

Out of the blue?



Disaster Reduction: Knowledge, Transfer, Practices

Proceedings of the
7th Forum and Disaster Reduction Day
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Ladies and gentlemen,

Disaster reduction is absolutely imperative if we are to counter the worsening damage caused by natural disasters. It is thus equally essential for sustainable development. Disaster reduction as a cross-cutting issue is a major challenge for all stakeholders, because aspects of disaster reduction must be incorporated in such wide-ranging and divergent fields as the environment, regional planning, construction regulations, development policy and humanitarian aid. This is only possible if all groups within society pull together – from civil society to government representatives, from the academic community to field-based practitioners.

All too often we must note that although we know a great deal, too little of what we know is applied in practice. Natural disasters are seen as “an act of God”, and the human responsibility is neatly ignored. The title of this event, “Out of the blue”, tackles precisely this aspect of natural disasters. Natural disasters do not come “out of the blue”. Well in advance we know a lot about the hazards and risks. But how can we pass on this knowledge to the people at risk? How can we ensure that the three vital steps are performed: recording available knowledge, developing operational transfer mechanisms, and finally putting this knowledge into practice? These are the difficulties that will be the focus of inputs to this documentation of the 7th Forum and Disaster Reduction Day of the German Committee for Disaster Reduction.

The first Forum was held in 2000. The DKKV had decided to establish an annual event for scientists and practitioners working in the field of disaster reduction. The first year, the Forum and the Disaster Reduction Day were held separately, later they were generally held parallel to one another so as to strengthen the exchange between the academic community and practitioners. This is also reflected in the title of this year’s event, “Knowledge, Transfer, Practices”.

Every year the event is held in a different location, and one member of the DKKV plays the part of host. In the past it has been hosted by the Global Fire Monitoring Center in Freiburg, the University of Leipzig, the Potsdam National Research Centre for Geosciences, the University of Munich, ZDF the second public television channel in Germany, and by the Hamburg Fire Brigade.



With this year’s event, held at the Head Office of the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), one of the implementing organisations of the Federal Ministry for Economic Cooperation and Development (BMZ), we aim to further scale up our contacts with development organisations. We would like to thank GTZ most warmly for hosting the Forum and the Disaster Reduction Day. The commitment of other organisations including the German UNESCO Commission, the United Nations University’s Institute for Environment and Human Security, the International Strategy for Disaster Reduction (ISDR) and the German government’s scientific advisory board on global environmental issues indicates that the topic of the Forum and the Disaster Reduction Day enjoy broad-based support. Recently UNESCO and the ISDR launched a joint programme, “Disaster Reduction begins at School”, which also deals with the issues we will be dealing with here: Knowledge, Transfer, Practices. How can we pass on knowledge?

This year, the event has a markedly more international flavour. Alongside representatives of four European states, we welcome participants from Africa and Central America.

Irmgard Schwaetzer
Chairperson of the German Committee for Disaster Reduction



Ladies and gentlemen,

Hurricanes and tornadoes hit without warning, leading to massive flooding, destroying people's existence and taking many lives. The tsunami in the Indian Ocean opened our eyes to the fact that natural disasters can totally negate the development efforts of our partner countries. But do disasters of this sort really come out of the blue? Has the international donor community not realised, at least since the United Nations International Decade for Natural Disaster Reduction, that the tragic impact of extreme natural events can be prevented or at least minimised?

The German Committee for Disaster Reduction (the Deutsches Komitee Katastrophenvorsorge e.V. – DKKV) and GTZ have worked closely for a long time now, in an effort to have greater political and practical importance attached to their common goal – disaster reduction. This event is being supported by the Federal Foreign Office and the Federal Ministry for Economic Cooperation and Development (BMZ), whom I would like to thank at this juncture. The two ministries are increasingly also promoting disaster reduction measures, based on the realisation that a part of the funding made available for emergency assistance should be invested in preventive measures for the future.

We have taken as the motto of this conference “Knowledge, Transfer, Practices”, because there is no lack of knowledge. What we need to do is to translate the available body of knowledge into practice. Development cooperation takes this interface as its entry point. We at GTZ see it as one of our main duties to make available sectoral and specialised knowledge to our partner countries, and to help them translate this knowledge into practice. In the full awareness of how important a smoothly functioning knowledge transfer is for our work and for international development we took as our spotlight for 2006 “Knowledge Powers Development”.

For some ten years now GTZ has been implementing disaster reduction projects and programmes on behalf of the Federal Ministry for Economic Cooperation and Development and the Federal Foreign Office. Since 2005, it has been helping the Indonesian Ministry of Education to integrate disaster preparedness into school curricula, on

behalf of the Federal Ministry for Economic Cooperation and Development. Since then more than 33,000 school children have been taught about the causes and results of earthquakes, and have practised evacuations and first aid. The number of deaths and injuries caused by the earthquake on Java in May 2005 would probably have been much higher, had most children not just learned in school what to do when an earthquake strikes. The children were able to save themselves and their families.

But still far too little is done in the way of disaster reduction. In 2005 alone, natural disasters cost more than 100,000 lives, most of these in developing countries. The economic cost of disasters in industrialised countries is significantly higher, but 97 percent of deaths hit developing countries. Poverty is the main cause of death. Disasters in turn exacerbate poverty and brake economic development. The international community is responding to these global challenges by trying to put in place a better disaster preparedness and disaster reduction system. For years the United Nations' International Strategy for Disaster Reduction (ISDR) has rightly stressed the fact that knowledge and experience must be better shared and disseminated not only at national level, but also at international level. A whole series of international initiatives, organisations and networks have made it their task to manage the knowledge available on disaster reduction.

I am delighted that representatives of the United Nations, the UN ISDR, the World Bank, private businesses and the insurance sector, of the academic community and aid organisations have found the time to attend this event, along with interested experts and the representatives of the media. I hope that together we can do our bit ensure that in future natural disasters do not simply come “out of the blue”.

*Bernd Eisenblätter
Managing Director
Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH
(Summary of the address held on 19 October 2006. Check against delivery.)*

Towards a culture of resiliency: The challenge of building an end-to-end tsunami warning system

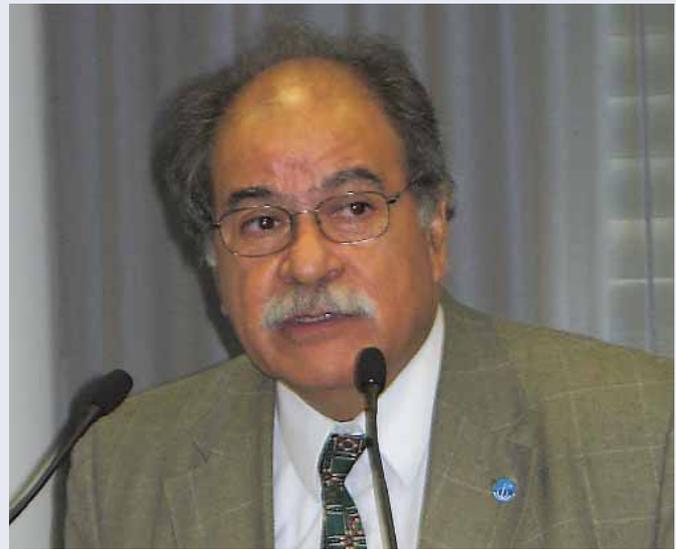
“Even the most perfect warning system is useless if people do not know what to do in an emergency.” Patricio Bernal hits on a central aspect of disaster preparedness here. The Tsunami Warning System for the Pacific (PTWS) with some 28 Member States, which the UN’s Intergovernmental Oceanographic Commission initiated in 1965 after two large-scale tsunamis (1960 in Chile, 1964 in Alaska), is operating successfully. But, says Bernal, it took decades for people to become aware of the adequate response to such a warning, whereas the technical side went ahead without any major problems.

Tsunamis happen everywhere

Thus, when a tsunami devastated the coastline along the Indian Ocean in December 2004, the technology needed to set up an appropriate warning system had already been in existence for quite some time. However, the experts had not succeeded in convincing the powers that be of the need for such a system. “In Indonesia people did not even know what the word ‘tsunami’ meant. How then could they have protected themselves against something they didn’t even have a name for?” asks Bernal, before going on to state that the situation in the Mediterranean today is comparable to that in the Indian Ocean prior to the tsunami. Tsunamis can happen in the Mediterranean too. “They may occur virtually everywhere. Some 250 years ago, Lisbon was destroyed by a tsunami. But memory fades away with time.” Empirical knowledge is not passed on, but lost.

Governmental responsibility

Risk awareness and knowledge about the correct way to respond is best communicated at the country and regional level. However, governments assert for themselves the right to issue warnings in their territory, rather than leaving this task to a multilateral warning system. Accordingly national ownership and engagement, i.e. government responsibility, is vital if international warning systems are to work. However, this presupposes that governments really do take on this responsibility and act on it. Otherwise alerts originating from the international networks of detection will be ineffective. This was the case with the tsunami of 17 of July 2006 generated by a submarine earthquake off southern Java, which claimed some 600 lives despite the fact that an alert was issued by the international system. “The



central hub of the system in Indonesia was not yet effectively linked up with coastal locations, nor with the local and national media; although national authorities did use technologies such as SMS to report the earthquake.” On the other hand, based on the same information, Thailand’s authorities concluded that the event posed no threat to Thailand shores and no warning was issued to the population.

For this reason, the architecture of Indian Ocean Tsunami Warning System (IOTWS) that is presently being set up is composed of the international networks of detection plus a network of 28 national tsunami centres. These national centres, under the authority of the government, will be responsible for communicating with the local authorities, the media and the population at risk. On top of this, disaster preparedness will be taught at schools. “National-level plans are now the greatest challenge,” stresses Bernal. In contrast, accessing the seismographic data was comparatively easy. Indeed, the 26 “Real Time Sea Level Stations” that make up the initial system operating today, were established within a period of just 18 months.

A global disaster detection system

The final objective is a global warning system that detects not only tsunamis, but also storm floods – in other words an oceanographic detection system that includes not only the higher risk areas of the Pacific, Indian, Caribbean and Mediterranean, but also Europe and West Africa too. This would be a building block for a more extensive “Multi-Risk Warning System” that brings together other warning systems presently in use. The rationale here is that although every type of disaster calls for a specific technique of detection if it is to be identified in good time, the channels of information used to inform and warn the people remain the same in each case and can thus be used for every type of disaster.

Out of the blue?

Disaster Reduction: Knowledge, Transfer, Practices

At first sight natural disasters often appear, as the name would suggest, to be unpredictable “natural” events, which are unavoidable and over which we have no control. But we have known better than that for some time now. Scientific findings and practical experience have together generated a huge body of knowledge about risks and effective preventive measures. A great many disasters are predictable, some are avoidable, a large number are caused by human activities – from landslides caused by the ruthless exploitation of natural resources and deforestation to the impacts of anthropogenic climate change. Targeted preventive measures can do much to reduce the consequences of disasters. Simple measures are often all that is needed to save human lives and prevent economic damage.

This is well illustrated by an example from Bangladesh. In 1991 a massive cyclone with wind speeds of up to 225 kilometres an hour hit Bangladesh, with almost 140,000 lives lost. A similar cyclone swept across the country again in 1997, this time with wind speeds of up to 200 kilometres an hour. Only 134 lives were lost thanks to improved forecasting, warning, mobilisation and coordination.

The risk of natural disasters is one of the main obstacles to sustainable development, as was confirmed in 2002 at the World Summit on Sustainable Development in Johannesburg. Half of the world's

population lives in areas at risk from natural disasters. Planning errors, a lack of knowledge and sustainability and economic constraints, in other words poverty, further increase vulnerability. In the nineteen nineties alone the economic cost of natural disasters worldwide could have been reduced by 280 billion dollars, if we had only invested 40 billion dollars in disaster preparedness measures. Action is clearly needed. What do we know about natural disasters? How can we make this knowledge widely available and use it to prepare for disasters? How can we learn from the disasters of the past for the future? These are the questions that the 7th Forum and Disaster Reduction Day focused on.

The transfer of knowledge to the practical level makes institutions and organisations more effective and expands the scope for action of the individuals affected. If practical experience is taken into account in theoretical concepts, the quality of scientific findings is enhanced. What ideas, initiatives and experience already exist with respect to a knowledge transfer in the field of disaster reduction? Where are the problems and difficulties (including communication difficulties), and how can we solve these? You will find some answers in this publication, which records the results and discussions of the 7th Forum and Disaster Reduction Day.



Communication with the population groups concerned

How to know what to do

When, on 26 December 2004 the waters of the Indian Ocean suddenly receded from the coastline, very few people interpreted the warning correctly. "A great many more people would have survived the tsunami if even every tenth person had understood the correlation between the earthquake and the receding ocean, and had interpreted it correctly," believes Gerhard Berz, and asks, "are we such failures that we cannot pass on even the simplest knowledge about tsunamis?" What can be achieved by successful risk communication is demonstrated by the example of the English girl, who had learned about tsunamis at school, and was thus able to save herself and her family.

A missing link in the early warning chain

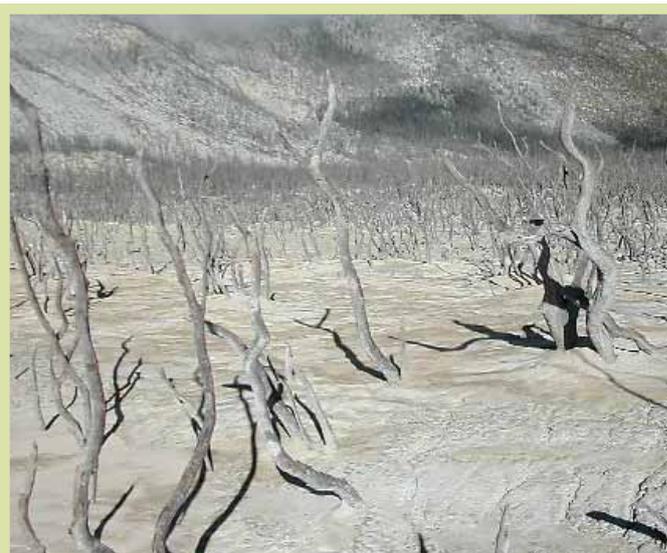
Patricio Bernal has already touched on this point in his keynote address: the best warning system in the world is useless if people do not know how to react. According to Wolf Dombrowsky, however, disaster experts still know too little about the complex links between the perception of danger, warnings and response. He analyses the "warning chain" as the interplay between technical and social systems and comes to the conclusion that "the ›last mile‹ is not a technical problem, but a missing social link in the warning chain."

The social part of the warning procedure consists of the warning cycle (from the perception of the threat to the warning being issued) and the response cycle of the local population (from the perception of the warning to their taking action to protect themselves). Many threats, for instance climate change, are not instantly tangible today. Before they manifest themselves they can only be recorded by technical measuring equipment or in the form of statistics. Examples of latent dangers of this sort include the pollution of drinking water by drug residues: these can be measured today but have so far had no manifest impact.

The slow perception ...

In modern societies a long period of measuring, research and interpretation thus often precedes the issuing of any warning. Scientist often hesitate to issue an early warning at such an early stage because of the lack of empirical data to back up their conclusions. But the longer the systemic processing time (as Dombrowsky puts it), the less time is left to the population to respond appropriately.

Disaster reduction should, according to Wolf Dombrowsky, increasingly focus attention on these early phases of potential or latent danger. Early warning and risk communication must take this as their starting point and anticipate potential dangers. Instead of this, the "technical system time", i.e. the speed at which technical warning systems operate, is frequently accelerated, but little is done to shorten the systemic processing time.



▶▶ Case Study

Disaster reduction in the education sector

Indonesia and Sri Lanka: parents learn from their children

Landslides and volcanic eruptions, floods, earthquakes – natural disasters of these sort occur frequently in Indonesia and Sri Lanka. Since the disastrous tsunami of December 2004 at the latest it has become clear that disaster reduction must thus become an integral part of school curricula.

Working in conjunction with the education authorities, GTZ has developed materials for school instruction and teacher training. To date more than 33,000 school children in Indonesia have learnt about the causes and results of earthquakes, tsunamis and volcanic eruptions. And they have practised what to do when disaster strikes. "The training can only be considered successful if people react correctly in an emergency," says Ria Hidajat, GTZ expert for disaster reduction. The efficiency of measures of this sort was demonstrated at the end of May 2006, when another earthquake hit the region of Yogyakarta. Although 5,000 people lost their lives, the figures would have been much higher had the children not just learned at school what to do in the case of an earthquake, and had they not passed this knowledge on to their parents. The families sought protection in doorframes, under tables and under beds, and did not leave their houses until the quake was over. None of them were seriously injured.

Xavier Castellanos relates this call not only to disaster risk reduction in industrialised countries, but also and quite specifically to developing countries. Risk management and communication must be integral parts of development projects, according to the expert from the International Federation of Red Cross and Red Crescent Societies. Because projects of this sort often take place in ecologically at-risk regions. Poverty also induces behaviour patterns which increase the risks of natural disasters: for instance the uncontrolled spread of slums (favelas) on hillsides prone to landslides. If risk management and communication is ignored in projects of this sort, the vulnerability of the population can actually be increased.

... and the slow response

Wolf Dombrowsky also believes that the “response time” of the population is still largely ignored. People do not respond to a warning immediately by taking action to protect themselves as individuals. The initial response is intensive social interaction. Mobile telephones are used to contact friends and family, they consult about how to interpret the warning, and what to do, where the family is, etc. Before any protective action is taken, complicated processing mechanisms take place. If we are to improve protection and minimise vulnerability we must be familiar with this response.

Disaster reduction experts still understand too little of these response processing mechanisms, however, criticises Dombrowsky. Before we focus more on ameliorating the speed of the technology involved in warning systems we should improve the response cycle. One option to do so, would be to reduce the role of the state and instead to scale up the commitment of citizens at local level. One example of citizen commitment of this sort is the “water level text message”. This, the first texting-based early warning system for flooding in Germany, was developed by a citizens’ action group in Cologne (see box below).

» Flood warnings as a text message

The citizens’ action group on flooding in Cologne-Rodenkirchen was founded after the flood that hit the city over the Christmas and New Year period in 1993/1994, in an effort to raise the awareness of both authorities and the local population, and to help those affected to protect themselves. Along with various companies and with the support of the German Committee for Disaster Reduction (DKKV), the action group developed a system which automatically informs registered users by text message about the current water levels. “Water level texting” uses the information supplied by the database of the federal water and shipping authorities. More information is available at www.hochwasser.de and www.pegel-sms.de.



Vulnerable tourist areas

Gerhard Berz touches on a special communication gap, which became apparent with the tsunami at the latest, “Why do we allow tourists to visit high-risk areas without giving them any form of information?” Many popular tourist destinations are in high-risk mountain or coastal regions (winter sport in the Alps, beach hotels in the Caribbean). The architecture of hotels also makes them particularly vulnerable: large restaurants with dubious static strength on the ground floor, that have to bear the weight of the rigid upper storeys. And a large number of hotels were built during booms, when little effort was made to inspect building work to ensure compliance with building regulations. Tourists and staff are not familiar with local hazard situations. They do not have the experience they need and are not familiar with either the area or the local language. The situation is further aggravated by the insufficient provision of information, the lack of early warning systems, the lack of free escape and departure routes, and channels of communication, as well as the inadequate capacities of hospitals and helpers.

Criticism from the “Master of Disaster”

Gerhard Berz – a few years ago appropriately dubbed the “Master of Disaster” by Focus magazine, criticises the tourist industry for being insufficiently willing to date to inform travellers about hazards of this sort. If before a flight takes off, the cabin crew can demonstrate how to respond in an emergency, there is no reason why this should not work for natural disasters. An initiative of the ISDR (International Strategy for Disaster Reduction) that was to operate along these lines however was roundly rejected. The airlines are afraid of upsetting passengers.

We need private industry on board

The tourist industry must be on board for successful disaster reduction, according to Berz. It must observe potential hazard situations, so that people can be evacuated in time, and incoming flights stopped. They must give the staff of travel agencies, local agencies, hotels and tourist information offices a basic grounding in risk communication and disaster management (perhaps in the form of a manual for emergencies). Hotels must be involved in the “last mile” of warning systems, since they are available practically round the clock and can be used as multipliers.

The information and warnings available to tourists can be improved at no major cost – there should be information on hazards and appropriate responses in travel documents, information films could be shown in flight, information made available at hotels along

with warning signs, information boards, announcements via the PA system or even text message warnings. However, if the travel industry continues to ignore its obligations to inform travellers and ensure their safety as far as possible, they could soon face serious liability problems.

Communication in the aftermath of a disaster

During the reconstruction phase following a natural disaster too, communication is essential. If we take the example of Aceh, in spite of the relatively rapid reconstruction work in the wake of the tsunami, the local people were disappointed because of delays, not least because there was a lack of communication to explain problems and organisational shortcomings. Christoph Müller, who heads the reconstruction programme of the German Red Cross (DRK) in Aceh Province, as Head of Mission Indonesia, reported.

Under this programme, the DRK cooperates with GTZ, the Indonesian Red Cross and the authorities, and can fall back on its wealth of practical experience in involving the affected population. This allowed the DRK to identify the need for housing on the part of the population even in the emergency aid phase, and to work with GTZ to develop an earthquake-resistant house type using local materials.

In order to involve the local people in reconstruction, to fall back on local knowledge and take into account cultural sensitivities, the DRK also uses a participatory planning instrument developed by GTZ: Community Action Planning (CAP).

CAP: planning together

CAP embraces three phases: firstly the local inhabitants systematically identify the situation in their village. Geological and health risks but also all potentials are recorded and displayed in visual form on a map. The second phase involves a planning workshop attended by inhabitants and all local interest groups. Inhabitants draw up an analysis of the strengths and weaknesses of the old village and develop their vision for reconstruction. This is the basis for binding planning, allocation of duties and responsibilities and the production of time schedules. During the third "post-CAP" phase, villagers are supported, trained and coached to enable them to put their plans into practice.

In the experience of Christoph Müller, CAP also improves communication between the inhabitants and the authorities. The local people are more self-confident and feel able, for instance, to demand an early warning system and instruction in disaster preparedness at schools.

» CAP in Pria Laot

A women's group, a fish market, street lighting, a prayer room (even if it was in a poor state of repair) ... these were the things that the people of Pria Laot on Sabang Island were proud of before the tsunami hit. On the other hand they had no safe drinking water, the sanitation facilities were in a desperate condition and solid waste was neither collected nor disposed of. Reconstruction is to change this, and turn Pria Laot into a picturesque, clean, peaceful, religious village – an example. This is the vision drawn up by the villagers at the CAP workshop.

In concrete terms this means: 40 new houses to be built along with the villagers, a village hall, landscaping, waste disposal and composting, training opportunities for women and fishermen ... as well as disaster preparedness lessons in schools and evacuation training so that the villagers are better able to cope with disasters in future. Local Red Cross groups are also being set up and trained in disaster protection.

What is important for the success of CAP is transparency vis à vis those affected. This also means communicating the limits of participation. To what extent, for instance, can people help design their own houses, to what extent must the house types be determined in advance? "If we cannot offer the people any real scope for independent action CAP loses its justification and the whole thing becomes a purely symbolic project," warns Müller. Experience gained with the CAP project is to be used in reconstruction work in the aftermath of the earthquake in Central Java and Yogyakarta.

This is a summary of the inputs "Communicating the risk – a challenge and opportunity" (Xavier Castellanos, International Federation of Red Cross and Red Crescent Societies), "Community Action Planning (CAP) – lessons on beneficiaries participation during tsunami reconstruction program in Aceh, Indonesia" (Christoph Müller, German Red Cross (DRK), "Tourism and natural hazards – Approaches for risk prevention and risk communication" (Gerhard Berz, honorary professor for meteorology at the Ludwig Maximilians University in Munich and former leader of the Geo Risks Research Department of the reinsurance branch leader, Münchener Rückversicherungs-Gesellschaft) and "The 'last mile' – not a matter of communication but of interaction" (Wolf R. Dombrowsky, Director of the Disaster Research Unit (KFS) at the Christian Albrechts University in Kiel) as well as the subsequent public discussion.

Xavier Castellanos,
Christoph Müller,
Gerhard Berz,
Wolf R. Dombrowsky
(from the left)



Education and training

Better training is required

“How can we ensure professional communication that people understand in an emergency?” asked the facilitator, Janos Bogardi, Director of the United Nations University’s Institute for Environment and Human Security. Increasingly, suprasectoral professional knowledge is needed to meet the rising demands facing us in the field of disaster reduction and emergency aid – and not only in terms of communication. Various universities now offer appropriate interdisciplinary courses.

Humanitarian aid from Bochum

The European course, “Joint European Master’s in international Humanitarian Action” at the Ruhr University of Bochum provides training in the management of emergency aid organisations. The “organisations are facing a rising demand for individuals with interdisci-



plinary training,” according to Markus Moke, who went on to stress the close links that exist to international and non-governmental organisations. “We find out directly from decision-makers what knowledge graduates must have”. The course gives students a basic grounding in the fields of law, geopolitics, medicine/epidemiology, management and anthropology/ethnology as well as relations to humanitarian aid. The curriculum also covers standards in humanitarian aid, institutions and actors, programme planning, project management, leadership activities of volunteers working in the area of humanitarian assistance and response to natural disasters. During the third semester of the 16-month course, students have the opportunity to gain practical experience within national and international organisations and produce a final dissertation for the master’s degree.

The special feature of this course of study is that it is offered jointly by seven universities which together make up the Network on Humanitarian Assistance (NOHA): Deusto-Bilbao (Spain), Uppsala (Sweden), Ruhr University of Bochum (Germany), University College Dublin (Ireland), Catholic University of Louvain (Belgium), University of Aix-Marseille III (France) and the University of Groningen (Netherlands). Since 2005 there have also been cooperation arrangements with eight non-European universities (New York, Melbourne, Brasilia, Beirut, Toronto, Cape Town, Yogyakarta and Bogotá).

Moke feels that their professional opportunities are good: most graduates find employment with international organisations. About 70 percent work in acute emergency aid, for instance in Afghanistan or the Sudan, while another 20 percent go into development cooperation.

Wanted – global change managers

We should not only see individual events or disasters, urged Pierre Ibisch, we must widen our perspective to take in global change. “Changes in the use of natural resources and the impact this has had on the individual, among other things in the form of natural disasters are evidence that we need global change management, which would include working on natural resources management and taking a proactive stance to anticipating global change.” To date, according to





Ibisch, most businesses and organisations still base their activities on models built on the assumption that environmental conditions are static.

The new postgraduate course, “Global Change Management” at the FH Eberswalde aims to train the global change managers needed to do this – specialists with technical, methodical and social skills. Disaster reduction and management are integral parts of the course of study.

So as to make the training practice-driven, partners are involved directly: the Deutsche Gesellschaft für Technische Zusammenarbeit, the German Society for Nature Conservation (NABU), the reinsurance branch leader, the Münchner Rück, Germanwatch and the Potsdam Institute for Climate Impact Research (PIK). These partners offer their own study and research modules. In future the course is also to target specifically students from developing countries.

» Floodmaster: International Teaching Module

What are the scientific and socioeconomic causes of flooding? What are the cause-effect chains and the vulnerability chains? This is the focus on the study module of the Technical University of Dresden, open to students in the advanced semesters of courses in hydrography and geology. For the floodmaster certificate, students must produce a case study working with in an institution, among other things. In future, sandwich courses and e-learning options are to be made available. More information is available at www.floodmaster.de.

Markus Moke,
Pierre Ibisch,
Bernard Guézo
(from the left)

Risk-aware engineers

In September 2001 a huge explosion ripped through a fertiliser factory on the outskirts of Toulouse. The explosion occurred in a warehouse in which 300 tonnes of granular ammonium nitrate were stored. Thirty people lost their lives, more than 2,500 were injured and some 15,000 homes were damaged. “This showed us that disasters are not limited in scope, but that they affect entire regions,” recalled Bernard Guézo of the Ecole Nationale des Travaux Publics de l’Etat (ENTP) at the University of Lyon. The worst industrial disaster on French soil since 1945 led to the establishment of a new course for engineers at the Centre for studies on urban planning, transportation and public affairs (CERTU): “Risk reduction and management”. This course trains future engineers to deal with natural, industrial and urban risks and their regional consequences.

Vulnerability and dialogue are on the curriculum, as is a basic grounding in risks in the main fields of urban planning, building construction, the environment, transport and infrastructure. In the main subject, “Environment, Risk and Region” one focus is on risk prevention and management. Graduates have the professional expertise that will enable them to undertake special tasks within businesses or organisations, for instance dealing with industrial accidents.

This is a summary of the inputs “Joint European Master’s Programme in International Humanitarian Action” (Markus Moke, Institute for International Law of Peace and Armed Conflict (IFHV), Ruhr University of Bochum), “Global Change Management: an innovative international study programme” (Pierre Ibisch, FH Eberswalde), “A new training course for engineers in Lyon: prevention and management of risk in the territory” (Bernard Guézo, Ecole Nationale des Travaux Publics de l’Etat (ENTP), University of Lyon, Centre for studies on urban planning, transportation and public affairs, CERTU) and of the following public discussion.



Drought in France

When climate change becomes a reality

Drought – as Grégory Boinel states in his presentation – is a very specific form of disaster. It occurs very slowly, allowing a lot of time for warnings; however, countermeasures also require a considerable amount of time to take hold. The summer heat waves in recent years have revealed just how vulnerable Europe's developed societies are to drought and periods of extreme heat. France has been particularly hard hit – which is why DKKV's French partner organisation has put together this thematic block.

Deadly heat

The rise in temperature being witnessed by meteorologists has accelerated dramatically over the past 30 years. In France, average temperature in the 20th century rose by about 0.1 degrees Celsius every ten years, and since 1976, each decade has seen a rise of some 0.6 degrees. Philippe Dandin, climate expert with the French meteorological service Météo-France, indicates that this evolution is related to climate change – started long ago and proven to be anthropogenic, i.e. caused by human activity.

For the future, according to climate scenarios, “heat waves such as the kind experienced in 2003 would be normal occurrences by 2050”. The regional impacts would be dramatic. Around 15,000 people died in France as a result of the extreme heat in the summer of 2003. The higher nighttime temperatures were a key factor here, preventing the body from cooling down and thus recovering from the day's heat. For the old, sick and very young, this is life-threatening.

Hot summers, wet winters

Temperatures are continuing to rise. Indeed, France is expected to experience even hotter summers in future. At the same time, overall precipitation is slightly increasing, although mostly during the winter. In summer, certain regions undergo long periods without any

rainfall. The French climate is evolving in line with a complex pattern, but one that fits in with the theories about climate change. July 2006, for example, was one of the warmest months since 2003, followed by one of the coldest Augusts on record, whilst September was extremely hot. This swing between heat waves and extreme rainfall translates into more floods in winter, but overall into more droughts, regional water shortages, and shrinking groundwater supplies.

A system out of control

“To put it bluntly, the system is in a way out of control. Even if we were to act immediately, our planet would continue to heat up due to the way our climate works,” says Philippe Dandin, describing the ongoing situation. He explains that a “business-as-usual” approach would definitely have drastic impacts on France. At the very least, the Kyoto Protocol needs to be upheld. The geologist Charlotte Vinchon adds, “Besides reducing CO₂ emissions, we have to look for alternatives to fossil fuels and for methods of geologically storing CO₂. Adaptation measures are also long overdue.”

Lack of regional forecasts

Politicians and administrations expect scientists to provide them with concrete, accurate and local information about the impacts of climate change in their region. But, according to Philippe Dandin, the regional scientific approaches needed to do so simply do not exist as easily at present. Scenarios and large scale computational models are constantly being improved, but too little is still known about the way in which the complex Earth system functions. The uncertainties inherent in such scenarios and forecasts are not much good to decision makers, who demand clear facts and instructions on how to act. This is why scientists increasingly have to formulate their statements not only as uncertainties, but as options for action.

Water shortages around the Mediterranean?

France is not the only country in which dry periods are causing problems in water supply. Admittedly periods of dryness are common in the entire Mediterranean region – some 43 per cent of the region is classed as arid or semi-arid – but the increasing number of droughts adds yet another stress factor to the ongoing burden (irrigation, tourism and population growth). Since the start of the last century, Cairo's population has grown from one to 14 million, and that of Athens from 200,000 to 45 million. Egypt uses some 80 per cent of its water for irrigation. The high levels of consumption in parts of Greece, France and Spain as well as in Northern Italy are also the result of irrigation. Whilst in many places the growing need for water can be met from renewable sources, places like Libya are already having to harvest fossil water resources. Water consumption in Libya, the





Lebanon and Egypt is forecast to increase. In Spain too, the water situation is set to become critical by 2025 at the latest.

This is where supply-oriented approaches reach their limits, says Lucien Chabason from Plan Bleu, a sustainable development initiative run by Mediterranean rim countries (www.planbleu.org). Sea-water desalination might resolve some of the problems. In Malta, Israel, Jordan and Algeria, this is already being practised. Spain too is aiming to obtain fresh water from desalination plants (for irrigation as well), in-

stead of re-directing the River Ebro as originally planned. Lucien Chabason questions whether desalination is a sustainable option. He does most definitely call for demand management so as to promote the sustainable, more economical use of water resources and, in particular, to develop the potential for savings in urban water consumption and irrigation.

Adaptation measures in France

Irrigation is the largest water consumption factor in France's southwest region too. During the relevant four-month period, it accounts for some 80 per cent of water consumption. Coupled with droughts occurring at the same time, this has fatal consequences for the water regime. Grégory Boinel from the Environment Ministry in Paris describes the adaptation measures that have already been initiated in recent years. They involve an overarching approach across the administrative units, as the 26 regions and 95 departments do not correspond to the six large water-catchment areas in the country.

Drought plans with protection and adaptation measures have been implemented since 2003. A long-term national management plan developed for water shortages provides additional instruments, including tax incentives, to balance out supply and demand. Grégory Boinel emphasises the fact that communication with the population is just as important for the project as raising public awareness about sustainable water use.

>> Traditionally sustainable

Since ancient times there have been Mediterranean civilisations that have known how to manage periods of drought and thus possessed the appropriate technology needed to secure the sustainable use of their water resources. In the second and third century BC, the Greek island of Delos, for example, was home to some 15 - 20,000 people, which equates to some 4-6,000 inhabitants per square kilometre. Water, although in extremely short supply, was collected in cisterns, which meant that in spite of the island's high population density, it even sufficed for irrigation.



►► **Case Study**

Water management in the Adour-Garonne Region

The Adour-Garonne region is really better known for its wines than for its dryness. However, some 40 per cent of France's irrigated land is located here. Since 1945, the total surface area under irrigation has doubled to 700,000 hectares – with a corresponding demand for water. The region's dryness has already led to restrictions on water consumption. And today water management schemes are legally enforced during low water-level periods. Amongst other things, these schemes regulate minimum flow quantities, limit withdrawal, and stipulate cost-covering water prices. All key interest groups are involved at the local government level. Five plans of this kind have been introduced in the region since 1997.

Swings in temperature impact locally

Charlotte Vinchon goes on to describe other areas of vulnerability at local level in addition to water supply, linked to ground movements, landslides, coastal erosion, etc... As an example damage can occur to foundations and building structures due to shrinkage of the clay soil which, when exposed to heavy rainfall followed by drought, alternately soaks up water and then dries out, causing it to lift and fall. A way of adaptation to that risk could be to alter construction regulations in a way that will mitigate the shrinkage.

Also a "Risk-GIS" is a mean of preventive information on risks: data on hazards and risks are stored on GIS-based maps and could be – via the Internet say – made accessible to the public. Maps such as these can also provide information for instance about the increasing threat of forest fires due to climate change.

Particularly vulnerable – agriculture

With regard to forests, the shift in climate zones is causing tree species to migrate northwards, in particular spruce and oaks. Increasing droughts in summer are set to turn into a massive problem for forest agriculture, but also for France's agricultural sector overall, which is the largest in Europe. In future, areas of cultivation for port wine could well shift to France, whilst champagne production could move up to England. Bluetongue, a cattle disease transmitted by the Culex mosquito, has spread from Africa to the European side of the Mediterranean, moving northward up to Belgium, the Netherlands and the region around Aachen in Germany.

The impacts of climate change are a challenge for Europe as a whole. Thus, research into climate change is also a joint task. In the forest sector, close Franco-German scientific cooperation has already led to a better understanding of the impacts of drought, tree diseases and parasitisation, leading to valuable insights at the prevention level.

This paper is a summary of the presentations "Climate Change and Droughts" (Philippe Dandin, Météo-France), "Drought risk and adaptation in the Mediterranean region" (Lucien Chabason, Plan Bleu), "Particularly vulnerable: clay soils, coastal zones, forest & species diversity" (Charlotte Vinchon, French Geological Survey / BRGM) and "Water resources management in France adapted to periodic scarcity" (Grégory Boinel, Ministère de l'écologie et du développement durable), as well as the audience discussions.

Philippe Dandin, Charlotte Vinchon, Lucien Chabason, Grégory Boinel (from the left)





Disaster Reduction Instruments

How can private preparedness be scaled up

Plot of land "bordering directly on the River Elbe, one-hundred percent flood protection, magnificent view across the river and access for swimming and fishing". Reimund Schwarze took this provocative example from the property pages of a local newspaper to prove a point. Land at acute risk from flooding apparently sells well and is well used, although of course there can be no such thing as a one-hundred percent protection from flooding, not where this has to be provided by the state.

More than one billion euros are spent every year in Germany on public flood protection measures. Spending on private protective measures is probably significantly lower, although measures of this sort can be extremely effective. According to the International Commission for the Protection of the Rhine (ICPR), even just "appropriate outfitting and use" can reduce the risk of a building sustaining flood damage by over fifty percent. Corresponding measures, for instance building on pillars and foregoing a basement, or even giving up some land, can indeed provide one hundred percent protection against recurrent flooding.

"The Schröder rule" ...

But how can private households be mobilised to do more to protect themselves against natural disasters? Economic incentives are the answer, according to the economist, Reimund Schwarze. A household will base its decision on whether or not to invest in disaster reduction measures on economic factors.

The "Schröder rule", according to which nobody should be worse off after flooding than before is, according to Schwarze, a massive disincentive for private households to take their own precautions. If state assistance is to give private households an incentive to take their own preventive measures, it must provide full compensation for damage sustained only by those households which have already undertaken all the private precautionary measures they could reasonably be expected to take.

...and "the good Samaritan dilemma"

This, however, is very much at odds with politicians' "good Samaritan dilemma". Once the images of flood damage (or of any other natural disaster) are broadcast and published politicians cannot turn a deaf ear to calls for help. "These people have no support," (and are frequently underinsured), "The state must do something." A sort of "disaster syndrome" emerges. Emergency aid from the state blocks people's willingness to cover themselves against damage. The demand for insurance cover drops. As a result, insurance premiums rise, which further reduces demand – and so on.

With its intervention, the state, however, also stifles every initiative to take private measures to protect households against flooding and lessens the pressure on local politicians to take public protective measures. Less protection means greater damage, which in turn necessitates more state aid.

Pros and cons of mandatory insurance

Reimund Schwarze sees mandatory insurance against flooding and all other damage caused by natural forces as one way out of the dilemma – mandatory insurance cover as was called for in the aftermath of each of the "floods of the century" on the Rhine, the Elbe and the Oder. Stefan Richter of the German Insurance Association (GDV), however, expressed serious doubts as to the potential benefits of this and the feasibility, from the point of view of constitutional law, political considerations and technical insurance issues. He recalled the findings of the Joint Federal-Länder Commission (Bund-Länder-Kommission) set up in the aftermath of the flooding in August 2002, and the working group of the Minister of Finance. In 2003 and 2004 they examined proposals for mandatory insurance – and finally rejected the idea as being unfeasible.

Legal problems

Mandatory insurance to cover the risk of flooding alone would not be legally permissible. The majority of homeowners are not at risk from flooding, and cannot be forced to take out insurance against



flooding. An extension of the policy to cover all pertinent natural hazards, however, such as storm, hail, avalanches, etc, throws up constitutional difficulties, since the state would in effect be requiring property owners to insure their own property against loss. To date only liability insurance, which is there to protect third parties, has been considered mandatory, however.

Flat-rate premium or collective liability?

Stefan Richter also considers a flat-rate premium, advocated by many in order to spread the burden evenly, and keep insurance premiums down to an acceptable level, to be neither permissible nor acceptable, in line with the findings of the Joint Federal-Laender Commission. A flat-rate premium would use low-risk areas to cross-subsidise high-risk areas. In motor vehicle insurance, the premiums paid in for Fiat Pandas cannot be used either to offset damage sustained to luxury limousines, as he puts it. All homeowners would be called to pay for damages sustained by the ten percent of settled areas which are particularly at risk from flooding. It should also be taken into account that it is frequently not possible to obtain insurance cover in only about four percent of the settled areas in Germany as a result of the extreme and regular risks involved. Individuals purchasing land (which is usually cheap) in these high-risk areas would benefit most from mandatory insurance schemes of this sort.

Insurance without protection?

Richter does not see any chance of obtaining political or social acceptance for mandatory insurance with risk-dependent premiums, however. He used an example to demonstrate why. For a building, worth EUR 250,000 in an area at high risk from flooding, the insurance premium is between EUR 500 and 600 – whereby the policy-holder must pay as much as the first EUR 12,500 damage him or herself. This means de facto that many buildings suffering regular flood damage pay insurance premiums but have no insurance cover. The property owners, who do take measures to protect themselves against flooding, say by emptying the ground floor of their houses, are in effect paying for nothing.

Need for a state guarantee

Can a mandatory insurance scheme operate at all without a state guarantee, in view of the extremely high damages that are conceivable? Insurers estimate the maximum damages that could be caused by an extreme natural event in Germany at between seven and nine billion euros. Since several extreme weather events can occur in the course of one year, the insurance sector would have to be able to finance damages of up to EUR 30 billion a year under extreme circumstances. Currently, however, the private insurance sector has a maximum capacity of about EUR 8 billion. The state would



have to underwrite the other EUR 22 billion – for an unlimited period. The Joint Federal-Laender Commission does not consider a long-term undertaking of this sort on the part of the state to be conceivable.

In view of this enormously high sum to be guaranteed, the state would also have to lay down the scope of insurance cover and the amount to be paid in premiums. And it would have to ensure that the guarantee of the state is only called in when the damages genuinely outstrip the capacities of the private sector. Interventions of this sort in the entrepreneurial freedom of businesses and in the operation of the free market would be unlikely to be constitutional.

Incentives through obligations

That's all far too complicated, countered Reimund Schwarze. "The model presented by Mr Richter and discussed by politicians in 2003 and 2004 is highly invasive. Other models exist with less state intervention and red tape. This is demonstrated by successful examples, say in the United Kingdom." Schwarze considers mandatory insurance to be feasible – and to be a rational way to escape the "disaster syndrome". It would, however, have to be compatible with a system of incentives – involving a high level of own risk, limiting of the role of the state to that of the final insurer and using a system of tariff zoning rather than a flat-rate premium. "We can reasonably expect everyone who allows themselves the privilege of building a house in a flood zone to take the necessary precautionary and protective measures themselves. Society as a whole cannot be expected to pick up the tab because of the particular preferences of some individuals."

Richter objected that these proposals had also been examined by the Joint Federal-Laender Commission, but that they had always been considered too complex to implement.

Whether with or without mandatory insurance, it is clear that more must be done. Stefan Richter calls for comprehensive public flood protection including, if necessary, restrictions on use in high-risk areas as well as individual precautionary measures to be taken by homeowners. Reimund Schwarze is considering further economic incentives, such as improved public information services including risk

Identifying and communicating potential damages

In order to identify premiums for insurance against natural disasters, insurance companies zone built-up areas into four hazard classes – for flood damage for instance depending on the frequency of flooding. To this end they use the ZÜRS system (zoning system for floods, backwater and heavy rainfall). This means that the premiums payable reflect the actual hazard situation of the area in question. There are no cross-subsidies.

The zoning system also has its critics, however. It encourages house owners not to take their own precautionary measure, say by setting low premiums for land immediately behind a flood dyke, although buildings there are very much at risk should the dyke break. The new zoning system does, however, incorporate risks of this sort more successfully. There are a number of other methods of identifying the risks posed by high tides and flooding across the board. Planning and engineering offices often use land use models such as Corine Land Cover and AKTIS. Firstly they determine where flooding takes place, how frequently and on what scale. Then they estimate how the high-risk area will be used, what assets are found there – for instance using assets statistics – and on what scale they would be damaged by the extreme weather event in question. Depending on the model used, this can be calculated for very small areas too.

This makes it possible to optimise the planning of flood protection and emergency aid, and to estimate the impacts of flood predictions and warnings on the extent of damage sustained. Even the impact of individual flood protection measures on the risks can be incorporated in the model. Thus processed and communicated, these data could thus produce an enormous incentive for households to take their own risk reduction measures.

This method is transferable to other natural events, earthquakes, fire, storm, etc., according to Ernesto Ruiz Rodriguez. Before doing so, however, he feels that a more intensive exchange of information and experience is needed between the various disciplines involved. And he calls for a database and a GIS-based internet portal in which the necessary regional data on land use and assets can be compiled and made accessible.



maps available on the internet. “Providing households with information on risks is a search problem in economic terms. If the costs of searching are too high, the willingness to seek the information is low, and as a result citizens are poorly informed about risks.”

Reimund Schwarze advocated involving banks, construction officers and private businesses. If banks, when rating properties, took into account the flood hazard, they could do much to ensure that insurance policies against natural disasters were taken out much more widely as a precondition for granting mortgages – and this is legally perfectly permissible. And if architects and construction officials were made liable for shortcomings in precautionary measures at the construction stage, and salesmen for failing to inform customers of the hazards (as is the case in California for instance), the incentive to take private precautionary measures would be far greater.

This is a summary of the inputs of “Economic instruments to foster private flood mitigation” (Reimund Schwarze, DIW Berlin and University of Innsbruck), “Practicability of mandatory insurance against elementary hazards from the political, legal and insurance perspective” (Stefan Richter, German Insurance Association, GDV) and “Methods for a wide-spread identification of damage potential” (Ernesto Ruiz Rodriguez, FH Wiesbaden and Ingenieur-gemeinschaft Rodriguez-Zeisler-Blank) as well as the subsequent public discussion.



Reimund Schwarze, Stefan Richter,
Ernesto Ruiz Rodriguez (from the left)

Science: improved communication with users

When theoreticians and practitioners simply cannot understand one another

In his address, which looked at drought in France, Pierre Dandin touched on communication problems between scientists and politicians. Similar barriers to mutual understanding between academics and practitioners working the field of disaster reduction are described by Wolfram Geier: all too seldom do the two sides realise what the other side expects of them. All too rarely do they clearly define their objectives. Moreover the lack of practice – driven scientific results often makes it impossible to translate scientific findings into practical disaster management. And because both sides have been disappointed so often, there is a lack of mutual acceptance and respect.

Heads full of flashing blue lights?

Wolfram Geier is not surprised that scientists and practitioners at conferences often have the feeling that they are talking at cross purposes, and that comments are heard such as “very interesting, but totally useless in practice”, or “too academic” or “no understanding of science” or “heads full of flashing blue lights” or even “what a total waste of time”.

This is absolutely fatal, because disaster reduction and management are becoming more and more dependent on receiving usable findings from the realm of science and research, for example in efforts to adapt our society to the results of climate change, to make societies more robust and to reduce their vulnerability.

To this end, however, there must be an open and honest exchange of views as to the genuine needs and expectations, and the applicability of scientific products, according to Wolfram Geier. “There must be more arguments and more open communication.” But why do we so often talk at cross purposes? Geier sees the fact that the two groups speak different languages as one reason. “The language of science is not the same as the language of administration, which in turn is different from the language used in operational disaster management.”

“Language of risk” or “risk of language”?

Moreover, the different (legal, administrative, technical) definitions of the same technical terms lead to misunderstandings. Andreas Kortenhaus from the European Floodsite Project terms this the “risk of language”. Within the Floodsite Project, communication among the 200 or so scientists from a variety of disciplines and countries proved to be such a problem that they first had to develop a common language, their “language of risk”, to prevent misunderstandings.

In future, “translators” and “mediators” could help to generate a common level of language and understanding, proposed Wolfram Geier. Dieter Farrenkopf too, former Head of the Hamburg Fire Brigade, and as such responsible for disaster protection on the side of the practitioners has come to realise that, “We must always be able

to speak the same language as our ‘client’ or other authorities with which we communicate”. His solution is to select fire chiefs in charge of specific assignments such that they can communicate on the same level as their opposite numbers. When dealing with an accident at an oil refinery, for instance, the fire chief should be a trained engineer, who speaks the same language as the refinery engineers.

Science, summed up Geier, can produce good solutions to most of the problems in the field of disaster reduction and management. But they must make more effort to explain how their findings and products can be used in practice. And practitioners must explain to scientists which problems they should work on and what solutions are needed. “Transfer exchanges” might be helpful in this context.

Floodsite: Information management rather than scientific treatises

For the Floodsite Project it is the most natural thing in the world to communicate their findings to the general public. This is the condition for receiving EU funding for the ten-million euro European research programme on flood hazards. And with every justification, says Andreas Kortenhaus, because “the hazards affect people and must be explained to these people”. Floodsite aims to target not only other researchers but also authorities, practitioners working in the field of flood protection, field-based organisations, those affected and the general public.

To ensure this communication it is not enough to publish results and findings in scientific journals. The integrated information management of the project thus also involves PR work, producing and updating websites such as www.floodsite.net and holding workshops. Only if communication becomes a two-way phenomenon, says Andreas Kortenhaus, can researchers produce the results that practitioners need. This is another reason why all Floodsite target groups are represented on project councils.

From the lab to the web: NaDiNe

The internet platform NaDiNe (Natural Disasters Networking Platform), which has been online since March 2006 (<http://nadine.helmholtz-eos.de>) is expected to focus scientific findings relating to natural disasters, render them comprehensible to the general public and made them available to the media, the general public, organisations and politicians. NaDiNe is a project of the Helmholtz Association. In the long term it is to offer a wide variety of information and products, from scientific information to processed data and models to PR information. “We have noted that maps and interviews with experts are in most demand,” explained Sören-Nils Haubrock, who sees a demand for information regarding the triggers, the impacts and the long-term effects of disasters, which goes beyond the contents of normal reporting.

The NaDiNe experts network already embraces experts on earthquakes, storms and storm tides, oil spillages, tsunamis and flooding. NaDiNe was, for instance, able to provide information compiled by the participating researchers to experts on the ground about the type and properties of the oil spilled in a disaster off the Lebanese coast in autumn 2006. This made it possible to take more effective measures and to predict the consequences more precisely. The specialised press in particular were able to use NaDiNe to access background information, concludes the media expert Albert Gerdes of the University of Bremen.

Information or censorship?

In addition to open internet platforms, there are also protected areas, accessible only to experts. This is an effort to avoid spreading panic among the general public in critical situations. But not everybody sees it this way. It is not open scientific information which is likely to cause panic, but sensationalised media reporting, maintain, for instance representatives of the citizens' action group on flooding in Cologne-Rodenkirchen.

How much information do we need?

An insight into practical disaster preparedness

How much information is really needed in practical hazard protection? "Not too much and not too little," according to the former Head of the Hamburg Fire Brigade Dieter Farrenkopf. "Practically no fire chief heading a mission can cope with a massive flood of information given the extremely limited time available. We must reduce information to a reasonable quantity, on the basis of which rapid decisions can be made," explains the former top disaster man from the North, taking a few examples from the everyday work of the fire brigade to make his point. An emergency takes place in the underground and urban railway station at the Hamburg Town Hall, for instance: dozens of callers each given contradictory versions of what has happened by mobile phone. How should the fire chief in charge know which of the 17 entrances to the vast underground station will allow him quickest access to the site of the emergency? "Without a precise description of where the emergency has taken place, the fire brigade could spend half an hour looking," explains Farrenkopf, although he believes that this problem could be solved with technology already available – if the will were there: a standardised response to calls to the emergency services, automatic tracking of the location of mobile telephones used to call the emergency number and fire brigade access to the images generated by police cameras. "When we are dealing with disasters, transparency is important – not secrecy".

Gas accident in the tunnel under the Elbe

Another example. A hazardous goods vehicle has had an accident in the tunnel under the River Elbe, with a release of toxic gas. The fire chief in charge must decide on the spot whether or not to switch off the ventilation system of the tunnel. He does not know how many people in the tunnel are in acute danger and how many people would be at risk in Altona from toxic gases escaping from the ventilation system. He does not know whether the neighbouring Europa school is in or out (which would be in the direct line of toxic gases coming from the ventilation system) and whether or not the nearby hospital in Altona has its air-conditioning system switched on (in which case it would be sucking in the toxic gases). How can he decide? "I always recommend that my fire chiefs carry a coin with them at all times. Heads or tails. Fifty percent of decisions are correct," commented Farrenkopf dryly in the face of the practically insoluble dilemma of constantly having to make decisions on the basis of inadequate or unclear information.

Training practitioners

To help them deal with situations of this sort, fire chiefs must in future be well trained and well equipped, but they must not become victims of a flood of information, according to the fire brigade expert, who advocates better training for executives, more assignments abroad in order to gather experience, as well as more assistance for upgrading and new courses such as the ones to be offered in Magdeburg/Stendal, Cologne, Bonn and Hamburg.

Peru: From the university to the village and back

One example of how science and practice can meet comes from Peru. The Andean state is extremely vulnerable to natural disasters such as heavy rainfall, earthquakes, and volcanic eruptions. Since 2004, a risk analysis has been part of every public investment project – as an instrument of risk management and sustainable development.

It is not always easy, explained Milton von Hesse from the Peruvian Ministry of Finance, “because local authorities assume zero probability of disasters. They think and plan in the here and now, without taking into account any risks.” With the support of GTZ among others, the Universities of Arequipa, Piura and Lima are now working to convince the municipal and regional authorities of the advantages of risk analysis in investment projects, and are familiarising them with the relevant procedures and methods. Scientists are also helping to draw up pertinent guidelines and standards. In return, the universities are gaining new competencies in the field of risk analysis and risk management.

How can scientists strike the right balance in the media?

When a disaster strikes, scientists are always called on to give their assessment of the causes and impacts – by disaster management experts, but also by the population and the media. Communication between scientists and the media, however, is full of pitfalls, warns Albert Gerdes. Driven by the need to simplify things, the media tend to be very “generous” in their interpretation of the facts. They are not suitable “translators” for scientists, but pursue their own interests, which while understandable from their own point of view, are not always in the interests of science.

Here is one example of how tabloids process scientific topics for their readers, sensationalising the contents in the process. In August 2005 the Oregon State University noted that the movement of the Earth’s north magnetic pole was accelerating rapidly, although scientists stressed that the figures recorded were within the normal bands of oscillation. Four months later the German tabloid, the

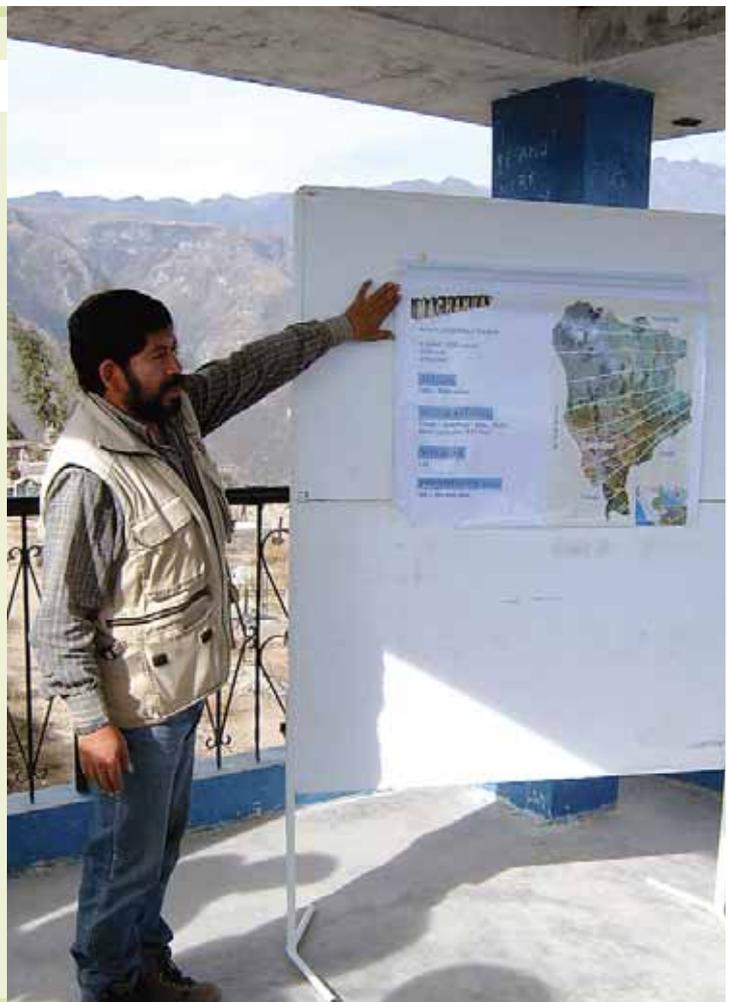
►► Case Study

Knowledge transfer between practitioners, university and bearers of traditional knowledge

Peru: Andes and Amazonas Academy

Normally the question is to how scientific findings can be translated into practice. Sometimes, however, the question is reversed. In Peru, for instance, where the scientific institutes of the country have hitherto paid scant attention to disaster reduction although the country is regularly hit by earthquakes, drought and flooding.

In 2006, GTZ thus initiated the Andes and Amazonas Academy. At this summer university, scientists, students and staff members of organisations were made familiar with the experience gained in a GTZ rural development project in the north of the country. The intercultural dialogue with indigenous students was particularly interesting. They presented traditional indicators used to detect impending disasters at an early stage – and triggered a discussion as to how indicators of this sort, passed down from generation to generation, could be integrated into German development cooperation.



“Bildzeitung” led with a headline “Planet on a downward spiral into magnetic chaos”. Can we learn from the Bildzeitung then, learn to win? No, says Albert Gerdes, in terms of dealing with facts. Yes, in terms of target group orientation – and the target group of scientists are journalists.

Geoscientists as agony aunts?

Only between three and five percent of all scientific articles printed deal with geosciences. The ranking list is topped by life sciences, because everybody is interested in health and nutrition tips. Why, Gerdes asks, should science not pay more attention to service vis à vis the media. “Why should geoscientists not present themselves from time to time in the media as ‘agony aunts?’” They could provide information on avalanche hazards for winter vacationers or on what to do in the case of an earthquake for sun worshippers heading for Turkey on holiday.

Practical tips

Never lose sight of the target group. Write and speak clearly and comprehensibly. Do not use technical terms and jargon. Concentrate on key messages. All these factors will facilitate your contacts with the press. But the process of communication is not over once the press release leaves your desk, or when you put down the receiver after a telephone interview. It is customary here to authorise quotations. Having the manuscript for a planned article checked for factual correctness by a scientist or academic presupposes a certain relationship of trust...

Gerdes recommends in this way building up a network of relations to journalists, say by holding informal background meetings at your institute. Or in the form of media fellowships, widespread in the USA and the United Kingdom, which involves one journalist spending one or two weeks at the institute, in return for which one scientist is seconded to the journalist's newspaper, etc. The DFG (German Research Foundation) Research Centre “Ocean Margins” at the University of Bremen sends its young scientists to press conferences and background meetings so that they gain experience in dealing with the media. And the DFG itself offers young scientists a two-day media training course. (www.dfg.de/aktuelles_presse/medietraining/).



This is a summary of the inputs, “Why we have to talk more to another – the necessity to improve communication between science and practice in disaster risk management” (Wolfram Geier, Bundesamt für Bevölkerungsschutz und Katastrophenhilfe, BBK – Federal Office for Population Protection and Disaster Relief), “Integrated Risk Assessment for Extreme Flood Events in European FLOODsite project” (Andreas Kortenhaus, Technical University of Braunschweig), “Need for informationen to successfully avert hazards” (Dieter Farrenkopf, German Fire Protection Association, GFPA), “Knowledge and local competence – A Peruvian proposal” (Milton von Hesse, Ministry of Finance, Peru), “Natural Disasters Networking Platform (NaDiNe) – a system for communicating scientific expertise on natural disasters” (Sören-Nils Haubrock, GeoForschungsZentrum (GFZ) Potsdam, Potsdam National Research Centre for Geosciences), “Communicate unwieldy information well – how do I pass on unwieldy information to the people?” (Albert Gerdes, DFG Research Centre “Ocean Margins”, University of Bremen) as well as the subsequent public discussion.

*Wolfram Geier,
Andreas Kortenhaus,
Dieter Farrenkopf, Milton von
Hesse, Sören-Nils Haubrock,
Albert Gerdes (from the left)*





Knowledge management – an international task

Digging up the treasure chest of knowledge

Experience and knowledge about the risks of disaster and effective disaster reduction methods are available round the globe – in the heads of practitioners, on the desks of theoreticians, within organisations and authorities, at the heart of indigenous communities, and inside universities and private businesses. At the same time, about half of the world's population live in areas where the risk of natural disasters is high. Three-quarters of global GNP is constantly threatened by natural disasters. And vulnerability is increasing – either as a result of poverty or in the wake of environmental destruction, because of the unchecked growth of our cities, with people settling in high-risk areas or because planners ignore or are not familiar with the risks. There are, then, enough good reasons for mobilising the body of knowledge that exists in the field of disaster reduction, and making it widely accessible.

But how can we dig up the treasure chest of knowledge – and who can do so? It is quite clear that this knowledge management is an international task, but a very large number of actors at local level must also do their bit.

Hyogo: A framework of action on disaster reduction

Sensitising the population and politicians to the need to take preventive measures is a key factor in disaster reduction. The call for education and knowledge management was heard during the UN International Decade for Natural Disaster Reduction (1990-1999). Knowledge management thus also plays an important part in the United Nations' International Strategy for Disaster Reduction (ISDR): in the Hyogo Framework for Action 2005-2015. This framework for action was adopted in January 2005 at the World Conference on Disaster Reduction in Kobe, Japan, where it was approved by 168 governments. It is to promote disaster reduction, especially in high-risk regions and countries so as to develop a culture of security and non-vulnerability at all levels, from central government level down to the smallest village, explains Stefanie Dannenmann from the UN ISDR secretariat. An important role is played by education and knowledge transfer, also through schools. With its "Risk Reduction begins at School" scheme, the ISDR has launched a worldwide campaign for 2006 and 2007. The aim is to integrate disaster risk reduction into school curricula in high-risk areas, and to make school buildings less vulnerable to natural hazards. The active partners involved in the scheme include UNESCO, UNICEF, ActionAid International and the International Federation of Red Cross and Red Crescent Societies (IFCR).

Education for a culture of security

The campaign aims to anchor disaster reduction and protection in the curricula of those countries that are particularly at risk. Children are important multipliers – but they are also victims when

disaster strikes. Schools are particularly vulnerable. A large number of children are housed in a small area, often in unstable buildings. This has been demonstrated by disasters such as the earthquake in Tangshan in China in 1976, in which 2,000 school children were buried under the ruins of their dormitories, and the school fire in 1989 in Dabwali, India which claimed 442 lives. Safe school construction is thus also a topic covered by the campaign.

The family learns too

Disaster reduction is not a subject like any other one taught at school. It must be a cross-cutting issue tackled throughout the school. GTZ projects in various countries show what form this can take. For instance, projects can look at the various natural and social causes of disasters on an inter-disciplinary basis. Emergency plans must also be drawn up and tested. Drills without prior warning are exciting and prevent disaster protection becoming routine. The focus must be on practical learning – not only with the children and during lessons. Along with the teachers and parents, the entire village community can identify escape routes, clear away anything blocking emergency exits, or anchor cupboards onto the wall, so that they cannot fall over and injure children. In this way children and their parents learn to recognise risks and to overcome these – also in their own homes and in the family.

Alongside these "non-structural" aspects of safety, of course, a school security concept must embrace safe school buildings, emergency plans, and evacuation drills. In the field, projects generally cooperate with other organisations, such as local Red Cross groups.

Overcoming resistance in everyday school life

A great many teachers, however, are not adequately trained in disaster reduction. Others are against the idea of including yet another cross-cutting issue in a curriculum that is already full to bursting point. Then there is a lack of age-appropriate materials. And several programmes, criticises GTZ expert Patrizia Bitter, are too short to have any real lasting effect. But development cooperation can help solve these problems.

In Indonesia, for instance, GTZ is working with all school staff. In line with the motto of "learning by doing", teachers first practise themselves what they will later be teaching. A project in Sri Lanka too firstly trains the teachers and provides advisory services on the curriculum. A south-south cooperation arrangement between India and Sri Lanka passes on positive experience from other regions to the project and makes the experience accessible – an example of an international knowledge management network having an impact at local level. Building up networks of this sort, using them and feeding in one's own experience and contacts is important for education projects and disaster reduction alike, believes GTZ expert, Patrizia Bitter.



►► Case Study

Adapting to climate change and disaster reduction

Mozambique: Flood protection on the curriculum

The people who live on the River Búzi in Mozambique are hit time and time again by flooding and cyclones. Mozambique is one of the countries in the world hit most frequently by flooding, storms and drought. As in many other poor countries, climate change too is already making itself felt in Mozambique in the form of more frequent extreme weather events.

Since 2003 GTZ has been helping the people living along the river to adapt to climate change, and improve their disaster preparedness. Village communities are informed about the consequences of climate change, how they can protect themselves and what to do when a flood warning is issued. Committees for risk and disaster management have been set up, and contribute their practical experience to a flooding early warning system. They also help coordinate evacuation drills. In schools too, disaster reduction is the order of the day. Curricula and materials have been developed in conjunction with the committee and representatives of the local communities, and have been tested in some schools. Experience gained so far is so promising that the scheme is not only to be introduced nationwide, but is even to be transferred to other parts of southern Africa.

All globally networked?

Bruno Haghebaert from ProVention sees networking as the key principle for knowledge management in disaster reduction for the 21st century. The exchange between scientists and practitioners is increasingly dependent on (international) networks, he claims, because this is the only way to bring together the numerous stakeholders, whose commitment is needed for disaster reduction – academics, experts, non-governmental organisations and governments.

Asked whether there were not enough networks already, Haghebaert's response was an unequivocal, "No". The very existence of so many networks is in itself an indication of the high level of need, he explains. Given the large number of actors, regions and topics involved, the many and varied contacts going down to local level would otherwise be impossible.

A meta-network for disaster reduction

Haghebaert does, however, feel that a "network of networks" is needed for disaster reduction, so that somebody retains an

overview with so many different networks in existence. Along the lines of the Global Earth Observation System of Systems (GEOSS), this meta-network could better integrate data and knowledge systems. It could also push back the boundaries of knowledge through joint research and problem-solving, and could standardise and harmonise methods, technologies and instruments so as to make them better accessible for all. Unnecessary duplication of effort could be avoided - a good argument for donors. The issue of who should be responsible for quality control and who decides what knowledge is fed into the network and what is not, is, however, critical. Many potential members would probably be overstretched with the work required by a meta-network though, suspects Konrad Otto-Zimmermann from the cities network ICLEI (Local Governments for Sustainability). He also sees less danger of duplication of efforts and overlapping than of a lack of capacity. "Networks require members to have a certain capacities, which they do not always have. For us joining a meta-network would not be an attractive option, for this reason."



How can we get disaster reduction into local politics?

ICLEI – Local Governments for Sustainability is a global cities network for local sustainable development. Since disasters are one of the main obstacles to sustainable development – seven of 495 ICLEI members have already been victims of major disasters, including Kobe, Dresden, Izmit and Phuket – ICLEI also aims to make local communities more resistant.

An ICLEI study pertaining to the Local Agenda 21 in 2002 revealed that only five of 45 cities studied had attached much importance to disaster reduction in their agendas for sustainable development. The topic is thus not by any means taken adequately into account in local politics and planning. Existing and publicly accessible guidelines, manuals and instruments of disaster reduction are practically unknown at local level. Municipalities do not pass on their experiences.

So how can disaster reduction be anchored in local politics and administrative procedures? Otto-Zimmermann sees several options: knowledge networks, twinning arrangements, within the framework of which experience is passed on and citizen participation, say in the form of a local agenda for disaster reduction. Disaster reduction should be an integral part of both administrative training and of local financial planning. Otto-Zimmermann sees a shortcoming in the fact that the authors of working aids cannot generally reach the target group at local level, either because the aids are not distributed at this level or because they are not appropriate for this target group. Too many provider institutions also think in an “emission-oriented” way. Brochures are simply sent out into the world, without paying enough attention to ensuring that they actually arrive, and that they are noted, read and understood.

Stop the topic “going off the boil”

And how can we keep disaster reduction on the local political agenda, outside of election campaigns? Possibilities being discussed include a ranking list for cities in line with their “disaster preparedness” so as to join forces with the media and exert pressure on local authorities to take action. Dieter Farrenkopf from the German Fire Protection Association (GFPA) considers a ranking list of this sort to be feasible. The data and figures are already available to the fire brigade and to the insurance sector. All moves in this direction, however, have been blocked to date by the Städtetag (the German Association of Cities). But local politicians too see disadvantages. Some mayors of small municipalities, for instance, fear that under popular pressure they might

be forced to set up a wildly expensive full-time fire brigade in the place of the current voluntary services.

New approaches to knowledge management

At global level Bruno Haghebeart also sees numerous new approaches to knowledge management for disaster reduction: whereas it has hitherto been dominated by scientists from industrialised countries, the education and research capacities in developing countries must now be strengthened, as must the exchanges between developing countries. More intensive contacts between scientists and practitioners – say in the form of internships or cooperation arrangements between organisations and research facilities, can improve communication between the producers and users of knowledge. Collaborative approaches to knowledge management open up entirely new prospects, including open online dictionaries such as Wikipedia or so-called “social tagging”, the common ordering of data on the internet by larger user groups.

Knowledge transfer – a key to success in the field of German technical cooperation

GTZ is an agency for international development cooperation. Christoph Feyen highlights the importance of effective and efficient knowledge transfer for the success of its daily work. As an international knowledge broker, one of GTZ’s primary tasks is to generate knowledge and to make it available to its partners. GTZ maintains a network culture to facilitate the smooth flow of information in all directions. The main elements of good knowledge transfer and management that lead to capacity development are to organise cooperation and communication, to determine clear target-oriented processes, to disseminate appropriate tools and teach relevant methods.

This is a summary of the inputs “Knowledge Management in the GTZ” (Christoph Feyen, GTZ, Eschborn), “Knowledge and Education for Disaster Risk Reduction” (Stefanie Dannenmann, UN ISDR International Strategy for Disaster Reduction), “International Networks and exchange mechanisms for science and practitioners” (Bruno Haghebaert, ProVention Consortium) “Disaster Resilient Communities – Aspects of Knowledge and Experience Transfer” (Konrad Otto-Zimmermann, ICLEI - Local Governments for Sustainability, “Strengthen Schools for Knowledge and Skill-Transfer on Disaster Reduction” (Patrizia Bitter, GTZ/ECO Sri Lanka) as well as the subsequent public discussion.

*Christoph Feyen, Stefanie Dannenmann,
Bruno Haghebaert, Konrad Otto-Zimmermann,
Patrizia Bitter (from left)*





Closing speech given by Irmgard Schwaetzer

To come back to the motto of this event, disaster reduction needs “Knowledge, Transfer and Practices”. The inputs we have heard have made it quite clear how much still needs to be done in these fields, and where we should start in order to make improvements. The meetings of the Forum and the Disaster Reduction Day followed the structure of our motto and can be broken down into three groups:

Under the heading “Knowledge” we discussed:

- Education and training, and
- Disaster reduction instruments.

The “Transfer” of knowledge and needs must be improved:

- in communication between scientists, politicians, the administration and the local population, and
- in messages communicated from the population to the academic community.

“Practices” embrace

- Knowledge management
- and, for instance, the example discussed here of measures to tackle drought in France.

Naturally the aspects covered by individual meetings overlapped in places – after all disaster reduction is a cross-cutting issue. Thus many of the methods and procedures presented are useful and applicable not only for Europe. However, the inputs also make it clear that there is still a lot to be done, in particular as regards ensuring the practical applicability of findings and the provision of well-founded methods and procedures in order to involve end users. Innovative approaches are needed in order to improve communication before, during and after a disaster.

With its networked structures, the DKKV is in a good position to master the cross-cutting task of disaster reduction better in the future with new, practice-driven ideas. The need to make findings applicable in practice in turn brings with it the link to the international level. Vulnerability to disasters is unequally distributed around the globe, with the risks particularly high in many developing countries and emerging economies. However, as the Elbe flood of 2002 or the droughts that hit France in 2005 and 2006 indicate, Europe too is far more sensitive to extreme (weather) events than is generally realised. The DKKV thus also focuses on disasters in Germany and in Europe along with its partners from other national European platforms.

With climate change and changing vulnerability, we in Germany and in Europe too must expect an increase in the frequency of natural disasters in future. This indicates the magnitude of the task of damage limitation that lies before us. In Germany and in Europe, the shortcomings in all three areas “Knowledge, Transfer, and Practices” are fairly comparable. An important task of the DKKV and its European partners will be to develop appropriate strategies to remedy these shortcomings. One important objective in this context will be to make sure that disaster reduction is viable and forward looking, in other words, to prepare the existing systems of disaster reduction and management for future developments such as climate change. In the international discussion the term adapting to climate change is generally used.

In 2008 the DKKV will be hosting this event jointly with the German National Meteorological Service (DWD). As a member of the World Meteorological Organization (WMO), the German National Meteorological Service has an important part to play in further developing and fine-tuning disaster reduction, including early warnings systems, identifying extreme weather events, and quantifying climate change.

Irmgard Schwaetzer
Chairperson of the German Committee for Disaster Reduction

Closing speech given by Bernd Hoffmann (GTZ)

In the view of GTZ, this Forum has been a vitally important event, and not only because we have long been a member of the German Committee for Disaster Reduction. As a federal enterprise for international cooperation, we consider it our duty to do all we can to bring this subject to the fore at national and international level. This is not new for us, nor is it something related only to this event. The Forum and Disaster Reduction Day have, however, been very helpful for us.

I would like to take this opportunity to express our warmest thanks to Irmgard Schwaetzer and the other members of the Executive Board of the German Committee for Disaster Reduction for giving us the chance to host this Forum and the Disaster Reduction Day. This too is a reflection of the long-standing and excellent cooperation between GTZ and the German Committee for Disaster Reduction, which is soon to be enshrined in a lasting and sustainable strategic partnership agreement.

As an international organisation, GTZ works closely with a large number of international institutions, of which I would like to mention the International Strategy for Disaster Reduction here. If we have managed, with this event, to make some small contribution to fulfilling the worldwide mission of the ISDR and other bodies, then we can consider it a success.

I am convinced that international cooperation will in future have to deal increasingly with disaster reduction. This event, held under the banner "Knowledge, Transfer, Practices" has made clear not only the technical dimensions of the subject, but also the political, economic and social factors involved. It has become clear that the scope of this field of activity far exceeds the capacities of individual. We must build more bridges and forge new alliances.

Over the last two days we have discussed a vast spectrum of experience, knowledge, ideas and recommendations for action. If we aim to take something home from this meeting, then perhaps the motto itself that we selected for it. What should we do with these ideas and recommendations for action? How can we transfer knowledge into our practical work with the resources and facilities available to us?



Our thanks go to everyone who has helped to ensure the success of the 7th Forum and Disaster Reduction Day. It is difficult to list names, because somebody is always left out – often those whose inputs have been so vital: our interpreters, interns, office services and so many others. Nevertheless there are a few names I would like to single out: I would like to thank Karl-Otto Zentel, Managing Director of the German Committee for Disaster Reduction, Birgit zum Kley-Fiquet and Winfried Glass for the excellent cooperation we enjoy with the DKKV. And I would like to honour the contributions of some of our own staff: Michael Siebert, who with his "comrades in arms" Hanna Sabaß, Ria Hidajat and Jens Etter has worked tirelessly to organise this event, not forgetting Thomas Schaef, who is responsible at GTZ for disaster reduction. Ladies and gentlemen, honoured visitors, I am delighted you could be here.

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