

# **Bridging research, policy, and practice: development of an integrated research programme**

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## **Abstract**

Integrated Research on Disaster Risk (IRDR), a decade-long programme co-sponsored by the International Council for Science (ICSU), the International Social Science Council (ISSC), and the United Nations International Strategy for Disaster Reduction (UNISDR), has been developed to address research gaps, siloed approaches to research, and research to policy voids in a trans-disciplinary, global approach. This is being implemented through four initiatives – Assessment of Integrated Research on Disaster Risk (AIRDR), Disaster Loss Data (DATA), Forensic Investigations of Disasters (FORIN) and Risk Interpretation and Action (RIA) – each developed to address different aspects of disaster risk research.

*Keywords: hazard, disaster, risk reduction, science, integration, policy, trans-disciplinary, decision making, case studies, data management.*

## **1 Introduction**

There is a story of about six blind men being asked to describe an elephant. They said it has skin like a wall; tail like a rope; ears like fans; tusks like a spear; legs like a tree; and a trunk like a snake. This is what happens when you try to bring together natural and social scientists with policy makers. Each sees the hazard risk through their own lens and vision. Natural scientists talk about wind speeds, ground motion, wave heights, and the like. Social scientists speak about age, gender, ethnicity, and other such variables. Policy makers look at planning, policy and funding. The reality is we need to be talking about risk reduction, lowering people's vulnerability to the hazards, and sustainability. What they fail to see and discuss is the complete picture. Disasters are about people; most



people do not care if a hazard occurs where there is no development. However, when we speak of reducing a community's or people's risk and vulnerability, we have to look at it in a manner that not only takes into consideration the community's social composition but also the size, location, and intensity of the hazard itself. We can no longer look at hazards and disasters as simply geological, meteorological or hydrological events. They are complex science problems that must be addressed in a comprehensive, multidisciplinary and culturally appropriate manner.

In order to address this need and to answer why, despite advances in the natural and social science of hazards and disasters, do losses continue to increase? And how do we address the lack of sustainability in current disaster practices? The International Council for Science (ICSU), International Social Science Council (ISSC) and United Nations International Strategy for Disaster Reduction (UNISDR) created the Integrated Research on Disaster Risk (IRDR) programme.

## 2 IRDR programme

The IRDR programme seeks to address the challenges posed by natural and human-induced environmental hazards. It is designed to fully integrate research expertise from the social, natural, engineering, health and technology spheres to address these issues. This, coupled with socio-economic analysis, the role of decision-making, and a policy and practitioner interface, distinguishes the IRDR programme from previous endeavours. The programme is guided by "A Science Plan for Integrated Research on Disaster Risk: Addressing the challenge of natural and human-induced environmental hazards" as developed by ICSU [1]. This document describes the vision for the 10 year initiative.

### 2.1 Objectives

The IRDR Science Plan [1] outlines three main research objectives:

- Characterization of hazards, vulnerability, and risk
- Understanding decision-making in complex and changing risk contexts
- Reducing risk and curbing losses through knowledge-based actions

In pursuit of these objectives the IRDR programme will create successful projects that lead to a better understanding of hazards, vulnerability and risk, and an enhanced capacity to model and forecast the risk; a better understanding of the decision-making choices that lead to risk and how they may be influenced; and how this knowledge can be better used towards disaster risk reduction. Three cross-cutting themes support these objectives:

- Capacity building, including mapping capacity for disaster reduction and building self-sustaining capacity at various levels for different hazards;
- Development and compilation case studies and demonstration projects;



and

- Assessment, data management, and monitoring of hazards, risks, and disasters.

IRDR focuses on all hazards related to hydro-meteorological and geophysical trigger events, e.g., earthquakes, volcanoes, flooding, storms (hurricanes, typhoons, etc.), heat waves, droughts, fires, tsunamis, coastal erosion, landslides, aspects of climate change (increases in occurrence of extreme events), and space weather, as well as impacts by near-Earth objects including the effects of human activities on creating or enhancing these hazards.

## 2.2 IRDR working groups

The IRDR programme is governed by a Science Committee comprising 15 experts from around the world and multiple disciplines. They have identified several key areas, organised into four working groups, which will help to address the proposed questions and fulfil the research objectives: Assessment of Integrated Research on Disaster Risk (AIRDR), Disaster Loss Data (DATA), Forensic Investigations of Disasters (FORIN) and Risk Interpretation and Action (RIA). These working groups are keys to the success of the programme, but are not the only method in which the IRDR is moving forward. These groups create a global IRDR community made up of scientists of all disciplines, as well as practitioners and policy-makers in disaster risk reduction and management.

### 2.2.1 Assessment of Integrated Research on Disaster Risk (AIRDR)

Its purpose is to undertake the first systematic and critical global assessment of research on disaster risk [2]. This will generate new knowledge about risk as well as create a baseline for future research and policy. The goals of AIRDR are to provide a baseline of current state-of-the-science in integrated research on disaster risk to measure the effectiveness of multiple research programmes; identify and support a long-term science agenda for the research community and funding entities; and provide scientific evidentiary basis in support of policy and practice. The outcomes will be the documentation and critical assessment of the literature on disaster risk. This project primarily will utilise documentation and critical assessment of extant literature on disaster risk to understand what kinds of research qualify as ‘integrated’ and how it is being constituted and organized. Additionally, the identification of the strengths, weaknesses, gaps and opportunities for new knowledge and investments will be used to further build the assessment. Essentially, what is known well and empirically supported, what is less well known, what gaps exist in our research knowledge base, and what opportunities exist for new research in the co-production of knowledge.

The review will include literature from 1993–2013, primarily from peer-reviewed, published literature; however, widely available grey literature that has already undergone some type of peer or official review (such as government reports) will be included where appropriate. This research will be conducted regionally – Latin America and the Caribbean, Africa, Asia, Middle



East-North Africa, North America, Europe, and Oceania – including authors from all regions based on a nomination process and vetting. This will include young and senior scholars from multiple disciplines and approaches, who possess an openness to other perspectives.

### **2.2.2 Forensic investigations of disasters (FORIN)**

As prescribed in the IRDR Science Plan [1] Forensic Investigations of Disasters (FORIN) is a keystone of the IRDR programme. FORIN case studies are to be carried out in the form of forensic investigations, where the term ‘forensic’ is used to suggest the qualities of serious, all-encompassing, arms-length, careful and detailed analysis of past disaster events [3]. These studies will establish a basis for analysis based on actual evidence and applied scientific methodologies/principles as well as delve more deeply into the causes of disasters in an integrated, comprehensive, transparent and investigative nature. The main objectives of FORIN address areas related to policy, management, scientific research, development, and disaster risk reduction. These are based on the common hypothesis that past and current programmes and activities are not being guided or supported by sufficiently strong and grounded knowledge of hazards and disasters, particularly a true understanding of their root causes.

FORIN will not only be interested in disaster ‘failures’, or cases where mistakes were made; it is also conducting forensic investigations of success stories to help accumulate evidence of best practices. The risk reduction community needs to begin to systematically document what works in reducing risk, not just the failures. These studies are not limited to any given hazard, location or social construct. The more types of events studied in varying environments will only help the community to better understand the risk, vulnerability and possible solutions. This will also help to identify any research gaps and factors that need further study. Several of these FORIN studies have been conducted in Japan with others currently underway in Algeria, China, and New Zealand.

### **2.2.3 Disaster loss data (DATA)**

One of IRDR’s fundamental goals is to both generate new information and data and to leave a legacy of coordinated and integrated global data and information sets across hazards and disciplines, with an unprecedented degree of access. One of the main contributions of the programme will be to serve as a framework for the development of a range of modern information systems devoted to disaster risk reduction.

The community that address disaster loss data is growing rapidly and the disaster data landscape itself is changing rapidly. Multiple organizations collect and store data related to the monetary, environmental and human losses related to a disaster. However, the accuracy, consistency and thoroughness of this data vary greatly. This results in inconsistent overlaps, gaps in data and biases that impact the quality of the policies developed and research conducted in relation to disasters.

The IRDR-DATA project is designed to bring together stakeholders from all levels of government, private sector, research and academia as well as multiple



disciplines to reconcile these issues and develop synergies on the collaboration in the production and utilization of the data. The key objectives are to bring together loss data stakeholders and develop synergies and capitalize on them; identify the quality of existing data and what data are needed to improve disaster risk management; develop recognized standards or protocols to reduce uncertainty in the data; define “losses” and create transparent methodologies for assessing them; advocate an increased downscaling of loss data to sub-national geographical levels for policy makers; and educate users regarding data interpretation and data biases.

This will allow for the establishment of an overall framework with appropriate nodes and networks for databases and, ultimately, conducting sensitivity testing among databases to ensure comparability. Making data more usable and reliable for all to utilize in an effort to reduce risk and vulnerability to hazards is an essential outcome of IRDR.

#### **2.2.4 Risk Interpretation and Action (RIA)**

The Risk Interpretation and Action (RIA) group focuses on the question of how people - both decision-makers and ordinary citizens - make decisions, individually and collectively, in the face of risk. In order to reduce disaster risk, there needs to be integrated risk analysis, including consideration of relevant human behaviour, its motivations, constraints and consequences, and decision-making processes in the face of risk. It is the goal to better understand decision-making in complex and changing risk contexts, risk governance and institutional development. Understanding how people interpret risks and choose actions based on their interpretations is vital to any strategy for disaster reduction.

The key objective of RIA is to build a community of practice that addresses these issues. This is in response to the demands of the policy and science communities. The RIA community will be interdisciplinary, international and integrative. It builds on an existing core network of internationally recognised scientists and practitioners active across the disciplines identified above, but the community will be open to all disciplinary traditions, natural, social, behavioural and from the humanities with interests in risk communication. The goal is to further develop this core group, expand into a self-organised community and promote the co-ordinated development of new approaches, methods and experiences in communicating risk and development between natural, engineering, and social science practitioners and those at risk.

Key outputs of RIA include the origination and recording of data collection tools for resilience, which can feed into the IRDR DATA project, and also of templates for the analysis of risk communication and perception in the production of disaster risk and loss, which will contribute to the framing of FORIN studies.

It is important to remember that not only does IRDR demand integration in research but also practices integration across its projects and activities. The four IRDR working groups are individually integrated across disciplines but are also integrated across the working groups. FORIN, RIA and AIRDR will all feed into DATA and practice the guidelines given by the DATA working group. RIA



and FORIN will often overlap to help create a more complete picture of the problem and identify possible solutions. These key activities will help to fulfil the vision of the IRDR co-sponsors; but, more importantly, help the communities, researchers and policy-makers that are living with and addressing hazards.

### **3 Network building**

In addition to new research IRDR is working to build on and complement existing research. IRDR is working to establish networks of organizations, research and others to build a stronger community to address the issues around disaster risk. This is being implemented through partnerships with various hazard related organizations. One example is the Inter-Asia Partnership (UNISDR). IRDR is working to establish a network of researchers, academicians, policy-makers, and civil society groups to implement and develop more science-based hazard and disaster risk reduction programmes and activities. It is also used to avoid duplication of work to ensure maximum benefit from programme funds. This supports the Yogyakarta Declaration on Disaster Risk Reduction in Asia and the Pacific 2012 and, more specifically, Annex 10 [4].

#### **3.1 National and regional IRDR committees**

IRDR National and Regional Committees are designed to encourage the development of crucial links between national and regional disaster risk reduction programmes and activities within the IRDR international framework. These committees will help foster the much-needed interdisciplinary approach to disaster risk reduction within national and regional scientific and policy-making communities, and serve as important national or regional focal points between disciplinary scientific associations. National Committees are designed to support national researcher to look at national issues through the integrated model.

#### **3.2 International Centres of Excellence (ICoE)**

IRDR has also begun to establish IRDR International Centres of Excellence (ICoE). Each ICoE research programme embodies an integrated approach to disaster risk reduction that directly contributes to the IRDR Science Plan and its objectives. ICoE and IRDR projects will collaborate to provide global contributions towards achieving the IRDR legacy – an enhanced global capacity to address hazards and make informed decisions to reduce their impacts. The ICoEs will, in particular, enable regional scientific activities through geographically-focused contributions based on more localized inputs and by being visible centres of research excellence to motivate participation in the IRDR programme, especially among young researchers. Each ICoE will have its own sources of funding from host agencies and organizations.

The ICoEs will have both local and international components. The local component will consist of a strong cadre of disaster risk reduction academics and researchers from universities, academies of science, institutes, and centres within



the host country (or countries). The international component will consist of short- and longer-term visiting scientists from developed and developing countries, in addition to supporting workshops, colloquia, and scientific meetings that, for example, bring together scientists to work on case studies or forensic investigations. These could then be extended to other countries in longer-term cooperative studies.

#### 4 Overall legacy

The Hyogo Framework for Action (HFA) [5] 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...” Many examples exist that demonstrate the importance of science and technology towards disaster risk reduction. The resulting legacy of the IRDR programme will be the enhanced capacity around the world to address hazards and make informed decisions on actions to reduce their impacts. IRDR has a commitment towards the development of science and development of broadly-based capacity. IRDR will work with partners to have in place quality-controlled, comprehensive data and information, so another legacy will be a firm basis for the determination of trends and demonstrations of success, for which we all strive.

IRDR’s main legacy will be an enhanced capacity around the world to address hazards and make informed decisions on actions to reduce their impacts. This will include a shift in focus from response–recovery towards prevention–mitigation strategies, and the building of resilience and reduction of risk through learning and sharing from past experiences and avoidance of past mistakes. By way of this enhanced capacity and a shift in strategic approaches there will be a reduction in loss of life, fewer people adversely impacted, and wiser investments and choices made by civil society when comparable events occur in the future.

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