NON-FORMAL AND FORMAL LEARNING INTERACTIONS:
NEW DIRECTIONS FOR.
SCIENTIFIC AND TECHNOLOGICAL LITERACY

Science learning and ultimately a nation’s scientific literacy depend on schools—but not exclusively. It is becoming increasingly important to recognise and embrace the media, science centres and museums, Industry-education programmes, out-of-school student programmes and competitions, community education programmes and other non-formal science learning outlets as valuable parts of a nation’s science education infrastructure.

A system can be greatly strengthened by building overlap into its infrastructure. For example, in an aeroplane, there are many rivets that hold the parts together—far more than is required. Even if some rivets break during flight, we remain safe because engineers have designed planes with more than are needed. This redundancy means that we can put much more confidence in arriving safely in an aeroplane.

How much confidence can we place in our science education infrastructure? In most countries there are serious gaps in educational infrastructure which are limiting the level of scientific literacy. These gaps can be largely overcome through the strategic formation of partnerships between schools and institutions of non-formal learning in science. Non-formal science education resources not only provide prerequisite experiences which make schooling more effective, but also critical overlap to create increased opportunities for learning science. We need to view non-formal learning resources as a key part of the whole, systematically incorporating them into our science education infrastructure. This has been a strategic emphasis of Project 2000+ since this global enterprise was launched jointly by UNESCO and several International NGOs and IGOs including ICASE, in 1993.

There are many types of non-formal learning institutions that contribute to the development of STL. This article focuses on the role of science centres and how they can work with schools to advance science curriculum reform. When the physicist Frank Oppenheimer founded the Exploratorium science centre in San Francisco, he felt concerned that people were becoming information rich and experience poor. He wrote:

‘On the whole, people have very little opportunity to have any direct experience with the separate elements of nature or technology. They watch ocean waves, but have never been shown how to observe the way waves pass through each other, bend around corners or bounce off cliffs. In a science museum, one can provide these direct experiences with the behaviour of light, sound and motion. One can set up these experiences in such a way that they not only generate, but partially satisfy curiosity.’

In schools, there is a tendency for teachers to teach abstractions, definitions and explanations of phenomena that, for the most part, students have never had the opportunity to explore. Schools usually put explanations before first-hand experience.
of natural phenomena, whereas science centres reverse the process. Science centres present phenomena in the form of exhibits that are interactive and manipulable, exhibits whose express purpose is to enable visitors to explore and experiment. From a constructivist point of view, learning involves constructing meanings by forming links between existing knowledge and new situations. This model of learning is of interest not only to those involved in formal schooling, but also to educators in science centres. The goal is to provide experiences for learners to test their understanding—the more compelling these experiences are, the more likely learners will develop understanding. Visitors to science centres bring with them great diversity in terms of previous knowledge and experience, assumptions and expectations, as well as ways of thinking and learning. Science centres expect this diversity and design their exhibits and programmes accordingly—as open-ended opportunities which provide flexibility in the manner and level of investigations individuals and groups may wish to undertake. The particular role of science centres is not so much concerned with ‘teaching people science’, although science learning does take place in science centres. Rather, their role may be more accurately described as ‘providing opportunities to develop a positive relationship with science’. Schools, many would acknowledge, have been somewhat successful in ‘teaching students science’. However, schools have been much less successful in helping students to ‘develop an ongoing relationship with science’.

Science teachers are often overwhelmed with the demands of covering a curriculum full of abstract principles. As a result, regardless of what curriculum documents may say about the need to relate science to everyday life, students are rarely given open-ended opportunities which provide flexibility in the manner and level of investigations individuals and groups may wish to undertake. The particular role of science centres is not so much concerned with ‘teaching people science’, although science learning does take place in science centres. Rather, their role may be more accurately described as ‘providing opportunities to develop a positive relationship with science’. Schools, many would acknowledge, have been somewhat successful in ‘teaching students science’. However, schools have been much less successful in helping students to ‘develop an ongoing relationship with science’.

Teachers become familiar with a variety of learning strategies based on the constructivist learning model; gain confidence in teaching a variety of topics as they develop an understanding of science principles; and develop skills in designing interactive science and technology activities based on their own curriculum requirements. Such teacher workshop programmes go beyond the mere provision of an idea for the next class—they encourage the development and implementation of new teaching-learning strategies. The contribution that science centres are making to teacher professional development is significant. In the USA alone, a recent survey revealed that more than 400 non-formal science institutions provide teacher workshops with over 80,000 teachers participating annually. More than 200 of these provide teacher institutes reaching over 20,000 teachers each year. Nearly 200 provide teacher internships, which involve about 1000 teachers each year. Various studies report that some teachers view science centres as their ‘philosophical home’. These teachers, in their contact with science centres, are being challenged to develop new instructional approaches and new ways of relating to their students and to science; their teaching is becoming more hands-on, more student-centred, and more inquiry-oriented.

The challenge confronting many nations in their education reform programmes is to effect a significant philosophical and pedagogical change from the predominant ‘education for those proceeding to higher education’ approach to an ‘education for all’ approach. An innovative programme to address this challenge in South Pacific countries was implemented by Questacon in partnership with ministries of education in nine South Pacific countries. The Questacon Science on the Move programme, funded by the Australian government and UNESCO, facilitated this change by touring a hands-on exhibition illustrating science in local, everyday contexts. Local people were trained as ‘explainers’ to assist school groups and members of the public as they interacted with the hands-on exhibits, providing interpretation in local languages as necessary. Teacher training workshops were conducted to encourage greater use of hands-on, activity-centred approaches as promoted by curriculum renewal processes already underway in these countries. The programme involved local curriculum officers and teachers in the development of hands-on activities using local, inexpensive materials to investigate science phenomena relevant to local contexts and issues. These materials have been used to assist in the implementation of new curriculum approaches.

Studies of the impact of non-formal science learning experiences indicate that people do learn from them. However, while the formative evaluations used in these studies have produced valuable results, the results are very difficult to generalise. Substantial research on informal and non-formal science learning will help to clarify the role of such programmes and, as a result, encourage the formal school sector to capitalise on partnership opportunities with non-formal education institutions. Effective links between schools, science centres and other agencies of non-formal learning are essential. Unless we create ways to integrate them into our educational infrastructure, we may find that there are not enough ‘rivers’ in our ‘aeroplane’ to carry our students and ultimately our nations to a destination of STL for all.

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Field Activities
International Conference on «Environment and Society: Education and Public Awareness for Sustainability»
Thessaloniki, Greece, 8 -12 December 1997

This conference, organized jointly by UNESCO and the Government of Greece (v. Connect, vol. xxii, no. 2, 1997), provided a unique platform to debate its guiding principles, exchange information on new developments in the matter of EE for public awareness and sustainability as well as review and debate its methodologies and practices. The 1,300 participants from 94 countries worldwide came from a variety of backgrounds representing governmental, intergovernmental and non-governmental organisations as well as educational, social and voluntary institutions.

UNESCO, as Task Manager for Agenda 21, Chapter 36, prepared the main background document for the conference. This document is also UNESCO’s contribution to the implementation of the special work programme of Agenda 21, Chapter 36 of the UN Commission on Sustainable Development which calls on UNESCO to refine the concept and key messages of education for sustainable development.

The tone of the conference was given by UNESCO’s Director-General, Federico Mayor, who in his inaugural address made an urgent call for action instead of the continued reflection and discussion which had marked the post-Rio period and yielded scarce tangible results. He also emphasised the need for education and peace in order to solve the problems that beset a major part of humanity today.

The main highlights of the conference were:
- The Issues Forum with 60 presentations;
- The innovative Practices Forum with 21 speakers;
- Workshops with 108 presentations;
- Exhibition with 94 posters.

Concurrently, 9 special activities were organised by various institutions on specific topics: Latin American Relationships with regard to Environmental Education for a Sustainable Future; Arab Network for Environment and Development (RAED); Geological Heritage: Research in Environmental Education and Cooperation at the European Level (GRECEL); Information, Awareness, Environmental Education and Public Participation of the UN Mediterranean Commission on Sustainable Development (MCSD); Workshop on Drama in Education; Drama Game with the participation of the third grade of the 106th Elementary School of Thessaloniki; UNESCO Workshop: Registry of Innovative Practices in Education, Public Awareness and Training for Sustainability; Meeting of the Teacher Education Consultation group; and Meeting of the IUCN Commission on Education and Communication members.

During the conference it was stressed that sustainability is about concrete and immediate problems. It is about the plight of over one billion people struggling to survive on less than a dollar a day and more than 100 million children of primary school age who do not attend school and are thus denied access to the knowledge and skills that could enable them to sustain themselves better. It is about a choice between a culture of war and a culture of peace, a choice between living within the limits required to preserve natural environments and reaping the riches of the earth without regard to the needs of future generations.

Above all, sustainability poses a choice between policies of development aimed at meeting the basic needs of all and those directed towards heedless growth regardless of its cost in both exclusion and environmental degradation. It is thus anchored in realities and anchored or held back by daily choices at all levels: policy choices as well as individual preferences and practices.

Education in its traditional forms is not sufficient to meet the immense challenge posed by unsustainable life styles. New educational approaches are required if people are to act upon awareness, if we are to achieve the necessary changes of life styles, in mobilizing support for public and private initiatives, developing a new ecological vision and fostering a sense of global solidarity. Education for sustainability, as mentioned in the Declaration adopted, represents a new vision for education. It is essentially a transdisciplinary activity informing other subjects with its values and emphasis rather than constituting a discipline in its own right. It seeks to avoid abstraction and favours an action-oriented approach with a view to prompting personal initiatives and social participation.

Among the most important outcomes of the conference was the recognition that education was not only just as important to arrive at sustainability as the economy, legislation, science and technology, but that it was a prerequisite for all of the latter. Moreover, the apparent diversion between two prevailing tendencies, if not ‘schools’ of thought, which address education for environment and education for sustainability as separate issues, was largely resolved. These tendencies, eventually deriving from different philosophical stand-points should be united under one single label ‘Education for Environment and Sustainability’ since in effect the content of their message is the same and their approaches complementary rather than antagonistic.

Furthermore, it was recognized that the present level of allocated funds and resources is totally inadequate for the effective implementation of Agenda 21. It was necessary to provide concrete support to train educators in environmental protection and sustainability, as well as equip and modernise schools and adopt school curricula appropriately in order to induce the concept of sustainability in every aspect of education.

These and other elements which are included in the “Thessaloniki Declaration” make it an important milestone in the struggle for a better education for a more sustainable world and a useful tool for UNESCO, the UN-CSD, Governments, NGOs, educators of all levels and all those...
Sub-regional Workshop on Scientific, Technical and Vocational Education of Girls in Africa

Harare, Zimbabwe, 8-12 September 1997

To follow up on the first phase of UNESCO's six-year Special Project on Scientific, Technical and Vocational Education (STVE) for Girls in Africa (v. Connect, Vol. XXII, No.1, 1997), which was devoted to national surveys in 21 countries of the region, a sub-regional workshop for experts from Southern Africa was organized in Harare, Zimbabwe, 8-12 September 1997. Fourteen countries of the sub-region were represented at this workshop: Angola, Botswana, Ghana, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Swaziland, Tanzania, Uganda, Zambia, and Zimbabwe as well as 31 participants from governmental institutions and NGOs. The aim was to form a first pool of resource persons who would act as contacts for UNESCO in the field.

The objectives of the workshop were to propose concrete actions for making curricula, textbooks and teacher training more gender sensitive and addressing socio-cultural constraints and negative role modeling which impede women’s access to scientific, technical and vocational education and training. The rationale of the workshop was based on the following considerations:

- The nature of the labour market is changing and girls can no longer rely on the traditional limited range of occupations
- An increasing number of occupations are technical and unless women have the ability to access them, they will continue to suffer from unemployment.
- Today, many of society’s problems are best solved by the application of technology.
- African women account for more than half of their national populations. As a human resource they cannot be left on the margin of the economic development of their countries, particularly during this period of social, cultural and political upheaval in the continent.

The workshop was organized with an emphasis on discussions and working groups which required and obtained an active participation of all the delegates in sharing ideas and experiences for meaningful strategies on enhancing female access to and participation in science and technical education. It included:

- Presentations of:
  - surveys on the participation of girls and women in scientific, technical and vocational education and in science-based occupations in Southern Africa;
  - views from the work-place on women in science;
  - case studies from Botswana, Kenya, Uganda and Zimbabwe on strategies for mainstreaming and institutionalizing gender equity and viable alternatives in scientific, technical and vocational education; and
- videos on the NGO Forum on Science and Technology of the Beijing Conference, the Botswana Roadshows, the Ghana Science Clinics and the Zimbabwe Science Camps.
- Working groups on recommendations and strategies for action in community sensitization campaigns, revising teaching-learning materials and teaching methods as well as teacher training.

The general recommendations of the workshop were notably to strengthen networking and dissemination of information and to foresee support to local and national initiatives. Specific recommendations for immediate and precise actions within the framework of the project were formulated in 3 main areas: advocacy for government commitment and support to STVE; overcoming socio-cultural barriers impeding girls’ access to STVE; and revision of the quality, relevance and appropriateness of STVE.

The final report of the workshop will be available in 1998.

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UNESCO-ICASE Regional Workshop
“Developing Science and Technology Literacy Materials at Basic Level”

Quezon City, Philippines, 4-9 November 1997

This UNESCO-ICASE workshop was organised in collaboration with the University of the Philippines Institute for Science and Mathematics Education Development (UP-I(SMED) in the framework of Project 2000+. It was organised as a follow-up to the one held in Lahore, Pakistan in May 1997 (v. Connect, Vol. XXI, No. 4, 1996, where exemplary teaching-
Field Activities

learning materials were developed by the participants. The objectives of this workshop were notably to:

- evaluate both the teaching-learning materials developed by the participants as well as the criteria used for their development and, if necessary, modify the materials
- develop teacher-based formative and summative assessments for the best use of the materials
- prepare a pilot procedure for testing the materials and planning future actions

The workshop was attended by 19 experts from Bangladesh, Brunei Darussalam, China, Republic of Korea, Malaysia, Nepal, Pakistan, South Africa and the host country Philippines.

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Congress on EE for Sustainable Development
Havana, Cuba, 16-20 September 1997

This Regional Congress was organised by the Cuban Ministry of Science, Technology and the Environment with the support of UNESCO and attended by 227 participants. Of these, 167 came from the host country including the UNESCO Havana Office and the remaining from Spain and 14 countries of the Latin American region: Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, Paraguay, Peru, Puerto Rico and Venezuela. UNESCO/EPD was represented by its Director, Mr G. López-Ospina, who gave one of the four keynote presentations: “Education for sustainable development: towards a strategy for concretisation”. The other keynote presentations which formed the basis of the work of the congress were:

- EE in the framework of Cuba’s environmental policy
- EE in the Cuban context
- Professionalising environmental educators: critical points for a curricular strategy

Additionally, two roundtable sessions were organised to stimulate discussion and exchange of views among participants in order to explore the limits of the congress theme. The themes of the roundtables were:

- The environmental dimension of development as the transversal base of training
- The environmental dimension of development as the transversal base of non-formal education

The work of the congress was organised in two major commissions on Formal Education and Non-formal Education, each being subdivided into four and nine sub-commissions respectively. Seventy oral and ninety poster presentations were made at the congress whose conclusions were grouped under three heads: General; Formal Education; Nonformal Education.

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III Regional Meeting on Intercultural Bilingual Education “Mathematics learning in the indigenous populations of Latin America”
Cusco, Peru, 22-26 September 1997

This regional meeting was organised by the German Foundation for International Development (DESE), the German Society for Technical Cooperation (GTZ), UNESCO and UNICEF. A total of around 40 experts from Bolivia, Brazil, Chile, Colombia, Ecuador, Guatemala, Mexico, Peru and Venezuela participated in the meeting. The theme of the meeting was “Mathematics learning in the indigenous populations of Latin America”. Its main objective was to exchange information on and experiences in teaching and learning ethno-mathematics in Intercultural, bilingual contexts. The highlights of the meeting were: specific case studies concerning the Quechua, Aimara, Paez, Maya and Guarani populations as well as those from Ecuador and Peru; keynote presentations on the state of ethnomathematics; relation between language and mathematics; knowledge, social practice and the curriculum; as well as new approaches to mathematics teaching for indigenous populations and training of indigenous teachers.

The report of the meeting including presentations as well as the proceedings is due to
be published and is expected to play a major role in national and institutional policies concerning mathematics teaching/learning in intercultural, bilingual contexts.

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International Meeting an Biology, Humanities and Education
Moscow, Russia, 25-30 August 1997

This International Meeting was organized by the Commission on Biology Education of the International Union of Biological Sciences (CBE-IUBS) with support from UNESCO, SBS-Agro-Bank and the Russian Foundation for Fundamental Research (RFFI) and hosted by the Moscow State University. Several hundred Russian teachers and educators participated in this meeting at which presentations were made by experts from Barbados, Belgium, Germany, Japan, Kenya, Malaysia, Mauritius, Switzerland, U.K., U.S. and Russia. The main topics addressed by the meeting were:

- **Biocentrism**: dealing with the evolution and perception of human-environment relationships that determine the course of human activities from their focus on egocentrism, ethnocentrism, anthropocentrism and biocentrism;
- **Core Biology Curriculum**: to address the growing current problems in the wake of rapid change and exponential growth of knowledge in humanities and biological sciences as well as the acquisition of appropriate technology and methodology for continuing lifelong education to survive in the changing environment;
- **Bioethics**: in view of its growing significance in every day life, the need to elaborate the ethical aspects of eugenics and conservation for classroom teaching;
- **Environmental citizenship and sustainable society**: a suitably designed curricula in both biology and humanities can promote the development of a new type of citizen awareness of the need to promote environmental conservation and management with a view to sustainable development. The role of political decision-making and government policies in promoting a sustainable society cannot be denied. However much will depend on education to develop human attitudes, behaviour patterns and a suitable code of ethics that can change the current unsustainable consumption and production systems as well as lifestyles in conformity with the laws of a sustainable society;
- **Future prospects**: regarding scientific research both as a human activity and a cultural product, reconstruction of scientific knowledge and its consequences on the development of new approaches and methods for science education and communication were considered. New attempts for developing partnerships between scientists/researchers, educators and students for carrying out research programmes for the mutual benefits of partners concerned were reported and discussed. In view of the unprecedented growth in the knowledge of biological sciences during the last quarter of the century and its impact on socio-cultural and political affairs, the CBE proposed to convene a World Conference on BioEd: the Challenge of the 21st Century in the year 2000 in which the following topics have been tentatively proposed for consideration: new knowledge, new direction for biology education and mutual interaction and subsequent impact on the environment, ethics, survival and sustainability.

The Proceedings of the meeting are available in English.

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Regional Workshop on Community-based Conservation: Policy and Practice
New Delhi, 9-11 February 1997

This workshop for South and Central Asia focused on community-based environmental conservation. Sponsored by UNESCO, it was organised by the Indian Institute of Public Administration in New Delhi, 9-11 February 1997. It brought together 62 participants from 8 countries of the region - Bhutan, India, Iran, Maldives, Mongolia, Nepal, Pakistan and Sri Lanka - as well as France, Switzerland and U.K.

The objectives of the workshop were:

- comparative assessment of community-based conservation (CBC) attempts across South and Central Asia and lessons to be drawn from it;
- analysis of the policy and legal implication of CBC in each country and sub-region;
- initiation of networking amongst groups and individuals in the sub-regions; and
- recommendations for follow-up action at the legal, policy and programme levels.

The workshop comprised country reports...
from each of the 8 countries from South and Central Asia as well as case studies and presentations on specific topics including: Grassroots Conservation Practices; Incentives for Conservation and Sustainable Utilisation; Lagoon Prawn Fisheries of Sri Lanka; Tribal Communities and Conservation; Enterprise Development and Conservation; Legal and Policy Issues; and Partnerships for Collaborative Management.

Following the presentation, of the results of the working groups recommendations were formulated on 4 key issues:

1. Role of local community knowledge systems in CBC
2. Benefit sharing
3. Institutional structures
4. Legal and policy issues

A full report of the workshop has been prepared and the 30-odd papers presented at the workshop have been compiled into a book.

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Regional Workshop on EE in Eastern & Southern Africa
Nairobi, Kenya, 2-8 November 1997

This regional workshop supported by the International Development Research Centre (IDRC) and the Swedish International Development Authority (SIDA), brought together 31 key actors in EE from 9 countries: Ethiopia, Kenya, Malawi, Namibia, South Africa, Tanzania, Uganda, Zambia and Zimbabwe as well as a number of IGOs and NGOs including IUCN, UNDP, UNEP and the World Bank. Its rationale was that despite commitments, declarations and recommendations made by various fora, implementation strategies were still weak, collaboration and coordination among stakeholders limited and follow-up mechanisms inadequate. The workshop thus aimed to explore modalities and mechanisms for coordination, collaboration and networking with a view to ensuring effective implementation of past EE recommendations and action oriented strategies.

Its main objectives were to:
- provide a forum for sharing experiences and practices in EE
- explore innovative approaches to environmental learning for use in formal and informal education
- formulate strategies to integrate indigenous knowledge and community learning practices in EE programmes
- prepare a joint Plan of Action and a strategy for its implementation

Four major sub-themes were chosen for discussions: donor cooperation and collaboration; technologies in environmental learning; integration of indigenous knowledge systems and community learning processes and practices. Work consisted notably of presentation of a video, short papers and case studies, group discussions, field trips and a market place session.

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Eminent Scientists on Science & Technology Education (STE)

In continuation of Connect vol. xxii, no. 2, 1997, we present the views of three renowned scientists from USA, India and Brazil on scientific literacy as well as the problems facing STE in general.

Ms Shirley Malcolm, Head, Directorate for Education and Human Resources Programs, AAAS, USA.

In today's world, literacy must include knowledge of science and technology (ST). Science is part of culture. In the developed countries ST is evident everywhere. One must realize that STE too has changed its focus: from being reserved for people who produce things to a more democratic aspect of ST available for day to day use.

The major problems facing STE are:
- Access to this education, about which there are still many misconceptions;
- Form of education which is provided in a too abstract manner: people don't see the connection with their lives;
- Distribution concerning gender;
- Expectations: one has necessarily to continue to tertiary education; and
- Content which must be based on different cultures and experiences and used in pedagogy, i.e. to find the universal and make it local.

In USA specifically, the problem arises from the attitude of the teachers - that ST is reserved for the elite; inadequately trained STE teachers and the tendency to "weed out people" at the professional level.

Gender is a major issue - notably the distribution of access to Basic Education. It must be remembered that on the daily level a lot of women have worked and are working in this field but their work is not recognized. To make ST attractive for women, it should be grounded in daily life. But the major impediment to greater women's participation in ST is the expectations of the teachers, the parents and the girls themselves: there...
is a conspiracy of low expectations. And it is difficult to remedy matters as long as such attitudes are not reversed.

Mr C.N.R. Rao, President, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, India.

In the first place, Science Education (SE) should concentrate on acquiring wisdom: it should be subject and knowledge oriented instead of just information oriented. Secondly, it is most important to start SE early - in primary school, so as to implant the right ideas concerning basic science. The various branches: biology, chemistry, physics etc. can be developed later on from this basic idea. Illiteracy being a major problem in the developing world, science has not made in-roads into basic education. Besides, literacy per se is not enough. Literacy should comprehend a sort of universal capsule including core knowledge on science, which should be ensured for children as well as adults. This is very important for the development of a scientific attitude or temper which is the most important part of SE. Scientific literacy which is not the same as Technological literacy - cannot be achieved through formal education alone. It must also be based on voluntary movement. SE too needs volunteers to support official measures. Governments cannot take care of everything. They should be catalysts. For example, in the state of Karnataka in India, it is volunteers who carried out a very successful public awareness campaign on science education.

Women, educated and scientifically literate, are vital for the future of India. The state of Kerala is a very good example of what can be done in this direction. But the current, overriding problem of India is the shortage of manpower as well as poorly equipped schools.

Prof. José Galizia TUNDISI, President, CNPq (National Research Council), Brazil.

The major problem facing STE is that of reaching out to the people - transmitting knowledge - which is the major occupation in education as a whole. On the one hand the same method does not hold good for all countries and on the other access to teachers is not easy in many cases. But if primary and secondary teachers are vital for the transmission of knowledge, the different forms of media are also very important. In fact, one must just try every possible way to find solutions: set up laboratories in boats, trains, trucks... to reach isolated populations or like the Harvard University project to donate computers to the poor in Thailand... One can also train voluntary workers in non-formal education... The best way is to start by raising awareness/interest in existing problems. Next comes the problem of how to transmit the knowledge in an interdisciplinary fashion to the public? By making use, for example, of daily life issues like those related to water, pollution etc. in the practical, local context to proceed from practice to theory. Needless to say, the impact of the social and cultural aspects of these issues must also be taken into account.

In fact the curriculum should be completely revised, though this would present enormous problems. The ideal thing would be to start with non-formal education and after a few years come to formal education. This should first be done on a local level - as we have done successfully in Brazil - and then enlarged to the national level. Women are extremely important and not only because they are the ones who are most in contact with the practical applications of science and technology in daily life. Thus in women's education, the practical aspect is capital.

Science Teachers Enhancement Model (STEM)

New York, USA

The Science Teachers Enhancement Model (STEM) is an umbrella project encompassing four distinct models for enhancing the teaching and learning of science in New York City: the Mathematics and Science Teachers Enhancement Program (MSTEP), the Science Literacy Improvement Program (SLIP), the Teacher Opportunity Corps (TOC), and the Professional Development Lab (PDL).

The primary goal of STEM is to foster an increase in the performance, participation and retention of students in K-12 science in accordance with New York State's student performance standards. The STEm program offers comprehensive, customized inservice training for science teachers and affords them the opportunity to contribute to the development, implementation, evaluation and dissemination of model instructional and lab activities both in print and multimedia formats. STEM's training and activity development are guided by recent research in teaching and learning. Strong content is aligned with State content standards is combined with effective pedagogy and strategies for incorporating recently developed technology into teaching while integrating techniques, methods and practices for meeting the needs of diverse student populations.

STEM targets in-service, uncertified and out-of-license science teachers from public elementary, middle or senior high schools and trains them to be responsive to the special learning needs of female, minority and at-risk students. It involves collaboration between the School of Education and the college of Arts and Sciences at New York University, four New York City Community School Districts, the Professional Development Lab and the Teacher Opportunity Corps.

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Science Across the World

Science Across the World, a global alliance of four regional initiatives: Science Across Africa, Science Across America, Science Across Asia-Pacific and Science Across Europe, is an international programme devoted to the promotion of better understanding of key international issues among students and teachers. The programme encourages 14-19 year olds to investigate common science-based themes and to exchange results, ideas and perspectives with their counterparts throughout the world. Using science and environment studies as a starting point, international teams of science educators have developed a range of teaching units which have been translated in 16 languages. Each unit contains background information on the topic covered, teachers’ notes, student pages, maps, data, registration and information-exchange forms. The programme aims notably to:

- broaden students’ understanding of global scientific and environmental issues
- raise awareness of different perspectives and ways of life as well as of the effects of science and technology on society, industry and the environment
- provide a platform for schools in different countries for collaboration on a range of exciting projects and opportunities for teachers and students to develop their communication skills
- encourage and develop local links between school and industry
- Already, 300 schools in 22 European countries and 500 schools and 1,000 teachers in 14 Asia-Pacific countries are participating in this programme which is the only cross-country science initiative for African students.

Centres, Networks...

Petnica Science Center

Yugoslavia

The Petnica Science Center (PSC) is a non-governmental institution which was founded in 1982. The main goal of the Center is to identify gifted and motivated boys and girls - mostly in the 14-18 yr. group - interested in science. It has gained international recognition for its innovative methods in science education as well as for results in extra-curricular education. Its young staff, supported by a multitude of scientists and teachers, uses flexible programmes and interactive teaching methods eschewing rigid discipline and classic notation systems.

Every year the PSC offers over 100 different programmes - including seminars, workshops, science camps, courses-to over 400 high schools and about 1,600 elementary schools in Yugoslavia and abroad. More than 2,400 students and around 500 guest teachers, scientists and lecturers take part in the programmes encompassing science and technology disciplines such as physics, astronomy, biology, chemistry, mathematics, electronics and computer science. The Center comprises seven buildings for various purposes and can cater for up to 100 participants. It is equipped with modern instruments, teaching tools, laboratories and a library. Its programme is run by a team of 20 young professionals, who are in constant contact with over 1,000 scientists and virtually every Yugoslav scientific Institute and university. Design, implementation and evaluation of the educational programmes is carried out by invited external scientists.

In 1996, a total of 110 programmes were out at summer camps. Students participating in the activities of the Center came from Macedonia, Slovenia, Croatia, the Netherlands, Austria, Bulgaria, Greece, Hungary, Russia and Yugoslavia.

Concerning gender, it is important to note that without specially favouring girls’ participation, the male-female ratio at the Center has always been very balanced. Although until 1995 the ratio had been very slightly in favour of boys, in 1996 the tendency was reversed with girls representing 51.1% of the total participants.

Centres, Networks...

ENvironment JEUnesse (ENJEU) Network

Canada

ENviroennement JEUnesse (Environnement & Youth) is a Quebecois network of youths, groups and those active in EE. Its main objectives are the following:

- To promote the conservation and improvement of the environment along with the quality of life
- To develop qualities in youth that lead to social commitment and teach them
DOING IT & TELLING IT

Seed Savers’ Network
Australia

Seed Savers’ Network is a non-profit, community based organisation founded in 1986. Its principal aim is to preserve agricultural biodiversity through community education and a grass roots network of farmers, gardeners and community groups across Australia, the Pacific and South East Asia. Other notable objectives are:

- Local seed production using local knowledge and varieties
- Access to a wide range of useful plants for small sustainable agricultural systems including urban food production leading to domestic food sovereignty
- Environmentally sensitive small-scale community development based on the sustainable management of local resources

Major activities include:

- Establishing national and local community-based seed networks of useful plants as well as seed-banks and field banks for non-hybrid locally adapted varieties
- Gathering and recording data on the varieties in the networks and seed banks for easy public access, research and exchange
- Education, training and technical assistance in all aspects of seed saving, banking and networking for community development projects
- Promoting and publicising the need to conserve useful plants through the media, meetings and conferences, as well as through publication of newsletters
- Seed Savers’ Library holds over 800 ethnobotanical books, old seed catalogues, national and international journals and a constantly updated data bank of letters accompanying seed donations.

Its future plans include:

- Establishing and upgrading Seed Savers’ preservation gardens
- Establishing a training centre for community seed banking courses and internships and extending it to other regions
- Inputs to education programmes in Australian schools
- Development of training videos
- Applied research and information gathering
- Publication of handbooks and booklets

For further information contact:
ENvironnement JEUnesse (ENJEU),
4545, Pierre-De Coubertin,
CP 1000, succursale M, Montréal,
Québec, CANADA H3R 2W1.
Tel: (514)252.3016
Fax: (514)254.5873

Seed Savers’ Network
India

Place: 10 villages in Narikudi Block, Kamarajar District, Tamilnadu.

Target Groups: Boys and girls aged 8-16 of which 150 school-going and 150 non school-going, including cattle herders, agricultural workers, brick workers etc.

Introduction: Rural Indian children suffer notably from a lack of information on the environment. EE and communication are thus vital in making them environmentally literate so as to allow them to explore their environment, to develop positive attitudes and acquire the skills and motivations for active participation in identifying and solving environmental problems in view of sustainable development.

Objectives: Overall: to formulate a procedure for implementing an EE and communication programme for rural children.

Specific: to assess the effects of various methods of communication on environmental awareness among children and the level of participation of children in the programme; and to understand their level of

For further information contact:
Michael and Jude Fanton,
The Seed Savers’ Network, Box 975,
Byron Bay, NSW2481, Australia.
Tel/Fax: 16 1-066) 856.624
E-mail: seedsave@om.com.au

Doing it & Telling it
EE & communication project for rural children

India

Place: 10 villages in Narikudi Block, Kamarajar District, Tamilnadu.

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knowledge of children in the pre- and the post-programme phases.

**Resources:** Experts on specific topics for lectures, training courses and demonstrations. Funds were provided by the International Development Research Centre, Ottawa, Canada.

**Methodology:** The programme comprised:
1) EE classes
2) media intervention
3) field study and exposure visits,
4) participatory training.
A project coordinator was recruited along with field investigators, research associates and rural female environmental educators. A curriculum covering various environmental issues was designed and a training manual was developed. Children’s EE centres, equipped with learning and play materials, were established in selected villages from each of which 30 children were enrolled. Various teaching/learning strategies and media approaches were used. Lectures, practical demonstrations, model experiments, films shows, audio/video presentations, slide projections and displays were organised together with competitions and street plays. Printed materials such as booklets, picture cards and posters were collected from local governmental organisations and distributed to the children.

**Evaluation:**
1) Basic scientific attitude measurement with statements itemised on a scale: Agree, Uncertain or Disagree, which were distributed to the children before the start of the programme.

2) EE evaluation through statements covering the curriculum distributed before and after the programme to resource persons; environmental communications distributed to the children; and on communication effectiveness meant for the educators.

**Results:** Both the evaluation and the significant difference in the attitudes of the children before and after the programme showed a high level of satisfaction on the part of both educators and the children. The success of the programme has led to its replication in Therkutheru, Melur Taluk, with the financial support of DuPont South Asia Ltd.

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**Eco-Grow Planting Activity**

**Belize**

**Place:** St John’s Junior College Campus, Belize City.

**Target Groups:** Young adults (16-20) and faculty at St John’s Junior college.

**Introduction:** Belize is a country with some of the most productive and diverse ecosystems such as the coral reefs, mangroves and rain forests, yet there is little knowledge or even appreciation for its environment in its current state. Eco-Grow was established in January 1997 to increase awareness and appreciation of the environment – particularly the flora – and also to enhance the appearance of the campus. By acting on their newly attained environmental knowledge, skills and appreciation, Eco-Grow aimed at changing attitudes of Belizeans by beginning at school.

**Objectives:**

- To stimulate environmental action, particularly in young adults who will be in a position to protect the Belizean environment in the near future
- To encourage the school community to be involved so that more people can appreciate the usefulness, fragility and beauty of plants
- To beautify the college campus with local flora

**Resources:**

- **Human:** Students and teachers of the college; volunteers and landscaping advisers from the community.
- **Material:** 250 plants' of different species; monetary support from the administration; planting tools from most participants; donations from community members and students.

**Methodology:**

Students chose the most pressing problem they were encountering and then proceeded to discuss and meticulously plan on how to deal with it. They sought solutions to the problem and then conducted research about their project.

This included information such as the types of soil in the area, types of flora that would naturally grow there as well as technical experts who would be able to provide assistance. They created plans which they adhered to and carefully implemented.

**Evaluation:** This was done by the lecturer at various stages of the implementation of the project such as planning, planting and maintenance.

**Results:** A large number of students got involved by providing assistance during the planting stage. Six areas were improved and the plants are thriving and have indeed beautified the campus.

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Readers are invited to send us their **FIELD experiences in Science, Technology & Environmental Education (STEE) activities involving the teaching/learning process** - but not necessarily limited to students and teachers. They should be **as brief as possible** and set under the following headings:

- **Place:** Locality where the activity was carried out
- **Target Groups:** For whom the activity was intended
- **Introduction:** Background information – reasons for initiating the activity
- **Objectives:** What was the activity expected to achieve?
- **Resources:** Materials/funds needed for the activity
- **Methodology:** The way in which the activity was carried out
- **Evaluation:** How was the activity judged? By whom?
- **Results:** Did the activity produce any concrete changes in the target group(s)?

Selected experiences will be published with the name and address of the author. Please address your contributions to: **Doing it and Telling it** (address on last page)
The Council for Environmental Education (CEE), a registered charity whose aims are to influence policy, promote good practice and increase the effectiveness and coherence of the EE movement, has been asked by the British Government's Department of the Environment, Transport and the Regions to develop a code of practice for sustainable development education materials. The code will set out principles for promoting good practice in the production of materials in all media including CD-ROMs, teaching packs, books and videos designed for use in England. There is general agreement that:

- materials should distinguish between facts and opinions
- they should prepare young people to think for themselves and help them to identify and handle issues
- resources should fulfill an educational need, not just be a vehicle for the views of the producer or sponsor

As well as the content of materials, the code will cover such issues as avoiding duplication and the environmental impact of the resource.

For further information contact: Christine Midgley, Head of Information, Council for Environmental Education (CEE), University of Reading, London Road, Reading RG1 5AQ, U.K. Tel: (44)0118-975-606 1 Fax: (44)0118-975-6264.

**Forests in Focus** is a project comprising seven international and interdisciplinary fora organised within the framework of the project "Weltforum Wald" (World Forum on Forests) itself part of the World Exposition EXPO 2000 Hannover dedicated to the promotion of sustainable development. **Forests in Focus** aims at achieving consensus among relevant interest groups on recommendations for action to support the conservation, environmentally sound use and sustainable development of all types of forests. It will provide a platform for specialists in politics, economy and science as well as the public to discuss ways and means to achieve a sustainable co-existence of humankind and forests through operational proposals for action. Presentations of model projects as well as exhibitions have been foreseen to stimulate personal initiative and local implementation. The seven fora are entitled: Forests and Energy, Biodiversity, Vegetation in the Forests, Forests and Atmosphere, Water, Soil, Forests - Source of Raw Material, Forests and Culture, Forests and Society. The first forum Forests and Energy was held in Shneverdingen, Germany, 16-20 January 1998 and the final event will be the presentation of the results of the entire series at the EXPO 2000.

For further information contact: Dr Birgit Grüsser, Agentur für Kultur, Ökologie und Kommunikation, Bodenstrasse 88, D-30161 Hannover, Germany. Tel: +49-511-90982-1 1 Fax: 90982-20 E-mail: Dr.Birgit.Gruesser@online.de

A new training initiative in rural and regional resources planning has been launched by the University of Aberdeen. **Rural Environmental Management** aims to produce professionals capable of implementing more environmentally sustainable forms of rural development. It builds on the principles which govern the functioning of natural ecosystems and the theoretical underpinnings of contemporary rural development and analyses the nature of environmental policy at different spatial scales and in different sectoral contexts. A key component of the course is the applicability of a range of environmental management instruments and integrated rural and environmental management strategies and plans at local, national and international scales.

**European Rural Development** aims to provide a clear understanding of the main features of rural development in different types of rural areas within the European Union. An in-depth appreciation of the forces leading to rural diversity in the context of globalisation, a working knowledge of the development and implementation of the main EU policies affecting rural areas, and the skills required by contemporary rural practitioners are key elements of this programme.

For further information contact: Prof. Brian Cark (Tel: 01224-272.353) or Alison Ramsay (Tel: 273.7781, Public Relations Office, University Office, Regent Walk, Aberdeen, AB24 3FX, Scotland, UK. Fax: 01224-272.086.

A written report of the European Multi-media, European Education and Training Project MEET (v. Connect, Vol. xxii, no. 1, 1997) is now available. Contact: Prof. Walter Leaf/Elings, MEET Coordinating Office, University of Lüneburg, Schnorhorstr. 1, D-21332 Lüneburg, Germany. E-mail: meet@uni-lueneburg.de

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**Conferences/meetings, workshops/courses...**

The International Centre for Conservation Education (ICCE) has announced for 1998 the following training courses in EE and Communication: **Visions and Visuals** (5 May - 26 June) emphasising production of educational materials; and **Awareness to Action** (21 September - 30 October), a course accredited by the University of Bath. For further information contact: The Training Coordinator, International Centre for Conservation Education, Dept TRS, Greenfield House, Outing Power, Cheltenham, GL54 5TZ, UK. Tel: ++(0)1451-850777 Fax: ++(0)1451-850705 E-mail: icce@compuserve.com

The Instituto Superior Pedagógico "Juan Marinello" has announced the **IV International Workshop on EE**, Matanzas, Cuba, 2-6 June 1998. For further information contact: Lic. Raúl Dominguez, ISP "Juan Marinello", Carretera de Cidra km 2.5, Matanzas, Cuba. CP 40100. Tel: (53-52)9-2489 Fax: 5-3393.

Government Institutes will hold two courses in Washington, DC, USA: **European Environmental Laws and Regulations** (4-5 June 1998) and **Far East Environmental Laws and Regulations** (10-11 June 1998). For further information contact: Government Institutes, ATT Brenda Kibler, 4 Research Place, Suite 200, Rockville MD 20850. Fax: (301)922-1003 E-mail: gin-go@govinst.com

International Symposium on Environmental Management in the Mediterranean Region, Antalya, Turkey, 18-20 June 1998. For further information contact: Prof. Güney Kocasoy, Bogazici University, 80815 Bebek, Istanbul, Turkey. Tel: (90) 212-263.15.40 Fax: 265.1800 E-mail: envs@boun.ed.tr

16th International Congress on Acoustics: **Sound of the Future**:
a Global View of Acoustics in the 21st Century, Seattle, Washington, USA, 20 - 26 June 1998. Contact: ICA/ASA '98 Conference Secretariat, Applied Physics Laboratory, 1013 NE 40th Street, Seattle, WA 98105-6698, USA. Tel: 206-543-1275 Fax: 206-543-6785 E-mail: ICA-ASA98@ap.washington.edu

Science Teacher Training 2000, an international conference for science teachers, organised by the joint European Project TEM-PUS (Phare), Banská Bystrica, Slovak Republic, 21 - 26 June 1998. Contact: Jan Klima, Physics Dept., Faculty of Natural Sciences, Matej Bel University, Tajovskeho 40, 97400 Banska Bystrica, Slovak Republic. Tel: (421-88)345.53 Fax:331.32 E-mail: stt2000@fhv.umb.sk

On the Threshold, 4th International Symposium on Technology Education and Training. Cape Town, South Africa, 27 June - 1 July 1998. Contact: Prof. N. Beute, WFTO Symposium on Technology Education & Training, Cape Technikon, PO Box 652, Cape Town, 8000 South Africa. Tel: +27(21)460.3151 Fax: +27(21)454940 E-mail: nbeute@norton.ctech.ac.za

Management of the Rural Environment: Cooperation or conflict, Twelfth Annual Conference of Caretakers of the Environment International, Ireland, 28 June - 5 July 1998. More information from: Andrew Cox, Caretakers of the environment, c/o Newtown School, Waterford, Ireland. Fax: (353) 051-71928 E-mail: NitfsWtfd@ol.ie

Technology Education: The Sloyd tradition of UNO Cygnaeus in the modern world. Jyväskylä, Finland, 4-8 July 1998. Contact: Dr J. Kantola, PO Box 40357, Jyväskylä, Finland. Fax: +358-14-60 160 1 E-mail: jkantola@campus.jyu.fi

The third conference of the World Federation of National Mathematics Competitions will be held in Zhong Shan, China, 22 - 27 July 1998. More information from: Ali Rejali, School of Mathematics, Isfahan University of Technology, Isfahan, 84 156 Iran. Fax: (98) 3 1-891.26.02 E-mail: A_Rejali@vax.ipm.ac.ir

1st International Conference on Children's Health & the Environment organised by the Dutch Association of Environmental Medicine, Amsterdam, The Netherlands, 11-13 August 1998. Further information from: Conference Secretariat ICCHE '98, c/o WAA Conference Service, PO Box 8153, 3503 RD Utrecht, The Netherlands. Tel: +31-30-247.44.50 Fax: 247.46.47 E-mail: congres@vwa.nl

The International Centre for Conservation Education (ICCE) has announced a training course, Awareness to Action (21 September - 30 October 1998), accredited by the University of Bath. For further Information contact: The Training Coordinator, International Centre for Conservation Education, Dept TR8, Greenfield House, Quiting Power, Cheltenham, GL54 5TZ, UK. Tel: ++(0) 1451-850777 Fax: ++(0)1451-850705 E-mail: icce@compuserve.com

BIOTUR 98, 1st International Seminar on Biodiversity and Tourism, Playa Esmeralda, Holguín, Cuba, 22-28 October 1998. For further information contact: Manuel A. Fernandez, ICE, Universidad de Santiago de Compostela, plaza de Mazareros, s/n, 15703 Santiago de Compostela, Spain. Fax: (98)34.89 or Parque Nacional Bahía de Naranjo, Carretera a Guardalavaca, Rafael Freyre, Apdo Postal 007, Holguín, Cuba. Fax: (53-24)30.126/30.065/30.035.
Books, Reports, Resource Materials...


OUTREACH has published a new resource pack on Energy. Meant for educators from Africa, Asia and Latin America, the pack is divided into three parts: I. Work, Waves and Currents; 2. Animal and People Power, Biofuels and Conservation; 3. Energy from the Sun, Wind, Water and the Earth and consists of “Learning-by-Doing” leaflets devoted to a topic containing an explanatory introduction followed by a certain number of simple educational activities. The aim of the leaflets is to provide students with a systematic knowledge of natural science in order to empower them to make useful innovations in energy technologies. They address some of the most pressing energy issues in the developing world and offer some possible solutions in the form of appropriate energy technologies. For further information contact: Ms Gillian Dorfman, OUTREACH Editor, TVE USA, PO Box 820, Sherbourne, VT 05482, USA. Fax: (1)802-985.2011 E-mail: tvusa@together.net

Open University Press has published a number of interesting books on school level science, technology and mathematics education, notably Mentoring for Science Teachers (128 p., f12.99 p.b.), Assessing Technology - International Trends in Curriculum and Assessment (192 p., f14.99 p.b.), Experiencing School Mathematics (160p., f13.99 p.b.) and Explaining Science in the Classroom (160 p., f13.99 p.b.). For orders/further information contact: Open University Press, Celtic Court, 22 Ballmoor, Buckingham, MK18 1XW, U.K. Tel: +44(0) 1280-823388 fax: 823233 E-mail: enquiries@openup.co.uk

Earthscan has published two new books of interest: 1) Exploring Europe’s Environment, a multimedia resource for schools which includes Teachers notes and disks and covers four key themes in a mixture of text, maps, photographs and statistical data: water and rivers, coasts and seas, forests and urban areas (130 p. + disk, f18.95 p.b.) and 2) Education for Sustainability providing an overview of the theory and practice of the issues with perspectives on the philosophy, politics and pedagogy of education for sustainability along with useful case studies and examples of good practice (256 p., f15.95 p.b.). Contact: earthscan, FREEPOST J 120, Pentonville Road, London N19BR, U.K. Tel: 44(0) 171-278.0433 Fax: 278.1142 E-mail: earthinfo@earthscan.co.uk

Towards an Environmentally Sustainable Transport System (52p., SEK 100) is a report of the Swedish EST project involving 11 public authorities and trade organisations. It presents a holistic view of the problem putting responsibility and cooperation at the centre of all effort to get to grips with the environmental effects of traffic. Order from: Naturvårdsverket, SEPA, Customer Services, S-10648 Stockholm, Sweden. Fax:+46-8-698.15.15 E-mail: kundtjanst@environ.se

Youth Action and the Environment (240 p., f13.45) is a collaborative effort by Alan Dearling and Howie Armstrong and the Council for Environmental Education [CEE] and is meant for everyone who works with young people - as well as young people themselves. It contains a wealth of thought-provoking, practical and engaging projects, examples and case-studies covering:
• Conservation and reclamation projects, games, arts, animation work
• Agenda 21 initiatives, problems and solutions, options for participation and involvement, taking direct action
• Human rights issues, homelessness, unemployment, war, poverty

Global and international issues and actions
Also contains examples of innovative practices in the natural and built environment collected from UK, Europe and beyond easily adaptable for use in local communities. For further information contact: Russell House Publishing Ltd, 4 St George’s House, The Business Park, Uplym Road, Lyme Regis, Dorset DT7 7LS, UK. Tel/Fax: +01297-443948.

Wetland Mitigation (305p., f75) is a guide containing everything you need to know about evaluating, selecting, negotiating and implementing the various mitigation measures available to avoid, minimize or compensate for land use development impacts on wetlands. Industrial Environmental Management: A Practical Handbook (600p., $79), the first book to cover “nuts and bolts” technical and management aspects of environmental compliance with the basic regulatory issues. Recycling and Waste Management Guide to the Internet (200 p., $49 + mail) containing summaries of over 300 World Wide Web sites covering a range of subjects including water management, waste
Journals, Magazines, Newsletters...

Owing to problems posed by printing and distribution costs, it has been decided to continue the International Newsletter on Chemical Education (INCE) as an electronic publication. It will henceforth concentrate more on notices and reports of meetings, conferences and other events in addition to featuring short articles of direct interest to the chemistry educator. INCE will appear on the shortly to be set up IUPAC Web site. For further information contact: Stuart W. Bennett, Dept of Chemistry, Open University, Milton Keynes MK7 6AA, U.K. E-mails: w.bennett @open.ac.uk

**Enviro**, No.22, June 1997, is a special issue devoted to Agenda 21 in Sweden containing articles on various Swedish initiatives in and out of Sweden in keeping with Agenda 21 goals, the Baltic States initiatives for a joint plan of action for sustainable development as well as a short list of Agenda 21 contact addresses. For copies contact: Swedish Environmental Protection Agency (SEPA), S-106 48 Stockholm, Sweden. Tel: +46-8-698.1 0.00 Fax: 6984.14 E-mail: pth@environ.se

**Ecologue XXI**, whose aim is to promote communication of environmental news, publishes a bimestrial magazine containing over 200 articles from the international press grouped thematically. Also contains surveys, innovations and publications. French only. For conditions of availability contact: Ecologue XXI, BP 8, 11200 Fabrezan, France.

The Journal of Ecobiology is an international quarterly devoted to scientific research on environmental biology. Its scope covers all aspects of environmental interaction with the animal and botanical world. The Journal of Ecotoxicology and Environmental Monitoring deals with the mechanisms and assessment of toxicity in aerial, aquatic and terrestrial environments and measurement of response at various levels from the molecular to the community and the ecosystem. For conditions of availability contact: Palani Paramount Publications, 69D Anna Nagar, Palani 634602, TamilNadu, India. Tel: (04545) 42332.

Dear Sir,

ENFOSAL, the Environmental Foundation for Sierra Leone, is a charitable, non-governmental organisation. It was established in March 1992 and is working to repair the widespread damage to the environment in Sierra Leone in two ways: by spreading public awareness of environmental issues and the importance of community participation in environmental conservation through education and training; and by developing schemes of and reclamation with local and other partners to restore a basic means of livelihood for future generations.

Sierra Leone, as you probably know, is a small West African country of 4 million people situated in the tropical rain forest belt. This once mineral-rich country however, is now only a shadow of its past with the forest cover reduced from 80% of the total area in the 1930s to only 5% in 1995. Mining as well as exploitation of forest resources have contributed to serious environmental problems, which could lead to a catastrophe in the near future.

In 1994, the leading government agency for environmental protection, after several consultative seminars and workshops published a National Environmental Action Plan which outlines in detail the prevailing environmental problems in the country and the underlying causes of these problems. It also recommends the necessary legislation and actions for a better environment and highlights the importance of NGOs such as ENFOSAL and other community based organisations in this process. However, most efforts have been strained due to lack of funding for the required actions, and the lack of information on the precise nature and the extent of the environmental problems in the country.

To enable ENFOSAL to adequately address one of its main goals, i.e. raising awareness, there is an urgent need to develop a pictorial catalogue of the precise nature and extent of the country’s environmental problems and of activities currently being undertaken to address these problems. Since November 1996, ENFOSAL possesses a national office base and a training and resource centre equipped with a range of modern audio-visual equipment, a selection of books, pamphlets, articles, charts and videos as well as a permanent display of photographs of the country’s beautiful landscapes together with horrific scenes of deforestation and degradation.

In order to increase the quality, scope and effectiveness of our education programmes and most of all to adequate cope with the growing demand for our EE resources/services, we intend to provide training opportunities for our staff as well as to stock a very good selection of books, videos, posters, magazines and...
any other materials that will assist us in reaching as wide an audience as possible. We would appreciate any assistance in helping us achieve our goal. Sincerely,

Christopher Garnett, Education Coordinator, ENFOSAL, PO Box 34, 3B Babadorie Lumley, Freetown, Sierra Leone. Tel/Fax: 00-232-22-23234 7.

Dear Sir,

I am a Lecturer in Biology in a college located in an underdeveloped area where the majority of the inhabitants are tribals. The tribal lifestyle being closely associated with forests, tribals consider the forest as their “foster mother”. However, over-exploitation of natural resources and over-simplification of natural processes has made the local environment unsuitable for the very existence of many valuable life forms. The causes, besides ignorance on the part of the tribals, are manifold: massive industrialisation, construction of roads, dams..., in other words, development without due regard for the environment. But the tribals have recently been awakening to the long term benefits to be derived from the protection and conservation of their environment. And I would like to trigger motivation in the youth for the preservation of nature through information and awareness before the arrival of any natural catastrophe. For this purpose, I would welcome documents, reports, posters etc. on related subjects. Sincerely,

Deepak Kumar Patnaik Lecturer, At, Pajariput Street, PO/Dist. Koraput 764 020, Orissa, India.

If you have something concerning STEE to communicate to us, information, suggestions, opinions, ideas on events or even the articles in Connect, write to us - briefly, The most interesting letter(s) will be published, in substance, with the sender’s name. Send your letters to viewpoint, address below.

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**International Congress on Water**

Beirut, Lebanon, 18-20 June 1998

Under the high patronage of the President of the Lebanese Republic and the auspices of UNESCO, The Saint-Esprit de Kaslik University (Lebanon) and the Aix-Marseille University of Law, Economics and Science (France) are organising an International Congress on the subjects: **International Law and Comparative Law on International Watercourses and Education for a shared and protected Water Culture**.

The Congress aims to study the educational resources required to raise awareness worldwide about the shortage of usable water resources; highlight the legal principles applicable to international watercourses and promote a strategy to develop a culture of water sharing contributing to a culture of peace. Concerning the educational aspects the aim will be to outline current trends and underscore the importance of integrating formal and non-formal education on water issues at all levels. On the legal front, analysis will be made of the present situation, trends and conditions for success. On the basis of legislation on international watercourses, an attempt will be made to define resources necessary for applying and abiding by water law based on the sustainable management of a world heritage.

For further information and registration contact: **Institut Universitaire International de l’Eau, Universite de Droit, d’Economie et des Sciences d’Aix-Marseille, 18, rue de l’Opéra, 13621 Aix en Provence, France. Tel: 33-4-42.38.20.81 Fax: 42.38.28.98. E-mail: jean.vergne@presidence.u-3mrs.fr or Universite Saint-Esprit de Kaslik, B.P. 446, Joumiel, Lebanon. Tel: 09-640664 Fax: 642333 E-mail: KHAL/FEA @cyberia.net.lb**

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**Connect**

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**Editorial Board:**


Editor: D. Bhagwut.

**UNESCO/ED/SVE/STE, 7, place de Fontenoy, 75352 Paris 07 SP, France. Fax: (33-1) 45.68.56.26.**

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**Save trees.**

This issue is printed on recycled paper not retreated with chlorine. Connect is also published in French as Connect, in Spanish as Contacto, in Russian as Kontakt, in Arabic as Arrubah, in Ukrainian as Kontakt, in Chinese as Lianjie and in Hindi as Sampark. Connect is free. Reproduction of its contents is not only permitted, it is solicited and encouraged; please send clippings, if used.

(Opinions expressed in the newsletter are those of the authors and do not necessarily reflect those of UNESCO)