

Integrated Research on Disaster Risk (IRDR): an example of collaborative & policy-oriented research

Symposium on Collaborative Research & Education in Safety & Security Areas
International Forum on Research Institutes for Disaster Risk Reduction
Disaster Prevention Research Institute - DPRI, Uji Campus
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www.irdrinternational.org

Significant natural catastrophes 1980 - 2011

10 costliest events worldwide ordered by overall losses

Period	Event	Affected Area	Overall losses	Insured losses	Fatalities
			US\$ m, original values		
11.3.2011	Earthquake, tsunami	Japan: Honshu, Aomori, Tohoku; Miyagi, Sendai; Fukushima, Mito; Ibaraki; Tochigi, Utsunomiya	210,000	35,000-40,000	15,840
25-30.8.2005	Hurricane Katrina, storm surge	USA: LA, New Orleans, Slidell; MS, Biloxi, Pascagoula, Waveland, Gulfport	125,000	62,200	1,322
17.1.1995	Earthquake	Japan: Hyogo, Kobe, Osaka, Kyoto	100,000	3,000	6,430
12.5.2008	Earthquake	China: Sichuan, Mianyang, Beichuan, Wenchuan, Shifang, Chengdu, Guangyuan, Ngawa, Ya'an	85,000	300	84,000
17.1.1994	Earthquake	USA: CA, Northridge, Los Angeles, San Fernando Valley, Ventura, Orange	44,000	15,300	61
1.8-15.11.2011	Floods	Thailand: Phichit, Nakhon Sawan, Phra Nakhon Si Ayuttaya, Pathumthani, Nonthaburi, Bangkok	40,000	10,000	813
6-14.9.2008	Hurricane Ike	USA, Cuba, Haiti, Dominican Republic, Turks and Caicos Islands, Bahamas	38,300	18,500	170
May-Sept 1998	Floods	China: Jangtsekiang, Songhua Jiang	30,700	1,000	4,159
27.2.2010	Earthquake, tsunami	Chile: Bió Bió, Concepción, Talcahuano, Coronel, Dichato, Chillán; Del Maule, Talca, Curicó	30,000	8,000	520
23.10.2004	Earthquake	Japan: Honshu, Niigata, Ojiya, Tokyo, Nagaoka, Yamakoshi	28,000	760	46

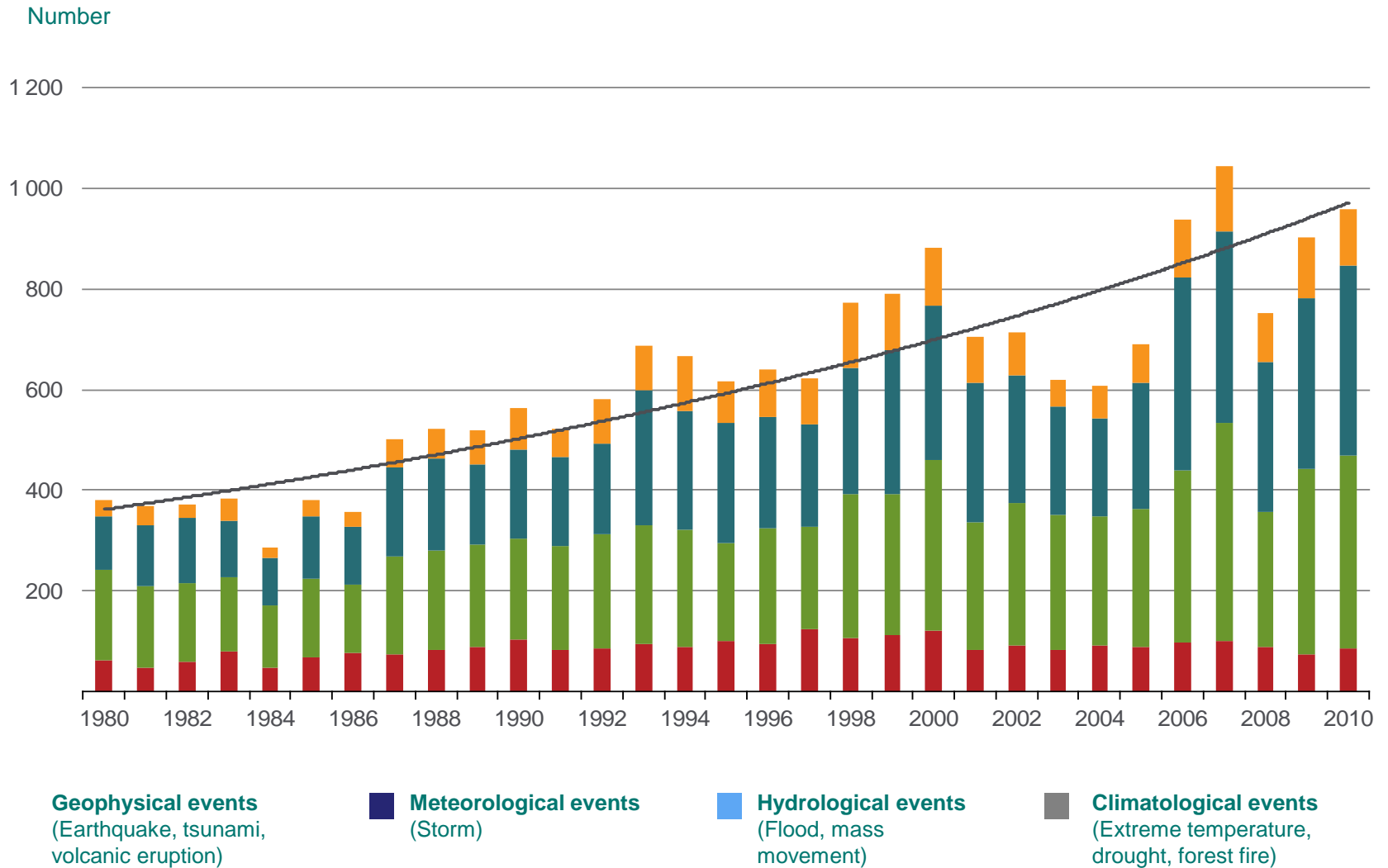
Significant “natural“ catastrophes worldwide 1980 – 2010

10 deadliest events

Period	Event	Affected Area	Overall losses	Insured losses	Fatalities
			US\$ m, original values		
12.1.2010	Earthquake	Haiti: Port-au-Prince, Petionville	8,000	200	222,570
26.12.2004	Earthquake, tsunami	Sri Lanka. Indonesia. Thailand. India. Bangladesh. Myanmar. Malediven. Malaysia	10,000	1,000	220,000
2-5.5.2008	Cyclon Nargis	Myanmar: Ayeyawaddy, Yangon, Bugalay, Irrawaddy, Bago, Karen, Mon, Laputta, Haing Kyi	4,000		140,000
29-30.4.1991	Tropical cyclon	Bangladesh: Bay of Bengal, Cox's Bazar, Chittagong, Bola, Noakhali districts, esp. Kutubdia	3,000	100	139,000
8.10.2005	Earthquake	Pakistan. India. Afghanistan	5,200	5	88,000
12.5.2008	Earthquake	China: Sichuan, Mianyang, Beichuan, Wenchuan, Shifang, Chengdu, Guangyuan, Ngawa, Ya'an	85,000	300	84,000
July-August 2003	Heatwave, drought	France. Germany. Italy. Portugal. Romania. Spain. United Kingdom	13,800	20	70,000
July-Sept. 2010	Heatwave, drought	Russia	2,000	20	56,000
21.6.1990	Earthquake	Iran: Caspian Sea, Gilan Provinz, Manjil, Rudbar, Zanjan, Safid, Qazvin	7,100	100	40,000
8-19.12.1999	Floods, flash floods	Venezuela: Vargas, La Guaira Punta de Mulatos, Miranda, Nueva Esparta, Yaracuy. Kolumbien	3,200	220	30,000

“Natural” catastrophes worldwide 1980 – 2010

Number of events with trend



Global Trends - Disasters are NOT natural

Greater exposure to natural and human-induced hazards, climate change and variability

Socio-economic: poverty & unsustainable development styles, unplanned urban growth and migrations, lack of risk awareness & risk governance institutions & accountability...

Physical: insufficient land use planning, housing & critical infrastructure in hazard prone areas, little safety awareness...

Ecosystem & natural resource depletion (coastal - coral reefs, mangroves...-, mountains, watersheds, wetlands, forests...)



**HAZARDS +
EXTREME EVENTS**

VULNERABILITY



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Main intergovernmental processes for disaster risk reduction or building resilience

- *International Strategy for Disaster Reduction (ISDR) & Hyogo Framework for Action (2005-2015): Building the Resilience of Nations and Communities to Disasters (HFA) Secretariat: UNISDR*
- *Two other major negotiating processes, in which DRR is an essential component: the Millennium Development Goals (UNDESA & UNDG) and climate change negotiations (UNFCCC & IPCC), both also at a turning point in 2015*
- *The three will change in 2015 for a post-Hyogo new guidance, post-MDGs becoming SDGs and a post-Kyoto agreement*

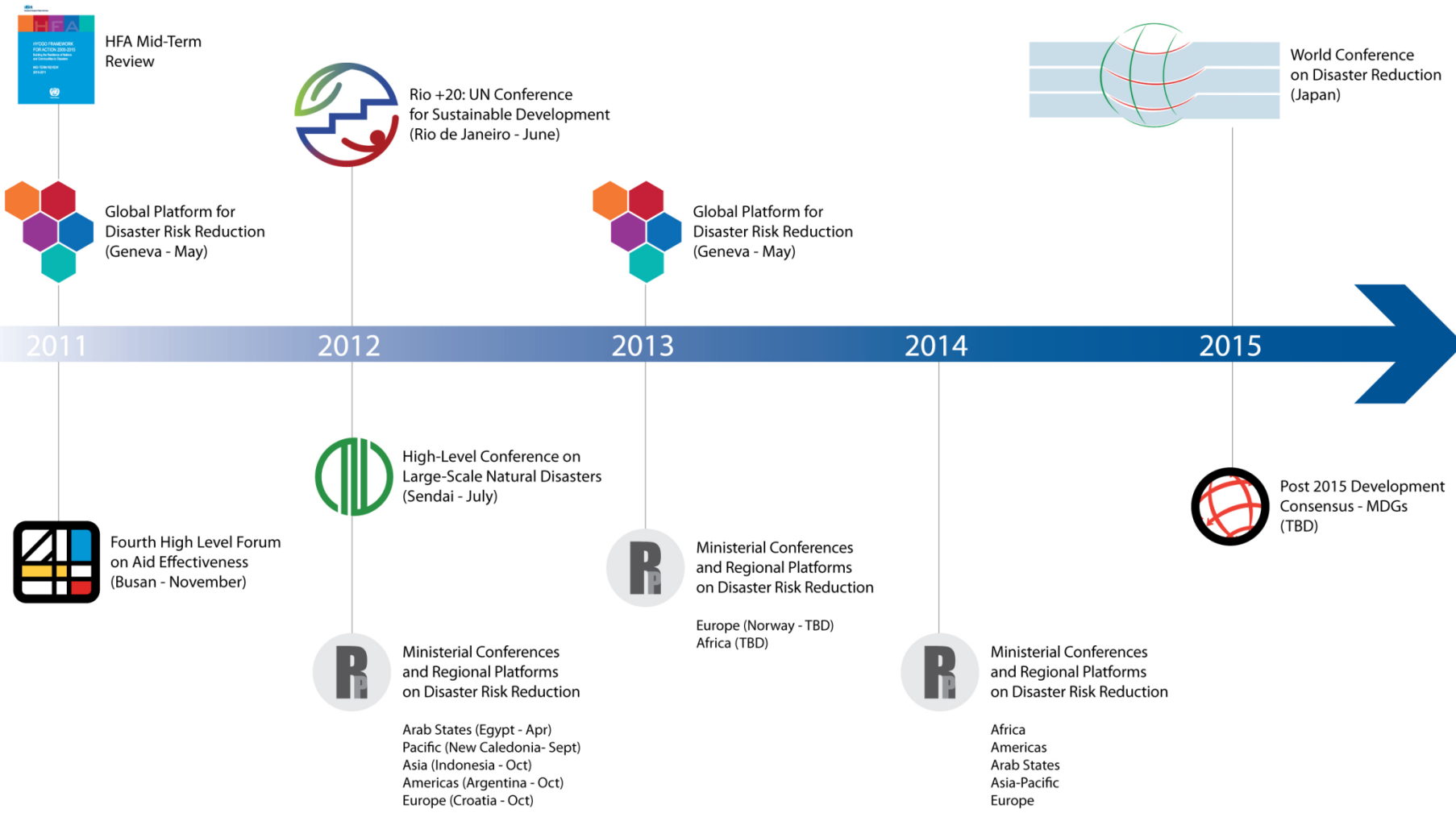
Major international scientific processes on disaster risk

- *Integrated Disaster Risk Management (IDRIM), annual forum, managed by DPRI, Kyoto University in collaboration with partners*
- *International Disaster and Risk Conference (IDRC), biennial conference managed by the Global Risk Forum (GRF), Davos, Switzerland*
- *Integrated Research on Disaster Risk (IRDR), programme of ICSU/ISSC/UNISDR with FORIN, RIA, DATA, SERA & AIRDR working groups, managed by the IRDR/IPO, Beijing, China*
- *Regional academic networks, such as AUEDM (Asia), PeriPeri (Africa), La Red (Latin America and Caribbean) and other.*



Timeline of Main Events for Post-2015 Framework for Disaster Risk Reduction

Version: 16 February 2012



Note: These reflect the key milestone events for disaster risk reduction. Other events and consultation meetings will also be part of the process.



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Key questions & a response:

Why, despite advances in the natural and social science of hazards and disasters, do losses continue to increase?

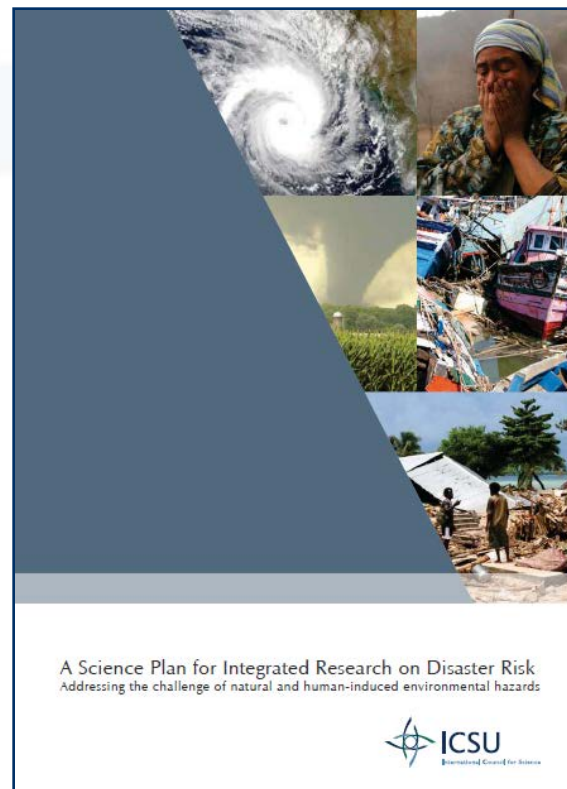
To what extent is the world-wide growth in disaster losses a symptom and indicator of unsustainable development?

The IRDR Science Plan: addressing the challenge of natural and human-induced environmental hazards with an integrated approach to research on disaster risk through: an international, multidisciplinary (natural, health, engineering and social sciences, including socio-economic analysis) collaborative research programme.

Science Plan

An *integrated approach* to research on disaster risk (trans-disciplinary, collaborative research programme)

- 1.Characterization of hazard, vulnerability and risk
- 2.Effective decision-making in complex and changing risk context
- 3.Reducing risk and curbing losses through knowledge-based actions



IRDR Science Plan at:

<http://www.irdrinternational.org/>

Introduction

- Debunking “natural” of disaster
- From nature to society; from natural construction to social construction of risk
- Gaps in past efforts to understand disasters
 - hazard or technological focus
 - sectorial or disciplinary based
 - emergency response priority





DATA Research

Accurate and precise data is needed for more effective policies, legislation, organizational arrangements in risk governance

Need to reverse the trend of rapidly increasing negative impacts of disasters due mainly to:

- rapid urban growth, especially in coastal areas;
- unequal distribution of wealth and poverty (reinforced by disasters);
- ecosystem degradation; and
- climate change.



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Data needed for managing and reducing the risk of disasters

Three main types of data:

- Data on **disaster losses**
- Data on **natural events or phenomena**
- Data on **vulnerability** (human, social, physical, institutional, economic, ecological)



Data needed for managing and reducing the risk of disasters (cont...)

(1) Data on disasters losses

- To assess impacts, relief & recovery requirements, insurance claims, identify trends..
- Main global sources currently: CRED, MUNICH RE...
- Data is approximate, collected in different ways for various purposes by different agencies (relief, recovery by each sector, for insurance claims, by donors, etc.)
- Sometimes high variation, e.g., Venezuela 2001...
- Effort of IRDR DATA Working Group aims at rendering these efforts more accurate and reliable...



Data needed for managing and reducing the risk of disasters (cont...)

(2) Data on natural events or phenomena

- Needed to understand them better, identify trends with possible/expected occurrence, frequency & magnitude
- Main sources globally: WMO network, FAO, GEM, USGS, US/NCDC, US/NDMC, EMSC, among many other...
- In general, widely covered by specialized research centres and global networks of observatories



Data needed for managing and reducing the risk of disasters (cont...)

- (3) **Data on vulnerability** (human, social, economic, institutional, physical, ecological...)
- Needed to identify trends and **more importantly, to reverse them** with sound land-use planning and sustainable development approaches in all sectors (agriculture, health, transport, critical infrastructure, education, tourism, energy, etc.)
 - **No systematic data source available at global level for the only area in which policy can change behavior!!!**



IRDR/CODATA WG DATA for Disaster Loss Data

- Identify what data and quality are needed to improve integrated disaster data management for risk reduction
- Bring together loss data stakeholders and utilize synergies for recognized standards to minimize uncertainty and advice more effective policy
- Define of “losses” and creation of methodology for assessing it for more accurate research
- Educate users on data interpretation and biases
- Increase downscaling of loss data to sub-national geographies for policy makers



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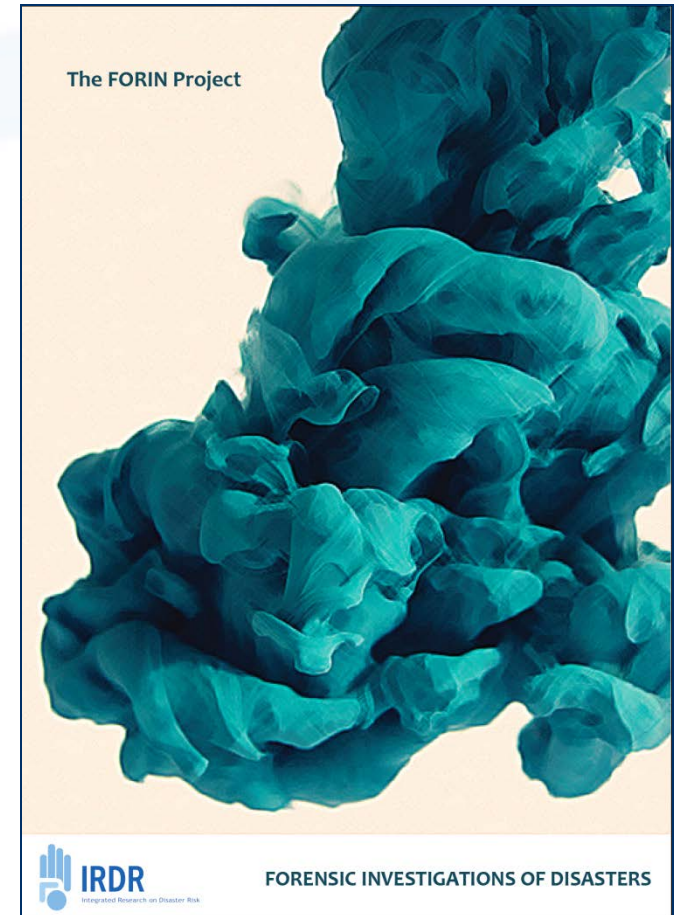


IRDR WG FORIN for Forensic Disaster Investigations

- Establish basis for analysis based on actual evidence and applied scientific methodologies/principles
- Dig more deeply into causes of specific disasters
 - integrated
 - comprehensive
 - transparent
 - investigative or forensic style

FORIN Research

- In-depth investigation into complex and underlying causes
- Common template & methodology
 - Fundamental causes of disasters
 - Trace out and assign causal explanation of losses and intervening conditions that increased or reduce losses
- Series of case studies



FORIN Narratives

Illustrate that the spatial and temporal scales in which disaster causation is understood must be both broadened and deepened.

Include perspectives from variety of communities involved in and affected by the disaster, including representative disciplinary viewpoints and most especially those of local population groups.

Identify the roles and responsibilities of specific actors and institutions in the creation, and/or prevention of the growth and expansion of vulnerability and exposure

Be framed in ways that permit the assimilation of the information and create a space for those involved in constructive engagement



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Objectives....

Management objectives

- Focus on the link between research findings and improved policy application.
- Develop a reference bank of quality case studies to be available to interested parties, in close coordination with relevant databases and networks in this field, as well as those at regional organizations.
- Effectively communicate the causes of disasters.



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Objectives...

Scientific
research
objectives

- Advance methodological diversity
- Test existing theories and concepts.
- Implement science-based results.
- Build a strong, interdisciplinary, 'in-country' capacity of young researchers for policy-oriented research.

Objectives...

Development objectives

- Substantiate that generic causes have local manifestations: “one size solutions do not work everywhere”.
- Promote a ‘learning culture’ amongst all stakeholders.
- Advance understanding of how causal factors can be major impediments to development.
- Identify situations where development initiatives can become causal factors in disasters.
- Guide recovery and reconstruction effort.
- Communicate key messages to shape values, perceptions and behavior for a paradigm shift

Objectives...

DRR objectives

- Promote sustainable risk management/reduction policy-making through science-based research
- Guide implementation of the Hyogo Framework and post-HFA needs
- Give priority focus on reducing human consequences, with a secondary concern for physical or environmental losses.
- Change paradigms, shifting responsibility from nature, physical environment and distributing to real circumstances and conditions involving all sectors of society
- Develop case studies that illustrate 'risk-drivers'

FORIN questions

A series of questions has been formulated to serve as the central structure of the FORIN investigations:

Core, case-specific questions

Generic questions

Additional questions

Governance/priority, risk assessment, understanding/awareness, outcomes/impacts, risk reduction, enhancing resilience



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Types of Studies

- Open source, independent and participatory
- Four types of study identified:
- specific events (e.g., Great Hanshin Awaji, Great East Japan EQ, Tsunami and Fukushima explosions...)
 - recurrent events (e.g. floods in Mozambique, hurricanes in Haiti, coupled with 2010 EQ, EQs in New Zealand...)
 - thematically important dimensions (school and hospital safety, trans-boundary risks...)
 - risk drivers (urban management, poverty, governance...)



IRDR WG AIRDR for Assessment of Integrated Research on Disaster Risk

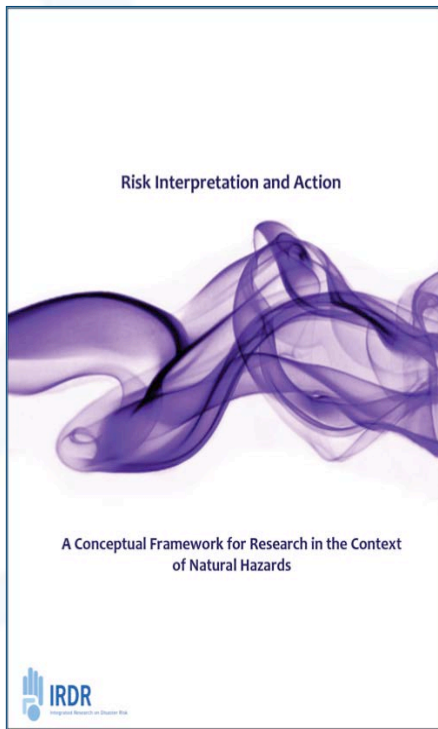
- First systematic, critical global assessment of published research on disaster risk
- Provide a baseline
- Use to identify and support longer-term science agenda
- Provide scientific evidentiary basis in support of policy and practice



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IRDR WG RIA for Risk Interpretation and Action



- How actors attempt to make sense of experience and information from various sources as a basis for decision
- Estimation of the likelihood, magnitude of event and vulnerability of physical infrastructure
- Social and behavioural factors leading to greater or lesser risk

IRDR/WWRP WG SERA for Societal and Economic Research and Applications

- Joint WWRP (WMO) and IRDR project
- To advance the science of the social and economic applications of weather-related information and services
- Development, review and promotion of societal and economic-related demonstration projects focused on high-impact weather and information



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IRDR Legacy

An enhanced capacity around the world to address hazards and make informed decisions on actions to reduce their impacts.

Societies to shift focus from response-recovery towards prevention-mitigation, building resilience and reducing risks, learning from experience and avoiding past mistakes.

Some reflections as conclusions

Avoid using « natural » disasters and use instead ‘natural hazards’ or ‘disasters’, or explain it ...

Policy focus on risk reduction and management (prevention, mitigation, preparedness), essential requirement for business continuity and sustainable development

Compare to health prevention policies focusing on safe (“healthy”) homes, offices, schools and infrastructure rather than only on the hazards or the emergency

Common objective of DRR and CCA policies to urgently reduce risk and vulnerability to current climate variability as a first step or basis for adaptation to the longer-term effects of CC, no need to wait...

Most urgently!, teaming up in the scientific community to convey similar messages and understanding to governments, private sector, civil society organizations and the media by

2015



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Thank you

www.preventionweb.net

www.unisdr.org

www.irdrinternational.org

www.globalquakemodel.org

www.gfdr.org

www.globalnetwork-dr.org



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