



# Chapter 3.

## Advancing international scientific cooperation and dialogue

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As an international scientific programme, IRDR has an overall role in promoting scientific exchange and cooperation and science-policy dialogue. To this end, IRDR has endeavoured to provide different platforms for engagement and as well as knowledge products for policy improvement. IRDR's relevance and significance

in this aspect is reviewed in this chapter, as we look back briefly on IRDR's major international scientific conferences and outputs, main policy recommendations and papers, and key research partnerships. Individual perspectives from IRDR members are also provided.

### 3.1

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#### The global position of IRDR in DRR

The 2008 IRDR Science Plan noted that there was neither an established and ongoing scientific assessment process, like the IPCC, nor an internationally planned and coordinated scientific research programme. The UNFCCC had benefited from four scientific assessments of climate change by the IPCC, which had been able to draw upon the internationally-planned and coordinated scientific research programmes of the World Climate Research Programme (sponsored by WMO, ICSU and the IOC of UNESCO), the International Geosphere-Biosphere Programme (sponsored by ICSU) and other international and national programmes. IRDR was created with the hope that it would take a similar role in the coordination of the scientific research programmes in DRR and fill the gaps.

With its Scientific Committee to collect and integrate individual expertise in specific domains, National Committees to facilitate national research and application, International Centres of Excellence to enhance the knowledge production and sharing, Working Groups to focus on frontier scientific questions, and Young Scientist Programme to support the young generation, IRDR did become a programme which successfully mobilized the international research capacity, creating new methodologies and new conceptions, and building bridges for science and policy dialogue in DRR.

Over its ten years of operation, IRDR has witnessed the international consensus shift from disaster management to risk management and

risk reduction. IRDR played an important role in the context framing of this process, not only through its direct contributions to the formulation of the Sendai Framework, but also through advocating this concept in the implementation of the global agenda. To this end, IRDR kept “integrated” and “interdisciplinary” as the criteria in all its DRR activities. This systematic approach is reflected for example in the evaluation criteria of ICoE nominations and IRDR Young Scientist applications. The “integrated approach” is a firm requirement for all the application proposals from both ICoEs and Young Scientists. This interdisciplinarity can also be seen with the diverse stakeholders engaged in the IRDR community, with multi-agencies collaboration the norm in the IRDR projects.

Under the co-sponsorship of ISC and UNDRR, IRDR has been, to some extent, acting as a scientific representative of ISC and UNDRR in addressing issues in the field of DRR. IRDR has spearheaded efforts to facilitate and contextualize the implementation of Sendai Framework and other related UN agenda at national and local levels. IRDR also acts as an international platform for the regional and national projects to present their work and achievements, and to outreach to other stakeholders. Finally, IRDR facilitates the visualization, teaching, and spreading of good practices through its meetings, workshops and internet portals.

To understand how international and regional institutions and programmes are positioned and engaged in the global DRR endeavour through the Sendai Framework, a mapping of typical DRR institutions using web-based accessible information has been carried out in an IRDR Working Paper<sup>48</sup>. 32 active institutions were selected and analysed by looking through respective institutional nature, goals and missions, products and services, and more perspectives. The results indicate that these DRR institutions and programmes have covered a good spectrum

of actions, including: a) monitoring, analysing, and coordinating the implementation of Sendai Framework; b) developing global platform for disaster risk reduction; c) promoting multi-disciplinary and integrated disaster science research; d) establishing disaster monitoring and early warning networks; e) applying disaster prevention and mitigation engineering and information technology; f) establishing data, information and knowledge services; and g) improving multi-scale disaster reduction practices. This mapping clearly demonstrates the important role IRDR plays in promoting multi-disciplinary and integrated disaster science research, science-policy interface, institutional capacity building, and the fostering young professionals in the field of disaster prevention and mitigation.

As a new initiative, IRDR inevitably had weaknesses and shortcomings in operation. The team in the IPO of IRDR has proved too small, and resources have been proved too limited compared to the tremendous needs and requirements. These include, for example, the resources needed to facilitate international science-policy dialogues; to develop new norms, standards, and research methodologies; to draw up and successfully and effectively communicate achievements and lessons learnt to various stakeholders; and to provide sufficient support to research communities in their integrated search initiatives. Additionally, there has also been a visible unbalance of IRDR work between different regions.

### ◆ Roles and relevance of IRDR as seen by IRDR SC members and Executive Directors

The former IRDR SC members and Executive Directors were invited to provide views, evidences and suggestions regarding the roles and relevance of IRDR and its impacts.

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48 Wang, J.L., Han, Q.L., Wu, Y.X., Zhang, M., Lian, F.(2020). Mapping Disaster Risk Reduction Institutions Using Web-based Accessible Information. *IRDR Working Paper Series*, 16 pages. doi: 10.24948/2020.08



## **Sálvano Briceño**

**IRDR Scientific Committee Chair (2011-2013),  
Member (2013 – 2017)**

Despite not having impacted the international policy settings as it was expected in its inception, with disaster risk increasing rather than reducing in the world, the IRDR has nevertheless made some substantive contributions both to international policy organs, UNISDR and ISC notably, and to academic and scientific institutions working in this field and aiming at reducing the risk of disasters. IRDR's value and relevance remain intact, with greater necessity given the rapidly increasing urban, climate and inequality risks. Its most important activities, in my view, the FORIN and RIA methodologies, as well as the DATA and international centres of excellence networks, provide a formidable basis to support and guide further work on reducing disaster risk, assuming, of course, that the IPO and Scientific Committee manage to influence and work closely together with the most relevant policy actors at international as well as national, local and academic levels, facilitating a team effort to make greater impact in changing institutional and personal practices and behaviours for increased and more effective risk reduction and management at all levels.

## **Rajib Shaw**

**Executive Director (2016-2017), Member  
(2017-onwards)**

The key achievement of IRDR as an international scientific program lies in its research networks. The SC members (both past and present) brings a great knowledge and human resource network. The institutions (ICoEs), and committees (regional and national) are considered as the engine of the network. Thematic ICoEs spread over both developed and developing countries were the key footprint of innovative research of IRDR. The last part

was the new generation researchers (young scientist network), which has also expanded the program to bring it to a wider audience, especially for the benefit of science in the global south. Collaboration (both formal through MOU and informal) with other research programs like WWRP of WMO, Belmont Forum, Future Earth, Urban Health Wellbeing etc. have been found beneficial to all, enabling programs to learn from each other. Thus, IRDR's performance can be seen through: 1) new innovative research product (like FORIN), 2) institutional network (ICoE / RC/ NC), 3) human resources (SC members), 4) developing new generation researchers (young scientists) and 5) partnership (with other science programs).

## **Jane Rovins**

**First Executive Director (2010-2013)**

IRDR was instrumental in the years leading up to the Sendai Framework to get the inclusion of science and research into the regional statements and ultimately the Sendai Framework. This was a significant and key accomplishment of IRDR.

The FORIN project seems to be active and contributing to scientific knowledge. It is not clear were RIA, DATA and AIRDR are or the contribution beyond the initial reports and activities. Several of the IRDR projects seemed to end when the member left the Science Committee even if there was a need or opportunity for the work to continue.

IRDR should take a larger role in activities like the GAR, IPCC, SDGs and other global reports. This would be an opportunity to make significant impacts in the DRR research going forward.

On a smaller scale IRDR was able to bring together natural and social scientists to work together and begin to have conversations about the interconnectedness of disaster research. This may be the single most important thing that IRDR has accomplished.

## Shuaib Lwasa

**IRDR SC Member (2013-2018), Vice-Chair (2014-2016), Chair (2016-2018)**

My opinion about IRDR is that despite the challenges over the program period, as a network of professionals in DRR, it has achieved a lot in context of the challenges it faced. IRDR has enabled a build-up of a network of senior professionals organized in working groups of its structure with a role to advance disaster science manifesting in form of journal articles and reports that have been published. Through its structures of working groups, the Early (Young) Career Scientists, IRDR had demonstrated its relevance in the DRR space. IRDR has had impact on young professional in various countries and universities who are not only developing skills and knowledge base but also advancing the

frameworks developed. The national committees as part of its structure have also been very critical in advancing the discourse of DRR in governance circles happening at national but also regional/continental levels. IRDR has been impactful on the global level with the involvement of its members/associates in UNDRR global discussions on solutions but also enabling the framing of UNSFDRR. Having had Scientific Committee members representing most sectors including private sector, the programs out of IRDR and the publications have impactfully shaped the understanding of risk with its science plan objectives squarely replicated in the UNSFDRR. Further getting into the Science and Technology Road map for implementation of UNSFDRR. This illustrates a key achievement of IRDR.

# 3.2

## IRDR as the science and policy interface

### 3.2.1 Dialogues through meetings and conferences

#### ◆ IRDR Conference

The IRDR Conferences in 2011 and 2014 were two international and high-level scientific gatherings on the challenges of implementing integrated disaster risk research, inter-organisational collaboration and policy, as well as the interaction with global discourses on sustainable development. The sessions provided by the IRDR Conferences addressed the range of environmental hazards, vulnerability, and sustainability at both global and local scales. It included key discussions on the influence of

science in the Hyogo Framework for Action (HFA2) in preparation for the 2015 World Conference on Disaster Risk Reduction (WCDRR) in Sendai, Japan.

The IRDR 2011 Conference was held from 31 October-2 November 2011, at the Beijing International Convention Center. It was organized by the IRDR IPO and the CAST. The conference, titled “Disaster Risk: Integrating Science and Practice”, aimed to advance new comprehensive approaches to natural hazards research and disaster risk reduction that investigated the root causes of disasters and incorporated input from scientists, decision-makers, and the public. Sessions revolved around three main topics:

characterization of hazards, vulnerability and risk; understanding decision-making in complex and changing risk contexts; and reducing risk and curbing losses through knowledge-based actions. Attendees included ICSU President and Nobel Laureate Yuan Tseh Lee, UNESCO Special Envoy

for Haiti and Former Governor General of Canada Michaëlle Jean, as well as state officials from around the world.

## The 2011 Beijing Declaration on IRDR

The 300+ participants at the inaugural IRDR Conference organized by IRDR and the China Association of Science and Technology (CAST) and held in Beijing, China from 31 October to 2 November 2011, acknowledge that to address disaster events requires a more strategic integrated approach of all scientists and engineers with policy makers, the insurance industry and the mass media to make disaster risk reduction a reality. The impacts of disasters triggered by natural hazards continue to grow and reduce the capacity for countries of the World to move towards sustainable development. The Conference provided a platform from which to launch trans-disciplinary, multi-sectorial alliances for the advancement of disaster risk research. Individual Conference events facilitated information sharing and knowledge transfer between researchers, practitioners and policy makers.

### The 2011 Beijing Declaration on IRDR:

- recognizing the IRDR Science Plan and the outcomes of this Conference and the valuable contributions made by participants; and,
- being fully aware of the international policy guidance provided by the HFA (2005-2015): Building the Resilience of Nations and Communities to Disasters, and other major policy and technical initiatives;
- calls for commitments to:
  1. RESEARCH: Promote and advance research on natural, social, engineering and

technology aspects of disaster risk in an integrated environment and enhance team efforts in hazard and disaster risk research, building on existing research networks and initiatives, and integrating various stakeholder needs at all levels

2. INTEGRATION: Ensure that disaster risk research programmes and policies are integrated across disciplines, and contribute to enhancing policy-making and capacity building for reducing risk in the face of natural hazards
3. GLOBAL STANDARDS: Develop and coordinate globally standardized open source information, disaster loss data, event documentation and analysis procedures, guidelines and frameworks for integrated and effective disaster risk management
4. AWARENESS RAISING: Raise awareness of decision-makers and the public by promoting effective, integrated, demand-driven, evidence-based disaster risk initiatives and increased advocacy
5. EDUCATION: Promote a holistic approach in natural hazards and disasters risk education and training by promoting integration of risk into various curricula
6. INCREASE FUNDING: Motivate funding sources (public, private, humanitarian, development, scientific, etc.) to allocate priority funding to address the urgent need for applied integrated research on disaster risks
7. AND specifically for the:

- Promotion of Forensic Investigations of Disasters (FORIN) by scientists, politicians and decision makers for a sound integrated disaster risk reduction through the development of a series of case studies with partners.
- Advancement of better integration of social sciences into disaster risk research, especially with regard to decision-making leading to Risk Interpretation to Action (RIA) research projects.
- A concise analysis of existing and applied methodologies of disaster data collection and impact assessment leading to standardized and transparent data collaboration under the Disaster Impact and Loss Assessment Data (DATA) project.
- Establishment of an Assessment of Integrated Research on Disaster Risk (AIRDR), a first systematic and critical global assessment of research on disaster risks.
- Enhanced and focused interaction between scientists, politicians and policy-makers, by introducing as project's input the search of success by political actors.
- Contributions to the dissemination and implementation of recommendations stemming from the IPCC's Special Report on Managing the Risk of Extreme Events (SREX), and the preparation of the 2013 UN Global Assessment Report on Disaster Risk Reduction.

**The IRDR 2014 Conference**, titled “Integrated Disaster Risk Science: A Tool for Sustainability,” was designed to emphasize the importance of science as a tool to address hazard risks and issues of sustainable development. It took place from 7-9 June 2014 in Beijing. Once more, it was held at the Beijing International Convention Center and was organized by the IRDR IPO and CAST. Through a series of plenaries and break-out sessions dealing with the challenges of implementing integrated disaster risk research, inter-organisational collaboration, and interaction with policy-makers, as well as the coordination with activities aimed at promoting sustainable development and climate change adaptation, sessions addressed the full range of environmental hazards, vulnerability, and sustainability, in both global and local contexts. The IRDR Conference 2014 brought together some 200 leading experts and some of the best of an emerging cohort of young researchers in the field of disaster risk reduction from all academic and professional backgrounds to help create a “global IRDR community,” and bring continued worldwide attention to the IRDR programme. The output of the 2014 Conference together with the

follow up actions by IRDR Scientific Committee and individual experts of IRDR, as well as the active participation of many of them at the Sendai Conference 2015, ensured the IRDR's contribution to the formulation of the Sendai Framework.

The 2014 IRDR Conference report are can be found at: 2<sup>nd</sup> IRDR Conference – Integrated Disaster Risk Science: A tool for sustainability. In: Planet@Risk, 2(5), Special Issue for the Post-2015 Framework for DRR: p. 332-336, Global Risk Forum GRF Davos, Davos.

### **Tokyo Conferences**

**The Tokyo Conference on International Study for Disaster Risk Reduction and Resilience** which took place between 14-16 January, 2015 was co-organized by IRDR, the Science Council of Japan (SCJ), the United Nations International Strategy for Disaster Reduction (UNISDR) and Tokyo University. His Imperial Highness, the Crown Prince of Japan, attended the opening ceremony of the three-day conference which brought together nearly 400 attendees from 37 countries.

In his keynote speech, ICSU President Gordon McBean outlined the ICSU's role coordinating the global Science and Technology community through IRDR, and highlighted the need to strengthen coordination and cooperation across scientific and research organizations, and institutions and networks currently delivering scientific information on disaster risk reduction, and to connect them to policy-makers and practitioners. This approach, called the Science and Technology Partnership for DRR, was proposed by the Science & Technology Major Group led by ICSU/IRDR during the preparatory work for the 3<sup>rd</sup> World Conference on Disaster Risk Reduction, held in Sendai, Japan, from 14-18 March 2015. A four-part strategy, it consists of a synthesis of the knowledge, assessment, monitoring and review.

Presentations and discussions during the three days of the conference provided input into the revision of the Tokyo Statement 2015 and the draft Tokyo Action Agenda presented on January 16.

The **Tokyo Statement 2015** called for:

- More awareness on the part of policymakers and practitioners of the latest scientific knowledge on disasters
- Greater empowerment of national platforms to incorporate science and technology into real practice
- Increased importance of science in disaster risk reduction through the development of collaborative frameworks with Earth environmental sciences and global Earth observations, thus promoting inter- and trans-disciplinary approaches for human well-being

The **Global Forum on Science and Technology for Disaster Resilience 2017**, held in Tokyo from 23-25 November 2017, was co-organised by SCJ, ICSU, UNISDR and IRDR. The declaration addressed science and technology action for a disaster-resilient world and committed to join

and led efforts by the science and technology community to work closely with stakeholders and partners at local, national, regional and global levels towards the achievement of a disaster resilient world where nobody is left behind.

## Tokyo Statement

### ◆ Science and technology action for a disaster-resilient world

With this declaration, we, the participants at the Global Forum on Science and Technology for Disaster Resilience 2017, held in Tokyo from 23-25 November 2017, commit to join and lead efforts by the science and technology community to work closely with stakeholders and partners at local, national, regional and global levels towards the achievement of a disaster resilient world where nobody is left behind.

**A new era on disaster risk reduction has begun.** The Sendai Framework for Disaster Risk Reduction 2015-2030 emphasizes the importance of a scientific basis for risk-informed development and investment. It highlights the important linkages and mutual reinforcement for disaster risk reduction with the 2030 agendas: the SDGs, the Paris Agreement on Climate Change, the Addis Ababa Action Agenda (AAAA) for financing and the New Urban Agenda. The importance of a science-based risk-informed planning and decision-making has been pronounced more than ever before.

The 2017 Global Forum builds on the outcomes of the First Science and Technology Conference in January 2016, namely the Science and Technology Roadmap to Support the Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030 and accompanying Science and Technology Partnership. The outcomes of the 2017 Global Forum should be incorporated in the 6<sup>th</sup> Session of the Global Platform for Disaster Risk Reduction in Geneva, Switzerland, in May 2019.



**In support of the implementation of the Science and Technology Roadmap, we identify the following needs under the four priorities for action of the Sendai Framework:**

**1) We need to contribute to knowledge on disaster risk.**

Through enhancement and extension of the existing research programs we need to develop a system for collection, archiving, management, analysis, modelling, and use data concerning root causes, risk drivers, disaster risk and disaster damage and losses. In support of policy makers and practice, establish and use reliable scientific frameworks and networks for evaluating disaster risk on a regular basis, as a function of the identification and assessment of hazards, vulnerability, and exposure including single and cascading events. The use of scientific tools, including geospatial information and earth observation systems, should be promoted to provide and share disaster risk information at different scales before, during and after disasters. In addition, participatory research methods involving grassroots and indigenous communities and systematically organized education for improving disaster literacy should be encouraged.

**2) We need to contribute to strengthening disaster risk governance and accountability.**

Promote dialogue in local languages on disaster risk reduction between scientific sectors and policy makers; facilitate networking between them; create and implement a systematic framework in which disaster risk assessment is used to make decisions for planning and development based on scientific evidence; improve data collection in proper ways and share them for research which could discover root causes of vulnerabilities; and gain the necessary trust to ensure collaboration among all actors in the reduction of risk by co-design of projects and co-production of solutions.

**3) We need to encourage investment in disaster risk reduction and adaptation for resilience.**

Develop and implement tailor-made methods to assess disaster risks and share those among relevant Government agencies and key stakeholders including international financial

institutions and the private sector at large as the main investor in all countries; propose policies that are highly effective as ex-ante investment and technologies that deliver a high return on the investment; create and provide incentives for investment in human capital; develop application criteria for each disaster prevention measure; propose reasonable plans for the develop methods for an optimal, risk-based allocation of limited resources; monitor the effectiveness of investments in DRR; and strengthen the capacity of scientific and technological disaster research and education in particular. Also we need to support implementation of sustainable observation infrastructure.

**4) We need to promote "Build Back Better" in recovery, rehabilitation and reconstruction.**

Take actions for sharing common paradigms including "rebuilding lives", "rebuilding livelihoods", "rebuilding economy" and "rebuilding regional communities"; developing indicators and guidelines based on scientific evidence; and make plans for disaster recovery, rehabilitation and intelligent reconstruction processes. To implement these effectively, support the development of legislation and procedures, based on enhanced scientific evidence, prior to disasters and based on scientific scenarios for possible disaster damage. We urge to actively invest in research with long vision.

**Successful disaster risk reduction depends on innovation and interdisciplinary approaches. The Science and Technology Community has a responsibility in this effort to co-create and co-implement new types of science and technology in society.**

**1) We need to promote and implement interdisciplinary and transdisciplinary collaboration.**

To assess the full spectrum of disaster risks, including those associated with natural hazards and vulnerability as well as anthropogenic and technological risks, we should develop innovative, integrated approaches and technologies for risk assessment that embrace all science, including citizens' health and mental

conditions, as well as other relevant stakeholder groups. Specifically, this should include efforts to advance intergenerational collaboration. The risks of highly complex mega or widespread small and medium-size disasters should be addressed seamlessly through collaboration among all stakeholders. The definition and usage of existing terminology should be clearly confirmed to avoid misunderstandings.

**2) We need to produce periodic synthesis reports on the state of science and technology for risk-sensitive development and investment.**

To understand and measure the status and progress of science and technology, we propose producing an online synthesis system with periodic reports incorporating “cognizing” science and “designing” science in a transdisciplinary way. The online and participatory report system would be multi-layered (from global to local), with diversity in language, user group (policy makers to practitioners) and age group (including the young scientists). A specific science communication and maintenance strategy will be developed at the inception stage of the synthesis report. Enhance resilience by promoting science and evidence-based policies and practices for disaster risk reduction that clearly factor in prediction, prevention and response strategies.

**3) We need to contribute to national platforms for more effective use of science and technology.**

Reflecting the call for an all-of-society approach in The Sendai Framework, a wide range of knowledge and expertise available within the national science and technology community should be effectively integrated into national platform activities, where policy makers and practitioners may indicate their specific needs regarding science and technology. Contributions from science and technology should include: translating the Sendai Framework into local languages; providing appropriate scientific advice for the collection, assessment and analysis/archiving of annual disaster records; assisting the national platform in compilation and publication of case studies on interactive dialogue between local authorities and scientists & engineers which led to

successful disaster risk reduction, for replication in the country and for sharing internationally; and assisting the Government in compiling and publishing their national reports on disasters, including Sendai Framework Monitoring.

**As a first step to pursue steady implementation of these actions, we commit to work closely with relevant stakeholders to develop and implement the following documents:**

**1) Guidelines for strengthening national platforms for DRR and coordination mechanisms through enhanced contribution of science and technology.**

**2) Periodic synthesis reports on the state of science and technology for reducing disaster risk.**

International research programs and alliances commit to implementing the outcomes of this meeting of experts to focus their research priorities and strengthen their contributions to the Sendai Framework to enhance the understanding of disaster risk, supporting governance and prioritizing investments in disaster risk reduction, and enhancing disaster preparedness for effective response. Particular focus must be placed on the engagement and harnessing of the potential of grassroots communities, women and youth, as well as other groups such as persons with disabilities.

Increased disaster risk demands an urgent response. Inaction is no longer an option. The support of all stakeholders is necessary.

**◆ 2016 UNISDR Science and Technology Conference on the Implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030**

The UNISDR Science and Technology Conference on the Implementation of the Sendai Framework for Disaster Risk Reduction 2015–2030 was held in January 2016 to discuss the role of science and

technology in implementing the Sendai Framework for Disaster Risk Reduction 2015–2030. This is the first international conference for the post-2015 United Nations landmark agreements. IRDR was one of the co-organisers.

The conference successfully launched the Science and Technology Partnership, and crystalized an agenda for the science and policy community to support the implementation of the Sendai Framework. The latter is reflected in the Global Science and Technology Road Map. Other notable outcomes included the proposal to launch a Women in DRR Science platform supported by UN Women, UNISDR, and UNESCO; and the launch of the Young Scientists in DRR platform that is coordinated by the UN Major Group for Children and Youth. The official conference outcomes are summarized on the conference website<sup>49</sup>.

#### ◆ Science and Policy Forum of 2019 Global Platform for DRR

The Science and Policy Forum for the Implementation of Sendai Framework for Disaster Risk Reduction was organised by United UNDRR Science and Technology Advisory Group (STAG), International Science Council (ISC) and IRDR (IRDR), and took place from 13-14 May 2019, at Assembly Hall, Palais des Nations, Geneva. The Forum was one of the major pre-events of the 2019 Global Platform for Disaster Risk Reduction (GP2019).

The one-and-half day Science & Policy Forum brought together some three hundred experts from the Member States, policy making bodies, research institutions, civil society organizations, enterprises and other relevant sectors. The Forum provided an open place for experts to share and review progress in global, regional, national and local implementation of science-based policy

making and risk-informed development, and to identify knowledge gaps and opportunities to strengthen a comprehensive and interdisciplinary science base for the implementation of the Sendai Framework. The dialogue and exchange through the Forum sessions helped enhance the engagement between science and policy for risk-informed decision making across the 2030 Agenda.

Notably, the Science & Policy Forum launched the contextualized Global Science and Technology Road Map, an important instrument for coherent science and technology backed actions in DRR, which opened the dialogue on the need to review hazard terminology and enhance interdisciplinary cooperation, discussed the best way forward for better DRR data, looked at the roles of technology in DRR (in terms of both opportunities for solutions as well as factors of new uncertainties), and deliberated the overall roles of science and technology for resilience.

#### ◆ 3<sup>rd</sup> Huangshan Dialogue on UNESCO Sites and Sustainable Development

At the 3<sup>rd</sup> Huangshan Dialogue on UNESCO Sites and Sustainable Development, which took place from 31 October-3 November 2018, UNESCO, its International Centre on Space Technologies and Cultural Heritage (HIST), and IRDR co-organised the session Disaster Risk Assessment and Mitigation for UNESCO Sites. This concerns three categories of internationally-designated areas, namely, Biosphere Reserves, Global Geoparks and World Heritage sites, and together comprise more than two thousand sites. The technical panel discussion resulted in an outcome document in which UNESCO and IRDR proposed several actions for consideration at the 2019 Global Platform for Disaster Risk Reduction:

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49 <https://www.unisdr.org/partners/academia-research/conference/2016/>

## Passage from Outcome Document

The following recommendations and key discussion points were made during the session:

- 1) The use of remote sensing and related technologies for hazard risk assessment and early warning has significant potential for further application.
- 2) An integrated, comprehensive global database on the application of remote sensing and related technologies for disaster risk reduction would be of considerable value.
- 3) Engineering solutions to mitigate disaster risk must be designed so as to be appropriate in the context of local conditions, with standards aligned with trends in hazard intensities.
- 4) The comprehensive, recently completed DRR survey among UNESCO-designated sites has yielded important data and results with the potential to serve as the basis for decision- and policy-making.
- 5) Existing levels of site-to-site and other modalities of international cooperation do not reach their full potential –considerable benefits could be derived from increased and intensified cooperation.
- 6) Local and traditional knowledge of cultural and natural heritage – ranging from knowledge of techniques, materials, landscape ecology, agriculture and more – are essential components in reducing and mitigating disaster risk and should be given full consideration.

Towards the implementation of DRR at UNESCO-designated sites, the following actions were recommended by the participants of the session.

- 1) Consider the establishment of an international task group on DRR for IDAs. This task group could be composed of committed DRR organizations such as IRDR, IDMR and ICL, under the overall guidance of UNESCO. First understanding on the modality of such a group would be discussed between UNESCO and IRDR in the upcoming year.
- 2) Continue the discussion on DRR for IDAs started at the Huangshan Dialogue, with particular attention to relevant indicators under international frameworks (Sendai, 2030 Agenda and the SDGs, Paris Agreements, New Urban Agenda, SAMOA Pathway, etc.)
- 3) Identify and promote concrete DRR actions at IDAs through the design and implementation of field projects and research cooperation, with focus on sites affected by recent major natural hazards such as Jiuzhaigou Biosphere Reserve/World Heritage and Kathmandu Valley as demonstration cases.
- 4) Through UNESCO and IRDR, bring the issue of DRR for IDAs to the attention of the 2019 Global Platform for Disaster Risk Reduction.

### ◆ Asia Science and Technology Conference for DRR

The Asia Science and Technology Conference for DRR is a serial conference organized by UNDRR AP-STAG, UNDRR AP Regional Office, and the national DRR departments regarding the host countries, with IRDR as a co-organizer.

The 1<sup>st</sup> Asian Science and Technology Conference on DRR was held on 23-24 August 2016 in Bangkok. The Conference brought together more than 300 senior policy-makers, practitioners, researchers and academics, civil society and the private sector in the realm of disaster risk reduction from across Asia (and beyond) to discuss how to strengthen science



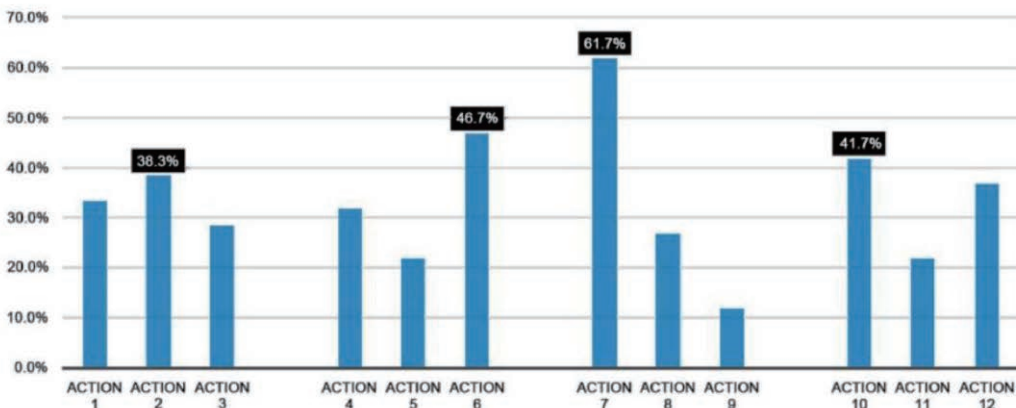
based DRR policy development in support of the implementation of the Sendai Framework in Asia. The conference came up with recommendations for 12 Actions for Science and Technology-based DRR in Asia. The outcomes of the conference were further intended to feed into the deliberations in the then upcoming Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR), which later took place from 2-5 November 2016 in New Delhi.

In addition, it was at this conference that the Asia Science Technology Status for Disaster Risk Reduction was published. This publication was developed by a group of individuals from the Asia Science Technology Academia Advisory Group (ASTAAG), with support from researchers, scientists from different countries. It includes a total of 28 case studies on 13 countries and 4 cross-cutting cases on the application of science and technology for disaster risk reduction.

After the Conference, IRDR conducted a survey to collect feedback about the twelve actions from a wide range of stakeholders. The survey consisted of 2 sections: (I) General Information (II) The twelve actions based on the 4 priority areas of the Sendai Framework. The analyses of the

survey were presented at the 2016 AMCDRR. The survey for organizations was designed based on the twelve recommended actions among the four priorities of the Sendai Framework. In part I, information about organizations and networks were collected, including names, websites and contact details. In part II, respondents selected their top four actions from the twelve for the short (in the next 2 years), medium (5 years) and long-term (10 years) that they felt most relevant to their organizations. The final part of the survey asked about the means of implementation for the top four priority actions in the short-term. The survey was circulated to a wide range of stakeholders from 27 September 2016 to 26 October 2016. The survey received 15 completed responses, including 8 from universities, 2 from international organizations and 5 from national research institutes, and represent institutions in charge of disaster risk reduction in 12 Asian countries. A crucial result of the individual questionnaire analysed which actions in each priority are the most relevant to the respondents and what kind of resources (technical resources, government/legal resources, human resources and financial resources) are most essential to each action. The results were as Figure 3-1 and Table 3-1.

**Figure 3-1: The most relevant action in each priority in 2016**



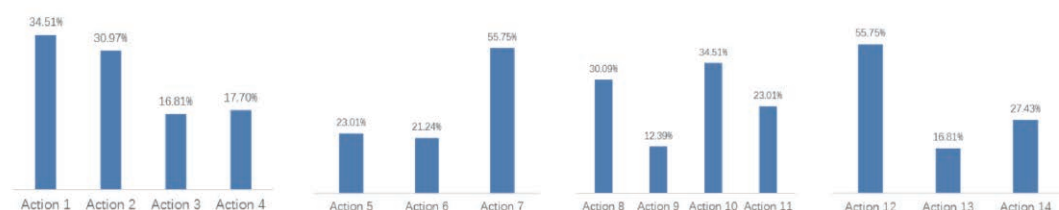
**Table 3-1. The most necessary resource for each action in 2016**

	Technical Resources	Government/legal Resources	Human Resources	Financial Resources
Priority 1	Action 2	Action 3	Action 1	
Priority 2		Action 4, Action 5	Action 6	
Priority 3		Action 7	Action 9	Action 8
Priority 4	Action 10	Action 11		Action 12

The 2<sup>nd</sup> Asian Science and Technology Conference for Disaster Risk Reduction, which took place on 17-18 April 2018, was organised by UNISDR with support from IRDR and other partners. Its aim was to renew the commitment to the accelerated implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030 as the pivotal means to achieve the goals

of sustainable development and resilience. The conference generated an outcome document, which reaffirmed the importance of the twelve actions identified in the First Asian Science and Technology Conference for Disaster Risk Deduction in 2016, and added two more actions which emerged from this conference.

**Figure 3-2: The most relevant action in each priority in 2018**



**Table 3-2. The most necessary resource for each action in 2018 compared to 2016**

2018	Technical Resources	Government/legal Resources	Human Resources	Financial Resources
Priority 1	Action 2	Action 1 Action 3 Action 4		
Priority 2	Action 6(5)	Action 5(4) Action 7(6)		
Priority 3			Action 8 (7) Action 10(9)	Action 9(8)
Priority 4	Action 12(10) Action 13(11)	Action 14(12)		

Note: Action 6(5) means Action 6 in 2018 is Action 5 in 2016; the action highlighted in red means the most necessary resource has been changed according to the respondents' answers.

In the Conference, Science & Technology into action: Disaster risk reduction perspectives from Asia was published. This publication “takes forward the 12 action points, adopted at the First Asian Science and Technology Conference for Disaster Risk Reduction as contribution to the global ‘Science and Technology Roadmap’. The publication identifies examples and good practices of implementation for these action points, as well as emphasizing the role of science and technology in each. This unique way of bridging the gap between science and policy was introduced by Ms. Loretta Hieber Girardet, chief of UNISDR Asia and Pacific Region.

After the Conference, IRDR conducted the same aforementioned survey to collect feedback about the 14 actions from a wide range of stakeholders. Significant differences were found when comparing results from the 2016 and 2018 surveys (Figure 3-2 and Table 3-2), and analyses of the survey were presented at the Asian Ministerial Conference on Disaster Risk Reduction on 03- 06 July 2018, in Ulaanbaatar, Mongolia.

The 3<sup>rd</sup> Asia Pacific Science and Technology Conference for Disaster Risk Reduction (APSTCDRR) was scheduled to take place on 16-17 March 2020, in Kuala Lumpur, Malaysia. As a result of the COVID-19 pandemic, this did not happen, with the Conference organized by IRDR ICoE-SEADPRI UKM finally taking place virtually on 15 October 2020. This conference covered the entire Pacific Region, with APSTCDRR’s goal to provide an opportunity

for the science, technology, and academic community in Asia and the Pacific to continue the much-needed science-policy dialogue to ensure that the implementation of DRR measures is based on reliable science, technology, and innovation (STI). Focus was placed on the application of STI for local and inclusive action to build disaster resilience in the face of growing disaster risks and a changing climate, and the application of STI in the development or revision of national and local strategies to meet Target E of the Sendai Framework highlighted. Finally, numerous opportunities were provided to various organisations and stakeholders, in particular young scientists, to learn and share about different innovation measures.

Before the Conference, IRDR together with APSTAAG conducted a survey to track the progress of the Asia and Pacific regional implementation of the Sendai Framework Science Technology Roadmap from a wide range of stakeholders. The results (Figure 3-3) were presented at the Conference and published as a report, “Science and Technology Status for Disaster Risk Reduction in Asia-Pacific. The other key report launched at the Conference was the “Asia-Pacific Regional Framework for NATECH Risk Management”.

All the outcomes of this Conference will be included in the 2020 Asia-Pacific Ministerial Conference on Disaster Risk Reduction (APMCDRR), which has yet to be rescheduled.

### ◆ DBAR Conference

DBAR was initiated in May 2016 during the International Symposium on Earth Observation for One Belt and One Road (EOBAR). This large-scale international science program uses space-based observation to scientifically understand the Silk Road Economic Belt and the 21st-Century Maritime Silk Road (abbreviated as the "Belt and Road") regions, and is designed to provide scientific, open, and cooperative information to support decision-making for sustainable development along the Belt and Road. As

**Figure 3-3: Outcome-wise Progress in Implementation**



breakthrough global initiative, this ambitious programme is long-term, involves numerous fields and large, complex geographic areas, making this a highly arduous long-term project. With Earth observation technologies now able to quickly and accurately detect changes on the surface of Earth at the macroscopic level, they can be used systematically to carry out large-scale and multi-scale, long-term, seamless, and continuous observations, providing real-time evidence and scientific support for decisions relating to the sustainable construction of the Belt and Road for its member countries. As Prof. Huadong Guo (PI of DBAR programme) stressed, DBAR is a scientific, open, cooperative Earth observation program, and will benefit all countries along the Belt and Road. DBAR has embarked on an ambitious journey to build a digital Silk Road for sustainable development through five priority

areas: 1 enhancing infrastructure, 2 promoting data sharing and interoperability, 3 extending applications to more people, 4 identifying research opportunities and 5 strengthening international collaboration<sup>50</sup>.

IRDR is one of the founding partners of DBAR and its DRR WG. IRDR co-organized the serial DBAR conferences and the DRR sessions. The 1<sup>st</sup> Digital Belt and Road (DBAR) Conference was held in Beijing from 6-7 December 2016. Nearly 100 experts and scholars from China, the Netherlands, India, Pakistan, Laos, Tunisia, Morocco and other countries and international organizations attended the meeting. Their goal was to discuss and formulate a DBAR Science Plan, establish a DBAR Science Committee and WGs, consider the strength of DBAR in 2017, and explore better scientific approaches to serve sustainable

Figure 3-4: The DBAR structure



50 Guo, H. (2018). Steps to the digital Silk Road. Nature, 554, 25-27.



development along the "Belt and Road". The 2<sup>nd</sup> DBAR Conference, which took place in December 2017, officially launched the DBAR Science Plan. The 3<sup>rd</sup> DBAR Conference, which took place in December 2018, in turn marked the beginning of the critical first implementation phase of the DBAR Science Plan after more than two years of consultations with the Earth observation community in a series of meetings in Asia and Africa. The DBAR Science Plan has already successfully completed all of its objectives in the Preparatory Phase, including formation of a reputed, international Science Committee to overlook DBAR, and the establishment of an international secretariat. The DBAR has also successfully established 7 Working Groups and 2 Task Forces with growing international memberships, and a network of 6 out of 8 International Centers of Excellence. Finally, the 4<sup>th</sup> DBAR Conference, convened in Shenzhen on December 17, 2019, with the theme "Digital Belt and Road Facilitates Sustainable Development", aimed to promote communication and cooperation between experts and scholars from all around the world on the issues related to selection and demonstration of SDGs most relevant to the "Belt and Road" region, mechanisms to aggregate and share Big Earth Data within the "Belt and Road" countries, means to enhance the capability of scientific discovery and decision-making related to Big Earth Data, and promotion of the sustainable development process by using Big Earth Data.

#### ◆ Silk Road Conference for DRR and Sustainable Development 2019

The International Conference on Silk-Roads Disaster Risk Reduction and Sustainable Development (SiDRR Conference 2019) took place in Beijing from 11-12 May 2019 and was jointly hosted by the CAS, the CAST, the United Nations Environment Programme, the United Nations Office for Disaster Risk Reduction, and international scientific partners including IRDR. The theme was "Towards Safe, Green, and

Resilient Silk Roads".

IRDR organized two sessions at this Conference. In the session titled "Mobilization of International Science and Technology Collaboration on Disaster Risk Reduction (DRR)", the following topics were addressed: International integrated disaster research and its possible contributions; international platforms for DRR data/knowledge sharing; university alliances and young scientists networks for DRR capacity building; and international collaboration on investment for DRR related research and technologies. In the session titled "Improving Policy and Science & Technology (S&T) Interface in Disaster Risk Reduction (DRR)", the objectives were to: share the good practices of science-based decision-making for DRR; further analyse the gaps and challenges in implementing science-based decision-making on DRR; promote the co-designs of national/local DRR strategies by multi-stakeholders; and identify policy support required by S&T communities in disaster science and the development of DRR application technologies. During the Conference, IRDR contributed to the establishment of the Alliance of International Science Organizations on Disaster Risk Reduction (acting as the supporting organization) and the establishment of Geoscience Youth Network of the Belt and Road (acting as Co-sponsor).

### 3.2.2 IRDR Policy Briefs

#### ◆ Integrated Science for Sendai Framework Implementation, 2016

This Issue Brief<sup>51</sup> was prepared for the UNISDR Science and Technology Conference on the Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030, held from 27-29 January 2016 in Geneva, Switzerland. It was prepared by Mark Pelling, Amy Donovan and Emma Visman of the IRDR International Centre of Excellence – Risk Information to Action, hosted by

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51 [http://www.irdrinternational.org/wp-content/uploads/2016/01/IRDR\\_-\\_Science-Road-Map-Conference-brief\\_final.pdf](http://www.irdrinternational.org/wp-content/uploads/2016/01/IRDR_-_Science-Road-Map-Conference-brief_final.pdf)

King's College London.

The main premise of the brief is that implementation of the Sendai Framework will benefit from a broad but clear understanding of the range of knowledge services science can provide. The science and technology communities are diverse and dynamic. The need for some knowledge services is well established in policy and practice – for example monitoring and evaluation and technical risk assessments, though gaps in application remain; other services, such as decision analysis or risk root cause analysis are only beginning to be developed and applied. Despite our growing understanding of risk, losses continue to increase. This supports ongoing calls for science to be evaluated, and re-organised to enter a new level of conversation with policy, practice and those at risk. Policy and practice actors also have to reflect on their relationship with science if the breadth of science-action relationships, from service to critical friend and catalyst, are to be valued and fostered. This is Sendai's call to science and science users.

#### ◆ Five Policy Briefs for 2017 Global Platform for DRR<sup>52</sup>

As discussed during the 16<sup>th</sup> IRDR Scientific Committee Meeting, IRDR and ICSU proposed to prepare policy briefs for the 2017 Global Platform for Disaster Risk Reduction, with the aim to contribute scientific inputs into critical issues for the implementation and monitoring of the Sendai Framework, as well as highlight IRDR's products that are of direct relevance. The following five policy briefs were then prepared:

- Coherence between the Sendai Framework, the SDGs, the Climate Agreement, New Urban Agenda and World Humanitarian Summit, and the role of science in their implementation (by Virginia Murray, Rishma Maini, Lorcan Clarke, Nuha Eltinay)

- Assessing country-level science and technology capacities for implementing the Sendai Framework (by Rajib Shaw)
- Disaster loss data in monitoring the implementation of the Sendai Framework (by Bapon Fakhruddin, Virginia Murray, and Rishma Maini)
- Forensic Investigations of Disaster (FORIN): towards the understanding of root causes of disasters (by Anthony Oliver-Smith, Irasema Alcántara-Ayala, Ian Burton and Allan Lavell)
- Cities and Disaster Risk Reduction (by Mark Pelling, Donald Brown and Fang Chen)

#### ◆ Two Policy Briefs for 2019 Global Platform for DRR

The policy briefs were presented at the Science and Policy Forum on 13 and 14 May 2019 in Geneva, providing insights from disaster risk reduction experts to science partners, Ministries of Science, scientific advisors and stakeholders, to enhance their understanding of the Sendai Framework and its connections to the SDGs and other agreements.

These policy briefs also highlight as the importance of ensuring disaster data archives are standardised to maximise the valuable opportunities to acquire better information about the health, economic, ecological and social costs of disasters.

- Disaster Loss Data in Monitoring the Implementation Of The Sendai Framework<sup>53</sup> (Bapon Fakhruddin, Virginia Murray and Fernando Gouvea-Reis)
- Achieving Risk Reduction Across Sendai, Paris And the SDGs<sup>54</sup> (by John Handmer; Anne-Sophie Stevance, Lauren Rickards, and Johanna Nalau)

52 <https://council.science/publications/disaster-risk-reduction-policy-briefs-2017/>

53 <https://council.science/publications/disaster-loss-data-in-monitoring-the-implementation-of-the-sendai-framework/>

54 <https://council.science/publications/achieving-risk-reduction-across-sendai-paris-and-the-sdgs/>

### 3.2.3 IRDR Working Paper Series

The **Working Paper Series** is a new publication of IRDR following the decision of the IRDR Scientific Committee in April 2019 to act to 'Expand IRDR Network and Scientific Output' (No. 5 of the IRDR Action Plan 2018-2020).

This Working Paper Series is thus specially made to facilitate the dissemination of the work of IRDR NCs, ICoEs, YS and institutions and individual experts that IRDR considers relevant to its mission and research agenda, and is of important value for a much broader audience working in DRR domains. We note that all working papers in this series are anchored their relevance and contributions of their work toward SFDRR, IRDR, SDGs and Paris Agreement on climate change. It is the hope of the authors of the working papers and IRDR that this working paper series will not only bring new knowledge, experience and information toward disaster risk reduction, but also help build better coherence between DRR and the UN's mainstream agenda toward inclusive, resilient and sustainable human societies. A quick list of the two batches of published papers is included below for reference purposes.

#### 1<sup>st</sup> Batch:

- A Framework for Transforming the Relationship Between Development and Disaster Risk
- Emergency and Disaster Management Programs in disaster prone, resource deficit context
- Making Cities Disaster Resilient in a Changing Climate
- Socio-ecological Resilience as a Sustainable Development Strategy for Remote Rural Settlements in Different Geo-climatic Zones of India
- Silk Road Disaster Risk Reduction
- Extraction and Analysis of Earthquake Events Information based on Web Text
- Disaster Metadata Management System Based on pycsw and Its Application

#### 2<sup>nd</sup> Batch

- The Biosafety - Biosecurity Culture Interface in Life Sciences Research
- Understanding the Geological Environmental Risks of Permafrost Degradation -Environmental and engineering geology in permafrost area in Northeast China
- Sustainable Infrastructure Development, Risk Perception and Vulnerability Assessment in Indian Himalayan Region
- Mapping Disaster Risk Reduction Institutions Using Web-based Accessible Information

# 3.3

## Cooperation with IRDR partners

### 3.3.1 Within ISC community

IRDR collaborates with other ISC Interdisciplinary Bodies (IBs), members, and regional offices on numerous DRR activities.

#### Committee on Data of the International Science Council (CODATA)

There is a close and long-term collaboration between IRDR and CODATA through the

IRDR DATA Working Group and CODATA Task Group on Linked Open Data for Global Disaster Risk Research. A large number of policy briefs, webinars, workshops on the DRR data issues have been developed in collaboration. The white papers and reports have so far focused on disaster data protocols. The recent publications include *Next Generation Disaster Data Infrastructure (2019)*, *Gap analysis on open data interconnectivity for disaster risk research (2017)*, *Disaster Loss Data: Raising the Standard*



Please join us for a panel discussion, where we will share our knowledge and best practices on:

- The application of big data for rapid damage mapping (RDM)
- Opportunities to strengthen the RDM capacity of emergency response organisations

We will also launch a white paper on *Next Generation Disaster Data Infrastructure*.

**Date:** Thursday 19 September 2019

**Venue:** The Friendship Hotel of Beijing

**Time:** 11.00 am - 12.30 pm



Bapon Fakhruddin



Guoqing Li



Carol Song



Edward Chu



Lianchong Zang



Virginia Murray

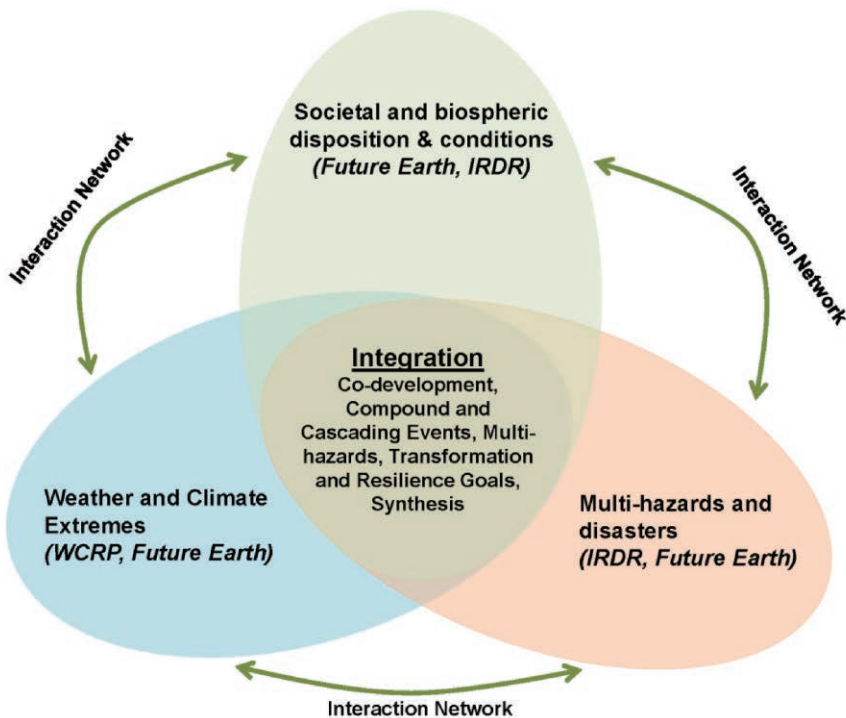


(2017), etc. In addition, since August 2018, IRDR together with CODATA, Public Health England, Sustainable Development Solutions Network, and Tonkin+Taylor, have published the monthly newsletter Disaster Risk Reduction and Open Data. The newsletter consists of three parts: DRR and data in news, Publications on DRR and data, Upcoming DRR and data events.

IRDR also hosted sessions and participated in the CODATA series conferences. At CODATA 2012: *Open Data and Information for a Changing Planet*, IRDR DATA WG hosted a session focusing on disaster loss data to address the data landscape and database development. At CODATA 2019: *Towards Next-Generation Data-Driven Science*, IRDR together with GEO and Tokin+Taylor organized a session to discuss the linked open data for global DRR with emphasis on big data application.

CODATA and IRDR contributed to the disaster responses by providing scientific evidence for decision makers. In November 2016 for example, New Zealand was hit by a 7.8 magnitude earthquake in Kaikoura. The New Zealand government has expressed thanks to IRDR and CODATA for their timely and free provision of satellite data that helped with damage and loss estimation following the disaster. The New Zealand Minister of Civil Defence, Gerry Brownlee, wrote in February 2017 to Professor Li Guoqing of the CODATA task group, saying: "In the immediate aftermath of natural disasters, accurate information on the nature and extent of damage is critically important for the efficient use of scarce resources. The New Zealand Government is very appreciative of the assistance that you and your organization provided in our time of need."

**Figure 3-5:** Conceptual illustration of the idea and scope of the Emergent Risks and Extreme Events KAN as the overlapping and integration platform of the core areas of Future Earth, IRDR and WCRP and the opportunity for building wider networks between all communities.



### ◆ Knowledge Action Network on Emergent Risk and Extreme Events (Risk KAN)

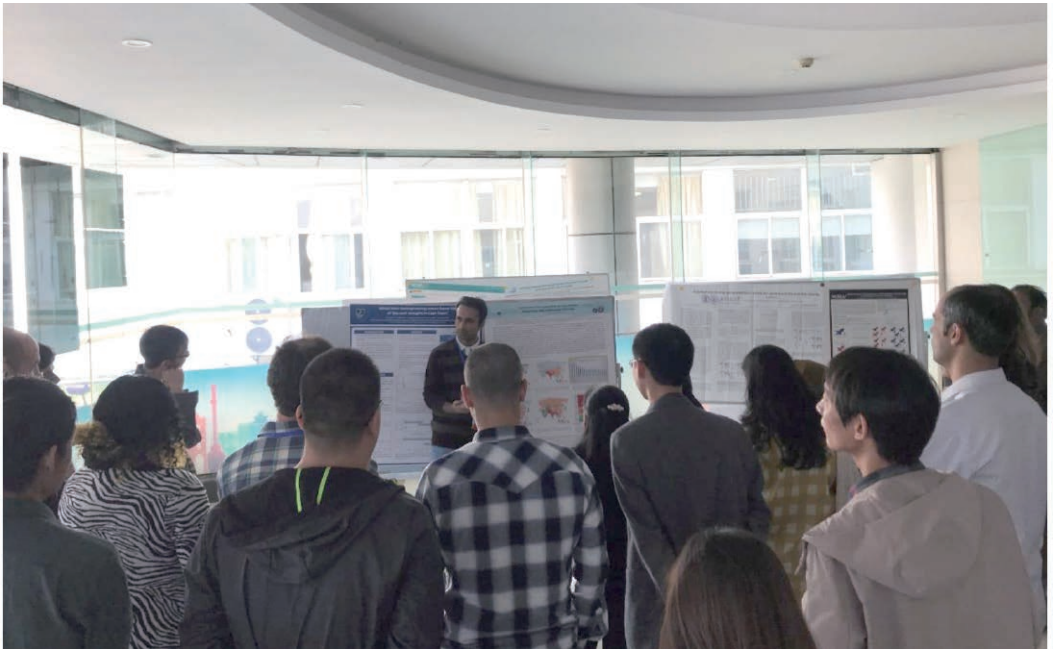
IRDR, Future Earth and World Climate Research Programme (WCRP) have been involved in the discussions that led to the creation of the Knowledge Action Network on Emergent Risk and Extreme Events since 2017 (Figure 3-5). Some IRDR scientists are involved as the members of Development Team and co-chairs of Working Groups.

### ◆ World Climate Research Programme (WCRP)

IRDR and WCRP signed a letter of cooperation in 2010 on the following area: 1) WCRP would assist with the characterization of climate-related hazards and input to the IRDR objectives; 2)

IRDR would assist WCRP in focusing the scientific questions for climate extremes research through the identification of specific vulnerabilities and risk and how these lead to the identification of climate-extreme critical research questions include the social as well as natural sciences; 3) IRDR and WCRP would work together in the provision of scientific information to and interactions with relevant international bodies, conventions, etc., where climate-related extremes pose important hazards towards the objectives of disaster risk reduction and climate change adaptation. One example of joint activities between IRDR and WCRP was the offering of 2-week advanced course entitled “Institute of Advanced Studies in Climate Extremes and Risk Management” for 39 young researchers from 17 countries in November 2019 (Figure 3-6).

**Figure 3-6: Poster presentation during the Institute of Advanced Studies in Climate Extremes and Risk Management**



## ◆ Future Earth

IRDR has worked closely with IRG-Project under the Future Earth Programme on the regional science and technology implementation for DRR. The two programmes cooperated on a series of reports of science and technology status for DRR in the Asia-Pacific region, on organizing some side events during the AMCDRR and Asian Science and Technology Conference for Disaster Risk Reduction (ASTDCRR), sessions at the Qianhai International Symposiums and more. IRG also translated the FORIN report into Chinese as reading material for DRR education.

In ICRC-CORDEX 2019: International Conference on Regional Climate, a side event on future risk and future Earth was co-organised by the Chinese National Committee for Future Earth (CNCFE), IRDR, Monsoon Asia Integrated Research for Sustainability (MAIRS-FE), Integrated Risk Governance Project (IRG-FE), and WCRP. This session provides an open platform for scientific communities from across science disciplines on extreme events, disaster risk reduction and governance to exchange information, knowledge and explore to potential opportunities in collaborative research activities.

## ◆ ISC Regional Offices

IRDR SC members and ICoEs have worked with the DRR working groups of ISC regional offices in Latin America, the Caribbean, and Asia-Pacific on several projects and events. In particular, IRDR and ISC ROAP successfully helped 12 countries in this region to develop a Science Technology Plan for Disaster Risk Reduction to implement the Sendai Framework.

### 3.3.2 With UN agencies and programmes

#### ◆ Science and Technology Advisory Group (STAG) of UNDRR

As co-sponsor, UNDRR worked closely with IRDR

through UNDRR regional offices, STAG and regional STAGs, and Science and Technology Major Group. IRDR was heavily involved in the regional DRR conferences organised by UNDRR as representative for science and technology stakeholders. In particular, IRDR organised the Science and Technology Stakeholder Consultation with Asian-STAG and other science and technology groups as the pre-event for every AMCDRR. IRDR SC members are also involved in the STAG and Science and Technology Major Group as members.

#### ◆ United Nations Educational, Scientific and Cultural Organization (UNESCO)

IRDR has worked closely with UNESCO, in particular on DRR for UNESCO heritage sites, and in the networking for young DRR professionals. Apart from the consensus reached at the 3<sup>rd</sup> Huangshan Dialogue, IRDR also cooperated with UNESCO-HIST to create a Community Activity within the GEO Work Programme in the field of Climate Change and Impacts on World Heritage Cities. IRDR and UNESCO also helped facilitate the establishment of U-INSPIRE, as organisers of the workshop at which the U-INSPIRE initiative was proposed. This occurred at the November 2018 Regional Workshop on SETI in DRR in Asia and the Pacific. Titled “Strengthening, Empowering, and Mobilizing Youth and Young Professionals in SETI for DRR”, it was organized by UNESCO, LIPI (IRDR NC Indonesia) and UNISDR, and took place in Serpong between 1-4 November 2018. The objective of U-Inspire is to mobilize and increase awareness for disaster risk reduction among youth and young professionals in science, engineering, technology and innovation, and to facilitate their collaboration with other stakeholders. The IRDR young scientists played important roles in the establishment of the national chapters of U-INSPIRE. Meanwhile, IRDR ICoE-SEADPRI-UKM hosted the U-INSPIRE Malaysia. During the COVID-19 Pandemic, U-INSPIRE organised serial webinars to discuss the role of youth. Finally, IRDR and the Disaster Risk Reduction Knowledge Service Sub-Platform (DRRKS), International Knowledge Centre for

Engineering Sciences and Technology under the Auspices of UNESCO signed a MoU to promote DRR data and knowledge sharing.

### ◆ United Nations Major Group for Children and Youth (UNMGCY)

IRDR also collaborated with the United Nations Major Group for Children and Youth (UNMGCY) Working Group. IRDR contributed to the design of The Disaster Risk Reduction Edition of the Youth Science-Policy Interface Publication. This report captures and promotes the role of young people in sharing knowledge of evidence-informed best practices, science and technology, emerging trends, challenges, and solutions in the implementation, monitoring, follow-up, and review of intergovernmental frameworks on sustainable development, specifically in disaster-related contexts. This initiative is part of the UNMGCY Youth Science-Policy Interface Platform and coordinated by the UNMGCY. Launched in May 2017, it is meant to feed into the discussions of the Global Platform for Disaster Risk Reduction, specifically around the SPI mandate, in order to showcase the contributions of young scientists, engineers, practitioners, and students in strengthening the science-policy interface, further linking policy and practice for a sustainable society. It seeks to build coherence between the Sendai Framework for Disaster Risk Reduction (2015-2030) and the DRR-dimensions of other intergovernmental agreed upon sustainable development agendas (e.g. 2030 Agenda, New Urban Agenda, etc.). IRDR young scientists have contributed the following three articles:

- Assessment of Coordination Mechanism in 2015 Nepal Earthquake, Kathmandu District (Indrajit Pal, Ranit Chatterjee)
- Business recovery after Gorkha earthquake 2015 in Nepal (Ranit Chatterjee, Basanta Raj Adhikari)
- Anthropocentric principles for effective early warning systems (Spyros Schismenos)

### 3.3.3 Global or regional partners beyond ISC and UN community

#### ◆ World Weather Research Programme (WWRP)

IRDR signed a MoU in 2012 with WWRP to cooperate in the following areas:

1. WWRP will assist IRDR with the characterization, understanding, and prediction of weather-related hazards (i.e., floods, storms, and typhoons) whose physical aspects manifest themselves at nowcasting through to sub-seasonal scales, thus contributing to IRDR Programme Objective 1—the characterization of hazards, vulnerability and risk.
2. IRDR will assist WWRP in defining and exploring critical natural and social science research questions based on an understanding of disaster risk and the implications of extreme weather or climate events for society and economy, thus contributing to the implementation of the WWRP Strategic Plan.
3. WWRP and IRDR will jointly support the activities of the Working Group on Societal and Economic Research and Applications (SERA) of the WWRP for which the research priorities include:
  - Estimation of the societal (including economic) value of weather and disaster risk reduction information;
  - Understanding and improving the use of weather-related hazard information in decision making;
  - Understanding and improving the communication of weather-related hazard information and forecast uncertainty;
  - Development of user-relevant verification methods; and
  - Development of decision support systems and tools.

4. IRDR and WWRP will collaborate in the provision of scientific information, guidance, and associated interactions with relevant international bodies, conventions, protocols, and agreements, concerning weather-related hazards and their role in disaster risk management.

#### ◆ Joint Research Centre of the European Commission (JRC)

A Memorandum of Understanding (MoU, No.: 32228) between the Joint Research Centre of the European Commission and IRDR was signed in 2011. The mission of JRC is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of European Union policies. Through its thematic areas “Security and Crisis Management” and “Sustainable Management of Natural Resources”, the JRC conducts research in the fields of disaster risk reduction, early warning, post-disaster damage analysis, and crisis management technologies.

The scope of the collaboration relates to research within the fields of:

- Characterisation of hazards, vulnerability and risk
- Post-disaster investigations focusing on natural hazards and human-induced environmental hazards.

For the first area, JRC acts a member of IRDR Risk Interpretation and Action (RIA) Working Group, contributing to:

- Enhanced capacity for identifying and assessing the level of hazards and for disaster forecasting and early warning
- Dynamic modelling of risk and elaboration of potential prevention plans (risk reduction)
- Consistent methods for the evaluation of vulnerability, including that of physical urban infrastructure, in disaster hot spots at a variety of spatial and temporal scales.

For the second, JRC takes an active part working with the FORIN project Working Group on case studies that aim at testing methods and approaches for post-disaster investigative analysis and the analysis of crises or disasters caused by natural phenomena from which lessons can be learnt in order to contribute to the production of new understanding and insights that would permit more effective disaster risk reduction. The results of this collaboration help identify major future research needs in the field. In particular, the collaboration focuses on:

- The organization of coordinated joint post-disaster field reconnaissance missions for the generation of new information and data and for the training of young researchers
- Methods for the classification, archiving, retrieval and metadata of photographic records and other data gathered from field missions
- Establishing a common exchange platform for easy access and use of archived data

#### World Vision

World Vision International is a relief, development and advocacy organization devoted to serving children, their families and their communities in impoverished regions. Currently, World Vision is working in about 100 countries and regions across the world. IRDR’s cooperation with World Vision extends to the following World Vision programmes, which goals intersect with IRDR’s: Information Management Workshops, Asia-Pacific Region DRR, Co-designed Research, Urban Resilience, Youth Group.

IRDR supported and participated in World Vision’s regional proposal for ECHO ERC, specifically the Action titled “Using Pre-crisis Information Management for responsive Decision Making in Emergencies”. IRDR’s young scientist Dr. Poorna Yahampath was invited to participate in the World Vision’s Humanitarian Leaders’ Meeting on May 21 - 22, 2018 in Colombo, Sri Lanka to introduce the role of science and technology in the DRR to the Humanitarian Emergency Affairs (HEA) directors from country levels.



◆ **SysTem for Analysis, Research and Training Int. (START Inc.)**

START Inc. is an internationally recognized independent international nongovernmental organization affiliated with the global environmental change related programmes of the ICSU. It is focused on capacity building activities to empower developing countries with scientific capabilities to motivate and inform societal action to manage risks and address opportunities of global environmental change and sustainable development. START Inc. is actively engaged in the DRR activities of IRDR ICoE-Taipei's Advanced Institute and provided seed funds for young researchers participating therein.