INTRODUCTION

The pursuit of sustainable development and environmental conservation policies, objectives and targets requires the public to be sufficiently sensitized about the multiple dimensions of environment and development. Awareness and understanding of environmental issues provide the basis and rationale for commitment and meaningful action towards environmentally sound and sustainable development.

This chapter provides an overview of developments in environmental education, information, awareness and training in the Asian and Pacific region during the 1990s. The trends and patterns in environmental education in formal and non-formal sectors, and initiatives and programmes that have been undertaken by governments, non-governmental organizations, communities and by regional and international organizations are also identified. The underlying needs for environmental education, information and communication are also discussed with a particular emphasis on the constraints and key issues that need attention.

ENVIRONMENTAL EDUCATION

A. Main Trends and Conditions

Education has been identified as a critical driving force for change in the Asian and Pacific Region, and countries and regional organizations have adopted a range of strategies for implementing programmes in environmental education (Fien 1999a). The overall trends in environmental education information and communication in the region reflect the concerns of people and societies in transition.

Environmental education is now being seen as an instrument and a process that enables participation and learning by people of all ages, based on two-way communication rather than the old paradigm of a one-way flow of information, from teachers to pupils. The content and substance of environmental education is also undergoing review and change. Reorienting education as a whole towards sustainability involves the various levels of formal, non-formal and informal education at all levels of society. Environmental education has developed within the conceptual framework that emerged from the first international conference in Tbilisi (1977) and is now seen as education for sustainability. This allowed environmental education to address the broad range of issues and concerns included in *Agenda 21* and others which evolved through the meetings of the Commission on Sustainable Development (UNESCO 1997).

The key international conventions on environment place a high value on public awareness, education and training and obtaining information through monitoring as essential elements for the success of the conventions. For example, the Convention on Biological Diversity, emphasizes the importance of public education and awareness through promoting and encouraging measures required for the conservation of biological diversity. Since the convention came into force in December 1995, the contracting parties (countries) have been motivated to address issues related to education and awareness on biodiversity.

In addition countries in the region recognize the immensity of the challenges they face, and of the vital role that environmental education can play in meeting these challenges. There is a growing perception by governments of the need to integrate environmental education information and communication into the country's on-going programmes. As a result of the *Agenda 21*, the level of cooperation and collaboration between environmental and the educational institutions has increased. In some countries, governmental environmental agencies have statutory requirements to engage in activities related to environmental education and awareness. For example, the Malaysian Department of Environment has established an educational division under the Environmental Quality Act, which is actively engaged in promoting and implementing a variety of activities.

In many countries of the Asian and the Pacific Region environmental topics have been included in education courses, through integrating environmental concerns in other subjects and through specific courses for the environment. Government, NGOs, educational institutions and media have undertaken some serious efforts to meet the growing environmental challenges by promoting environmental education, information and communication in their respective countries. Activities such as green bank, green press, eco-lubs, eco-polies, eco-farming and eco-harvesting; are emerging in the region. Special economic incentives (such as subsidy, tax-exemption and other incentives) are provided to schools in some countries where environmental education courses are offered.

There is greater recognition of the role of NGOs and civil society organizations, and the need for meaningful community participation in debates and action programmes aimed at education and training for sustainable development. NGOs and governments are increasingly working together, reinforcing each other's strengths and outreach. Linkages between governmental institutions and

NGOs are improving in most countries of the region, and in some cases, governments are actually depending on mature and experienced NGOs to promote environmental awareness, communication, and training activities (See Chapter 14).

B. Formal Environmental Education

Environmental education is increasingly a prominent part of primary, secondary and tertiary education in Asia and the Pacific. The formal education sector plays a vital role in environmental education and awareness by exposing the younger generation to the information, issues, analyses and interpretations on environment and development.

A number of factors have influenced the development of environmental education in the region. The two over-arching factors are national education policy and national environment and population policy. These policies are a reflection of national cultural values, priorities and socio-economic goals in most countries. The national environmental education policy is usually the result of decisions made in these broader fields (UNESCO-PROAP 1996). For example, environmental education in Australia has seen two major shifts since 1970s. First, there has been a distinct move away from nature and science-based environmental education to a concern with the social, economic and political aspects of sustainable development. There has also been a major shift from schools to adult and community environmental education. (Fien 1999b).

Rather than establishing a new subject, most countries have opted to infuse environmental education objectives and strategies into the existing curricula, while some other countries practice both options. In addition, the focus on practical learning in the real world in environmental education helps schools to address important general educational objectives related to values and to skills development (UNESCO-PROAP 1996).

Nationally determined syllabi often provide for a coordinated programme of environmental topics in both primary and secondary schools in countries of the region. However, there is some lack of coordination at different levels of education in the national framework, which prevents the development of a comprehensive environmental education programme.

1. Primary and Secondary Levels

The diversity of approaches in primary and secondary education seen across the Asian and Pacific Region are based on each country's major and threatened resources, and issues of concern. For example, in the Maldives, environmental education and awareness programmes highlight issues of the marine environment emerging from the National Environment Action Plan of 1989 (IUCN 1998). Whereas in Nepal, the national goals of education are to teach thoughtful protection and wise use of the natural environment and national heritage. In Nepal, the general need of environmental protection from specific problems resulting from population pressure on natural resources, and the links between environment, population and natural resources, were addressed in the environmental education plan (IUCN 1998).

In Republic of Korea, during the 1990s, "Environment" and "Environmental Science" were included in the middle school curriculum as separate courses, attributing to the common understanding that environmental education for young children was the most important means to solve persistent environmental pollution (Kang 1999). In order to raise young people's awareness of environmental preservation, and to cultivate environmental perspectives, the Republic of Korea designated 63 schools as demonstration environmental schools from 1985, and has disseminated their best practices to an additional 26 schools in 1999. These schools are now eligible for subsidies and environment-related educational materials (Green Korea 1999).

In People's Republic of China, environmental education is coupled with the working schedule of public agencies and educational institutions. This was formalized by a regulation issued by the National Bureau in the Conference of National Environmental Education in 1992. At pre-school and primary levels, environmental education is carried out through games, audiovisual means and the study of natural systems. In secondary schools, environmental concepts are infused into the courses of physics, chemistry, biology and geography. At the same time, the teachers use local examples to help develop environmental understanding among the students (UNESCO-PROAP 1997).

In small island countries of the South Pacific subregion, considerable effort is directed towards infusion of environmental education into various subjects within the primary and secondary school systems. The syllabus for the secondary level has a strong emphasis on environmental studies, developed either independently, as in the Solomon Islands and Papua New Guinea, or in collaboration with the South Pacific Regional Environmental Programme, SPREP (Ravuvu 1998).

2. Tertiary Level

Tertiary level education has responded to the increasing demand for environmental managers and

experts in the 1990s. Key trends have been observed across the region in relation to environmental education at tertiary level these include:

- basic environmental concepts and elements added to existing courses at undergraduate and postgraduate levels, for all students irrespective of their courses;
- new environmental units or modules introduced into a large number of courses at undergraduate and postgraduate levels, thus increasing the depth and detail of environmental study;
- new non-degree programmes and courses (at foundation, certificate or diploma levels) introduced by tertiary education institutions to cater to the demand for in-service training and upgrading of knowledge and understanding on environmental issues and practices;
- an increase in the publication of relevant textbooks and audio visual material;
- greater emphasis on training the trainers, and in strengthening the tertiary education system and research capabilities;
- more research on environmental education policies and practices;
- a greater dialogue and information exchange between the users of environmental skills and talent, in government, private and NGO sectors etc., and the institutions of tertiary education, ensuring, education and training address prevailing practical needs; and
- increasing emphasis placed on adult and community education, using both formal and non-formal methods to raise the overall environmental literacy levels.

Increase in environmental studies has been a response to the market realities, and also to the growing recognition of the environmental crisis and the management options available. Countries have adopted different mechanisms to cater to their specific needs in tertiary education. For example, in Viet Nam in 1995, the Ministry of Teaching and Education made it compulsory for a course in Environment and Man to be taught in all aspects of natural sciences, social sciences, humanities, agriculture etc., with more specialized environmental science and technical courses in other university courses. Since the early 1990s, short, medium and long-term postgraduate courses for environmental managers and researchers have been conducted in various specialized centres (UNESCO-PROAP 1997).

Specialized degree courses have been introduced in Thailand, at graduate level, with compulsory course introduced and targeted to first year undergraduates. The courses raise awareness and understanding of topical environmental issues and are integrated with other courses, especially science and social science (UNESCO-PROAP, 1997).

In People's Republic of China and Pakistan, many colleges and universities have introduced environmental courses for undergraduates and postgraduates, and have also directed then towards training professionals and officials. In Mongolia, the government has prepared a masterplan for environmental education and awareness, which will cover both formal and non-formal education and communication (IUCN 1998).

However, constraints that prevent countries in Asia and the Pacific from achieving their environmental education and training needs are evident. At a UNESCO sponsored regional seminar on environmental education in 1996, it was noted: "Each country has already initiated a number of education and training programmes at the tertiary or higher level of education that are related to aspects of the environment. In various ways and to varying degrees, each of the countries has responded to the problems of the environment with environmental laws and regulations, and with associated political and institutional initiatives. However, in all countries, the development of persons with the conceptual understandings and skills that these regulatory intentions require for implementation and management lags well behind what is needed" (UNESCO-PROAP 1997).

3. Materials and Study Aids

In line with the growing interest and activity in environmental education, awareness and training, the demand for educational materials and study aids has also increased. However, the limited availability of materials may not meet individual country requirements in terms of local language, and in coverage of the most relevant issues to the country.

Many government and non-government institutions have risen to this challenge. For example, in Malaysia, the Academy of Writers was enlisted to produce storybooks that will instill environmental values and attitudes amongst primary school children. A similar initiative has been made in the South Pacific subregion where there have been several efforts to produce locally relevant environmental education material at the primary and secondary school levels.

A widely felt constraint has been the lack of standardization in textbooks and other material on environmental issues and a failure to provide the full information base. While the subject of environment can be interpreted and presented in many ways, and it can be looked at through a

scientific or cultural angle, there is a basic need to present facts accurately and discuss issues in a balanced manner. If this is lacking, the wider goals of environmental education cannot be met. An extensive review of environmental textbooks, supplementary readers and other material is required in many countries of the region as part of a process to improve their quality.

Establishment of environmental study centres has helped a great deal in developing materials and study aids for both formal and non-formal environmental education. Such centres also provide students with information, insights and practical activities, and adult visitors gain information and advice. In Indonesia, the Ministries of Environment and Education have been collaborating since 1979 in establishing Environmental Study Centres (PSLs) in all public universities. By 1997, there were more than 72 PSLs covering all 27 provinces of Indonesia. These centres perform three functions: education and training pertaining to environmental management; extension services, fostering public education and awareness; and research and surveys in support of environmental management.

The Department of Environmental Quality Promotion (DEQP) in Thailand has supported the establishment of Provincial Environmental Education Centres (PEEC) in selected schools since 1995 and are expected to expand these to every province by 2001. The main objectives are to develop environmental education materials and tools in relation to local environmental problems, and to strengthen the capability of environmental educators in all parts of the country.

4. Issues and Constraints

There are many constraints and barriers to the widespread adoption and practice of environmental education in the region. In the formal education sector, class sizes are often large and teachers lack resources and experience in interactive pupil-centred teaching strategies. School curricula are also dominated by competitive academic curricula which prioritizes end–of-course examinations and discourages the development of locally and personally relevant intellectual skills. Outside the formal education sector, environmental education is often poorly organized and resourced.

Another common constraint is the lack of clear integration of environmental education objectives and programmes with national education and environmental policies. In some countries, the absence of national policies or guidelines for environmental education has resulted in a lack of coherent strategies and long term planning. Even in those countries which do have such policies, the educational systems are often insufficiently dynamic to accommodate the evolving social, economic, political and conservation aspects of sustainable development.

The important pre-requisites for the successful introduction of environmental education in schools include: the existence of clear and well communicated policies; the political will and availability of sufficient resources for implementation; curricula revision; proper preparation of teachers through in-service training; the availability of relevant materials in local languages; networks for exchange of expertise between teachers; and adequate assessment and incentives for teachers development. It is encouraging to note that in spite of many constraints, practitioners and promoters of environmental education have found innovative ways of teaching throughout the region.

C. Non-formal Education

Non-formal environmental educational activities exist alongside the formal educational systems, at curricular and extra curricular levels, in occupational training, and through wide public awareness activities through non-formal channels such as mass media, and voluntary organizations. Different communities, institutions and individuals choose methods and practices that best suit their local needs and capacities.

1. Learning by Doing

In several countries, there are efforts to get students to relate to local problems, while understanding their global implications. In Bangladesh, an environmental education programme called *Muktangan Siksha,* or open-air education, encourages field programmes related to the surroundings and communities. In Myanmar, an imaginative pre-school and lower primary environmental programme bases its teaching on a study of the surroundings, or *patwinkyin*, without formal textbooks (Kartikeya V. 1995). In Sri Lanka, a WWF-supported innovative environmental education programme involving over 750 schools has been implementing an approach called 'greening of learning'. In this, students are encouraged to beautify the school garden, start a plant nursery or engage in other 'green' activities within the school premises. Due to its success the WWF has started introducing the same concepts and approaches in other countries, such as Viet Nam.

Research and advocacy organizations are increasingly involved in developing non-formal environmental activities. For example, Development Alternatives (DA) located in India, has launched the Community Led Environmental Action Network

(CLEAN) which promotes among school children and communities activities based on the "four r" concept: refuse, reduce, recycle and reuse (DA 1998). In several countries, government agencies or NGOs support nature clubs or environmental societies in schools as a means of encouraging and inspiring students to undertake non-formal environmental activities.

2. *Outdoor Activities*

Government agencies as well as NGOs have developed a wide array of outdoor activities that expose youth and adults to different aspects of environmental awareness, action and understanding. For example in Nepal, Environmental Camps for Conservation Awareness (ECCA), a local NGO, has been active for over a decade in organising outdoor environmental activities aimed at children, both able and disabled. These camps are held at places of environmental significance and aim to raise awareness about conservation issues, and to potential careers in conservation.

Similar environmental camps have become a regular feature in many countries. For example, in Malaysia, environmental awareness camps are regularly organized by the Department of Environment. The camps are for children between 14 and 16 years of age, at the Nature Education Centre (NEC) established in 1992 by the Malaysian Nature Society. In Singapore, the Ministry of Environment allocates small portions of the beach to volunteering schools under an 'Adopt a Beach' programme. Students are then responsible for keeping that stretch of the beach clean, and in that process learn aspects of the coastal and marine environment.

The China Association for Science and Technology (CAST) is engaged in the promotion of non-formal science education for children and youth. CAST has 165 natural science societies and is established at county level all over the country. CAST relies on its member scientists and technologists to provide the knowledge base and necessary human resources for various activities organized to promote better understanding of science, technology and environmental issues. Also in People's Republic of China, the State Environmental Protection Administration (SEPA) is playing a lead role in non-formal activities, and has introduced the Global Learning and Observations to Benefit the Environment (GLOBE) Programme, a worldwide network focusing on science and education, which brings together students, teachers and scientists in order to share information on monitoring the global environment.

In Australia, Waterwatch was established in the early 1990s as a national level, community-based water quality monitoring programme under the National Landcare Programme. Monitoring water quality on a regular basis gives communities a greater understanding of the natural environment, and may lead to action which will have local, regional or even national benefits (Palmer J. 1995). Both school children and adults participate in water monitoring activities, and government funding is provided through facilitators who have been appointed in each state attached to a lead state government agency.

3. *Innovative Approaches*

New strategies and innovations for environmental education have been developed and applied throughout the region. For example, in Singapore, the Ministry of Environment in 1996 published the 'Fun and Discovery Through Environmental Clubs', outlining environmental activities and clubs. Similar publications have been developed in Japan, India and Bangladesh.

The observation of National Environment Days and Weeks across the region, provide a focal point for environmental activities, including seminars and exhibitions. In New Zealand, school education kits on sustainable agriculture are also provided to educate young people about agriculture and to survey changes in land management and planning.

Japan, has various examples of innovative education, public awareness and training activities including, Environmental Counselor Registration System, the Environmental Activities Evaluation Programme and various campaigns for conservation of natural resources and energy. In addition to these programmes, the "Junior Eco Club programme" supported by the Environment Agency has been a very effective programme at the elementary and junior high school age children level. Club activities are supported by local governments, and a nationwide festival for the Club is organized at the end of each school year. There are about 4 000 clubs with 70 000 children in Japan and its popularity is increasing (ITO 1999).

Rising to the challenge of going beyond mere awareness raising, the Centre for Environment Education (CEE) in India has produced an exhibition package called 'Act Now'. It focuses on some actions that people can take in their everyday lives to help improve the environment. Another environmental education package produced by CEE consists of a one-hour video story in Hindi called *Dhraki*, which discusses some concepts of drought, conservation of water, land and vegetation, and the management of exotic plant species. The accompanying booklet suggests ways of developing activities that will involve children or other viewers on these issues and themes and has been used widely in classrooms, environmental camps and workshops. In response

to the lack of material the CEE has also developed the Environmental Education Bank, providing situation specific material for use in both formal and non-formal instructional situations. Such materials include physical resources like posters, kites, booklets, films, publications and a computerized database of over 800 environmental concepts, 2 500 activities and 600 case studies. The Bank is usually accessed through a five-day workshop, organized by the Centre at the request of small groups.

In Thailand, an example of innovative education and public awareness activities related to sustainable development is a Management of Science and Environment course in Hard Amra Aksornluckvittaya School, in Samutprakan Province. This project used local problems, such as a degraded mangrove, to let the student groups analyse problems systematically, searching for options and solutions and preparing work plans for action. As a result, teachers and students replanted the mangroves in the Asokaram Temple and used the area as a study site.

ENVIRONMENTAL TRAINING

Agenda 21 states that training is one of the most important means to develop human resources and facilitate the transition to a more sustainable world. "It should have a job-specific focus, aimed at filling gaps in knowledge and skill, and would help individuals find employment and be involved in environmental and developmental work. At the same time, training programmes should promote a greater awareness of the environment and development issues as a two-way learning process" (United Nations 1993).

A. Types of Training

1. Teachers in Formal Education

In a large number of countries in the region, teacher-training programmes at both pre-service and in-service levels have incorporated elements of environmental education. In general, governments of most the Asian and Pacific Region are responsible for training teachers in formal environmental education. In Malaysia, the establishment of National Institute for Environmental Skill and Training (IKLAS) is an important step forward for the Department of Environment to equip its own personnel, as well as staff of other related government agencies and private sector, with the knowledge and skills for pollution control and sound environmental management. The IKLAS is expected to be operational by the year 2001 (Malaysia Environmental Quality Report 1996). Similarly, in Thailand, the Ministry of Education has trained teachers, administrators, educational planners, and non-formal educators. In Sri Lanka, March for Conservation, a university-based NGO, has designed modules for introducing environmental concepts to primary and secondary teachers, and conducts short-term training programmes for teachers.

Regionally, initiatives for training teachers focus mainly on material development and training of trainers. *Learning for a Sustainable Environment: Innovation in Teacher Education through Environmental Education Project* is a joint undertaking of UNESCO's Asia Pacific Centre for Educational Innovation for Development (ACEID) and Australia's Griffith University. This long-term project seeks to expand the range of innovative practices used in teaching education programmes by introducing teachers and teachers-in-training to the curriculum planning skills and teaching methodologies of environmental education.

In the South Pacific subregion, teacher training in formal education is seen to be the key to the success of environmental education in schools. A teacher's guide to environmental education has been produced for adaptation by all countries. Several teacher-training workshops have been held at national and subregional level, where the teachers are encouraged to use outdoor education and investigative learning approaches.

2. Practitioners of Non-Formal Education

Training for the practitioners of non-formal education is less systematic in most countries, and on the whole fewer opportunities exist. This is partly due to the enormous diversity of professional backgrounds of the individuals engaged in non-formal environmental education activities. Most non-formal education activities are designed and carried out by NGOs or community organizations, whose large numbers and wide geographical spread makes it difficult to expose them to centralized and long-term training programmes. More effective in their case are short-term refresher courses and skills development seminars and workshops.

The Indian Centre for Environmental Education, offers a training Programme in Environmental Education for Indian and overseas participants and introduces various approaches and methods in communicating environmental messages to different target groups. The CEE in cooperation with IUCN and WWF also offers a Certificate Course in Environment Education (CCEE) as a means of in-service training for professionals already engaged in environmental education work. The Centre for Environmental Concerns (CEC) in the Philippines, offer a course that includes elements of community-

based rehabilitation technology, community-based environmental monitoring, and participatory approaches to environmental education.

In Bangladesh, the Environment and Social Development Organization (ESDO) has conducted, with the support of the Advocacy Institute in the US, several national workshops to train local activists, with examples of strategies and practices of the US counterparts. In the South Pacific subregion, organizations like SPREP and the SPC (Secretariat of the Pacific Community) have concentrated on providing communication skills for extension workers in specific fields such as fisheries, coral reef monitoring and conservation area management.

3. Training Media Professionals

Training and sensitising journalists on different aspects of the environment remain urgent needs in most countries of the region where the standards of environmental reporting are low. Even journalists and broadcast producers who are well trained in their craft face new challenges in reporting on issues related to environment and sustainable development. The technical nature of most environmental issues requires the ability to grasp these technicalities and then to interpret these in layman's terms. Many environmental stories involve the assessment of risks and the weighing of costs and benefits, all of which require experience, skill and a strong sense of balance in journalists.

In spite of a decade of heightened interest in environmental journalism in the region, the formal training courses and curricular for journalists in many countries do not as yet pay sufficient attention to the specialized needs of environmental journalism. However, some national forums of environmental journalists regularly organize short training activities, including workshops, seminars conferences etc., for the benefit of their members and other environmental journalists. The national forums in Bangladesh, People's Republic of China, Japan, Malaysia, Nepal, Pakistan, Philippines and Sri Lanka have been particularly active in this respect. For example, from 1995 the Japanese Forum of Environmental Journalists (JFEJ) has organized an annual environmental study tour of Japan for selected journalists from both print and electronic media in the region. Journalists and producers are exposed to Japanese environmental policy and practice through a series of lectures, discussions.

At a regional level, several initiatives are noteworthy. UNEP has conducted several workshops, seminars and training programmes under its Environmental, Communication and Information Strategy for Asia and the Pacific (1995-2000). A high-level meeting was held in Beijing, People's Republic of China, in 1996 that brought together editors and managers from leading publications in the region to discuss how to boost environment related coverage in the media. Parallel to this, training workshops were organized for environmental journalists drawn from several countries in the region.

In the Pacific Island countries, SPREP and UNESCO have cooperated on a series of national 'Environment and Media' workshops to train television, radio and print journalists in incorporating environmental issues in their reporting. Five training workshops were held in 1999 (Samoa, Tonga, Marshall Islands, Cook Islands and Fiji) and an additional 4 are proposed for 2000.

One weakness in short-term training activities available for journalists is that most programmes are targeted only at the print media, with relatively few opportunities for journalists and producers working in radio and television. With this in mind, regional organizations have started supporting training for broadcast journalists. Panos South Asia office, based in Kathmandu, is placing particular emphasis on training radio journalists to improved coverage of environment and development. Panos has also organized several field study tours for environmental journalists from South Asia to better understand the complex issues of trans-boundary water resource sharing and management (Panos 1998).

The training of audio-visual communications is another widely felt training need and several organizations are now engaged in offering such training. The Worldview International Foundation regularly conducts training courses for NGO activists and media professionals in the use of video for documenting environmental abuses, issues and problems. Meanwhile, the Television Trust for the Environment (TVE) annually organizes a technical skills development workshop for NGO professionals on using television and video for awareness and advocacy work. It has also conducted national level training programmes on environmental video programme making for producers in People's Republic of China, Bangladesh and Sri Lanka, each tied up to an actual production that was later broadcast. In mid 1999, Panos and TVE collaborated in organising a South Asian level workshop that exposed mainstream print and broadcast journalists to the effective ways of using the Internet for researching environmental stories, and also disseminating them through the World Wide Web.

4. Specialized and Technical Training

The number of specialized training programmes at country and regional levels has increased since the 1990s, a reflection of the greater

market demand for specialized environmental skills and environmental managers. Traditional areas of environment related specialized training includes protected area management, environmental quality monitoring and environmental information systems. Relatively new areas of training include, environmental economics, environmental impact assessment (EIA) and in the adoption and implementation of environmental standards, especially the ISO 14000 series. In Malaysia, for instance, universities have worked with experts from the SIRIM Industry Standards Committee on the Environment to produce both training materials and training modules for ISO 14000 implementation.

Training activities are also conducted by some of the larger and well-established NGOs working nationally or regionally. For example, the Society for Participatory Research in Asia (PRIA), based in New Delhi, India, regularly organizes national and regional level training courses and programmes on occupational and environmental health. The UNEP International Environmental Technology Centre (IETC), based in Osaka, Japan, organizes specialized training programmes at regional and subregional level under its capacity building initiative. Professional target groups for its post-graduate training interventions are decision-makers in central and local governments, civil society and industry, academia, NGOs and senior trainers attached to regional or national environmental training centres.

Other specialized training includes the Regional Community Forestry Training Centre (RCFTC), Thailand, which runs several courses on areas such as community-based ecotourism for forest conservation and rural development, offered in collaboration with the Institute of Forestry in Nepal. The United States-Asia Environmental Partnership (US-AEP) is a regional initiative that provides technical assistance and training to Asian governments, business and industry, and NGOs in relation to environmental management and technologies. Training focuses on five critical environmental areas: addressing global climate change; providing safe drinking water and wastewater management; reducing urban air pollution; promoting solid waste management (including medical waste and landfill methane recovery); and participating in regional policy projects on performance matrix, environmental management systems, and public disclosure (US-AEP 1998). The Pacific Islands Climate Change Assistance Programme (PICCAP) at SPREP, undertakes Greenhouse Gas Inventory and Vulnerability and Adaptation Assessment (V&A) training for countries who have insufficient capacity to undertake these tasks, in order to fulfil their obligations under the United Nations Framework Convention on Climate Change (Box 15.1).

Box 15.1 PICCAP: A Training Success in the South Pacific

The Pacific Island Climate Change Assistance Programme (PICCAP) is a GEF funded regional climate change project. It involves 10 Pacific Island countries (Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Samoa, Solomon Islands, Tuvalu, Vanuatu) and is coordinated and executed by the South Pacific Regional Environment Programme (SPREP). PICCAP has been designed in such a way as to strengthen the capacities of participating countries, in terms of training, institutional strengthening and planning activities, to enable them to meet their reporting obligations under the United Nations Framework Convention on Climate Change (UNFCCC).

In less than three years, PICCAP has achieved excellent results. Through its subregional approach, PICCAP has fostered greater sharing of information, built up a qualified pool of climate change experts from within the South Pacific subregion, instituted cross-sectoral climate change country teams with technical and policy-related functions, established a database of climate change information, and assisted with the development of national climate change action plans which have formed the basis for initial national communications and the implementation of the UNFCCC at national level. Much effort has gone into the training and related activities needed to the build in-country capacity that has allowed these countries to prepare and report on their national greenhouse gas (GHG) inventories, GHG mitigation strategies, assessments of vulnerability to climate change impacts and of adaptation options, national climate change action plans, and enabled their initial national communications to the UNFCCC.

One notable achievement under PICCAP has been the design, development, and delivery of a comprehensive university-based vulnerability and adaptation certificate programme for the region. This was done in conjunction with the Climate Change Training Programme implemented by UNITAR and with cofunding from the Government of New Zealand, and included the transfer of entire training course from the originating institution (the International Global Change Institute IGCI, University of Waikato, New Zealand) to a regional institution, the University of the South Pacific in Fiji.

PICCAP is an example of a subregional training and technical and policy-related cooperation activity that has enhanced national capacities to address an environmental issue of critical importance to the small island developing states of the Pacific.

Source: IGCI, New Zealand

B. Main trends and Conditions

As countries in the Asian and Pacific Region address environmental management problems and create institutional mechanisms in response, the training needs in environmental related sectors continue to expand rapidly. A variety of training and skills development activities are being pursued at local, national, subregional and regional levels by governments, NGOs as well as by international and inter-governmental organizations in the region. In terms of content, duration, methodology, instruction mechanisms, types of participants and other factors, there is great diversity, but the end result is an overall strengthening of skills and capacity to better manage the environment and natural resources. The need for greater numbers of trained personnel in a wider range of environment related disciplines and skills are required for:

- the implementation of National Environmental Management Plans (NEMPs) or action plans (NEAPs);
- servicing of international environmental conventions and treaties that many countries have become parties or signatories to, each of which places specialized demands and requirements on the participating countries;
- the adoption of international environmental standards, such as ISO 14000, as well as environmental policy and management tools including environmental impact assessment, environmental audits and eco-labelling, which require well-trained and highly skilled personnel in sufficient numbers within government, industry and other sectors; and
- the provision of environmental procedures, systems and checks, demanded by the increased environmental awareness of the public. Market forces are also demanding greater commitment to, and professionalism in, environmental management and compliance.

A question often arises as to who should be trained given the limited available resources. While environment related training is needed across the board in a large number of sectors, professions and pursuits, some prioritization is required to identify areas for immediate support and intervention. In this regard, UNEP's Environmental Education and Training Unit identified the following categories for priority environmental training: teachers, teacher trainers and teachers' curricula developers; students at all levels; policy makers; decision makers; media professionals; and other opinion leaders and multipliers.

In addition, foreign service personnel who negotiate environmental conventions on behalf of their countries; government officials who negotiate donor funding support for development projects; managers and administrators in educational and media institutions, who often act as gatekeepers, deciding what training and exposure trainees will receive, have all been identified as target groups for environmental training.

C. National Networks For Environmental Training

National level networks of tertiary level institutions have been formed in several countries of the region to share resources and efforts in providing environmental training. One such network is the Philippine Association of Tertiary Level Educational Institutions in Environmental Protection and Management, PATLEPAM, which by mid 1999 had linked over 300 higher educational institution. It has conducted training programmes in environmental impact assessment, and a large number of seminars and workshops on environment and education (Supetran 1999). UNEP/NETTLAP has catalysed the formation of two country level networks in Thailand and Malaysia for environmental training and research. These networks, known by their acronyms THAITREM and MATREM respectively, have brought together dozens of tertiary level institutions in each country for undertaking collaborative research and training activities.

The Australian Environmental Education Network (AEEN) is a national network of environmental education and information programmes, materials and publications. The Network includes access to materials and programmes produced within the Federal Environment Portfolio, States/ Territories Environmental Education Resources, a number of current school and community environmental programmes, and links with tertiary resources and a bulletin board for the exchange of ideas.

Education Network Australia (EdNA) aims to facilitate the provision of cost effective education to all parts of the education community in Australia. EdNA is founded on cooperation and consultation between representatives of all sectors of the education community including Commonwealth, State and Territory governments, non government schools, the vocational education and training sector, the higher education sector and the adult and community education sectors. The aim is to maximize the benefits of information technology for all sectors in education and to avoid overlap and duplication between the various sectors and systems.

REGIONAL COOPERATION FOR ENVIRONMENTAL EDUCATION AND TRAINING

Recognition is growing that many environmental issues and challenges are common to more than one country in the region, and that countries and communities can learn from each other in their responses to similar situations and problems. In some cases, the transboundary nature of environmental problems and their impact make it an imperative for countries in the same geographical vicinity to work together to address and cope with environmental trends and conditions.

Regional networking is one of the most cost-effective ways of promoting active cooperation among those engaged in environmental education and training. The Asia Pacific Network for Tertiary Level Environmental Training (NETTLAP) contributes to human resource development and the strengthening of tertiary institutions in the Asian and Pacific Region. Staffs of tertiary institutions are key targets for environmental training for the multiplier effect they can generate; they often act as advisors to government and industry; and because of the high standing university staff members enjoy in many communities as opinion leaders. The roles and objectives of NETTLAP are outlined in Box 15.2.

Another example of regional network is the South and Southeast Asia Network for Environmental Education (SASEANEE). It was initiated in 1993, coordinated by the CEE in India and the Commission on Education and Communication of IUCN. SASEANEE membership includes governmental and non-governmental organizations, academic institutions, as well as agencies and individuals involved in or interested in networking, initiating or supporting environmental education activities in the South and Southeast Asian countries. Activities include: a directory of persons and institutions involved in environmental education; a newsletter called *SASEANEE Circular*; and short training courses in environmental education.

In 1995, the South Asia Cooperative Environment Programme (SACEP) initiated a project to assess environment related training needs in its member countries, with a view to developing a Regional Plan of Action. Country studies were carried out in Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka, which were coordinated by CEE, India. Based on the country level assessments, SACEP and CEE prepared a Regional Plan of action that sought to help synergize environmental capacity building within the subregion. It found that courses were well developed and that some institutions had also developed considerable expertise and experience in their areas of specialization and provide appropriate training. However, the assessments underlined the fact that the available training opportunities were inadequate to cater to the growing needs, and in some cases, the quality of training required improvement.

INFORMATION AND AWARENESS

A. Monitoring Assessment and Reporting

Environmental monitoring by government agencies and institutions in many countries has focused on certain environmental concerns, such as the quality of air, water and other natural resources. Monitored data are transformed into information that show environmental trends and effectiveness of past mitigation measure which are vital for environmental management. This information is also utilized in the state of environment reports; for example, of Australia; New Zealand; Malaysia; India; Fiji; Japan; Hong Kong, China; Turkmenistan; Azerbaijan; Uzbekistan; and Palau. NGOs and community-based organizations also play a significant role in collecting and disseminating information to the community and to all spheres of government.

1. National level

Air pollution is a concern for which extensive monitoring systems have been put in place in many countries of the region. In the Republic of Korea, for example an automatic air pollution monitoring network measures seven atmospheric pollutants which includes TSP, SO_2, NO_2, CO, O_3, etc. Other countries in the region may not have such a sophisticated system but nonetheless have established monitoring systems to cover sites across the country. Indonesia now has 31 air quality monitoring stations nationwide to help check increasing air pollution arising from motor vehicles in large cities. People's Republic of China illustrates a wide array of monitoring stations and also implements a quantitative examination system for urban environmental control. The central and provincial governments have already performed quantitative checks in over 37 major cities and 330 smaller cities.

In the Russian Federation, special attention is given to the development and support of a system for monitoring the condition of the ozone layer as well as a system for monitoring ultraviolet radiation over the whole country and adjoining territories. Information is processed and presented in the form of daily maps showing deviations in the volumes of total ozone content from norms established over many years.

In Australia, a number of strategies and plans provide a focus for particular resource issues, including Agriculture Land Cover Change project and the revised National Overview for the Decade of Landcare Plan (the main strategic plan for the National Landcare Programme The government, through its Commonwealth and State agencies, funded a programme to monitor changes in Land cover from 1990-1995, through the use of Satellite data. Information from the project provides as baseline for future monitoring which is vital to land clearing and agriculture development that have major impacts on wide range of country's natural processes.

Box 15.2 NETTLAP: Building Regional Capacity through Environmental Research, Training and Education

In 1993, UNEP's Regional Office for Asia and the Pacific (ROAP) established an ongoing programme to enhance the region's capacity to manage the environment in a sound and sustainable manner. This initiative, called the Network for Environmental Training at Tertiary Level in Asia and the Pacific (NETTLAP), has evolved into a major contribution in helping to achieve both national and regional goals of sustainable development. It has explicitly recognized that tertiary institutions such as universities, technical and training institutes and teacher training colleges, play a major role in building capacity for sustainable development.

Staff of these institutions were identified as "agents of change" for two reasons. Firstly, a large multiplier effect is associated with actions that strengthen tertiary institutions and enhance the abilities of staff to transfer, to their colleagues and students, state of the art understanding and international best practices. The improvements involve many people in a short period of time-graduates are soon improving the environmental management policies and practices in industry, government and the community. Secondly, governments and industry keenly seek the advice and guidance of staff from universities and technical institutes. Industry in particular recognizes the ability of such people to bring innovative solutions to current environmental problems and creative approaches to preventing the occurrence of new problems.

Initially NETTLAP focussed on strengthening key tertiary institutions in 35 developing countries in the region. The early efforts of NETTLAP did more to recognize the enormity of the need and, in relative terms, little to address it. But incrementally NETTLAP made a difference throughout the region. The benefits of the multiplier effect have begun to be seen. This was particularly so in the case of the design, preparation and dissemination of environmental curricula and the supporting instructional methods, materials and tools for use in tertiary and other relevant institutions in the region. These efforts resulted in sets of curriculum guidelines and associated training methods, resource materials and tools cover such topics as environmental economics, hazardous waste management, toxic chemicals management and coastal zone management. These outputs are still widely sought, and extensively used in the region.

By the late 1990s, NETTLAP had matured in several ways. Significantly, it has shifted its target from institutional strengthening and human resources development in the tertiary sector itself to assist developing countries to plan and implement their own activities to build the capacity to achieve effective environmental management, and sustainable development. Countries can take a comprehensive approach that targets other important "agents of change" – politicians, government officials, and leaders from the private sector and NGOs.

Therefore, in recent years NETTLAP has focussed on building national networks that can facilitate the linking of policy makers, development planners, environmental managers from industry and key staff from tertiary institutions. In addition to sharing expertise, experiences and best practices, the networks are also designed to help identify current and emerging needs that can best be addressed through a symbiotic relationship between these key players. Through these national partnerships, NETTLAP is linking research, training and education in order to improve the capacity to prevent or minimize adverse impacts on the environment. This involves identifying and implementing responses that are sustainable, assured of achieving the desired results and identified needs, supportive of related policies (e.g. appropriate economic and social development), innovative but consistent with traditional indigenous practices, add value to other initiatives and encourage complementary activities.

NETTLAP has played a key role by facilitating nationally "owned and driven" environmental capacity building networks in the Philippines, Malaysia and Thailand. The major achievements of the latter two networks for training and research in environmental management have resulted, in part, from significant funding from DANCED, an initiative of the Government of Denmark. Given the success of its current approach of "Regional Cooperation with National Implementation", NETTLAP is in advanced discussions to help develop similar networks in People's Republic of China, Viet Nam, India and the Mekong countries.

Key players in NETTLAP's strategy – "Regional Cooperation with National Implementation" – are such subregional organizations as SACEP, ASEAN and SPREP. NETTLAP is working with these, and similar organizations, to ensure that its actions are supportive of their strategies and action plans related to environmental research, education and training. NETTLAP has evolved as new needs are identified and past needs are addressed. But despite its efforts, and its significant successes, much more needs to be done. NETTLAP has shown that the most effective approach is one that builds synergies between key international, regional, subregional and national players.

Source: NETTLAP office at UNEP/ROAP

Wastewater is also intensively monitored in some countries across the region. Databases in Australia (Australian Waste Database) and New Zealand (Waste Analysis Protocol; WAP) are used for collating national baseline and update information, so as to monitor waste management services and ensure national objectives are met. These data will also eventually form the basis for developing national waste reduction targets.

Environmental quality monitoring has also been focused on natural resources, such as coastal and marine resources. In Thailand, the Fisheries Department of the Ministry of Agriculture monitors coastal zones and estuaries for toxic chemicals, heavy metals and oil pollution. India has a programme on Coastal Ocean Monitoring and Prediction System that is engaged in a systematic monitoring of marine pollution in the country and conducts studies relating to waste assimilation capacity of coastal waters. The Russian Federation monitors and evaluates the environmental impact of activities affecting coastal and marine regions such as in the Caspian Sea where a system is being developed to forecast its fluctuating level over various time spans to predict possible future changes.

Forest resources and biodiversity are extensively monitored throughout the region. For example, National Biodiversity Surveys are carried out approximately every five years in Japan. Indonesia conducted a project with GEF support to establish a Biological Diversity Inventory and develop a User Advisory Group Information System. In Australia, a National Forest Inventory and Wilderness Inventory are carried out to produce a national State of the Forests report every five years. The Republic of Korea has a 10-year periodic forest inventory with site surveys to produce a geographic map that is computerized into digital databases. Monitoring for forest pests and diseases has also been developed in the Russian Federation and the Republic of Korea for early warning systems related to pest and disease outbreak.

Other monitoring techniques include the use of Geographical Information Systems (GIS), which are used to establish nationwide conservation and protected areas (Australia); identification of environmentally sensitive areas (Malaysia, Fiji); forest resource mapping (Indonesia, the Philippines, Myanmar, Solomon Islands); flood action planning (Bangladesh); studying ecosystem changes, river pollution and marine environmental surveys (Republic of Korea); analysis of river change, water logging and salinity, desertification, and agro-ecological zonal maps for water research (Pakistan); and industrial pollution control (Thailand). The significance of disaster prevention and mitigation has also prompted many countries to take initiatives in the areas of disaster forecasting, early warning, risk assessment and mapping of climate and water related hazards.

2. Regional and Global Monitoring

Environmental quality monitoring goes beyond country activities and programmes when environmental concerns take on transboundary characteristics. An example is the Mekong GIS project (of the Interim Committee for Coordination of Investigations of the Lower Mekong Basin), which was initiated to evolve a network of data centres in Lao People's Democratic Republic, Thailand and Viet Nam. Regional cooperation in Central Asia has also been initiated on questions relating to radiation safety.

Remote Sensing and GIS are also being applied as a tool for monitoring at regional level. The value of remote sensing in monitoring transboundary pollution was demonstrated recently when ASOEN (ASEAN Officials for the Environment) used the data developed from these for planning inter-country cooperation regarding haze caused by forest fires in Indonesia.

3. Issues and Problems in Monitoring and Assessment

The most often cited constraints in relation to environmental quality monitoring in developing countries relate to inadequacy of funds and the lack of manpower and/or training, which leads to low coverage and low frequency of monitoring, particularly in the rural areas. This is especially so when the monitoring cover a wide area, for example, in Mongolia there is a need to monitor about 20 000 bored wells and a similar number of dug wells as it is believed that 70-80 per cent of these are contaminated. However, present capacity only allows chemical analyses for 14 per cent of the bored wells and none of the dug wells. Lack of training and technical capacity has also reduced the capacity of developing countries to actively participate in global monitoring efforts.

Environmental monitoring and assessment in the developing countries of the region still requires strengthening in terms of standardization of, monitoring network system design; sampling and analytical methodologies; quality control in data collection and laboratory analysis; national procedures for harmonizing data collection; and improving the access to data of researchers and interested citizens. There is also a need to establish systems for collecting new benchmark data to assess the sustainability of resources, as well to environment with health, population, and economics.

B. Information Dissemination

Dissemination of environmental information is extremely important in integrated environmental management, since it plays a vital role in sensitising individuals to environmental issues. In the past, dissemination has been done through campaigning using mass media and scientific publications, however, advanced technology, especially the electric media, is now playing an increasing role. However, access to environmental information is not easy in most countries in the Asian and Pacific region. Some region-wide efforts such as the UNDP funded Asia Pacific 2000 initiation have concentrated on promoting such efforts (Box 15.3).

1. *National Level*

In some countries, there is no legal policy to disseminate environmental information to the public or private sector. Lack of effective coordination makes information exchange more difficult. For example, in the Russian Federation, though environmental information distribution policy does exist by law, there is no legal administrative mechanism available to put it into practice. As a result, the information cannot be obtained easily, even among coordinating agencies.

In Australia, environmental information can easily be accessed from a diverse range of institutions. There are numerous projects being undertaken by government agencies at the Federal and State level and in research and teaching institutions, which are aimed at developing methods of integrating economic, social and environmental information. These include state of environment reporting, the development of indicators of sustainable development, methods for resource valuation and systems of environmental and natural resources accounting.

The Environmental Resources Information Network (ERIN), located in Environment Australia provides environmental information for policy development and decision-makers. ERIN databases

Box 15.3 Awareness Raising Campaigns

The UNDP-funded Asia Pacific 2000 initiative (AP2000) seeks to support and strengthen the role of civil society in meeting the challenges of urban environment and poverty. Established in the early 1990s, it works closely with governments, NGOs, researchers and all other stakeholders in the region's unfolding urban drama. Studying how AP2000's partners are mobilizing themselves sheds light on the use of different campaign methods for environmental awareness, advocacy and activism.

Environmental Campaigns in urban areas of Asia and the Pacific have taken various forms. Some have been as simple as making and putting up posters, or conducting slide presentations and exhibits, for example as the Penang Organic Farm (PAF) does to promote the concept of Eco-cities. Eco-cities are designed to revitalize nature in over-exploited areas, while bringing new prosperity to its inhabitants. The Asia Pacific 2000 initiative has involved PAF to become the core of an Asia-wide Eco-cities network that will create awareness of alternative ways of building cities and to create sensitivity toward the environment. There are many other ways of carrying out campaigns. For example, in March 1995, AP2000's partner Waste Wise in Bangalore organized a three-day 'Festival of Recycling'. This event brought together the community, local authorities and private enterprise to promote the concept of reducing, reusing and recycling as a way of life. Now, the organization is spreading its advocacy work beyond Bangalore to the region with Waste Wise Asia Pacific.

Some campaigns target specific audiences. Magic Eye, a Thai community development organization, for example, aimed its 'Do Not Litter' campaign at school children. The programme, which made children aware of the need for proper waste disposal – for instance through separation and recycling – was a success. But Magic Eye's ultimate target was the parents, who are in a better position to put into practice the waste management schemes advocated through the programme.

Sometimes campaigns involve protest and agitation against policies or practices that are felt to be harmful to the environment (see Chapter 14). Across the region, NGOs and other citizens' groups regularly organize such campaigns which employ a variety of means, ranging from letter writing, marches or rallies, to the more active forms such as *satyagraha* or sit-in protests that are often adopted in parts of South Asia. In India, sustained campaign efforts have also used the method of *yatras* or long marches by groups of people – sometimes stretching across hundreds of kilometres – which attract news media interest, and expose thousands of people in communities along the way to the messages of the campaign.

Government agencies also use campaigns to rally public support for specific environmental issues. Singapore has a well established practice of environmental campaigns like the Clean and Green Week, and it's calls to Save Energy and Save Water. In Japan, October of each year is observed as the Recycling Promotion Month, during which all government ministries and agencies concerned with the environment conduct an extensive campaign to persuade the people to recycle resources.

Hopefully these and other campaigns in the cities of Asia and the Pacific will go a long way in improving the urban environment.

Sources: 1. Inter Press Service, Manila 1997
2. Ministry of the Environment, Singapore 1996

store a vast array of information about the environment, ranging from endangered species to drought and water pollution. Information is drawn from many sources including maps, species distributions, documents and satellite imagery and the information is easily accessible through the internet.

Similarly in Japan, public access to data on air and water pollution and natural environment is provided to government agencies, laboratories and outside users under pollution control laws.

The Government of India and the State Governments, through several of their organizations have taken various steps to develop information network capabilities of both the public and private sectors. The Environment Information System (ENVIS) has the joint objectives of building a repository and dissemination centre for environmental science and engineering, and providing national environmental information services to originators, processors, and disseminators of environmental information.

2. *International Level*

Internationally, INFOTERRA of UNEP is an important source of information. Additionally, United Nations system-wide Earthwatch programme initiated in 1994 by UNEP has emphasized environmental education. It aims at coordinating, harmonising and integrating observation, assessment and reporting activities across the United Nations system in order to provide environmental and socio-economic information to interested parties. Some countries also promote dissemination of environmental information for users around the world. The National Resource Information Centre (NRIC) of Australia develops advanced computing systems designed to service policy and community needs for information, for example, on sustainable development. Its information resources consist of more than 50 national and 100 regional spatially maintained datasets, and FINDAR, a software package for interrogating metadata on more than 6 500 databases that it maintains as a directory linked to all other major international directories.

In March 1996, the NIES, Japan, began to provide environmental information from its research activities to the world via the Internet. At the same time, the Centre established a computer communication system for the general public called the "Environmental Information & Communication Network (EICnet)" in order to promote national activities for conservation of the environment, including "EI-Guide" a survey of environmental information including explanations of laws, treaties, and environment-related terms.

3. *Issues and Constraints in Information Dissemination*

Effective communication plays an important bridging role between information and target groups. The first stage of communication, however, which is listening to what people know, think, believe and do, has often been weak. In the formal education sector, timely access to credible information is one of the major constraints for environmental education in the region. Furthermore, in some countries, although data and information are often collected by different agencies, a lack of effective coordination and communication among related agencies make information sharing ineffective. NGOs have been effectively involved in dissemination of environmental information to promote environmental awareness, although there is still a need for improved promotion at the regional level.

ENVIRONMENTAL COMMUNICATION

Environmental communication has now emerged as strong complementary practice to environmental education. A broad definition of environmental communication would be, "the sharing of information, insights and opinions on environmental issues, trends, conditions and solutions using any means of communications, ranging from inter-personal methods to means of mass communication using the modern as well as traditional media". In this sense, environmental educators constantly engage in environmental communication. However, an important distinction is that, while all environmental educators are communicators, not all environmental communicators are necessarily educators. Across the Asian and Pacific Region, individuals and institutions engage in a very wide range of environmental communication activities with varying degrees of sophistication, outreach and impact.

A. Communication Trends

In the mid to late 1990s, the main focus in environmental communication was to inspire positive behaviour, on the part of individuals, communities, corporate and industrial bodies and others, to help conserve the environment and achieve sustainable development.

A key issue for many countries in the region is to integrate environment into development policy, and to use communication and education in an integrated way as an instrument of policy. There is, however, a tendency to focus on formal school education target groups, both by governments and NGOs, rather than addressing other groups who can

make a difference in a policy issue, or in an immediate practical sense (IUCN 1998).

One of the major channels through which environmental communication is practised is the mass media, which includes both print and electronic sections. The communication media in Asia and the Pacific underwent rapid change during the 1990s, with liberalization of media policies allowing private sector involvement, spread of global media networks owned by trans-national companies and the proliferation of new communication technologies which have removed the barrier of large investments required to enter the media field.

Trans-national television is the most prominent example of the changes taking place in the region's communications scenes. More than 386 million households in the region (more than 55 per cent) are now equipped with television sets. Estimates indicate that by the year 2005, more than 447 million households will have television sets (UNESCO 1997b). The last few years has also seen the rapid expansion in the use of the Internet, with most countries in the region already connected to the global information superhighway. Cellular phones, faxes, email, electronic networks and cable are also expanding countries' outreach, often at unprecedented growth rates.

The Asian and Pacific Region is experiencing a trend where the public service component on television is declining while the number of broadcast hours and channels continues to increase. The medium's potential for non-formal education and for raising public awareness remains largely untapped. While advertisers and sponsors compete to support entertainment, news or sports programmes, the more educational programmes, documentaries, investigative current affairs programmes or in-depth interviews, are having to contend with budget cuts, intense competition for prime-time slots, and an overall decline in the public service spirit in broadcasting (TVE 1999). Media's role in environmental communication remains effective only to the extent that the environmental experts, researchers and activists engage and use the media to influence and shape the accuracy, balance and scope of environmental coverage.

In response, throughout the region, governments and NGOs are adopting strategies to mobilize communications and cooperate with the media, and in some cases, to strengthen the media's capacity to cover environmental issues more effectively (Box 15.4). In 1996, Malaysia's Department of Environment (DOE) launched two major programmes with the cooperation of the electronic media. One was a TV serial called 'Bicara Alam' that discussed environmental issues of current interest, the other was a radio environmental awareness quiz.

B. Print Media

Environmental reporting is now well-established within the region's print media, newspapers and magazines. Investigative journalism on environmental issues has resulted in exposing environmentally damaging plans, polices or practices. Newspaper exposures and subsequent public pressure have forced governments, local authorities, industries and others to change their plans, to tighten laws and regulations, and to abandon certain development projects whose environmental and social costs outweighed any benefits.

This is illustrated by Thailand's two leading English language newspapers, the *Bangkok Post* and *The Nation*, both of which have been honoured by UNEP with its Global 500 awards for excellence in environmental coverage and for their commitment to the environmental cause. The Nation newspaper has a recognized tradition of covering groundbreaking environmental stories, and the production of a weekly environmental page, Earth Focus. In Malaysia, a leading newspaper group, the *New Straits Times*, has supported and managed a national environmental education programme for students since 1992, which aims to enhance the awareness of the environment, culture and social values, whilst encouraging problem solving, motivation and participation in environmental programmes.

Producing special publications for children is another important strategy. Many conservation organizations produce material meant for children and young adults. The Centre for Science and Environment (CSE) in India, for instance, has published the science and environment fortnightly *Down to Earth* since 1992 and launched a children's supplement in 1998, called *Gobar Times*. It aims to stimulate young minds to question prevailing development patterns, lifestyles and governance systems. The supplement carries news and views on the environment, science and technology, stories from various traditions including environmental movements and inventions, and highlights of social implications of the issues. It uses comic strips, cartoons, quizzes, essay competitions and interactive pages to engage children's minds.

CONCLUSION

As the Asian and Pacific Region enters the new millennium, it is clear that a new surge of interest, enthusiasm and activity is underway on many fronts to place environmental education, training and communication higher on the public agenda in countries of the region.

Although a considerable amount of work has been done and achievements made in the 1990s, many challenges remain. As many countries of the region struggle to overcome the social, economic and cultural barriers placed on them by poverty and under- development, and at the same time face up to the new challenges of economic globalization, the priority assigned to environmental issues and conservation is at risk of being overlooked or traded off for more immediate benefits, and for survival needs. The environmental educators and communicators of the region need, therefore, to be vigilant and active to ensure that governments, industry and other key players in the sustainable development arena remain mindful of their international and national commitments to environmental conservation, in addition to ensuring that sufficient investments of resources, time and attention are made to consolidate the achievements of the 1990s.