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REPORT OF THE WORKSHOP ON SCIENCE MECHANISMS AND PRIORITIES FOR THE ISDR SYSTEM

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Report of the
Workshop on Science Mechanisms and Priorities for the ISDR System
Geneva, 2 April 2007

The Workshop on Science Mechanisms and Priorities for the International Strategy for Disaster Reduction (ISDR) system was convened by the ISDR secretariat on behalf of the ISDR system to develop guidance on suitable mechanisms for providing independent scientific and technical advice for the ISDR system and on potential priority issues that such mechanisms might address.[1] Participants included a number of eminent experts and representatives of United Nations and international organizations covering a range of scientific and technical concerns. The workshop was chaired by Professor Walter Erdelen, Assistant Director-General for Natural Sciences, UNESCO. The workshop examined the gaps and needs for scientific and technical (S&T) inputs to disaster risk reduction and the ISDR system, including the potential priority issues for scientific and technical attention, and it addressed the question of how best to arrange the ISDR S&T advisory mechanism. The agenda and list of participants are attached as annexes.

1. Setting the scene

In her welcoming remarks, Margareta Wahlstrom, Assistant Secretary-General for Humanitarian Affairs, stressed the importance of S&T to assist practitioners in the effective implementation of disaster risk reduction. There was a need to develop a stronger evidence base for risk reduction and to assist in the overall quality control of the work of the ISDR system.

The Hyogo Framework for Action sets out a number of expectations that require scientific and technical input, for example in risk assessment, early warning systems, and reducing the underlying causes of risk. Scientific information is an essential ingredient to most risk reduction activities, and is a particular requirement at national level where most investments in disaster risk related policies, projects and public initiatives occur. Paragraph 17 of the Hyogo Framework states:

> "*The starting point for reducing disaster risk and for promoting a culture of disaster resilience lies in the knowledge of the hazards and the physical, social, economic and environmental vulnerabilities to disasters that most societies face, and of the ways in which hazards and vulnerabilities are changing in the short and long term, followed by action taken on the basis of that knowledge.*"

The challenge to develop and apply this knowledge base is urgent. The subject of disaster risk reduction is being placed higher on the agenda of States and regional organizations, as they work toward implementing the Hyogo Framework for Action. The ISDR system is being revamped to provide support, including advocacy to Governments, organizations and individuals to change their way of thinking and to promote new ways of doing things. The ISDR partners are strengthening their capacity to respond to the increased demand for clear messages and guidance. It is important that these are embedded in strong S&T evidence.

[1] Note – in this workshop science is considered in its widest sense to include physical, ecological, social, economic, health and engineering sciences, and the term scientific and technical includes relevant technology matters and engineering practice.

Many organizations already take responsibility for aspects of these practical needs for science development and application, through their own work programmes, expert working groups, and special initiatives, for example among the thematic network of the ISDR system and in governments and the academic community. However, there are also many gaps and shortfalls, both at national and international level, and it is very clear that the ISDR system needs to strengthen its coordinating efforts on science and technology in order to underpin the implementation of the Hyogo Framework.

A specific effort is required to provide authoritative scientific or technical advice on the risks of rare major events, but there are also critical questions of vulnerability, such as those arising from social and global change, the application of new or cutting edge science or technology, and the needs for long-term research on disaster risk. Referring to the ISDR secretariat discussion paper on S&T mechanisms of 10 December 2005, Ms Wahlstrom stated that ISDR system's S&T mechanism needed to be able to deliver to policy demand and complement the work of existing ISDR science-related activities and organizations.

2. Scientific, technical and technological requirements for reducing disaster risks and supporting the implementation of the Hyogo Framework for Action

Following large disaster events, it is common for authorities to question whether the available scientific and technical knowledge had been effectively recognized, disseminated and applied in the relevant policies and practices on disaster management. This was certainly the case after the tsunami disaster in the Indian Ocean on 26 December 2004, as it became evident that scientists had been well aware of, and concerned about, the geological and associated tsunami risks of the Sumatra region. This had not led to effective policies to ameliorate these risks, and as a consequence, warning systems and public education programmes were not in place. Although the scientific capacity to predict the timing of occurrence of earthquakes is very limited, once an undersea earthquake has been detected it is possible to make predictions of tsunami occurrence.

Professor Sir Howard Dalton, Chief Scientific Adviser, Department for Environment, Food and Rural Affairs, UK, presented the findings of the Natural Hazard Working Group (NHWG) that was established by Prime Minister Tony Blair shortly after the 2004 tsunami to examine and advise on the risks of high impact events on a regional and international scale. The working group reviewed the general background of increasing natural hazard impacts and the existing global natural hazard frameworks and the effective use of scientific evidence. It concluded that there were gaps in knowledge as well as inadequate uptake and use of available information.

The main recommendation of the working group, of relevance to the present workshop, was the proposal to establish an international science panel for natural hazard assessment, as part of the UN disaster management framework. Some of the needs that would be addressed by the panel were:

- Advising decision-takers authoritatively on potential natural hazards likely to have high global/regional impacts;
- Facilitate the pooling and testing of expert knowledge;
- Addressing gaps in knowledge and advising on future threats; and
- Addressing how S&T can be used to mitigate threats and reduce vulnerability.

He said the panel might cost £500,000 to £1,000,000 to run, but this was a small cost compared to the costs of being ill prepared for large hazard events. It should be noted that these costs are

just for the assessment function, i.e., assessing the state of scientific knowledge and related policies through the examination of existing literature and reports, and not for undertaking the scientific research (across the broad spectrum of the sciences as noted earlier) that would be needed to reduce the gaps in this knowledge.

The British working group also recommended that consideration be given to developing the WMO framework to provide an authoritative coordinated warning system for other natural hazards and that governments and international bodies should prioritize national capacity building for hazard risk management, particularly risk assessment, monitoring and early warning. Professor Dalton said that the recommendations were introduced into the discussions at the G8 Summit in 2005 leading to a strong outcome statement supporting risk assessment and risk reduction and early warnings of potential natural hazards. He said that the ISDR system was a well-connected UN mechanism that could ensure the right parties were involved and that the systems were workable at all levels – national, regional and international.

At this point Reid Basher, ISDR secretariat, presented a summary of the Hyogo Framework for Action, agreed in January 2005, noting that it was negotiated and agreed by 168 countries and is now the globally accepted instrument for systematically implementing the reduction of disaster risks. It identifies five main areas for priority action and includes many references to science and technical requirements.

Professor Gordon McBean, representing ICSU, described the plans being developed for a major ICSU-coordinated, decade-long, international research programme on natural and human-induced hazards and disasters. Its areas of focus would be on (1) risk modelling and assessment, (2) decision making processes, and (3) reducing disaster risks through knowledge-based action, building on good practices and examples to convey to Governments. Two cross-cutting themes, on capacity building and case studies are included. A high-level, multidisciplinary ICSU planning group chaired by Professor McBean is developing the framework of the research programme that will build on, and complement, existing initiatives, and will be undertaken in due course by a wide array of international and national organizations and institutions. ISDR, WMO and UNESCO have been active observers in the planning process.

A comprehensive review of S&T initiatives in Japan was provided by Professor Takara. Japan has a well-established, sophisticated S&T mechanism involving a number of governmental and academic organizations coordinated by the Cabinet Office and strongly supported by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). Thematic approaches were introduced as examples including earthquakes, tsunamis, and landslides. It was emphasized that the wide distribution of knowledge on disaster reduction is a key to success. Regarding their efforts to assist other Asian countries, the importance of understanding different social situations and local characteristics covered by social science was also mentioned.

In the ensuing discussion, it was pointed out that the need for scientific assessment is different to that of doing scientific research. Assessment of what we know and do not know was identified as a current gap. It was also emphasized that the modalities for translating expertise on natural hazards and risk reduction into policies and concrete implementation is a major area of shortcoming. Some participants strongly felt that the primary problem was in implementing the results of research, making knowledge available to policymakers and users, and not in gaps in hazard science knowledge. S&T knowledge needs to be provided in appropriate formats to service policy makers and practitioners. This aspect becomes even more relevant as many S&T needs for disaster risk reduction address aspects related to the social, economic and environmental context of daily life, such as the safety of rural houses and local environmental

management. The situations and needs of developing countries needed specific consideration, to ensure local relevance and to make use of local experts. It was also stated that the ISDR system should engage top scientists to address the core challenges, covering the whole range of natural, engineering and social sciences with a real interdisciplinary approach to problems.

The IPCC process was mentioned as a successful effort that could hold lessons for the disaster risk reduction field. It was noted that the World Climate Research Programme, co-sponsored by ICSU, WMO and the IOC of UNESCO, along with other scientific programs such as the International Geosphere-Biosphere Programme (sponsored by ICSU) have provided the framework and substantive research basis for IPCC assessments. This combination of internationally coordinated scientific programs and an independent intergovernmental assessment process has worked relatively well in the case of climate change. Prediction of future circumstances on different time scales provides a basis for assessing the full impacts of decision making, through scenario analysis, as well as for early warnings.

It was recognized by the group that the issue of communication, of knowledge transfer and the utilization of S&T, was a key issue. Understanding of these processes, how they bring about change in Government, communities and people's behaviour needs to be addressed better. This included developing and driving knowledge through university education and establishing much better information on the costs and benefits of different risk reduction methods.

Science can be divided into so-called 'pure research' 'applied research' and 'translation of research to practice', and the latter two categories need to become more demand driven. A lot of innovations on risk management are coming from the private sector. The ICSU-planned programme will address gaps in scientific knowledge. Scientific excellence and the building of scientific capacities globally and locally was important. To deal with multi-factor issues like disaster risk, it was necessary in an increasingly specialized world to build bridges between disciplines and use multidisciplinary R&D teams.

3. Scope, directions and priorities for scientific and technical activities for the ISDR system

The workshop discussed the topic on the basis of two areas of need for S&T in the ISDR: (i) better methods for risk reduction and their practical application, and (ii) better strategies and policies to deal with major global risks, emerging problems and core issues in disaster risk reduction. The scope of the requirements for S&T is broad. Examples provided of objectives for the first of these categories include:

- Providing authoritative guidance to decision makers at various levels to support the effective implementation of the Hyogo Framework;
- Achieving interaction and synergy between the scientific and technological communities, on the one hand, and local authorities and decision-makers, planners, sociologists, the media and communication experts and the community at large, on the other;
- Developing sound methodologies for specific risk reduction applications;
- Facilitating the development of research and research networks and the pooling of knowledge; and supporting interdisciplinary studies that link and integrate across all sciences (see list of disciplines in footnote 1);
- Ensuring that new technology and scientific advances are rapidly applied for risk assessment, information exchange, disaster-resilient engineering, education, training and early warning, etc;

- Contributing to national capacity building and the transfer of technology, including south-south co-operation, in the application of research, science and technology to disaster reduction.

Beyond the routine professional concern for effective use of scientific knowledge, there lies a set of problems of typically international concern (the focus of the British Natural Hazards Working Group) that require high-level inputs to address, such as the risk of major catastrophes. There is clear geological evidence that the Earth has experienced much more devastating hazard events in the past than those we humans have witnessed over the last few hundred years. Moreover, human populations and economic systems have growth enormously in size and complexity over this time, making the world much more vulnerable to such hazards. In addition to "rapid onset" events such as earthquakes, volcanic eruptions and asteroid impact, there is now the growing threat of climate change, which in the long run may have similar or greater catastrophic consequences, as well as possibly triggering or changing the likelihood or character of particular rapid onset events. There are two special factors at work with truly major catastrophes.

- The largest events have worldwide impacts that extend beyond the country of the event itself, through humanitarian aid flows, reinsurance markets, food, energy, business, and transportation disruptions[2]. In particular, very large volcanic eruptions or impacts of space objects can spread debris and aerosols throughout the globe's atmosphere, significantly cooling the climate for several years and radically disrupting global agriculture, trade and social welfare.
- The largest events are very rare and we lack direct experience of their evolution and effects. They are therefore difficult to assess and to incorporate into public imagination and thinking and into national policymaking, in the face of competition of more immediate concerns.

While recognizing the informal nature of its discussions the workshop nevertheless provided a number of suggestions concerning priority issues and how to address them.

It was agreed that the Hyogo Framework provided the right framework for considering S&T needs, as this would enable better communication of the S&T agenda and it would orient people toward taking action. But it should not constrain the choices for science and technical enquiry.

It was recommended that the ISDR S&T mechanism should pay particular attention to Priority for Action 1 of the Hyogo Framework, which calls for a strong institutional basis for action as a means to implement all five priorities for action. Governments needed S&T capacities, knowledge and guidance, and capacity building was needed to develop national institutes and champions and to strengthen the S&T elements of the ISDR national platforms (multi-stakeholder mechanisms for disaster risk reduction). Building regional networks with local scientists working together is an effective strategy, and it is also important to bring an S&T perspective to the various national planning processes such as the UN's CCA/UNDAF process and the PRSP process supported by the World Bank. Similarly, there is a need to better understand the intersections between climate change, disaster reduction and related processes (MDGs, UNFCCC, MEAs, etc). It was proposed that this could include a special report of the IPCC on disaster risk reduction as an adaptation to climate change.

[2] This has been well demonstrated at a more modest scale by the larger disasters of 2004-2005.

Many tools and methodologies exist, but sometimes these are divergent (the example of risk assessment tools was mentioned), and there is a need to provide greater clarity and guidance on the effectiveness of these tools to Governments and communities.

Specific topic suggestions included:

- Housing safety, and schools safety.
- Risk mapping and risk communication.
- Public awareness and effective education.
- Disaster risk reduction innovations.
- Reviewing Millennium Environmental Assessment (MEA) from a natural hazard perspective (could relate to an ICSU/UNESCO project looking at research gaps in the MEA).
- Cost effectiveness of land use control, including ecosystem valuing.
- Tools for assessing social vulnerability.
- Indicator evaluation.
- Secondary damage to critical infrastructure.
- Vulnerability and resilience of social systems linked to institutional continuity mechanisms.
- Insurance and business continuity approaches.
- Recovery, rehabilitation and reconstruction following disaster events.
- Costs and benefits of risk reduction methods.
- Global assessment of disaster risks.
- Capacity building in developing countries.

4. Functions and modalities of scientific and technical mechanisms for the ISDR system

A short description of the strengthened ISDR system was presented by the ISDR secretariat, together with a summary of the proposals set out in the workshop's supporting document "Draft Modalities of a Scientific and Technical Mechanism for the ISDR System". The basic idea is to have a standing ISDR scientific and technical committee that would be responsible for policy-related matters, provide advice to the ISDR system and the Global Platform, and act in a catalytic and coordinating role, plus expert panels of limited duration that would be tasked to address specific priority scientific and technical questions.

It was suggested that the membership of the S&T committee comprise representatives of the main scientific and technical institutions of the ISDR system, as well as renowned experts, spanning the relevant scientific disciplines, and that the membership should not exceed 20 members. The committee would be established by the Chair of the ISDR system (the Under-Secretary-General for Humanitarian Affairs). It would be a subsidiary body of the Global Platform for Disaster Risk Reduction and would be both guided by, and report to and advise, the Global Platform. It would also act as a focal point for the various ISDR thematic platforms and networks of a scientific and technical nature.

It was envisioned that the S&T committee would develop proposals for the priority issues that required addressing and for follow-up action, seeking the endorsement of ISDR system partners for these, particularly through the biennial sessions of the Global Platform for Disaster Risk Reduction if it were a major issue, but also through other channels such as the individual ISDR system partners and the thematic platforms, depending on the nature of the proposals. Then, given the appropriate level of endorsement, the S&T committee would commission a time-bound

independent panel of experts or other appropriate approach for addressing the issue. The British proposal for an international science panel for natural hazard assessment readily fits this concept.

The meeting noted that policy bodies cannot alone set the S&T agenda. The S&T committee would need to define its own priorities for addressing knowledge gaps and fostering international scientific action on these gaps. It was suggested that the committee should endeavour to address one or two major issues during a given biennium. Leading scientists and technical experts should be engaged in the panels set up by the committee. It is suggested that the members of such panels would be appointed by the Chair of the ISDR system, upon the recommendation of the S&T committee.

On the membership of the S&T committee, it was agreed that it should consist of a core group with a good understanding of where relevant expertise and knowledge of international cooperation can be found. Members should act as individual experts and not merely as representatives of their own institutions. It should engage key S&T institutions, relevant experts from the private sector, and a suitable range of social scientists. It requires a level of excellence and experience to ensure authority and credibility of its recommendations, but it should also have an appropriate regional distribution, gender and developing country balance. The meeting recommended that further thought needed to be given to these issues of governance, including how the chair would be chosen and the relationships with other bodies in the ISDR system.

The S&T committee would develop its own programme of work, which should be largely built on existing programmes and ISDR partner contributions, and it would meet face to face at least once each year. Its work, along with that of any working groups or panels, would be supported by a secretariat, organized by the ISDR secretariat and ideally hosted by a partner of the ISDR system. Additional scientific and technical institutions of the ISDR system could be invited to second staff to the secretariat on a rotational basis.

Activities carried out by the S&T committee should be included as appropriate in the ISDR system's Global Joint Work Programme framework, which is currently in an early stage of development, and would be included in ISDR system resource mobilization packages as appropriate. Major studies such as by a high level panel would require specific additional funding.

Next steps

It was agreed that the recommendations of the workshop should be reported to the Chair of the ISDR system, and should be brought to the first session of the Global Platform for Disaster Risk Reduction, Geneva, 5-7 June 2007, for discussion and guidance. It is expected that some form of scientific and technical mechanism would be established as soon as possible thereafter.

The conclusions of the workshop and the associated Global Platform outcome would be reflected in the UN Secretary-General's report on the ISDR to the General Assembly later in the year. That report is prepared in July. The ISDR secretariat said it would move ahead as fast as possible to advance the development of the S&T mechanisms over 2007.

ANNEX 1: ANNOTATED AGENDA

International Strategy for Disaster Reduction
Workshop on Science Mechanisms and Priorities for the ISDR System
2 April 2007

Room 2, International Environment House, 9-15 ch. des Anémones, Geneva

09.30 to 10.00

Coffee will be served at the venue

10.00 to 10.20

Item 1 - Opening

i. Welcome remarks by Margareta Wahlstrom, ASG for Humanitarian Affairs
ii. Adoption of the agenda
iii. Objectives of workshop[3]

10.20 to 12.30

Item 2 – Scientific, technical and technological requirements for reducing disaster risks and supporting the implementation of the Hyogo Framework for Action

i. Presentation on the findings of the Natural Hazard Working Group (NHWG)
ii. Presentation on the Hyogo Framework for Action and its science-related aspects
iii. Open discussion

Suggested outcome of discussions
Identified gaps and needs for science and technology and its effective translation to support disaster risk reduction policies and in particular the implementation of the Hyogo Framework for Action.

12.30 to 13.30

Lunch will be provided at the venue

13.30 to 15.00

Item 3 – Scope, directions and priorities for scientific and technical activities for the ISDR system

i. Open discussion

Suggested outcome of discussions
List of priority issues recommended for independent scientific and technical advice for the ISDR system in the next biennium

[3]Note – in this workshop science is considered in its widest sense to include physical, biological, social, economic, and engineering sciences.

15.00 to 15.30

Coffee break

15.30 to 17.00

Item 4 - Functions and modalities of scientific and technical mechanisms for the ISDR system and way forward

i. Presentation of paper entitled 'Draft modalities of a scientific and technical mechanisms for the ISDR system'
ii. Open discussions

Suggested outcome of discussions

1. Proposals for strengthening the leadership and engagement of ISDR system partners in the provision of scientific and technical inputs for the implementation of the Hyogo Framework for Action.

2. Agreement on the terms of reference, criteria for membership and processes for implementing the proposed scientific and technical committee and next steps to finalize its establishment in 2007.

Item 5 – Any other business and wrap-up of the meeting

Supporting documents

1. *Mechanisms for Science and Technical Inputs to the ISDR System (December 2005)*
2. *Illustrative list of possible scientific and technical priorities for the ISDR system (March 2007)*
3. *Strengthening the ISDR System: Background and Discussion Document (31 December 2006)*
4. Modalities of a scientific and technical mechanism for the ISDR system (March 2007)

Other relevant background documents

Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters (available on http://www.unisdr.org/eng/hfa/hfa.htm)

Proceedings of the WMO/UNESCO Sub-Forum on Science and Technology in Support of Natural Disaster Reduction, IDNDR Programme Forum (1999)

International Decade for Natural Disaster Reduction (IDNDR), Final report of the Scientific and Technical Committee (STC).

Global Survey of Early Warning Systems (UN, 2006), http://www.unisdr.org/ppew/info-resources/ewc3/Global-Survey-of-Early-Warning-Systems.pdf

Recommendations (related to disaster risk reduction and early warning) by the G8, Gleneagles 2005 (see http://www.fco.gov.uk/Files/kfile/PostG8_Gleneagles_Tsunami.pdf)

An assessment of capacities, gaps and opportunities towards building a comprehensive global early warning system for all natural hazards (available on http://www.unisdr.org/ppew/info-resources/ewc3/Global-Survey-of-Early-Warning-Systems.pdf)

Report of ICSU Scoping Group on Natural and human-induced environmental hazards (see) http://www.icsu.org/Gestion/img/ICSU_DOC_DOWNLOAD/865_DD_FILE_Hazards_Report_Final.pdf)

The Role of Science in Physical Natural Hazard Assessment, Report to the UK Government by the Natural Hazard Working Group, June 2005 (see http://www.dti.gov.uk/files/file8511.pdf)

ANNEX 2: LIST OF PARTICIPANTS

International Strategy for Disaster Reduction
Workshop on Science Mechanisms and Priorities for the ISDR System
2 April 2007

Room 2, International Environment House, 9-15 ch. des Anémones, Geneva

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