# International Symposium on Disaster Reduction and Global Environmental Change

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From a culture of reaction to a culture of prevention:
**Joining forces for a sustainable development**

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German National Committee on Global Change Research

DKKV

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# Declaration on Disaster Reduction and Global Environmental Change

## Towards a Policy of Disaster Prevention

Seventy-five experts from seventeen countries in Africa, North and South America, Asia and Europe and representatives of four United Nations organizations (ISDR, UNEP, UNFCCC, UNCCD) as well as major international scientific research programmes (International Geosphere-Biosphere Programme IGBP, World Climate Research Programme WCRP, International Human Dimension Programme IHDP and the International Programme of Biodiversity Science DIVERSITAS), implementing agencies (GTZ, ADPC), the IGAD Drought Monitoring Center (DMC), the Global Fire Monitoring Center (GFMC) and the Inter-American Development Bank, met on 20 and 21 June 2002 in Berlin under the auspices of the German Committee for Disaster Reduction (DKKV), Germany's National Committee on Global Change Research (NKGCF) and the Federal Foreign Office. The Symposium brought together experts from the global change research and disaster reduction communities to discuss trends in global change and their implications for disaster reduction activities.

**In the course of their deliberations, participants identified a number of points they considered of key importance for the future:**

- Despite the good progress made by some countries in reducing the impacts of and deaths caused by natural disasters, environmental degradation continues to exacerbate not only the hazard potential but also the vulnerability of societies. Human suffering and material losses from natural disasters are on the rise worldwide: since the 1960s the global economic cost of disasters has increased by more than 800%. Given the growing long-term vulnerability of people living in high-risk regions, rising prosperity and the cumulative effects of global environmental change, this trend is expected to continue.

- There is increasing evidence that global environmental change and natural disasters are linked. Future trends with regard to natural disasters are expected to be non-linear, featuring critical thresholds caused by abrupt changes in earth system dynamics. Extreme weather events having particularly severe impacts on certain regions of the world are likely to increase. At the same time economic marginalization and population shifts towards more hazardous regions will increase people's vulnerability to extreme events such as hurricanes, coastline flooding, droughts, wildland fires, river floods and famine. Poor people tend to live in high-risk areas and urban settlements are often not adequately prepared to deal with such extreme events. Increasing attention therefore needs to be given to the vulnerability of urban settlements and their infrastructure.

As the first forum bringing together experts from both the disaster reduction and the global environmental change communities, the Berlin Symposium has been instrumental in launching a new and important dialogue, from which both communities stand to gain. To maintain this dialogue, however, further ongoing efforts are needed.

In the light of the data on current trends presented at the Symposium, participants call for:

- A recognition on the part of policy-makers and decision-makers that losses from natural disasters – in terms of both human suffering and infrastructure – will continue to increase unless a concept is adopted that makes disaster reduction an integral part of sustainable development and links efforts to reduce community vulnerability and promote resilience with efforts to develop the local economy and sustainable management of natural resources.

- A new approach to global cooperation designed to raise awareness among decision-makers that communities may suffer a higher incidence of natural hazards also as a result of environmental emissions possibly originating in distant regions of the world.

- Endorsement of the Amsterdam Declaration of the four international programmes (WCRP – IGBP – IHDP – DIVERSITAS) and the development of "an ethical framework for global stewardship and strategies for earth system management" as well as "a new system for global environmental science".

**The Symposium adopted the following specific recommendations:**

**Action should be taken to:**

1. Establish a "Type 2" partnership linking disaster reduction and global environmental change under the auspices of the WSSD process. A partnership along these lines under the umbrella of the ISDR and ICSU should envisage concrete project-oriented action to be implemented by global environmental change programmes as well as specific ISDR programmes.

2. Improve the capacity of the social and economic sciences to undertake global monitoring of the human aspects of disaster reduction. Integrating a monitoring system of this kind with the well-established observation systems of the natural sciences will generate a new dimension of predictive data giving decision-makers further insights into how to effectively reduce vulnerability.

3. Establish a global early-warning mechanism under the auspices of the United Nations that would also include an International Early Warning Platform. Such a Platform should facilitate inter alia concrete action to implement the recommendations of the global environmental change and disaster reduction communities along the lines approved by the Experts Meeting on Early Warning and Sustainable Development held in March 2002 in Bonn.

4. Promote the development of global observation systems, including inter alia satellite technology applications and ground-based observation, with special emphasis on incorporating such data more effectively into global mapping and geographic information systems. This could be achieved by encouraging greater political awareness and networking on the part of ongoing international initiatives (e.g. Data Exchange Platform for the Horn of Africa, Global Monitoring for Environment and Security, Integrated Global Observing Strategy and others). Here the proposed International Early Warning Platform could give an important lead. The main focus should be on environmental impacts, land-use changes and natural disasters. Unrestricted and affordable access to such data for all actors is the key to their effective utilization,

improved transfer of information to end-users and increased awareness on the part of all concerned.

5. Strengthen local, regional and national strategies encompassing medium and long-term action to mitigate the impacts of climate change and related hydro-meteorological events. This should be achieved through capacity-building, education and training, building networks of community stakeholders as well as developing and improving consistent government policies and programmes for sustainable disaster risk management.

6. Put in place supporting economic mechanisms to provide vulnerable countries with funding and technical assistance to help mitigate the impact of global environmental change, establish early warning systems and rehabilitate communities affected by disasters.

7. Develop with the full involvement of all parties indicators designed to enhance the effectiveness of disaster reduction and vulnerability reduction activities. Linking research data on global environmental change and disaster reduction yields a wealth of information on socio-economic issues, ecosystems and food security that gives significant added value to the available data base.

*Floods, Mozambique 2001*

## Background

Losses associated with natural disasters are growing globally. The death toll is estimated to reach an average of 100,000 lives each year (as of 2050) with more than 97% of casualties suffered in developing countries. Furthermore, natural disasters are often followed by dramatic in-country and cross-border refugee flows, with a huge potential for unforeseeable security problems and internal/ international conflicts. The Red Cross estimated that 1998 was the first year in which the number of people being displaced from environmental disasters exceeded those displaced as a result of war. By the year 2050 global economic losses caused by natural disasters are expected to top $ 300 billion annually if no breakthrough in disaster prevention, disaster adaptation and risk reduction can be achieved. Again most of the burden is on the developing world, if not in absolute numbers then as a percentage of the gross national product (GNP). Almost all of them are exposed to a high level of hazard by various disasters. Simultaneously the vulnerability of developing countries to disasters is increasing and so is their risk. An increasing percentage of funds is absorbed by disaster response activities, funds which could have been allocated for development efforts. During the 1980s, the Asian Development Bank earmarked 6 per cent of their loans for reconstruction measures. In the 1990s this figure rose to 20 per cent. The negative impacts of natural disasters are posing a substantive threat both to sustainable development and to poverty eradication.

There is an increasing evidence that global environmental change and natural disasters are closely linked.

- **Population growth and increasing impoverishment in developing countries**
  The over-use of soil closely correlated with increasing demographic pressure and low prices on the world market for agricultural products from developing countries results in the inappropriate use of resources, leading to the destruction of the natural sources of life. With its man-made aspects, extreme poverty increases the number and extent of natural disasters. The situation can be further exacerbated by economic crises which hit underdeveloped regions and the poor particularly hard. Women are particularly badly affected by these problems. This negative link between extreme poverty and natural disasters makes it more difficult to attain sustainable development because the will of the individual to help himself and the degree to which the population can be organized decreases rapidly under these conditions (institutional vulnerability).

- **Biodiversity losses – how to find a balance between protecting resources and utilizing them**
  The ecosystems of developing countries carry up to 90 per cent of the species of the world known today, with populations already considerably diminished. If the current rate of destruction of nature through clearing land of trees, intensified forms of use, urbanization, exploitation of raw materials and infrastructure expansion continues, it must be expected that further species will be lost. For people in developing countries, the resources provided by biodiversity in the form of foodstuffs, building materials and medicines are often the only, and in many cases the most important, basis for economic development. In particular mangroves and wetlands are important resources which contribute towards mitigating the impact of floods.

- **Environmental pollution, climate change and future disasters**
  In industrialized and threshold countries the non-sustainable over-use of resources causes environmental pollution and ultimately leads to changes in the

global environment. According to the most recent report by Working Group II of the Intergovernmental Panel on Climate Change (IPCC, 2001), there is an increasing likelihood of human induced climate change which will result in more water-related disasters, in particular in tropical and sub-tropical countries. Sea level rise will exacerbate the situation in small islands and in coastal areas with one third of the world population living within 100 km of coastline. On the contrary wildland fires may increase as a consequence of droughts. Demographic growth, climate variabilities and land-use changes are increasing the devastating effects of many wildland fires.

- **Increased vulnerability of urban settlements and infrastructure**
  The rapid and often uncontrolled urban growth is one of the main factors contributing to the increasing vulnerability towards natural hazards. Due to a lack of choice poorer parts of the population in the cities tend to live in extremely hazardous places close to rivers and seasonally flooded locations, on steep slopes where landslides are a natural hazard, near waste dumps or hazardous industrial facilities. Additionally the types of construction in cities are often not in line with the extremes to be expected. In many countries, people settle in areas prone to fires. People in globalized societies are much more dependent on life lines than they used to be (roads, railway lines, subways, telephone and electricity connections). A failure of these services due to natural or technological disasters can have considerable consequences even for people in areas not directly affected. Natural hazards can trigger technological hazards like a domino effect. In major industrial areas, particularly involving the chemical industry, extreme natural phenomena such as earthquakes or floods can result in cataclysmic environmental disasters, a fact not given due consideration in some regions.

- **Migration due to the destruction of the natural sources of life**
  The destruction of the natural sources of life forces people to seek a new future elsewhere, for example by migrating to in-country or transboundary urban areas or uncultivated regions ("Environmental Refugees").[1] In some cities, up to 70% of the urban area has emerged as the result of sporadic settlements of poor migrants from the rural areas in squatters. The areas which have not yet been settled are often threatened by floods, landslides or high tides. Supplementary migration flows may cause conflict constellations domestically (through ethnic, religious or other eruptions), in the recipient countries or even in an international dimension, which might cause disaster scenarios as well.

1 Migration flows, determined by environmental stress, are described with the term "Environmental Refugees" (El-Hinnawi, 1985 on behalf of UNEP), environmental migration or "distress migration" (Elisabeth Meze-Hausken). "Those people, who have been forced to leave their traditional habitat, temporarily or permanent, because of a marked environmental disruption that jeopardized their existence and/or affected the quality of their life" (El-Hinnawi).

## Section 1

# Disaster Reduction and Adaptation

The escalation of severe disasters caused by natural hazards and the related environmental and technological disasters are increasingly posing a substantive threat to both sustainable development and poverty eradication initiatives. Disaster reduction has been recognised by the United Nations as a precondition for sustainable development. The tremendous loss of lives, the increase in the costs of reconstruction and loss of development assets has forced the topic of disaster reduction on the political agenda and led to the adoption of the International Strategy for Disaster Reduction (ISDR). The mission of ISDR is to develop a culture of prevention and build resilient societies and communities by promoting increased awareness of the importance of disaster reduction as an integral component of sustainable development, with the objective of reducing human, social, economic and environmental losses due to natural hazards and related technological and environmental disasters.

The involvement of civil society representatives is essential to ensure the community development purpose of the ISDR. In this regard, NGOs contributed greatly. In some countries more than others, NGOs are actively involved in the work of national platforms for disaster reduction. Among the NGO community, the academic and scientific institutions play a key role as they are the main sources for development of knowledge in society. Disaster reduction aims at enhancing and supporting a wide variety of activities, some related with disaster management, others not. Disaster prevention, mitigation and preparedness are intimately related

*Floods, Vietnam 2000*

with disaster management and therefore require the active and effective participation of disaster management institutions and experts. However, vulnerability and risk reduction also address needs that go beyond disaster management and include the tasks of urban, rural and land-use planners, educators, scientists and researchers, psychologists, lawyers, economists, architects, sociologists, engineers, agronomists, health professionals, etc., and which are not necessarily related with disaster response, relief or recovery needs.

Risk and vulnerability reduction need to be integrated as essential components of programmes in the fields of combating poverty, addressing climate change or urban sustainable development, which are not however, the responsibility of disaster or emergency managers.

The task of disaster reduction is of long-term nature, and thus requires a progressive approach which addresses all sectors of society, as no single sector can do it alone. Such an approach involves government, business, academic, scientific and technical institutions, NGOs, CBOs, media, schools, etc., and at all levels, from local to international.

According to the different levels various needs and possibilities for adaptation exist.

- At the **local level** risk mapping to identify hazards and vulnerabilities and the implementation of preparedness and mitigation solutions (Stand alone and under existing development projects) are required.

- At the **national level** national disaster management organizations and systems that have been in place for the past 15-25 years are under resourced and constantly challenged. Reforms driven by public expectation and committed leadership are needed.

- At the **sub national level** district and provincial disaster management committees must develop integrated preparedness and mitigation plans and projects in effective partnership with NGO and CBO work to form innovative initiatives.

The private/insurance sector developed specific adaptation strategies like formation of reserves, giving incentives for loss prevention/reduction, exclusion of high risk areas, exclusion of certain hazards from insurance coverage and more indirect to support Eco-audits in environmental liability insurance and to work on Eco-balance of insurance business and real estate.

Examples for effective integrated hazard specific programmes are:

- Integrated Hazard specific programmes

- Cyclone Preparedness Program, Bangladesh

- Core Shelter Project, Philippines

- Radius Project – Indonesia, China, Uzbekistan, Nepal

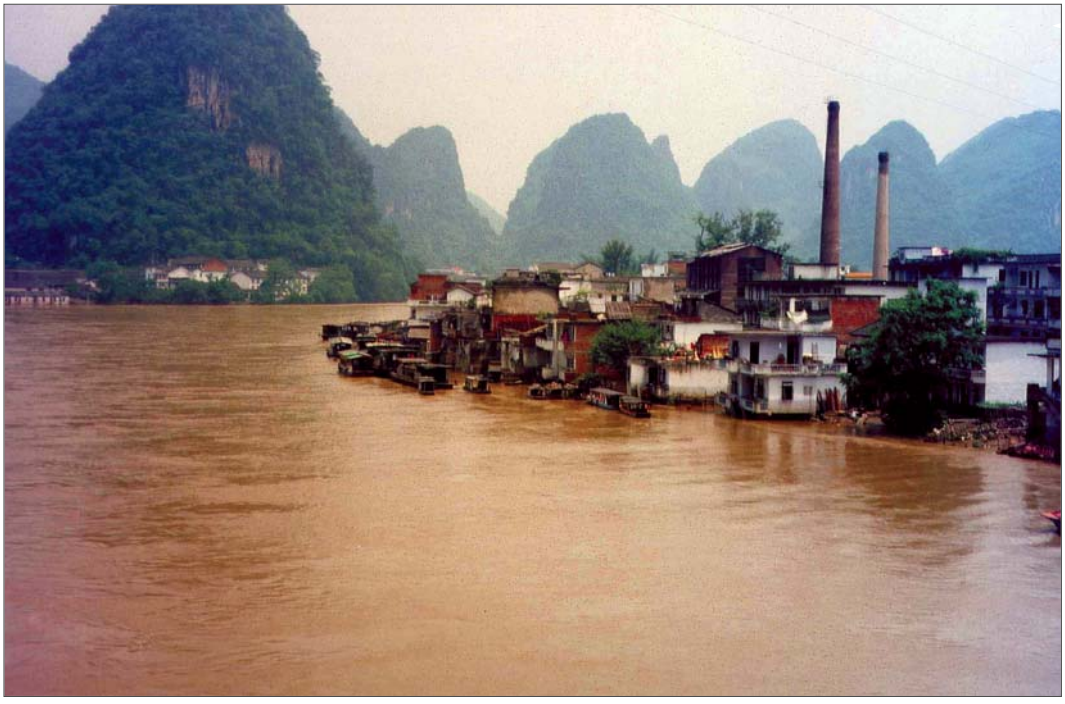
- Asian Urban Disaster Mitigation Program.

Regional cooperation must be promoted to share resources, expertise and programme implementation, thus enhancing the effectiveness of existing mechanisms to:

- use Decision Support tools
- establish "Actionable" Early warning
- implement Vulnerability Mapping and DM Information Systems
- work out Preparedness and Mitigation Plans
- address social causes of risk and vulnerability
- mainstream Disaster Risk Reduction in Development Planning
- build Prevention and Mitigation measures into Response and Recovery initiatives.

To implement effective disaster reduction projects in order to establish appropriate adaptation strategies:

- Disaster reduction must be linked to poverty eradication
- Disaster reduction must be linked to human security and environmental degradation.
- Disaster reduction must be linked with urban settlements and globalisation.



*Floods, Lijang / China 2001*

## Section 2

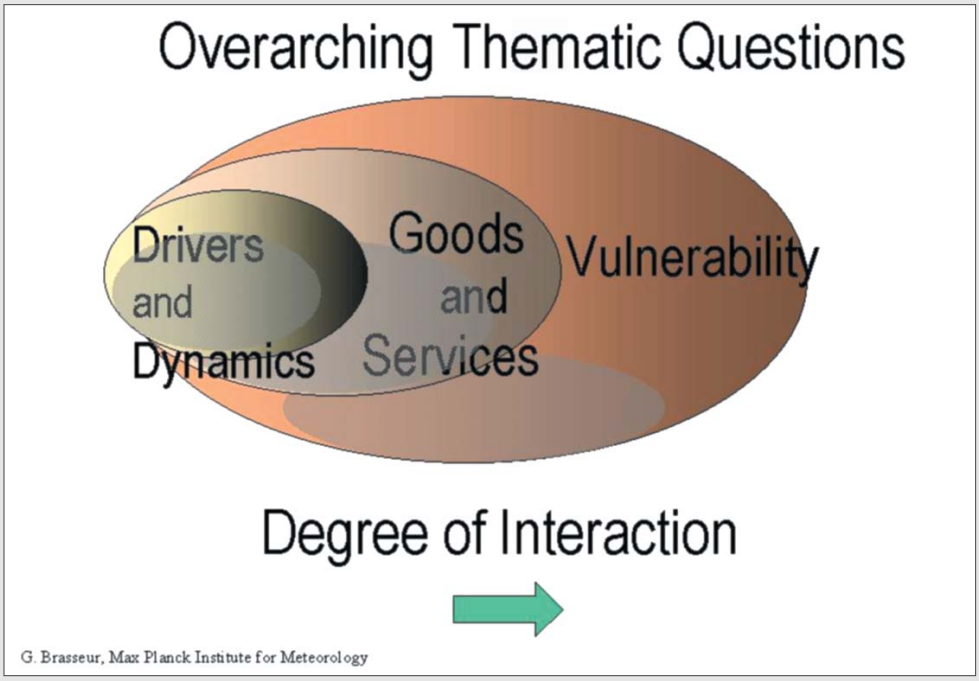
# Living with Global Change: Challenges for Global Change Research

The world faces significant environmental problems: shortages of clean and accessible freshwater, degradation of terrestrial and aquatic ecosystems, increase in soil erosion, loss of biodiversity, changes in the chemistry of the atmosphere, declines in fisheries, and the possibility of significant changes in climate. These changes are occurring over and above the stresses imposed by the natural variability of a dynamic planet and are intersecting with the effects of past and existing patterns of conflict, poverty, disease, and malnutrition. Possible changes in weather extremes such as heat spells, droughts, heavy precipitation or storms are highly relevant factors contributing to regional consequences of climate change, since they are able to lead to natural disasters causing considerable damage.

Over the past few decades, evidence has mounted that planetary-scale changes are occurring rapidly. These are, in turn, changing the patterns of forcings and feedbacks that characterise the internal dynamics of the Earth System. Key indicators, such as the concentrations of CO2 in the atmosphere, are changing dramatically, and in many cases the linkages of these changes to human activities are strong. It is increasingly clear that the Earth System is being subjected to an ever-increasing diversity of new planetary-scale forces that originate in human activities, ranging from the artificial fixation of nitrogen and the emission of greenhouse gases to the conversion and fragmentation of natural vegetation and the loss of biological species. It is these activities and others like them that give rise to the phenomenon of global change.

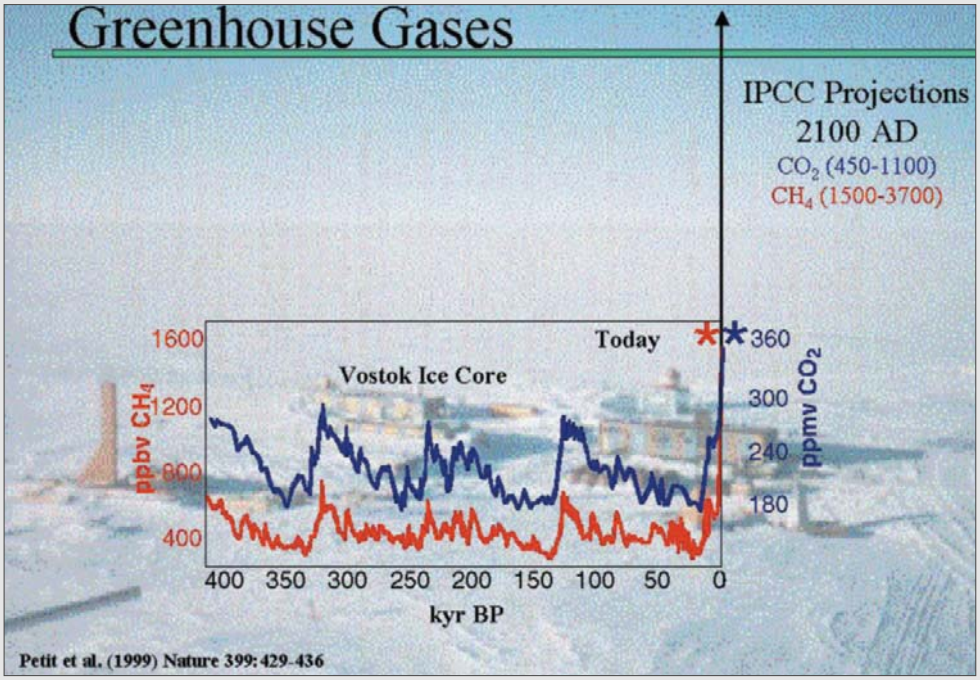
As the 21st century unfolds, population, development, affluence and technology are set to interact in ways that will have important implications for the Earth System. Unless many of the trends of the 20th century are slowed significantly or reversed, the pressure on the planetary environment will increase even further. Strategies will have to be found to ensure the sustainability of the Earth System while accommodating economic and social development. The implications of human activities for the Earth System become apparent when the myriads of smaller human-driven changes are aggregated globally over long periods of time, influencing Earth System functioning as a global scale force in their own right. Several properties of this new force emerge as important features of an altered Earth System.

The challenge of understanding a changing Earth demands not only systems science but also a new *system of science*. This approach must retain and strengthen existing tools for studying the planetary machinery, develop new systems-level approaches for integration and build an effective framework for substantive collaboration between the social and natural sciences. An integrative Earth System science is already beginning to unfold. Observations of Earth from the surface and from space are yielding new insights almost daily, interdisciplinary research centres focused on global change are springing up around the world, and the global environmental change programmes (WCRP, IGBP IHDP and DIVERSITAS) are beginning to build an international science framework. Management strategies for global sustainability are urgently required. Earth System science is the key to




*Overarching Thematic Questions*






*Greenhouse Gases – IPCC Projections 2100 AD*

implementing any approach towards good planetary management, as it can provide critical insights into the feasibility, risks, trade-offs and timeliness of any proposed strategy.

Source: IGBP SCIENCE No. 4, further reading http://www.igbp.kva.se

*Earthquake, Gujarat / India 2001, Magnitude 7.6*

## Section 3

# Integrated Research and Perspectives

A key element of integrated approaches to disaster reduction and global environmental change is the vulnerability assessment of different social actors. Vulnerability is defined as the degree to which an individual or a community is susceptible to, or is unable to cope with, adverse effects of an extreme event or shock, including exposure, resistance and resilience. Vulnerability assessment has to include components of natural sciences, engineering practice and the human dimension within the broad context of public policy.

Vulnerability reduction can be achieved by the increase of resilience, which is the ability to withstand extreme events and shocks. In view of global climate change the concept of adaptation is of high importance, which gives an individual or community the ability to respond and adjust to actual or potential impacts of changing conditions. Effective adaptation practice to reduce climate change induced vulnerabilities needs

- strategies to sustain and enhance the livelihood of vulnerable people
- usage of measures based on existing community-based resource management pratices by real bottom-up, user-driven approaches
- developments of institutional capacities to offer immediate benefits and contributions to longer-term capacity development
- focus on gaps between local individual/household, community and governmental processes.

Within the general theme of disaster reduction and global environmental change the assessment of the natural disaster potential of intensively human-constructed places is a distinct component of future scientific research. Cities as dominant places where people live will become the most important localities in the 21st century. Analysing urban hazards is part of a continuing debate.

There are difficulties of relating climatic fluctuations with the potential of natural disasters in urban areas because of their enormous complexities and dynamics. They are constantly reshaped by specific urban development patterns, where climatic change is one of many factors. Therefore, approaches are needed, which simultaneously address climate change, disaster potential and urbanisation by urban vulnerability analysis and modelling.

Within this framework multiple perspectives are necessary. A new generation of disaster reduction strategies and models recognise that scientific approaches are only one way of perception. To improve public policies for disaster reduction other social groups must be brought into the discourse. To engage other interest groups the increase and expansion of the dialogue is a prerequisite to conduct action-orientated studies. Our attention should be focused on conversation itself between the different groups of actors. This society discourse about hazards, risks and vulnerability must begin now.

# Summary of Working Groups

## Working Group 1

### Disaster reduction and long-term risk assessment (agriculture and urban land use, biodiversity, desertification, water resource management)

**Rapporteur: David Alexander**

The participants in Working Group 1 recognized that several issues are paramount in the connection between global change and disaster reduction. They are:

- natural resource management
- early warning systems in relation to long-term climate change.
- short-to-medium term poverty alleviation
- community development
- the implementation of applied research

Firstly, it was felt that global change programmes do not yet seem to co-ordinate adequately with each other. They also need better representation from the developing countries. Secondly, the connection between global environmental change programmes and the disaster reduction community needs to be developed more fully: this is mainly a problem of communication.

We recognized that a successful strategy for reducing the disastrous effects of global change must be carried out at several levels of communication and action. For instance, a successful strategy to combat desertification requires the following levels of organization:

- scientific investigation and surveillance
- risk assessment, with special emphasis on the human dimension
- technical co-operation
- policy and the preparation of national action programmes

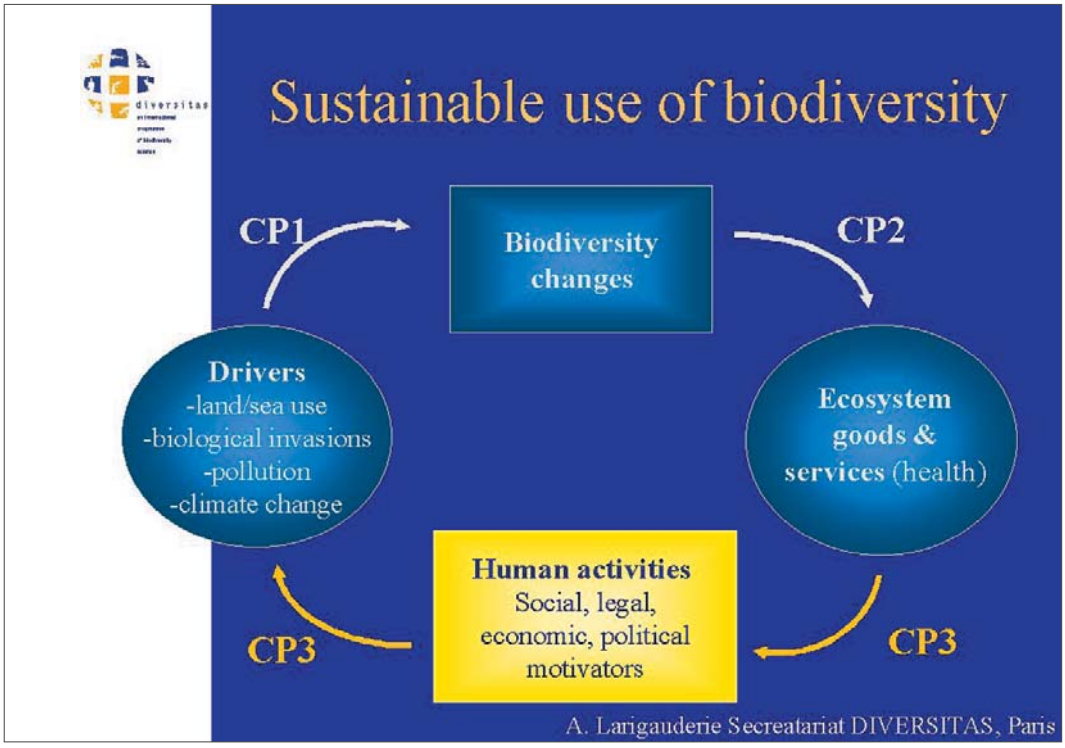
Scientifically, it was felt that vegetation cover is a key issue. Plant biomass (phytomass) is often wasted or used and converted in inappropriate ways. Land-use plans should therefore be developed that seek to ensure the stability of biomass. In some cases this will involve outright conservation, in others some degree of adaptation of land use may be necessary and desirable. In all instances, recommendations are needed for vegetation protection. Moreover, the start of the desertification process (i.e. the degradation of plant cover) is the key to knowledge

of soil loss. To gain adequate knowledge of this critical phase, indicator-based resource biomonitoring is needed on a regional level, using specific local indicators and particular tools.

More generally, how can we progress from reaction to environmental disasters to prevention of them? We do not lack the tools and methodologies to monitor potentially catastrophic environmental change, though we may lack the coverage of data on particular areas of the world. Thus there is a need to homogenize the tools used in monitoring regional biological indications of desertification. We should try to identify the need for new instruments, reshaped ones, or better use of existing tools.

We felt that technology transfer gaps need to be studied, and that scientists in particular should not suffer from a communications gap. In this context, socio-economic aspects of land degradation problems have been badly neglected by physical scientists. But technology transfer is only part of local-scale capacity building. It is not sufficient merely to offer solutions, it is also necessary to see how they work in practice. Many top-down development projects have failed. We need more bottom-up projects marked by strong participation of the local community, especially women, who have a huge role in the management of natural resources. Here, it is very important to raise awareness of environmental issues, but this *must* be accompanied by immediate proposals for action. This should be driven by improved efforts to ascertain what the priorities of developing countries are.

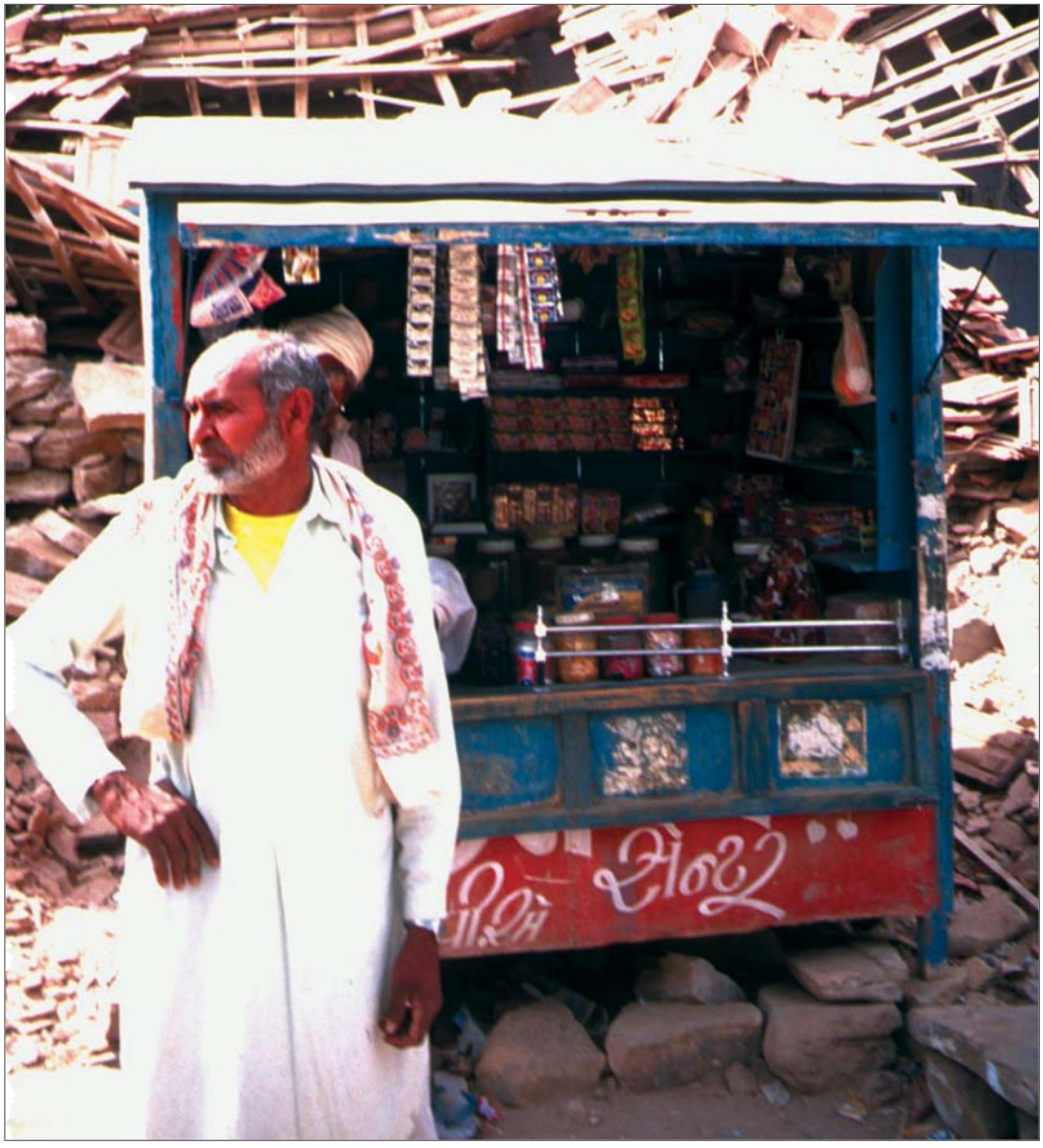
Indigenous solutions to land degradation problems need to be encouraged and research needs to be more sensitive to local needs. Moreover, much useful research is not transferred to poorer countries at all. In particular, there is a lack of technology transfer that goes beyond single projects. Governments and donor agencies tend not to support projects which are very long-term (e.g. 20-25 years).




*Sustainable use of biodiversity*
© A. Larigauderie, Secretariat DIVERSITAS, Paris

We lack follow-through, and thus many development projects end without leaving a positive legacy. In this respect a programme-based approach is considered to be more effective than one based on single projects, especially if it continues after the usual three- to five-year duration of such projects.

In synthesis, we need to establish a culture of communication, consisting of functional networks and characterised by two-directional flows of information (i.e. both top-down and bottom-up – providing both leadership and responsiveness to local issues). The political dimension in developing countries needs to be taken into account. Mobilisation is needed at different levels. Policies for land conservation or rehabilitation need to be better integrated with rural development programmes in general. The political will to carry through such programmes needs to be generated. Existing regional and national institutions need to be built upon in order to promote sustainability.



*Earthquake, Gujarat / India 2001, Magnitude 7.6. Fourteen days after – first signs of daily routine*

# Working Group 2

## Strategic framework for the development of indicators for effective disaster reduction and the enhancement of resilience

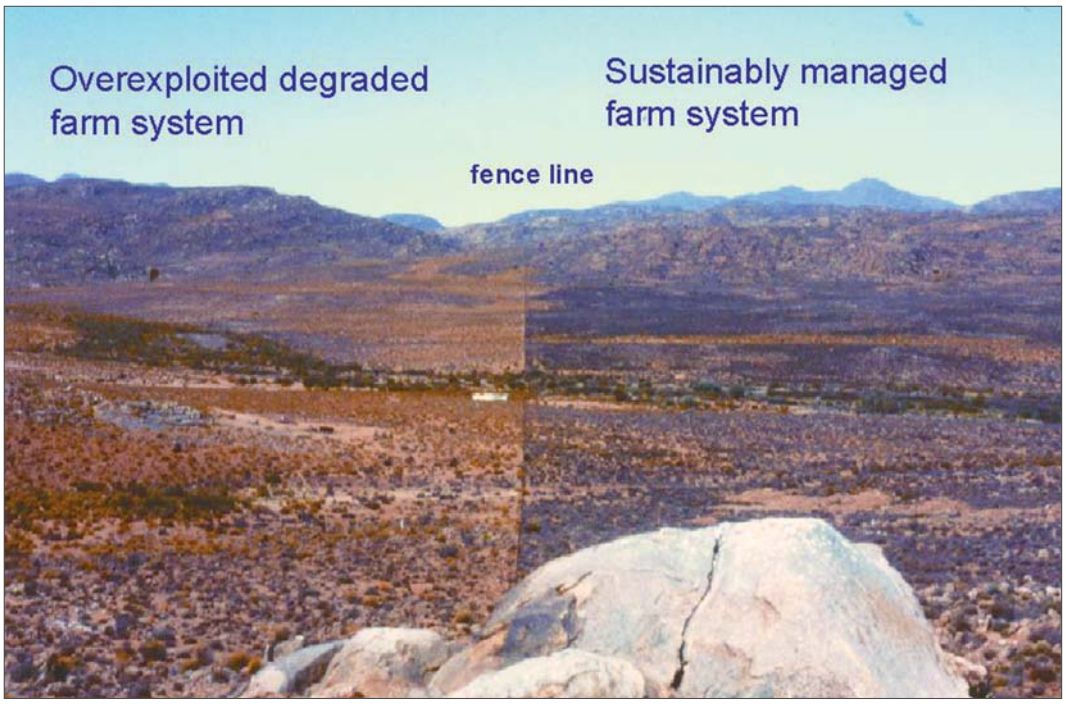
**Rapporteur: Maureen Fordham**

Efforts must be made to define vulnerability and other key terms such that they are understood and acceptable to a wide range of stakeholders.

Mechanisms must be explored to support integrative and interdisciplinary approaches to the collation and analysis of existing indicators and the identification of gaps and future needs. It must also be recognized that indicators are not neutral and therefore we must be clear about the assumptions which they contain.

In this context it will be important to reconcile different methodological approaches and to recognize the equal value of quantitative and qualitative measures, and to acknowledge economic, social, political and cultural dimensions.

The development of indicators must be carried out with the full participation of all parties directly concerned and due attention must be given to their usefulness and appropriateness at the local and other levels.




*Effects of small stock farming in a landscape at the boundary of the farms Paulshoek and Pooiwal, Namaqualand, Republic of South Africa*

It is recognized that we will never achieve perfection of data. However, this must not delay interventions: we must learn through doing and document, not just post-disaster losses, but also concrete evidence of resilience data range of scales. All fora call for new and better data and indicators, and improved methodologies, but we reiterate that action cannot wait.

# Working Group 3

## Implications of global environmental change on risk management and human security

**Rapporteur: Erich Plate**

- Modern human nations are risk societies. Managing risk is a basic requirement for all societies and should be extended to the global scale: impacts on the natural environment generated in one country may affect other countries far away. Example: developing countries generate global warming that causes sea level rise, thus increasing the impacts of storm surges on Bangladesh.

- Global change affects human security not only by influencing extreme events and their impacts on human society, but also by modifying the ability of the society to handle the impacts. Impacts are destabilizing stressors acting on an existing socio- economic state of society, the ability of society to handle impacts is the resistance.

- Global change is one of many factors affecting human security. Its basic causes are more predictable than many other unforseen effects, such as a flood, or small effects which have large impacts. However, both impacts and resistance are highly variable and should for planning be described by statistical methods.

- The effectiveness of responding to impacts depends not only on the state of the environment, but also on the structure and capabilities of the administrative organisations. These should be flexible to be able to handle unforeseen or infrequent extreme events.

- In order to quantify impact and resistance for decision making, it is necessary to combine many factors into a common human security index. The factors should include development indicators. In the simplest case it is possible to rank communities by expressing their state of human security by using the matrix of high and low, combined with resistance and impact, i.e. ranking high resistance and low impact as best combination, and low resistance and high impact as worst situation.

- A human security index must depend on scale ranging from the household scale to the regional scale. With increase in scale, additional factors have to be integrated into the index, i.e., when changing from the household to the

community scale, effects on lifelines: streets and infrastructure components, have to be added.

- The weight factors given to different indicators must have components which reflect the value system of a society, but the definitions of index components and the basis for determining the weights have to be general enough to provide the basis of comparison for different communities and countries.

# Working Group 4

## Disaster reduction, sustainable development research and information technology (satellite observation systems, GMES – Global Monitoring for Environment & Security, IGOS – Integrated Global Observation Strategy, GIS)

**Rapporteur: Norberto Fernandez**

The group agreed on the value and indispensability of good quality data and information as a prerequisite for sound decision making, at all levels of global environmental change and disaster management. In this context, information technology, its uses and applications, should support the transition from a culture of reaction to disasters towards a culture of prevention. The recommendations split in two dimensions: vertical and horizontal

**Vertical:** This has to do with the quality of ready-to-use data and applications.

- Satellite data, offering the unique capacity of visualising complex interrelationships and ongoing threatening processes, at global, regional and subregional levels, need to be integrated with data obtained from existing conventional monitoring systems and networks. Further, socio-economic data need to be fully integrated with physical data to support integrated analysis and assessments. In doing so, the operational reliance of space and information technology will be demonstrated.

- Capacity building and training. Encourage international and national cooperation to increase technology transfer and local structures able to deal with modern technology and information

**Horizontal:** This has to do with awareness of the existence of appropriate data and their increased use by policy makers, scientists and practitioners in general.

- Policy makers should be provided with ‚re-packaged' information, easy-to-understand and ready to be used for their particular purposes.

- Legislation should be encouraged in all countries to ensure citizens direct access to all environmental information

- networks established to provide worldwide data access and exchange, as well as coordination of data assembling initiatives (e.g. the DEPHA, Data Exchange Platform for the Horn of Africa, the GMES, Global Monitoring for Environment and Security, IGOS, Integrated Global Observation Strategy, etc.)

For that purpose ISDR should play a catalytic role in providing an international platform where data and information providers and users can meet and exchange their views, leading to optimisation of data sources and their use.

*Global climate change scenarios correspond in the prediction of increasing climate variability associated with increasing occurrence of extreme droughts and wildfires in Continental Eurasia and Northern America. Such a trend is already being observed at the turn to the 21st century. As a consequence high-intensity forest fires lead to a reduction of ecosystem stability and affect sustainable forestry, human health, and the atmosphere. The photograph shows a high-intensity forest fire in Central Siberia.*

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