Plataforma Regional para la Reducción del Riesgo de Desastres de las Américas

Invertir en RRD para proteger los avances del desarrollo

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Título de la presentación: Establishing an international science advisory mechanism for disaster risk reduction to strengthen resilience for the Post-2015 Framework

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UNISDR
The United Nations Office for Disaster Risk Reduction
Science and Technical Advisory Group

Establishing an international science advisory mechanism for disaster risk reduction to strengthen resilience for the Post-2015 Framework

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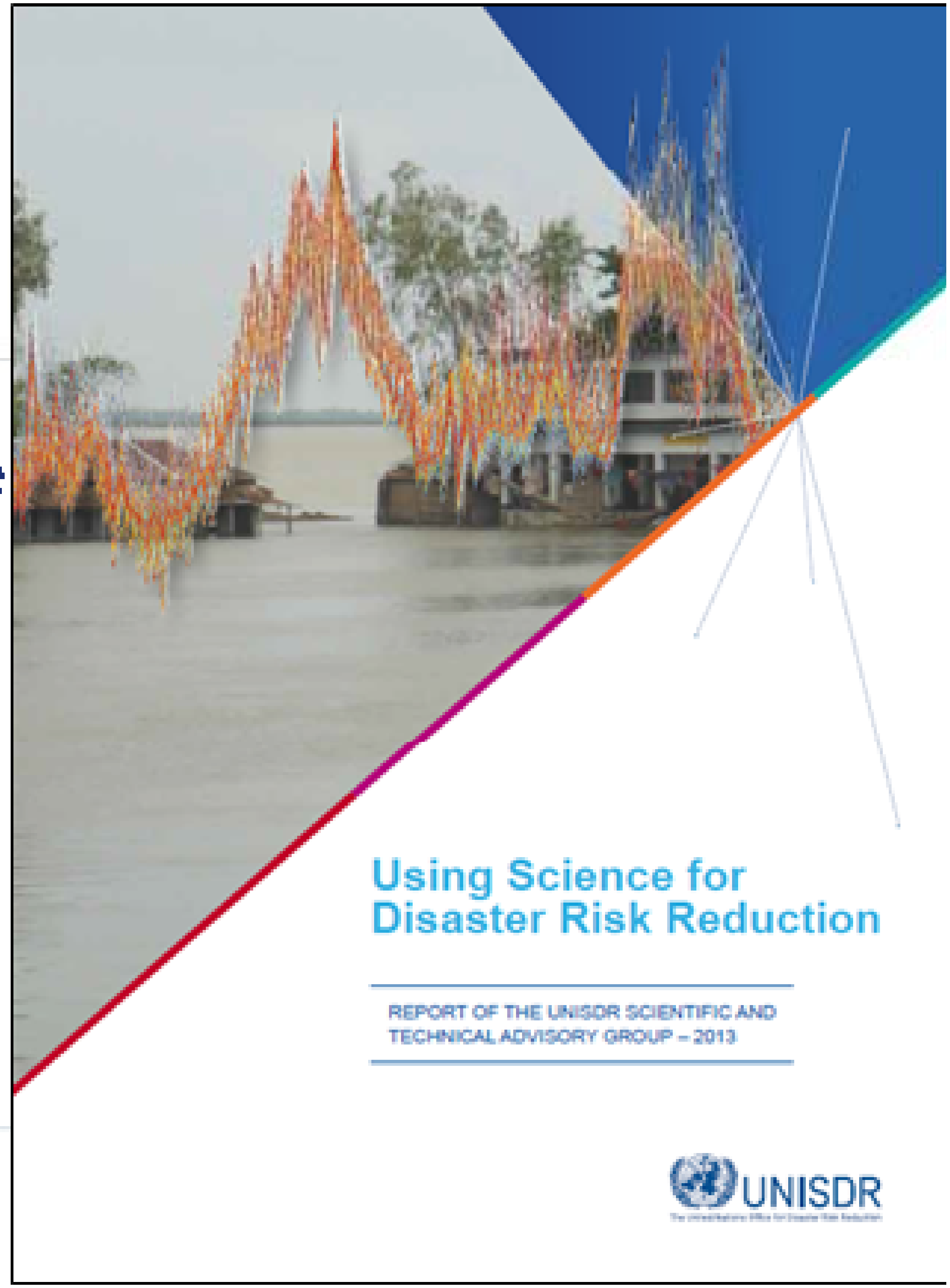
Report of the UNISDR Scientific and Technical Advisory Group 2013

Using Science for Disaster Risk Reduction

http://www.unisdr.org/files/32609_stagreport2013assembled.pdf



Case Studies: Objectives

- *The disaster risk reduction problem*
- *The science*
- *Application to policy and practice*
- *Did it make a difference?*

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The case studies

1. *Tsunami Warning and Mitigation for the* ***Indian Ocean***
2. *Assessing Vulnerability to Improve Risk Reduction****, US***
3. *Flood Early Warning in* ***Bangladesh***
4. *An Earthquake Early Warning for* ***Japanese*** *Bullet Train*
5. *Watching the Rains to Build Resilience in the* ***African Sahel***
6. *Flood Risk Reduction in the* ***Netherlands***
7. *Health disaster risk reduction through Rubella vaccinatic*
8. *An Atlas of Hazards and Disaster Risks to Support Disaster Risk Reduction in* ***China***
9. *Mathematical Models for* ***Cambodia*** *to Reduce the Risk H5N1 Flu Outbreaks in Poultry*
10. *Building Resilience to Earthquakes in* ***Chile***

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CASE STUDY 10:

Building Resilience to Earthquakes in Chile

Image 1: Tie-column reinforcement cages extending from foundations of a new building; these are a key feature of 'confined masonry' construction. Source: *Brzev, Astroza and Yadlin, 2010*[1].

The problem

Hundreds of thousands of people have lost their lives due to the collapse of buildings during earthquakes in the last two decades; billions of dollars of financial loss have also been sustained. Building vulnerability generally results from a lack of understanding of engineering science and poor enforcement of building codes. The problem is most severe in developing countries where populations are growing, towns and cities are expanding and buildings are more vulnerable to damage[2–4].

The science

Scientists have studied the ways in which materials and structures are affected by strong shaking as experienced in an earthquake. By exposing structures to physical forces in the laboratory, and by studying the effects of real-life earthquakes, scientists can see how structural elements like beams, columns and walls behave under earthquake ground shaking, what type of damage they experience and how collapse takes place. This has brought an understanding of how to construct buildings to better withstand earthquakes.

For instance, buildings constructed in the 'confined masonry' style, have been designed to withstand earthquakes better than buildings built with other, more traditional building techniques[5]. 'Confined masonry' buildings are characterized by masonry walls combined with reinforced concrete confining elements, such as tie-column and tie-beam reinforcement cages (Image 1), and, in some cases, concrete bands through walls[6–8].

Building codes with seismic provisions are the most common tool used to put this scientific knowledge into practice. If adequately enforced, seismic building codes result in earthquake-resistant buildings that are less likely to collapse even in severe earthquakes, thus ensuring the safety of inhabitants.

Seismic code provisions are generally based on earthquake hazard maps and are more stringent in high hazard regions and for structures with high importance such as schools, hospitals, fire and police stations, and critical facilities. Building codes are generally updated regularly to incorporate new knowledge and experience gained from major earthquake events.

The application to policy and practice

The South American country of Chile experiences frequent earthquakes which have claimed many lives[9]. Chile has a long history of regulated 'confined masonry' construction practice, starting in the 1930s, after the 1928 Talca earthquake of magnitude 8.0[10].

Seismic design provisions for buildings were first formally laid out in 1940[11]. From the 1960s onwards, the Chilean government funded research work into seismic design codes for the country[12] and, in 1997, new building regulations were introduced which gave provisions for all new buildings to be designed and constructed in the 'confined masonry' style[13]. The regulations specify how buildings should be constructed and include standards such as the required strength for clay and concrete masonry units such as bricks and blocks. The regulations include the newest methods and techniques available[14].

The 1997 building regulations have been enforced well, with local authorities requiring that seismic and structural computations in the design of new buildings are verified by an independent professional[15].

Similar examples are seen in other areas of the world, particularly in Pakistan, which is also heavily affected by earthquakes. The new Building Code of Pakistan[16] was prepared after the 2005 Kashmir earthquake; these guidelines move away from the use of traditional adobe structures and adopt 'confined masonry' as the main building typology[16, 17]. More than 400,000 buildings were reconstructed in the affected areas after the 2005 earthquake, using the new code and with the aim to 'build back better'[18]. Other examples include the introduction of the Dhajji Diwari building typology (clay brick confined by small timber elements) in Kashmir[19].

Internationally, 'confined masonry' technology is being promoted by earthquake engineering experts. For instance, the Confined Masonry Network[20] has developed guidelines on seismic design for low-rise constructions, targeting countries where 'confined masonry' is not yet used[21].

Did it make a difference?

Over 200,000 people died in the magnitude 7.0 Haiti earthquake in January 2010 but when a magnitude 8.8 earthquake struck central Chile the next month, on 27th February 2010, only around 300 people lost their lives due to collapsed buildings[22] (Image 2). Well-enforced, science-based seismic building codes have been suggested as a major reason for the low number of casualties in the Chile earthquake[24, 25]. The earthquake was the most severe since the 1930s and produced significant ground-shaking over a large area of the country. Despite this, 'confined masonry' buildings of all sizes performed very well and it is estimated that only about 1% of the total building stock in the affected area was damaged[26]. Similarly in Pakistan, buildings constructed in line with seismic codes have survived several moderate and strong earthquakes over the past five decades with no or only minor damage[27, 28]. In this way, integration of science into building practice can and does save lives and livelihoods.

Image 2: A building with a collapsed ground floor as a result of the February 2010 earthquake in Chile. Source: *Brzev, Astroza and Yadlin, 2010*[23].

1 Brzev S, Astroza M, Yadlin MO. Performance of confined masonry buildings in the February 27, 2010 Chile earthquake. EERI report. Confined Masonry Network, 2010. Available at: http://www.confinedmasonry.org/performance-of-confined-masonry-buildings-in-the-february-27-2010-chile-earthquake [accessed 9 April 2013].
2 Jain SK. Historical developments in India towards seismic safety and lessons for future. Proceedings of the 14th World Conference on Earthquake Engineering, Beijing, China. October 2008.
3 Maqsood ST, Schwarz J. Building vulnerability and damage during the 2008 Baluchistan Earthquake in Pakistan and past experiences. Seismological Research Letters. 2010; 81(3):514-525.
4 Maqsood ST, Schwarz J. Comparison of seismic vulnerability of buildings before and after 2005 Kashmir earthquake. Seismological Research Letters. 2010; 81(1):85-98.
5 Meli R, Brzev S, Astroza M, Boen T, Crisafulli F, Dai J et al for the Confined Masonry Network. Seismic Design Guide for Low-Rise Confined Masonry Buildings. Oakland: Earthquake Engineering Research Institute, 2011. Available at: http://www.confinedmasonry.org/wp-content/uploads/2009/09/ConfinedMasonryDesignGuide82011.pdf [accessed 11 April 2013].
6 Ibid.
7 International Association for Earthquake Engineering (IAEE). Guidelines for Earthquake Resistant Non-Engineered Construction. Columbia and Delhi: IAEE, 2004.
8 Chilean Ministerio de Tierras y Colonización. Ordenanza General de Urbanismo y Construcción. Decreto Supremo Nº 1.050 de 1940. Santiago, 1940.
9 Ene D, Craifaleanu I-G. Seismicity and Design Codes in Chile: Characteristic Features and a Comparison with some of the Provisions of the Romanian Seismic Code. Constructii. 2010; 2:59-78.
10 Brzev S, Astroza M, Yadlin MO. Performance of confined masonry buildings in the February 27, 2010 Chile earthquake. EERI report. Confined Masonry Network, 2010. Available at: http://www.confinedmasonry.org/performance-of-confined-masonry-buildings-in-the-february-27-2010-chile-earthquake [accessed 9 April 2013].
11 Chilean Ministerio de Tierras y Colonización. Ordenanza General de Urbanismo y Construcción. Decreto Supremo Nº 1.050 de 1940. Santiago, 1940.
12 Ene D, Craifaleanu I-G. Seismicity and Design Codes in Chile: Characteristic Features and a Comparison with some of the Provisions of the Romanian Seismic Code. Constructii. 2010; 2:59-78.
13 Instituto Nacional de Normalizacion (INN). Norma Chilena Oficial 2123.Of 1997. Confined masonry – Requirements for structural design. Santiago: INN, 1997.
14 Ene D, Craifaleanu I-G. Seismicity and Design Codes in Chile: Characteristic Features and a Comparison with some of the Provisions of the Romanian Seismic Code. Constructii. 2010; 2:59-78.
15 Ibid.
16 Maqsood ST, Schwarz J. Comparison of seismic vulnerability of buildings before and after 2005 Kashmir Earthquake. Seismological Research Letters. 2010; 81(1):85-98.
17 Ministry of housing and public works. Building Code of Pakistan – seismic provisions. Islamabad, 2007.
18 Maqsood ST, Schwarz J. Comparison of seismic vulnerability of buildings before and after 2005 Kashmir Earthquake. Seismological Research Letters. 2010; 81(1):85-98.
19 Maqsood ST, Schwarz J. Building vulnerability and damage during the 2008 Baluchistan Earthquake in Pakistan and past experiences. Seismological Research Letters. 2010; 81(3):514-525.
20 www.confinedmasonry.org/ [accessed 11 April 2013].
21 Meli R, Brzev S, Astroza M, Boen T, Crisafulli F, Dai J et al for the Confined Masonry Network. Seismic Design Guide for Low-Rise Confined Masonry Buildings. Oakland: Earthquake Engineering Research Institute, 2011. Available at: http://www.confinedmasonry.org/wp-content/uploads/2009/09/ConfinedMasonryDesignGuide82011.pdf [accessed 11 April 2013].
22 Brzev S, Astroza M, Yadlin MO. Performance of confined masonry buildings in the February 27, 2010 Chile earthquake. EERI report. Confined Masonry Network, 2010. Available at: http://www.confinedmasonry.org/performance-of-confined-masonry-buildings-in-the-february-27-2010-chile-earthquake [accessed 9 April 2013].
23 Meli R, Brzev S, Astroza M, Boen T, Crisafulli F, Dai J et al for the Confined Masonry Network. Seismic Design Guide for Low-Rise Confined Masonry Buildings. Oakland: Earthquake Engineering Research Institute, 2011. Available at: http://www.confinedmasonry.org/wp-content/uploads/2009/09/ConfinedMasonryDesignGuide82011.pdf [accessed 11 April 2013].
24 Ibid.
25 Ene D, Craifaleanu I-G. Seismicity and Design Codes in Chile: Characteristic Features and a Comparison with some of the Provisions of the Romanian Seismic Code. Constructii. 2010; 2:59-78.
26 Brzev S, Astroza M, Yadlin MO. Performance of confined masonry buildings in the February 27, 2010 Chile earthquake. EERI report. Confined Masonry Network, 2010. Available at: http://www.confinedmasonry.org/performance-of-confined-masonry-buildings-in-the-february-27-2010-chile-earthquake [accessed 9 April 2013].
27 Maqsood ST, Schwarz J. Building vulnerability and damage during the 2008 Baluchistan Earthquake in Pakistan and past experiences. Seismological Research Letters. 2010; 81(3):514-525.
28 Maqsood ST, Schwarz J. Comparison of seismic vulnerability of buildings before and after 2005 Kashmir earthquake. Seismological Research Letters. 2010; 81(1):85-98.

UNISDR Scientific and Technical Advisory Group Report 2013

Recommendations

1. *Encourage science to demonstrate that it can inform policy and practice*
2. *Use a problem-solving approach to research that integrates all hazards and disciplines*
3. *Promote knowledge into action*
4. *Science should be key to the Post-2015 Hyogo Framework for Action*

Global Platform
for Disaster Risk Reduction
Fourth session, Geneva, Switzerland
19-23 May 2013

PEOPLE
RESILIENT
PLANET

It is expected that the HFA2 will recognize the need to govern disaster risk reduction and resilience through clear responsibilities, strong coordination, enabled local action, appropriate financial instruments and a clear recognition of a central role for science.

and science. The session builds on regional platforms for disaster risk reduction convened in Africa, the Americas, Asia-Pacific, Arab States and Europe as well as many consultative and preparatory meetings convened by civil society, national and local governments and Red Cross and Red Crescent national societies.

UKCDS wellcome trust *in collaboration with* UNISDR ICSU UNESCO

Statement on establishing an international science advisory mechanism for disaster risk reduction to strengthen resilience

The imperative now

The role and value of scientific information in disaster risk reduction and resilience has long been recognised. However, it is vital that research becomes more directly actionable, coupled with more effective ways of providing evidence-based advice to support disaster policy and practice. Given the coalescence in 2015 of three major international instruments[1] under discussion, there needs to be an immediate step change in the use of science in these international efforts. In particular:

- We[2] call upon governments and other stakeholders engaged in preparations for the post 2015 international discussions on the successor to the Hyogo Framework for Action and the post 2015 Sustainable Development Goals to support the implementation of an Action Agenda for an international science advisory mechanism for disaster risk reduction to strengthen resilience.

- We invite scientists, scientific organisations, science networks and other entities around the world to share ideas and actions for advancing this Statement. Further details can be found here: http://preventionweb.net, http://www.unisdr.org/partners/academia-research and www.icsu.org

An Action Agenda

1. **Champion and reinforce existing and future programmes and initiatives for integrated research and the scientific assessment of disaster risk.** To strengthen the provision of actionable research, we particularly emphasise the importance of co-design, production and delivery of research with public, private and civil society stakeholders, engagement of scientists from across the world and that all the necessary natural, social and health sciences, engineering, and humanities disciplines needed are deployed to conduct research and to connect research, policy and practice on disaster risk reduction and resilience across sectors and scales.

Statement on establishing an international science advisory mechanism for disaster risk reduction to strengthen resilience

Action Agenda

- Champion and reinforce existing and future programmes and initiatives for integrated research and the scientific assessment of disaster risk
- Establish and promote an international science advisory mechanism for disaster risk

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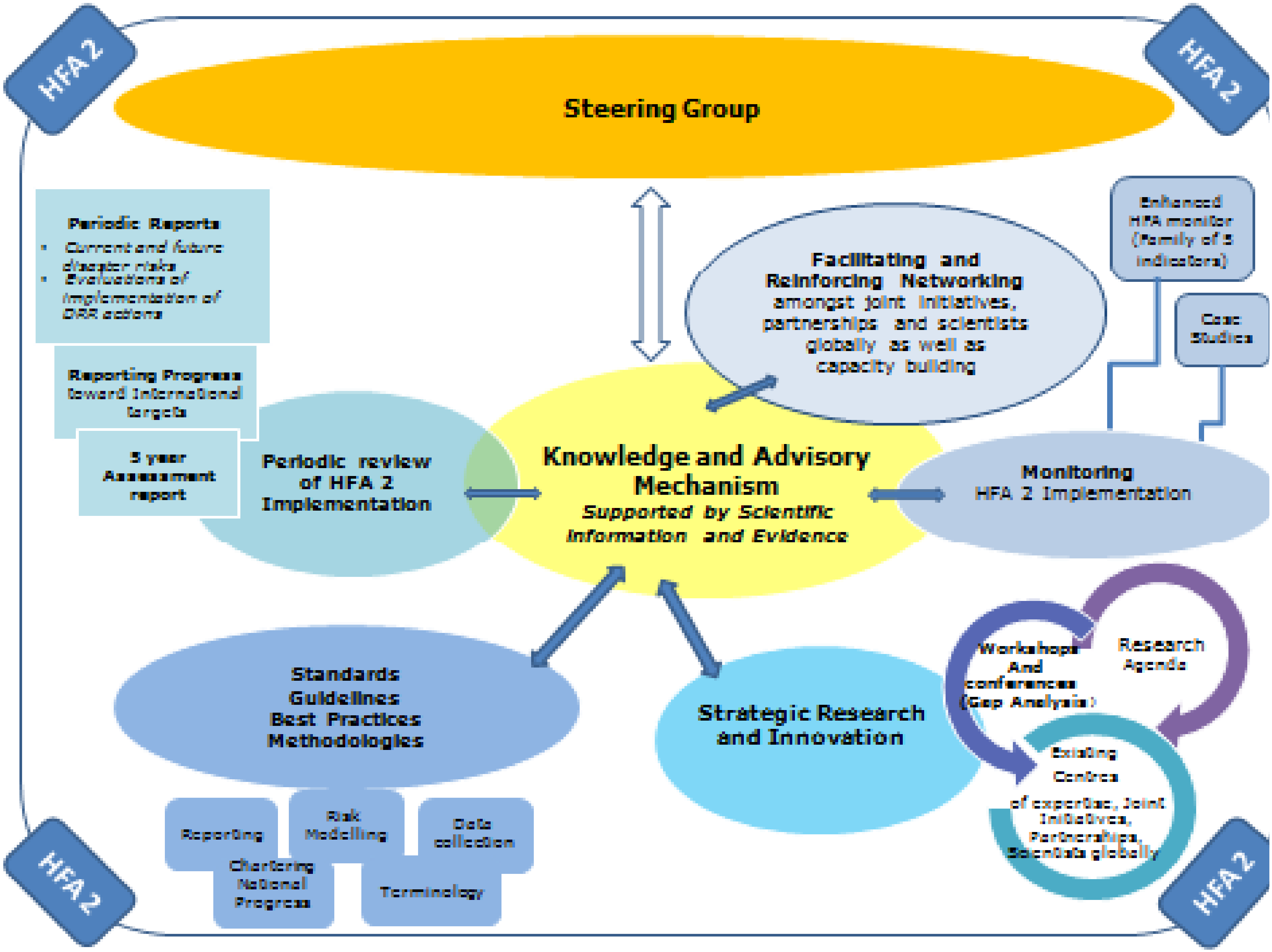
Statement on establishing an international science advisory mechanism for disaster risk reduction to strengthen resilience

- producing periodic reports on current and future disaster risks and on the status of efforts to manage such risks at global, regional, national and local scales.
- monitoring progress toward internationally-agreed targets for reducing disaster losses and building resilience to disasters.
- providing guidance on terminology, methodologies and standards for risk assessments, risk modelling, taxonomies and the use of data.
- convening stakeholders to identify and address demands for scientific research, information and evidence on disaster risk and resilience.
- enhancing the communication of complex scientific information and evidence to support the decision-making of policy makers and other stakeholders.


HFA 2
HFA 2
Steering Group
Periodic Reports
Current and future disaster risks
Evaluations of implementation of DRR actions
Reporting Progress toward International targets
5 year Assessment report
Periodic review of HFA 2 Implementation
Knowledge and Advisory Mechanism
Supported by Scientific Information and Evidence
Facilitating and Reinforcing Networking amongst joint initiatives, partnerships and scientists globally as well as capacity building
Enhanced HFA monitor (Family of 5 indicators)
Case Studies
Monitoring HFA 2 Implementation
Standards Guidelines Best Practices Methodologies
Reporting
Risk Modelling
Data collection
Charting National Progress
Terminology
Strategic Research and Innovation
Workshops And conferences (Gap Analysis)
Research Agenda
Existing Centres of expertise, Joint Initiatives, Partnerships, Scientists globally
HFA 2
HFA 2

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More information on the post-2015 process:
http://www.preventionweb.net/posthfa/

Towards a post-2015 DRR Framework

- Requested by the UN General Assembly Resolution A/RES/66/199
- UNISDR is facilitating a multistakeholder consultation process and engages a full range of actors from Member States to civil society.
- Consultation events include the Global and Regional Platforms, national and local events, and targeted events of stakeholders, partners and networks.
- Builds on the *International Framework for the International Decade for Natural Disaster Reduction of 1989, the Yokohama Strategy and Plan of Action of 1994, the International Strategy for Disaster Reduction of 1999*, the *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters (HFA)*, and *the Mid-Term Review of the HFA (2010-2011)*.
- Expected to be adopted at the Third UN World Conference on Disater Risk Reduction and endorsed by the UN General Assembly in 2015.

2013

Consultations started in March 2012 (with some 89 events up to the Global Platform) through 2013...

MINISTERIAL CONFERENCES AND REGIONAL PLATFORMS ON DISASTER RISK REDUCTION

- Feb 13-15 : Africa (Arusha, Tanzania)
- Mar 19-21 : Arab States (Aqaba, Jordan)
- Sep 23-25 : Europe (Oslo, Norway)

MAY 19-23
Global Platform for Disaster Risk Reduction (Geneva, Switzerland)

SEP-NOV
UN Secretary-General's Report and UN General Assembly Resolution on the *International Strategy for Disaster Reduction*

2014

... and continues in 2014

MINISTERIAL CONFERENCES AND REGIONAL PLATFORMS ON DISASTER RISK REDUCTION

- Apr : Arab States (TBC)
- Apr/May : Europe (Brussels, Belgium)
- May/Jun : Africa (TBC)
- May 27-29 : Americas (Guayaquil, Ecuador)
- Jun 23-26 : Asia (Bangkok, Thailand)
- Jun : Pacific (TBC)
- Oct : Europe (Madrid, Spain)

JUL 14-15
1st Preparatory Committee Meeting (Geneva, Switzerland)
Subject to an anticipated decision of the UN General Assembly in 2013

NOV 17-18
2nd Preparatory Committee Meeting (Geneva, Switzerland)
Subject to an anticipated decision of the UN General Assembly in 2013

SEP-NOV
UN Secretary-General's Report and UN General Assembly Resolution on the *International Strategy for Disaster Reduction*

2015

MAR 14-18 / SENDAI, JAPAN
The Third UN World Conference on Disaster Risk Reduction will review the implementation of the Hyogo Framework for Action and is expected to adopt a successor framework for disaster risk reduction.

SEP-NOV
UN Secretary-General's Report and UN General Assembly Resolution on the *International Strategy for Disaster Reduction*. The UN General Assembly Session will also consider the post-2015 disaster risk reduction framework for endorsement.

Version: 10 September 2013

More information on UNISDR:
http://www.unisdr.org

PERFIL PROFESIONAL

La catedrática Virginia Murray fue nombrada consultora en reducción de riesgos de desastres globales en el departamento de salud pública de Inglaterra en el 2014. Este nombramiento tiene como objetivo avanzar su trabajo como vice-presidenta del grupo técnico (STAG) para la estrategia internacional de reducción de desastres (ISDR) de las Naciones Unidas y es uno de los miembros del grupo consultivo del UNISDR para el Post-2015 marco de reducción de riesgo de desastres.
Como miembra de UNISDR STAG y en preparación para la agenda post-2015 su objetivo es establecer mecanismos internacionales de asesoría científica para la reducción de riesgo de desastres y fortalecer la capacidad de recuperación. Virginia también lidera la UNISDR STAG, la cual está recogiendo y publicando estudios de caso (aproximadamente 600 palabras/ 2 paginas incluyendo imagines y referencias, fecha límite 30 Julio). Este documento recalca el impacto que la ciencia ha tenido en la reducción del desastre de riesgo o la gestión del desastre de riesgo.

Experiencia previa

- Directora del equipo de eventos extremos y protección sanitaria, Departamento de salud pública de Inglaterra, Enero del 2011. Con el equipo de eventos extremos, Virginia contribuyo al desarrollo de evidencia científica y consejería en inundaciones, olas de calor y frio, ceniza volcánica y otros eventos extremos climáticos y naturales.
- Virginia fue nombrada catedrática invitada en protección sanitaria en el centro de medio-ambiente y salud del MRC-HPA, Imperial College and King's College, Londres (2004) y catedrática honoraria de University College London (2013), donde ha publicado abundantemente.
- Fue coordinadora y autora principal del capítulo 9- Estudios de caso del IPCC informe especial sobre la gestión de riesgos de eventos extremos y desastres para la aportación al cambio climático (SREX). Este informe evalúa el papel que juega el cambio climático en el cambio de las características de los eventos extremos. Igualmente, este informe evalúa las opciones tomadas por varias instituciones, organizaciones y comunidades para reducir la exposición y vulnerabilidad a los extremos climáticos y aumentar su capacidad de recuperación. Publicado por Cambridge University Press Mayo 2012 http://ipcc-wg2.gov/SREX/report/full-report/
- Consultora medica toxicológica del centro de peligros radiológicos, químicos y medio-ambientales, 2003-2010.
- Directora del servicio de respuesta a incidentes químicos, servicio de información nacional de venenos, Guy's and St Thomas's Hospital 1995-2003.
- Consultora de toxicología medio-ambiental y ocupacional, servicio de información nacional de venenos, Guy's and St Thomas's Hospital 1986-1995.