through theatre, sports, debating societies, environmental and service clubs and the various co-curricula activities which are such an important part of the lives of children in rich countries, but

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<sup>32</sup> "A cultural Typology of Economic Development" in Harrison and Huntington *Culture Matters: How Values Shape Human Progress*

which are considered as “luxury extras” in developing countries. In the animal kingdom, early learning is achieved through play – we should learn from this and reintroduce play as a central component of education.

#### **4.1 Challenges and problems in developing countries**

The lack of resources must be addressed. The sceptical attitude of society to innovative education is also a hurdle in achieving change.

*“There is a fear of change even when it promises good things; change is even harder to achieve if society is unsure of the value of promoting life-long learning and personal attributes”*

Ruth O’niango, Kenya, 2002<sup>33</sup>

More debate and media exposure is necessary to highlight the importance of changing education. There needs to be a broad acceptance of the limitations of current systems, including:

- Limitations of existing system to develop required skills
- Low self-esteem and motivation of teachers
- Lack of trained teachers
- Lack of resources to hire and retain adult educators and teachers
- Low pay for teachers – they go elsewhere or into other jobs
- Few relevant materials, books and AV
- Limited access to laboratories
- Limited transport facilities to allow practical experience and student exchanges
- Limited access to computers and sophisticated technology
- Entrenched attitudes – children, parents, teachers, heads, administrators and policy-makers
- Inappropriate Evaluation and Assessment systems for the new goals
- Lack of incentive for investment (returns to education are slow)

#### **4.2 A multi-pronged strategy for developing countries**

##### **Improve the profile of education and educators**

Teaching, once the noble profession, needs to be accorded greater status. Reward systems need to reflect the importance of teachers. Their contribution to society needs to be recognised. In many developing countries, teachers and lecturers engage in other activities in order to meet basic financial needs. This limits the time and energy even the most dedicated teacher is able to invest in the students. Initiatives to motivate teachers might include:

- Sponsor programmes and awards that accord teachers a high profile.
- Provide fair remuneration and reward systems.

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<sup>33</sup> Prof. Ruth Oniang’o was the Founder Director of Graduate Studies at the Jomo Kenyatta University of Agriculture and Technology, and currently executive director of the rural Outreach Program, Kenya.

- If unable to pay well, develop opportunities for earning which complement teaching.
- Increase and improve teacher education.
- Sponsor radio and television programmes on the importance of a broad education, life-long learning and self-taught skills.

### **Change the curricula**

Changes to curricula depend on the objectives of the specific institution and to the social reality involved in matching resources with demand. However, there are some elements that are applicable to rich and poor nations, pre-school and adult education. The focus of education in the past was on the acquisition of knowledge and technical and scientific skills. There needs to be more emphasis on understanding and analysis. To achieve this curricula need to be changed and some of the elements to be included are:

- Fun – learning through play within curricula.
- Ethics, values and personal attributes need to be incorporated in the curricula
- Experiential learning – learning by doing, practical exposure.
- Humanities and the Arts.
- Computer skills.
- Entrepreneurial activities.
- Environmental awareness.
- Social service.
- Time and the opportunity to explore, to develop enquiring minds and the ability to independently access knowledge

UNDP Capacity 21 has supported the incorporation of sustainable development into the formal education curricula at both primary and secondary levels in Costa Rica. These have helped in building awareness of the opportunities and constraints in natural resource use.

*"We need to ensure that our students are able to link the concepts they are learning to their environment and to be able to understand it in the context of both traditional and modern Africa"*

Tenkir Bongor, Ethiopia 1995<sup>34</sup>

### **Change the teaching paradigm**

This is the most revolutionary change required. In developing countries, rigid, missionary-style education systems can dominate. Intolerant, command-style politicians can be a product of that heritage. Freedom of expression, criticism and independence need to be combined with respect for institutions, elders and self. It is possible to achieve but requires a total change in approach. Rote learning and testing for facts can no longer be considered education. New systems that promote an understanding of how to access and apply knowledge must be established.

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<sup>34</sup> Dr. Tenkir Bongor, former University lecturer, now senior policy advisor, Ethiopia.

- Teachers need to become facilitators (didactic counsellors).
- Promote more self-directed learning. Lessons should be discussions of material students have gone and found for themselves. More teaching time should be devoted to assignments, both individual and team.
- Promote technology-based learning. Using modern technology allows for more self-directed learning and greater flexibility in programmes
- Advocate experiential learning. Formalise practical experience in the programmes.
- Assessment methods. A key to these changes is to develop innovative evaluation. If you change everything but continue to assess based on traditional tests of accumulated knowledge, nothing will change.

### **Develop and promote extra-curricula activities**

In addition to efforts to incorporate methods of teaching that integrate play into the curricula, it is important to recognise the valuable contribution of extra-curricula activities. They can be directly used to develop self-confidence, creativity, teamwork, social skills, networking, confidence, adaptability and professionalism. They can be important in developing cosmopolitan citizens who celebrate their own culture and accept others. They expose students to others outside their immediate milieu and can help to:

- Provide resources – financial and human for a wide range of activities (especially in poor areas).
- Sensitise parents, teachers and education departments to the value of these activities.
- Use these activities to forge links – arranging meetings and competitions that bridge income gaps and the different types of institutions.
- Promote international, regional and national exchanges.

### **Identify niches and provide targeted systems**

The multiple demands of modern society and the importance of life-long learning opportunities make it necessary for the education system to allow students to select particular emphases and approaches – especially for secondary and tertiary education. More demand-driven systems may be appropriate with smaller institutions catering to specific needs within a broad social “school or college” environment.

Developing countries must be able to meet the demands for expanding access to all levels of education while at the same time strengthening their advanced skills. To achieve this, selection and self-selection systems are essential. It is also important to make it possible for multiple entry points so that students can switch and those from disadvantaged groups are not permanently excluded from advanced institutions.

Countries need to:

- Establish selection systems and channels for change.
- Provide more technical and work-based learning institutions.
- Provide innovative institutions to develop social and environmental skills (“folk” high schools in Norway are a good example).
- Allow private sector to provide services where possible and so expand choice and release public resources to meet social needs.
- Support and encourage advanced institutions to engage students in locally relevant research and critical debate on values, governance, environment and other issues relevant to social advancement.

### **Develop appropriate materials**

There is a need for much more reading, radio, television and Internet material which directly addresses the education of environmentally and socially sensitive innovators. There is also the need for information that easily explains how to make the best use of modern technologies for accessing information. Higher profile, culturally and environmentally relevant sites on the Web would facilitate globalisation and contribute to a broader understanding and knowledge base.

### **Invest in information technology**

Developing countries need to invest in communications and power as well as computer systems, Internet and advanced imaging technology. It is essential for these countries to use the opportunity to use the advantages of coming into the era late, rather than remain isolated and continue to operate without modern information infrastructure. In addition to being essential for economic growth and reducing the gap between rich and poor nations, the availability of this technology is essential to assist in providing both broad and highly specialised education, in resource-poor countries.

Access by the poor to new technologies involves provision of both the physical equipment and the human resources that make it effective. Training and learning institutes are essential. Just as companies investing in hardware in the 1980s found that they needed to invest more in effective use of that hardware, training educators to utilise equipment will promote utilisation.

### **Provide training for new pedagogy**

If teachers are required to become educators and to direct their efforts towards facilitating life-long learning skills in their pupils, then they need to be provided with the orientation and skills to achieve this. They need to understand why it is important to reduce emphasis on knowledge transfer and why, apart from basic literacy and numeracy, they need to emphasise analytical and critical skills and develop creativity, independence and confidence. They also need to be exposed to different methods of achieving these changes.

## **Identify and support successful individual and community initiatives**

In a number of countries, there are examples of individuals and communities that have been proactive in establishing informal or formal education systems to address glaring gaps. This can be seen in South Africa, where a wide variety of individual actions have been directed to redress the gaps particularly for the generations who lost education opportunities due to apartheid. Many of these initiatives are driven by committed, inspired and independent individuals. Mechanisms need to be found which will formally support these initiatives without undermining their independence, or creating a moral hazard or dependency syndrome. The introduction of centralised, formal systems must be careful not to weaken innovative local initiatives.

### **Partnerships**

*"we need to look at specialisation...(removing) the barriers to investment in education by the private and business sector"*

Brendon Nelson, Australia 2002<sup>35</sup>

It is important for communities to engage in partnerships with government, the business community and alumni in order to develop effective programmes and source support for their changes. Partnerships between institutions within the education sector may help to make optimal use of resources and allow for greater exchange of ideas. Partnerships between different education levels may assist in addressing the shortage of trained staff and supplementing the income of educators. Partnerships between institutions at both regional and international level can assist in reducing the technology and resource gaps and provide platforms for the meaningful exchange of ideas.

## **4.3 Examples of interventions to overcome constraints and improve school, tertiary and adult education**

This section highlights some of the key areas for intervention and change. The examples are not exhaustive and may not always be appropriate. They are primarily intended to stimulate more ideas of how to improve education in a manner appropriate to a particular region or country. The key is to find ways of mobilising and releasing resources to address the constraints and change education so that they contribute directly to equity and sustainable growth.

### **Improving literacy**

In many countries in the developing world, literacy and numeracy cannot be taken for granted. In Senegal, for example, despite a long history of a highly educated elite, almost 70% of the population were still illiterate in 2001.

#### **Mobilisation of educated population to contribute to the literacy drive**

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<sup>35</sup> Dr. Brendon Nelson, Minister of Education, Australia, quoted in The Australian March 25 2002.

Pay students to provide adult education classes in the evenings at schools. During term time they could give them at their own schools and during vacations they could travel to rural areas with no high schools and use the facilities of primary schools. Payments to students could be made through the schools with a service fee provided to cover direct costs, Headmaster time and Administration costs. A secondary result would be that it would make more resources available to schools. Schools in areas of low literacy are likely to be less well endowed and would welcome the input. Another secondary benefit is that once involved in helping others (even if paid) it will help to show those involved, the rewards of assisting others. Incentive to the school per pupil registered and per pupil achieving particular success level will encourage quality. Unscheduled frequent audits and the Headmaster taking responsibility would avoid misuse of funds.

This could be a concerted effort with different industrialised countries targeting specific countries and then mobilising their own educational institutions in different cities in the donor country to raise funds to pay the trainers and administrative costs for particular regions within the recipient country. This could be followed with exchanges of staff and students, which would serve as mechanisms to ensure good use of the funds and to encourage international understanding. In addition, the donor government can make greater contact with its own electorate through the programme while at the same time fostering closer relationships between its nationals and other countries. Similar systems are in existence between municipalities (through 'twinning' initiatives), but this would require a much larger and more co-ordinated effort with a very strong drive to eradicate illiteracy.

### **Availability of material that recognises the importance of sustainable development**

*Development of environmentally appropriate materials* to use at all levels of education including the adult literacy campaign. These are not to be limited to texts on sustainable development but on producing readers, audio-visual material, and general texts with an infusion of messages that promote environmentally friendly living. Primary readers and advanced texts could use environmentally sound stories or examples. Plays, television and radio programmes could dramatise environmental messages that are both entertaining and informative. Initiatives which produce materials which assist in environmental education need to be encouraged, particularly where they are user friendly, directly relevant and fun.

CAMPFIRE GAME - In order to teach simple bookkeeping, decision-making and accountability skills a game has been developed by WWF in Zimbabwe based on the principles of Monopoly but applying it to wildlife resource use decisions. This game is enjoyable and instructive and is most successful in developing both skills and environmental awareness. The principle could be adapted to other resources and other countries. The game has been successfully used in rural communities to teach them the relationship between resource management, profit and sustainability together with management, transparency and financial skills. It is currently being adapted to Namibia and Zambia and has the potential to become widespread.

*Pay teachers and lecturers to produce these materials during their vacations*

This would give the teachers involved in producing the material the supplementary money they may need to keep them in teaching. It also involves them even more closely in the environment and will have spill-over effects into their normal teaching programmes. Use the radio and press to advertise what is required and to immediately indicate when any area is oversubscribed. Request teachers to submit short manuscripts/ materials that fulfil the requirements. Then select and pay for appropriate submissions. Longer concepts could be made as proposals for funding. An editorial board to accept or reject manuscripts and audio-visual “first cuts” will need to be in place and will need to work to strict deadlines. A team of editors could then be used to refine the work. Specialised and more complex information could be returned to author for changes.

### **From teacher to educator**

*Initiate widespread media debate* on which skills are important so that parents and pupils are aware that pupils need to do more than just rote learn information if they are to compete in the job market. Establish competitions for new ideas and products. Encourage criticism, artistic expression and the arts and humanities. Although a strong grounding in mathematics and science is very important for technological advances, there will be very little lasting development without the “soft” disciplines. These teach analysis, exploring the outer limits, debate, and the broader minds so necessary to innovation. They are also essential if societies are to be able to transform their norms to be able to cope with the fast-paced technological changes and the information era.

*Establish educator-learning institutes* where educators can be exposed to techniques that make it easier to facilitate their students learning. Provide them with, and engage them in, developing materials that expose students to environmental, social and global issues.

### **Forging links**

*Establish an “Education and Rural Development Corps”* which operates within and between countries. This could take a form similar to the Peace Corps and other voluntary overseas service organisations but be established locally and have the main contingent drawn from nationals. This could be a mechanism for employing graduates and providing them with more realistic practical experience and environmental and social activism than the formal education process can provide. In the past, government jobs provided the first step into the working world but with structural adjustment and government downsizing, graduates find employment very difficult.

The Corps would implement aid and education programmes with the volunteers living in the rural communities. In addition to the tasks set, all the university graduate volunteers could be asked to assess the needs of the community and to

develop research and further development project proposals in association with the local community.

Such a system would provide donor countries and institutions with the opportunity of working directly with needy communities instead of providing resources through central governments. Although it is administratively more expensive the process would also contribute to education of both the donor and host country volunteers and would provide opportunities for closer exchanges and better world understanding. The system would also reduce the moral hazard involved in so many aid projects.

### **Incubators to develop “ideapreneurs”**

*Establish new institutes* specifically focusing on developing people who are less reliant on the formal employment sector, are able to be creative and to translate their ideas into practical reality. These graduates should be environmentally, socially and internationally sensitive and aware. These changes are not easily implemented and resources are limited. The EARTH model is being considered as part of the EARTH-Salzburg Seminar Series to see whether the concept can be adapted to the reality of other regions.

Thus “seed” institutions could be established to educate educators, and/or to produce graduates who would go back to their communities and stimulate change. These graduates should be capable of initiating new ideas, of self-employment and even of generating employment.

There are many different forms that such incubators could take. Returns to investment may be greatest where the primary function of an incubator is to educate the new facilitators. The incubators should be established so that, while training, the educators are directly involved in producing graduates who can go out into their regions with the experience, resources and confidence to make changes. For any change to occur within a school or tertiary or adult education institution, a critical mass is required and incubators will need to take this into account when selecting participants.

Incubators could also be established at a more localised level to address particular opportunities and unemployed groups, encouraging them to develop ideas to service gaps in their own communities and thus create employment. These needs could specifically target environmental and social issues which remain unsolved. However, it is important that the participants are encouraged to develop concepts which are, or could become, financially viable and self-supporting. Participants could be engaged using innovative techniques, theatre, games etc. They could also be exposed to modern technology and essential skills training.

## Bibliography

Angstreich, M. G. 2001 Unpublished paper. "Agricultural Aid with Impact" NORAD, Oslo.

Basnyat, Maoj, H. Bahadur-Gurung and H. Stewart. 2000. *Made in Nepal: Nepal's Sustainable Community Development Programme*. Approaches to Sustainability series, Capacity 21 UNDP.

Collier, Paul, 2001. "Consensus Building, Knowledge and Conditionality" in Pleskovic and Stern (eds). *World Bank Conference on Development Economics 2000*. The World Bank, Washington DC.

Diouf, Mamadou. 2001 "Sustainability, Education and Management of Change in the Tropics: Agricultural Education in West Africa Inventory of the Best Practices" presented at a workshop on Sustainability, Education and the Management of Change in the Tropics EARTH-Salzburg Seminar Series, Senegal 25-26 September 2001.

Dlamini, B.M. 2001 "Institutional Innovations for African Tertiary Agricultural Education to Promote Environmental and Social Awareness and Entrepreneurial Skills" presented at a workshop on Sustainability, Education and the Management of Change in the Tropics EARTH-Salzburg Seminar Series, Uganda. March 2001.

Dobie, P. 2000. Capacity 21. *Models for National Strategies: Building Capacity for Sustainable Development*. Approaches to Sustainability. UNDP.

EARTH University 2000. "Sustainability, Education and the Management of Change in the Tropics". Proceedings from Session Two at Earth University, Costa Rica, August 2000 prepared by Salzburg Seminar, Noragric and EARTH University.

*The Economist* 2000-2002 (various issues) but particularly "Survey of the Young". December 2000

Engel, P. G. H. and van den Bor. 1995. "Agricultural Education from a Knowledge Systems Perspective: from teaching to facilitating joint inquiry and learning". *Journal of Agricultural Extension* Vol 1: 4, pp. 1-24.

Goleman, Daniel. 1996 *Emotional Intelligence* quoted in the *Economist* April 2001

Halvorsen T. and Guddal Michelsen. 2000. "Identity Formation or Knowledge Shopping? Globalisation and the Future of University Education and Research in Africa". University of Bergen.

Harrison, Lawrence E and Samuel P. Huntington. 2000 *Culture Matters: How Values Shape Human Progress* USA.

Igodan, Chris 2000 “Innovation, Identity and The Future of Agricultural Universities” paper presented at Sustainability, Education and the Management of Change in the Tropics, EARTH University, Costa Rica, August.

Lockett, K. and L. Sutherland. 2001 “Improving Assessment Practices in Higher Education”. Unpublished paper. University of Natal and University of Zululand.

Murillo Martinez, Carlos. 2000. “Education, Entrepreneurship and Community Development” paper presented at Costa Rica August workshop on Sustainability Education and Management of Change in the Tropics *op cit*

Narayan, Deepa. December 2000. “Poverty is Powerlessness and Voiceless”. *Finance and Development*. International Monetary Fund.

Njie, Ndey-Isatou and Koy Thomson. 1998. *Learning for Real: Bringing Sustainable Development Planning Down to Earth* Approaches to Sustainability Series. Capacity 21 UNDP.

Negrao J; I. Palte, L. Santos and Wouter van den Wall Bake. 2001. “Designing an MSc Programme at Eduardo Mondlane University”. *Forum News Issue 12* June/July 2001 <http://www.rockfound.org>

Norman D. W. “Reforming Higher Agricultural Education in the Context of the Changing Realities in Eastern and Southern Africa”. Unpublished paper.

Oniang'o R. and C. K. Eicher. 2001. “Universities and Agricultural Development in Africa: Insights from Kenya”. Rockefeller Foundation Strategy Workshop on Curriculum Development and Transformation in Selected African Universities in the areas of Rural Development and Resource Management. Bellagio, Italy November 12-16, 2001.

Pinstrup-Andersen, P. and J. Babinard. “Globalization and Human Nutrition: Opportunities and risks for the poor in Developing Countries”. *African Journal of Food and Nutritional Science*.

Pleskovic B and N. Stern. July 2001. “Annual World Bank Conference on Development Economics”. The International Bank for Reconstruction and Development, The World Bank, Washington D.C.

Sherrard, Daniel. “The Change Agenda.” Unpublished paper to be presented at Sustainability, Education and the Management of change in the Tropics” Uganda, May 2002

Stewart, J.M. 1997 *Industrialised Countries* Road from Rio Series, Capacity 21, UNDP

Sustainability, Education and the Management of Change in the Tropics. A Multi-Year Project Developed by Earth University and the Salzburg Seminar with the collaboration of NORAGRIC.

Turnham, D. 2000. *African Perspectives: Practices and Policies Supporting Sustainable Development*. Results of the Scandinavian Seminar College's "Sustainable Africa Initiative", carried out in 1998-99.

Umaly, Rueben. C. 2000. "Globalization, Information Technology, Distance and Virtual Education". Paper presented at Sustainability, Education and the Management of Change in the Tropics, Costa Rica, *op cit*.

UNDP, *Local Action, National Impact*. 1999 Annual Report. Capacity 21 Building Capacity for a Sustainable Future.

Van den Bor, W. J. M. Bryden and A. M. Fuller. 1995. "Rethinking higher agricultural education in a time of globalisation and rural restructuring". *Journal of Agricultural Education Extension Vol 2:3 pp 29-40*.

Van Rooyen, J, F. Swanepoel, J. van Zyl, J. Rwelamira, A. Stroebel and T. Dayer 2001 "Education and Change Management in Africa: A New Framework for Human Capital Development in Agriculture" paper presented at Sustainability, Education and Management of Change in the Tropics, Makerere University, Uganda

Wallace, I. 1997. "Agricultural Education at the Crossroads: Present Dilemmas and Possible Options for the Future in Sub-Saharan Africa". *Int. Journal Educational Development Vol 17 No. 1 pp. 27-39*.

Willums, Jan Olaf 1998 *The Sustainable Business Challenge* Sheffield, Green Leaf Publishing

Young M. E. 1996. *Directions in Development: Early Child Development: Investing in the Future*. The World Bank, Washington D.C.



**Table 1 SEMCIT Workshop Findings**

Sessions	Main Objectives	Objectives of the Working Groups (WG)	The Focus of Discussions and Conclusions
I (August 22-27, 99)	Explore the role of education in sustainable development and possible new paradigms for higher education in agriculture and natural resources in the humid tropics	<p>WG 1: Strategies and constraints to change in traditional universities</p> <p>WG 2: Breaking down the walls between universities and the community</p> <p>WG 3: Graduates as agents of change</p> <p>WG 4: Financing mechanisms for education and sustainable development</p> <p>WG 5: Building network for change</p>	<p>Limitations commonly found in traditional institutions including ailing internal structures and resistance to change, lack of autonomy, absence of sustainable development context in the curriculum design</p> <p>Means to facilitate the flow of solutions between the university and the larger community and acknowledgment of the ever widening gap between universities and communities</p> <p>Best way to foster and encourage change in societies and communities and responsibilities of the universities for fostering agents of change</p> <p>Encouraging donor support through innovative approaches including "green taxes" and debt for nature fiscal exchanges</p> <p>Establishment of a new and dynamic network to exchange innovative experiences and "best sustainable" practices in tertiary education</p> <p>Strengthening networking and communications, developing awareness of the need for change, identifying training opportunities and commissioning papers</p>
II (August 5-12, 2000)	Innovations and experimental learning: the basis of education at EARTH university (share and discuss EARTH educational model and its relevance to other areas of the tropics)	<p>WG: Africa: analyze EARTH example and generate share conclusions, doubts, questions and proposals from a regional perspective</p> <p>WG: Asia</p> <p>WG: South America</p> <p>WG: 4 Visioning Group To achieve a broad sustainable agriculture inclusive of all forms of natural resource use through a new approach to education combining disciplines and including ethics</p>	<p>Topics for session III in Africa: commissioned papers including the complexity and challenges of the African landscape, case studies of institutional innovations, innovative training across disciplines and effecting change with farmers, extension agents and entrepreneurs. Pre-session regional workshops proposed</p> <p>Need for policy changes, adjustment of the role of agricultural universities; review of the curricula of the universities to meet needs; promoting research and development, modernization of the extension services to respond to target group demands; collaboration with government, NGOs and other groups addressing poverty alleviation and other social issues and</p> <p>Possibilities offered by EARTH model as resource for professional development, intensive courses for faculty and staff of other institutions to facilitate change, providing a forum for discussions around agricultural higher education</p> <p>Most on nature of change agent: 1<sup>st</sup> rank: creativity, initiative, entrepreneurship, adaptability and social consciousness. 2<sup>nd</sup> rank life-long learning, problem-solving, courage, empowerment. 3<sup>rd</sup> ranked financial and technical skills, common sense, scientific bases, English and language skills, indigenous knowledge, emotional balance. To be achieved by Exposure and training within traditional institutions to experiential learning and extra-curricula activities and a multidisciplinary or holistic approach. Establishment of relevant incubators on each continent Create a repository of positive experiences throughout developing world</p>

Source: derived from Diouf, 2001

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