



4.2 Education and Training

The highest priority has to be given to present the various dimensions of disaster risk within a community through structured educational programs and professional training. As people's understanding and the exercise of their professional skills are essential components of any risk reduction strategy, an investment in human resources and capacity building across generations will have more lasting value than any specific investment made in technological systems to reduce risks.

Education and training for disaster risk reduction takes many different forms:

- Basic role of education and training
- Disaster risk management training centers
- Academic and educational programs
- Primary and secondary schooling
- Professional trades and skills training
- Capacity building
- Future challenges and priorities

Basic role of education and training

As disaster risk reduction has evolved over the past two decades years from interests focussed on the study of specific hazards, the responsibilities of civil defence authorities and the largely structural nature of physical protection, both the needs and the institutional resources related to education and training have also changed.

Academic research has become much more

focused on the transfer of knowledge and experience, which in turn has established the need for much closer association between the sources of specialist knowledge and the population it is intended to serve. With more attention being given to the social and economic conditions of vulnerability, conventional thinking about disaster management has become much more closely linked to basic developmental issues. By looking beyond the physical attributes of hazards, a greater emphasis has been placed on matters associated with disaster risk issues and preparedness.

Education and training about disaster management can no longer be considered as an area of specialist scientific study. The very concept of a disaster manager, fostered in the 1980s and early 1990s, no longer sufficiently conveys the expanded roles and responsibilities involved in contemporary strategies of disaster risk reduction.

This historical context is important to demonstrate the evolution of education and training as the concept of disaster management has grown and diversified. As increasing attention must now be given to the changing nature of hazards and the more complex conditions of risk, institutional facilities and relationships required for educating future populations will likewise have to become more diverse. A need remains to accommodate the combined influences of environmental and land management

"One of the most significant trends affecting disaster preparedness and response is the transformation that has occurred in disaster management. Once focused equally on war readiness and planning for disasters and viewed as the exclusive purview of individuals with military backgrounds, 'civil defense' has evolved into the profession of emergency management - a profession that requires diverse skills, ranging from the ability to develop formal disaster plans, to skills in community outreach and organizational development, the ability to mobilize political constituencies, and knowledge of new and emerging technologies. The professionalization of the field has been accompanied by the development of new organizations, specialty fields, and credentialing processes, as well as the growth of college and university curricula focusing on principles of emergency management. With this ongoing evolution in disaster management, disaster research must continue to document how and why disasters occur as well as their immediate and long-term impacts.

Source: K. Tierney, 2001.

issues, climatic uncertainty, changing demographics, and the pressing demands for sustainable livelihoods.

Education and training for disaster risk reduction must proceed along several fronts. Where disaster management training programs are already established, there is evidence that the frames of reference and the intended audience is expanding. More attention is being given to integrating disaster risk reduction into national development planning processes and in creating more resilient local communities.

There is now a recognition that disaster risks can only be successfully managed on a broad and multidisciplinary basis that narrows the existing gaps between researchers, teachers, and practitioners. While there is a much greater need for wider dissemination of professional and technical knowledge, there is at least as much need for study and understanding about the underlying social and economic dimensions of risk too.

Professional training for risk reduction will play a growing role as both the public and political authorities recognise that effective risk management strategies require many different skills. But such an investment in the development of human resources can only be sustained to the extent that the value of risk management is institutionalised. The examples that follow give some indication of the extent and variety of activities furthering the education and training of disaster risk management.

Disaster risk management training centers

There are a number of highly regarded disaster management training institutions that have evolved from an earlier emphasis on operation. Earlier attention devoted to such subjects as contingency planning and community preparedness activities has been reoriented towards motivating more local participation and multidisciplinary outlooks that can create disaster-resistant communities. As these centers have been organizing a variety of training programs over the past 15-20 years, alumni from one or the other of these centers frequently constitute the core of disaster professionals in many developing countries, particularly in Africa and Asian Regions.

Established training centers include:

- Disaster Management Center (DMC) at the University of Wisconsin in Madison, United States
- Asian Disaster Preparedness Center (ADPC) in Bangkok, Thailand,
- Cranfield Disaster Preparedness Center (CDPC) at Cranfield University in Cranfield, United Kingdom
- Emergency Management Australia Institute (EMAI) in Mt. Macedon, Australia.
- Asian Disaster Reduction Center (ADRC) in Kobe, Japan.

National Training Centers

Asia

- International Institute for Disaster Risk Management in Manila, Philippines
- National Center for Disaster Management at the Indian Institute of Public Administration in New Delhi, India
- Uttar Aranchal Disaster Mitigation and Management Center in Dehra Doon, India
- National Institute of Rural Development in Hyderabad, India
- Center on Integrated Rural Development for Asia and the Pacific in Dhaka, Bangladesh
- International Center of Integrated Mountain Development (ICIMOD) in Kathmandu, Nepal

Africa

- Disaster Mitigation for Sustainable Livelihoods Programme of the University of the Western Cape in Cape Town, South Africa. This programme conducts a course that aims to achieve an integrated understanding of disaster risk and its implications for sustainable development in southern Africa, with a specific focus on South Africa. It assumes an interdisciplinary perspective in disasters and conceptualizes disaster risk as an outcome of the interplay between human and natural factors. The programme also work with community outreach.
- Africa University in Mutare, Zimbabwe
- Disaster Management and Mitigation Unit of the National College for Management and Development Studies in Kabwe, Zambia
- Disaster Management Institute of Southern Africa (DMISA) in South Africa



Earlier training has in turn given impetus to the creation of national training programs or centers within individual disaster-prone developing countries which impart instruction for further extension of risk reduction practices through community-level practices. These initiatives also foster the growth of smaller informal training adapted to local situations and needs.

Academic and educational programs

Natural hazards have always been studied within the physical sciences, or expressed in terms of physical forces considered by other technical disciplines such as engineering. There was little academic interest in relating the study of hazards or their social and economic effects to societies.

Noteworthy exceptions in the United States included the early exploration of sociological aspects of disasters in the mid 1960s at the *Ohio State University Disaster Research Center* which led to the creation of the *Natural Hazards Research and Applications Information Center at the University of Colorado* in 1974.

Parallel developments occurred in Europe during the 1970s as a variety of technical specialists contributed to ideas that coalesced in the creation of the *Center for the Research and Epidemiology of Disasters (CRED)* at the School of Public Health, Catholic University of Louvain in Brussels in 1972. The ideas of a multi-disciplinary group of technical researchers called the London Technical Group led to the creation of the International Disaster Institute, a specialist research centre, in London in 1978.

Academic programs related to hazard studies and the different but related fields of emergency management have expanded widely over the past 10 years but only in some parts of the world. More than 60 centres that study hazards and disasters are listed by the University of Colorado Natural Hazards Center web site (www.Colorado.edu/hazards/). In addition, an

equal number of academic institutions are listed that offer either graduate or undergraduate programs in emergency management courses at colleges, universities, and other educational institutions located principally in the United States.

A similar record, but with a wider international scope, is maintained by the *Asian Disaster Reduction Center* in Kobe, Japan. Its web site (www.adrc.or.jp) lists more than 70 training institutions and program contacts for an extensive range of technical specialist, national and professional organizations including some academic institutions that offer short-term professional courses in various aspects of disaster management.

One academic program that reflects the development of programs in disaster risk management is the Masters of Science Course in Disaster Management offered by Cranfield University in the UK. Now in its third year, it aims to attract experienced mid-career personnel drawn from all organizational sectors among governments, UN agencies, uniformed services and NGOs, while at the same time catering for newly graduating students from a variety of academic backgrounds such as geography, development and environmental studies, political science and various technical courses of study. The focus is on the development of tools, techniques and approaches for effective disaster management rather than giving priority strictly to academic study and reflection. The aim of the course is to build effective disaster management capacity as well as reducing risks from natural disasters, complex emergencies and human induced disasters. Further information can be obtained from www.rmcs.cranfield.ac.uk/dmc

Regional variations also exist, although comprehensive listings of formal programs are not so readily available. However, in Latin American and the Caribbean there are several universities that offer postgraduate programs in disaster risk management.

In Latin America and the Caribbean

- The University of Antioquia in Colombia hosts the PAHO/WHO collaborating Centre for Education in areas of public health. In addition, the same University offers a Masters Degree in Contemporary Social Sciences and Risk Management within the faculty of social sciences.
- The University of the Andes in Bogota, Colombia offers a Risk Assessment and Disaster Prevention Postgraduate Program of Disasters.
- The University del Valle in Bogota, Colombia offers a post graduate program in Integrated Risk Management.
- The Cuyo National University in Mendoza, Argentina offers a postgraduate degree in Prevention, Planning and Integrated Management of Risk-Prone Areas.
- The Venezuela's Institution of Technology of Ejido (Instituto de Tecnología de Ejido) offers a technical degree in Emergency Management and Disaster Response.
- The Faculty of Medicine at the Central University of Venezuela has included subjects related to emergency and disaster preparedness in the undergraduate curriculum for many years.
- In Chile, the first postgraduate course on journalism and disaster management has begun.
- In Costa Rica: UNICEF, the Latin American Social Science Faculty (FLACSO) and LA RED promoted in 1998 a project to introduce reforms in the curriculum of risk and disaster education. The project undertook theoretical development, which are published in Education and Disasters (Educación y Desastres), and are also contained in a website www.desenredando.org.
- In the Caribbean region, the University of West Indies (UWI), has several disaster management related programmes out of the Jamaica and Trinidad & Tobago campuses. These include earthquake and volcano monitoring systems, disaster research units, crop production and management of tropical hazards, natural resource management programmes, as well as coverage of disaster management as part of Bachelors degree programmes. In addition at the Masters level, at the Mona and Cave Hill Campus, disaster management components are included in the Environmental programmes.

Four universities in Central America are presently conducting or developing Masters degrees in disaster-related fields.

- The National University (UNA) of Costa Rica offers a Masters degree in Natural Disaster Mitigation for Central America, established through cooperation with the Swedish Agency for Research Cooperation with Developing Countries. It involves many other Central American state universities.
- The University of Costa Rica (UCR) offers a series of courses related to hazards.
- The National Autonomous University of Nicaragua is currently designing a Masters degree in Prevention and Mitigation of Natural Disasters in conjunction with possible supporting interest from the Swiss Government.
- The Del Valle University in Guatemala is designing a Masters degree related to disasters oriented towards emergency preparedness and response.

Other courses:

- In Bolivia, an administrative resolution has encouraged the designation of risk management as an elective course or a technical discipline at college level.
- In Colombia, a higher education policy on risk prevention is being designed through a "National Commission on Disaster Prevention Education"
- In Venezuela, an existing program is being restructured to include disaster reduction subjects while a parallel initiative seeks to improve the disaster resilience in the design and construction of school facilities.



Professional trades and skill training

One notes a different orientation for education and training in disaster or risk management practices in Asian countries. The past thirty years have seen a remarkable growth in the number of professionals trained in different science and engineering branches related to geological, hydrometeorological and climatic hazards so that there are now many more people to assess and interpret the physical phenomena of natural hazards, even within smaller developing countries.

A variation of this approach is the Kathmandu Valley Earthquake Risk Management Project implemented by the National Society for Earthquake Technology (NSET) in Nepal. Engineering students participated in a building inventory and vulnerability analysis program during their summer vacation. More than 100 students were involved in the program and learned different aspects of safer construction in earthquake-prone areas, which had not otherwise figured in their engineering curriculum.

Even such an informal exposure of students to risk issues and their own recognition of the relevance to their studies, demonstrates a potential for future courses for the younger generation.

However, the teaching of science and engineering only infrequently proceeds into matters of hazard and risk assessment. When the subject is addressed, typical courses of study will rely on teaching structural mitigation and tend to feature physical means of seeking to control the effects of natural hazards, such as by the construction of check dams, flood embankments, or retaining walls.

While modern social science and public administration widely acknowledge the prevalence of increasingly complex societies, there is correspondingly little attention paid in formal educational programs to the human social factors, economic rationale, or political responsibilities associated with risk management. Accordingly, there is a visible lack of social scientists, community-based leaders or broadly informed public administrators practising in the field of risk reduction.

One exception is the Asian Urban Disaster Mitigation Program (AUDMP), implement-

ed under the auspices of ADPC in 10 Asian countries. This program's approach to training, learning materials and continuing education is to develop generic curricula on urban disaster mitigation, which can be adapted and institutionalised at national and local levels through training institutes.

An array of training programs, methods and tools have been produced over the past seven years including courses on floods, earthquakes and technological hazards. Other courses have emphasised community-based approaches to disaster reduction, while courses for safer construction techniques for masons have also been developed. In Asian countries, there is much more likely to be specialised institutions related to disaster management created by state authorities.

The on-line discussion in the lead up to the 2002 World Summit on Sustainable Development considered how best to promote education and capacity-building for the management of risk reduction. It considered means to incorporate disaster risk reduction issues in sustainable development practices and reflected a common understanding that education is linked to safety in many immediate and longer term ways. It noted that education involves a number of relevant aspects including public awareness of hazards, advocacy for public adherence to creating a culture of prevention, development of school curricula and professional training. However, it was also observed that the issue is not simply one of recommending more education. There is equally a need to address the ways in which these various forms of education and training can link and complement one another (see more: www.earthsummit2002.org/debate).

Such a gap becomes apparent when one considers that a disproportionate exposure to risk is concentrated in countries of the developing world where a dramatic potential for loss can be attributed to unsafe buildings. Most of these buildings are constructed informally. The involvement of certified technicians, or the application of formal engineering practices in these constructions is limited, due to economic realities.

The problem of safer construction becomes one of conveying sound, risk reduction building practices to the building owner. One mech-

anism that has been exploited to only a limited extent is by working with a more concentrated effort to involve the artisanal carpenters, masons and other locally skilled tradesmen who provide the great majority of technical expertise in construction. As they are local residents themselves, they can work as motivators for both current and future improvements. To accomplish this form of risk reduction training, it is necessary to recognise the role of these artisans more fully and to engage them in better understanding about the issues involved and by encouraging them to use technical knowledge in their work. Where the time has been taken to do this, such as in the *Core Shelter Construction Programme* in the Philippines and the NSET activities in Nepal, considerable interest was shown by the participating communities with rapid replication of the principles in neighbouring locations.

A significant advance in disaster education has been observed in Latin America and the Caribbean in recent years. There has been a growth in educating and employing professionals with skills necessary for risk reduction from within the region in contrast to an earlier reliance on external technical advice and abilities. This practice of developing local capabilities has been encouraged by international agencies. A few years ago, most courses and instructors had to be imported but that is no longer the case.

Capacity building

The concept of capacity building is to provide a target group with skills, resources and technical abilities to enable it to better help itself. In recent years, increased emphasis has also been placed on developing overall policy frameworks in which individuals and organizations interact with the external environment in their respective areas of endeavour.

Capacity building can be achieved through means such as training and education, public information, the transfer, provision or access to technology or other forms of technical assistance intended to improve institutional efficiency. In the field of disaster risk reduction, the concept can also relate to the formulation of an appropriate policy framework such as in the

training of disaster managers, the transfer of technical abilities or expertise, the dissemination of traditional knowledge and know-how, strengthening infrastructure or organizational abilities at local community, national and regional levels.

Most of the Programmes and agencies of the UN system are geared to provide and support capacity building in their respective areas of competence. For example, in 2001, UNDP through its country offices, Regional Bureaux and specialised programmes, strengthened disaster reduction capacities in over sixty countries. These programmes included building local capacities for disaster reduction in Central America and Jamaica, developing a new national risk and disaster management system in Haiti, strengthening national disaster offices in the English Caribbean countries, developing regional strategies for disaster management in the SADC countries and in the Stability Pact area (South-Eastern Europe countries), addressing flood risk reduction in the Tisza River Basin (Hungary, Romania and Ukraine), and addressing drought risks in Iran, Tajikistan and Uzbekistan. UNDP also supported several capacity-building programmes including in Albania, East Timor, Romania, Madagascar, and Malawi (see more information on UN agencies in chapter 6.2).

● Latin America and the Caribbean

Institutional initiatives to develop capabilities in hazard and risk reduction have been particularly evident in Latin America and the Caribbean for many years. The Organization of American States and the Pan American Health Organization (PAHO) have sought to relate their particular technical abilities and practical experience through expanded opportunities for education. PAHO's publication, *Catalogue of Disaster Publications and Information Resources*, contains a detailed description of all PAHO disaster training materials (books, CD-ROMs, slides and videos) and other sources of information, including the Virtual Health Library for Disasters and principal web sites that contain PAHO content. The catalogue is available on the Internet at www.paho.org/disasters/publications, and print copies are available on request to disaster-publications@paho.org / crid@crid.org



A comprehensive Inter-American Strategy was launched in 1999 to reduce the education sector's vulnerability to hazards by initiative of the Unit for Sustainable Development and Environment of the Organization of American States (USDE/OAS), working with PAHO and ISDR. Known as EDUPLANhemisferico, the program seeks to engage public and private institutions, national and international agencies, NGOs and private individuals to encourage member states to adopt the Action Plan for Reducing the Vulnerability of the Education Sector to Disasters through a variety of international forums. With a Technical Secretariat for General Coordination located at Peru's National University at Trujillo, EDUPLAN works through eight technical focal points located in Argentina, Costa Rica, Trinidad and Tobago, the United States, and Venezuela to conduct activities at a number of local, national and regional locations. Work is divided into three areas: academic improvement, citizen participation, and physical infrastructure protection. There is a commitment to improve the curriculum with the addition of more elements pertaining to risk reduction in primary, secondary and higher education so that individuals and groups of various professional interests are prepared to work together for disaster reduction.

In another sector in Latin America, progress in risk management in the public health services would not have been possible without building additional professional capacities. Independent consultants and local professionals have agreed that a low-cost, culturally sensitive strategy is the most effective way to contribute to the

LÍDERES is a vulnerability reduction course in Spanish organized by PAHO/WHO taught almost exclusively by national specialists with international reputations with the aim of strengthening the managerial skills required by disaster risk reduction practitioners. The content of the LÍDERES course is constantly evolving and is revised in response to the needs of its target audience, the Latin American disaster reduction community.

A multi-sectoral course programme sponsored by OFDA/USAID in partnership with national governments and NGOs has a key advantage that Latin American and Caribbean agencies can hire professionals from neighbouring countries and benefit from their knowledge about local contexts and cultures, in addition to their local language abilities.

reduction of risk. All ministries of health in Latin America and the Caribbean now employ at least one official who is in charge of disasters. In many countries there is an entire department or agency devoted to the subject. In Argentina, Bolivia, and Chile, new water and sewage concessions demand that participating private sector companies meet disaster reduction criteria in the construction, operation, and maintenance of water and sanitation systems. Vulnerability studies have been carried out in Brazil, Chile, Costa Rica, Ecuador, Peru, and Venezuela to examine water supply and sewage systems. This has led to an increased availability of current technical information and a growing demand for training in disaster reduction in this field.

LA RED has developed a methodology for training of local authorities in risk management. It has elaborated training modules and support material, with important conceptual contributions in the area of vulnerability reduction and risk management. This methodology is currently being applied in many countries in the region and adapted to local conditions.

● Africa

As current risk reduction efforts in South Africa require a considerable amount of inter-sectoral collaboration, a Training and Capacity Building Working Group has been established within the national Inter-departmental Disaster Management Committee to form one body that can monitor disaster management training and research throughout the country. The working group is compiling a comprehensive framework for all types of formal and non-formal disaster management training and other capacity building programs. It is also in the process of establishing a body to set standards for disaster management training consistent with the accreditation requirements of the National Qualifications Framework and the South African Qualifications Authority.

Schools for community outreach play a vital role in the community. A proper education through the schools not only teaches the children but also reaches deep into the community through the parents and teachers. It is observed from past experience that the basic problems related to disaster mitigation and

preparedness are frequently attributed to lack of training, awareness, education, and self-reliance within the communities. An appropriately educated and trained community is much more capable to cope successfully with natural hazards and to reduce their impacts.

● Asia and the Pacific

The School Earthquake Safety Initiative is being implemented by the UN Center for Regional Development/Disaster Management Planning Hyogo Office (UNCRD, Hyogo Office) in Kobe, Japan, in association with the Earthquake Disaster Mitigation Research Center (EDM) in Miki, Japan. It focuses on five cities in four countries in Asia: Bandung and Bengkulu, Indonesia; Chamoli, India; Kathmandu, Nepal; and Tashkent, Uzbekistan.

The objective of the initiative is to develop disaster-resilient communities through self-help, cooperation and education. The initiative also aims to promote disaster education among children, teachers and parents. This approach to public education also encourages widespread involvement in the realization of safer construction practices through retrofitting of school buildings with the involvement of the local communities, local governments and NGOs. As a visible and highly considered community asset, a safer school can serve as a valuable example of practices that can save the lives of children and serve for relief activities as well. It can be used as a temporary shelter after an earthquake, and can also promote the culture of prevention and mitigation through ongoing community activities.

Thus, the importance of schools in every aspect of the disaster cycle from pre-disaster mitigation to post-disaster rehabilitation can be recognised. Significant success has been achieved and many important lessons have been learned, which can and should be applied to different hazard-prone cities and countries.

In December 2001, the Philippine Institute for Volcanology and Seismology (PHIVOLCS) and the Asia/Pacific Cultural Center for UNESCO jointly held a training course in collaboration with the Philippine Commission on Higher Education (CHED), United Nations University (UNU) and the Asian Disaster Reduction Center (ADRC). ADRC encouraged participation from its member country network and personnel responsible for education about disaster management from 11 Asian countries. The program for these school commissioners, government education officials, and NGO officials included training aimed

particularly at furthering disaster management in schools, such as by demonstrating a model earthquake evacuation drill. Following this training, it is expected that disaster preparedness will be reflected in more school curricula across Asia.

The United Nations Disaster Management Training Program (DMTP) has been a major international initiative to develop training in disaster management. Originally launched by UNDP and UNDRR (now OCHA) in cooperation with a core group of UN agencies in 1990. DMTP, currently administrated by UNDP, supports ongoing capacity-building efforts of the UN system, international organizations and individual disaster-prone countries. Workshops have promoted the establishment of national or regional centres and strengthened their capacities to study technological and environmental hazards, seismic protection, crisis prevention and preparedness.

DMPT has conducted more than 70 workshops involving 6,000 participants in Africa, Latin America and the Caribbean, Asia and the Pacific, the Middle East and the Commonwealth of Independent States. Training materials include 22 training modules, 27 country case studies, simulation exercises, trainers' guidelines, and videos that have been created to implement DMTP's goals. They encompass a wide range of topics including learning about emergencies and disasters, techniques of disaster assessment or risk reduction, links between crisis and development. The training modules have been written in English, French and Spanish, with selected modules translated also into Arabic, Bahasa Indonesian, Chinese, Portuguese, Russian, and Vietnamese. To improve information exchange and access to all learning resources DMTP established a web site at www.undmtp.org.

In recognition of the importance of education in disaster reduction, the International Federation of Red Cross and Red Crescent Societies has devoted significant energy to this area, with activities including: training geography and social studies teachers as was done in the Caribbean through the Community Based Disaster Preparedness Programme, so that they may include the topics in their own classroom plans;

- working with tertiary institutions in Pacific island states to incorporate disaster management topics in their curricula;
- developing games and drama exercises as a means of imparting disaster preparedness information to children in the Pacific;
- preparing disaster preparedness manuals for school children, as was done in Vietnam; and
- using television cartoons to convey messages to adults and children in Central Asian countries.



Future challenges and priorities

In formal education programs and professional training activities, the shift from hazard-focussed to a broader integration of risk awareness, analysis and management has only just begun. Major disaster events in recent years such as hurricane Mitch in Central America, the Gujarat earthquake in India, or the widespread floods of Southern Africa have each dramatically increased both the public and official recognition that risk education is lacking. More sustained focus on informal training and community based capacity building is encouraged. The following priorities must be integrated if disaster risk reduction is to become more fully incorporated in routine education and training programs:

- Proceeding beyond emergency response
- Incorporation of risk in sustainable national development
- Educating about the social dimensions of risk
- Institutional basis to transmit experience
- A sustained commitment to risk reduction in the future

• Proceeding beyond emergency response

There has been a progressive acceptance of the distinction between emergency services required to respond to disaster and the longer-term and much more diverse responsibilities related to risk reduction. Both national and international commitments are necessary to invest in human resource development dedicated to risk reduction, first and foremost to support initiatives in the most disaster-prone countries.

A continued expectation, or reliance of external emergency assistance in response to singular disastrous events will impede any efforts to educate and involve future generations more fully in disaster risk management. The significant imbalance in financial allocations and international emergency assistance during disasters compared to the meagre amounts committed to building locally-based risk reduction

capabilities remains a disincentive for developing effective education and training programs in disaster-prone countries.

• Incorporation of risk education in sustainable national development

Risk is seldom taught in a systematic way on a broad, multidisciplinary basis. A critical challenge for more effective education and training about risk reduction is the need to broaden the base of association with the subject and the more commonly adopted topics of educational programs. The subject of risk needs to become more integrated elements of national economic growth and development. This implies a closer identification with both the causes of risk as well as planning the means by which it may be reduced.

• Educating about the social dimensions of risk

Current views about the relevance of subjects such as the socio-economic conditions of vulnerability, matters of social equity related to risk, and the promotion of means to motivate more popular participation within local communities all describe topics yet to be accommodated systematically in education programs. An emerging trend of advanced academic studies that are able to attract both students and working professionals from a variety of fields, including technical, social and administrative disciplines should continue to be encouraged and supported.

There is considerable scope also to address risk management within educational programs of public administration. By doing so, the continuity and managed integration of responsibilities inherent in civil service functions could provide a more sustained basis for making risk management an essential element of expected government practice at all levels. Much more can be accomplished by introducing risk awareness into secondary and even primary educational programs through innovative programs of teaching science, geography, ecology, and civic responsibility.

- **Institutional basis to transmit experience**

The managerial and organizational responsibilities in identifying, monitoring and managing risk remain insufficiently represented in educational and professional contexts. While specific aspects of financial risk management are routinely included within economics, financial investment and insurance curricula, parallel approaches of risk management within the technical, environmental or social contexts of a society are much less in evidence.

Future challenges in education revolve around developing individual capabilities and the creation of collective institutional capacities. Local communities must be aware of the risks to which they are exposed. They then need to institutionalise the technical and managerial abilities to assess and monitor them, and the political and popular structures to manage them.

- **Sustained commitment to risk reduction education and training**

A longer term vision is needed to build education and training processes that will contribute to culture of prevention. Investment in the development of human resources can be sustained only to the extent that the values of risk management are embedded within the education and training capabilities of disaster-prone communities. There is a pressing need for innovative means to convey shifting organizational relationships and the mosaic of interests involved in shaping people's understanding and developing professional abilities for the future, with an increasing expectation of substantive private sector involvement in their realization.