The United Nations Office for Disaster Risk Reduction

UNISDR Science and Technology Conference
on the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030

Launching UNISDR Science and Technology Partnership and the Science and Technology Road Map to 2030

To promote and support the availability and application of science and technology to decision-making in Disaster Risk Reduction

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Short concept note: Work Stream 3, Working Group 3

Sharing Innovations to Improve Implementation and Reporting of the Sendai Framework for Disaster Risk Reduction 2015-2030

1) Overview

The Sendai Framework for Disaster Risk Reduction (DRR) 2015-2030 calls for the "*use and expansion of thematic platforms of cooperation, such as global technology pools and global systems to share know-how, innovation and research and ensure access to technology and information on disaster risk reduction*". Commitments to enhanced access to innovations in science and technology, exchange of disaster risk reduction information, and improved innovations in integrating local knowledge into DRR decision-making are essential to addressing the challenge of an all-hazards approach that incorporates natural and man-made hazards (including technological hazards that can have cascading effects.

Innovative ways of working collaboratively as well as tools, data collection and management methods, risk communication and knowledge sharing approaches will be needed to achieve progress in DRR Innovations in science and technology are key enablers for sustaining informed decision-making for managing disaster risks in general and for implementing and monitoring the Sendai Framework in particular. For example, an efficient monitoring system for Disaster Risk Reduction (DRR) requires a solid information and knowledge base, as well as dedicated mechanisms for sharing innovation in science and technology.

Despite the wealth of scientific findings, important challenges exist for those tasked with translating evidence into information for decision-making. The main issues are related to the scattering of information among various agencies without coherence, coordination and sharing. Local disaster risk information is not systematically used for decision-making in DRR policies. At the local level, dedicated capacity and skill development in disaster risk information and knowledge management are lacking, while communication channels are inadequately used.

In a recent study on how countries want to use science, data and technology for DRR, countries have considered the main gaps and difficulties in national implementations of DRR measures as products of the fundamental barriers at the science-policy-practice nexus (Calkins, 2015). Previous research (Weichselgartner and Kasperson, 2010) has also suggested that the underuse of science is related to factors such as differing objectives, needs, and priorities; different institutional settings, as well as differing cultural values and understanding between knowledge generators and knowledge user (see Work Stream 4, Work Group 3 on "Leveraging science" for an overview of the challenges facing the science-policy-practice nexus).

Work Stream 3, Working Group 3 on 'Sharing Innovations to Improve Implementation and Reporting of Sendai Framework" will discuss different forms of innovation in supporting the implementation of the Sendai Framework and modern DRR, including Information and Communications Technologies (ICT) and data collection and knowledge sharing mechanisms, particularly in relation to the challenge of monitoring and reporting of progress on the Sendai Framework.

2) Stock taking

A scientifically-sound, effective and participatory approach is crucial to the full and effective implementation of the Sendai Framework, while building on the achievements of the Hyogo Framework for Action 2005-2015 (HFA) implementation period. The HFA contributed both directly and indirectly to stimulating science and technology applications related to DRR. The development of regional work programs aimed at strengthening the integration of Science and Technology into the DRR practices are one good example of such an endeavor (e.g. the hierarchical framework developed by the Disaster Management Centre of the South Asia Association of Regional Cooperation (SAARC))[1]. Overall, the HFA provided balanced and integrated expectations in respect to both political/social and science/technical needs for DRR. However, in practice, a strong emphasis has been placed on the political and social factors in DRR which overshadows the role of science and technology in the implementation of the HFA (Basher, 2013).

Participants in this working group are invited to consider the following examples of innovation:

1. Example of innovation through interdisciplinary concepts: resilience

The Sendai Framework renews the commitment to the resilience of societies. Resilience is fundamentally an interdisciplinary concept that requires both the natural and social sciences (SRC no date) Building resilience is complementary to reducing disaster risks. Resilient recovery and reconstruction are also recognized as imperative for sustainable development. As reflected in the priority for actions 4 of the UNISDR science and technology (S&T) Road Map, resilience is pivotal to increase disaster preparedness for effective response and to build back better in the phase of recovery, rehabilitation and reconstruction. The aim is to strengthen preparedness and resilience, while building capacity and ensuring that science and technology information can be accessed widely for better-informed decision-making.

Measurements and indicators to evaluate the progress in building resilience and the data necessary to establish these measures are critical for helping communities clarify and formalize what the concept of resilience means for them but remains a challenge (National Academies of Sciences, 2012). Disaster resilience measurements need to "monitor and incentivize both ex-ante and ex-post actions and ones that support action to reduce extensive (small scale, more common) and intensive (high magnitude, less common, more headline grabbing) disaster risk" (Overseas Development Institute, 2013). Innovative data sources, methodologies and tools for measuring resilience are needed including a thorough review of existing resilience indicators and a compilation of recommendations for their integration into the Sendai monitoring system.

[1] http://saarc-sdmc.nic.in/index.asp

2. **Example of technological innovation: maintaining and strengthening geospatial information technologies**

Satellite earth observation and geospatial information can support the monitoring of progress in the DRR implementation as well as the harmonization of international standards and risk assessment practices (**see Work Stream 3 Working Group 2, for examples of geospatial technologies).** Areas of improvement typically include:

i) the capacity development of national and local users in the integration of satellite data and information into the DRR decision making process;
ii) the need for synergies between the private sector, the research community and the policy makers as a way to facilitate the use of Earth observations for reducing risks and increasing resilience;
iii) the development of guidelines (and or standards) on how the countries can use earth observation and geospatial information to monitor several indicators of the Sendai Framework and the SDGs.

A pilot initiative that can contribute to addressing these gaps is the “Global Earth Observation Partnership” launched during the World Conference on Disaster Risk Reduction. This partnership aims to ensure the inclusion of Earth Observation and satellite-based tools into global efforts for disaster risk reduction and to develop a synergistic framework for Earth observations in support of national strategies for disaster-risk management. This initiative complemented by regional and national coordination efforts are expected to contribute to a better access and use of earth observation and geospatial data for measuring the indicators of the Sendai Framework.

3. **Example of innovative ways to enhance the uptake of scientific knowledge in policy making and operations: sharing platforms**

The need to break down the isolation of scientific knowledge by actively assisting governments in the uptake and use of this knowledge is among the key lessons learned from the implementation of the HFA. Capitalizing on the wealth of existing scientific knowledge and improving the use and accessibility and uptake of research results for operational activities are a big challenge for policy-makers and practitioners. Mechanisms for sharing innovations and enhancing uptake of scientific knowledge in policy making and operations are needed to strengthen the evidence-base to support the implementation of the three international frameworks: Sendai Framework, SDGs and UNFCCC.

In global policy processes, the role of science in informing policy is manifested in several ways, such as in the form of scientific assessments and reports, as well as the establishment of scientific advisory bodies. The widely known example for a mechanism of science and policy interaction is the Intergovernmental Panel on Climate Change (IPCC). For DRR, such a science-policy platform is yet to exist and the real challenge is to harmonize all related processes to avoid inefficiency and overlapping in such a mechanism.

There is an opportunity to learn lessons from existing international and regional initiatives such as the UNISDR Scientific and Technical Advisory Group (STAG) and the recently launched European Disaster Risk Management Knowledge Centre (DRMKC). The structure, role and work the STAG are illustrative examples of the essential components for an effective interface between science, technology and practitioners. At a more practical level, the DRMKC aims at facilitating access to relevant knowledge and translating scientific data into actionable disaster risk information at the local, national, European and global levels. Similar initiatives and partnerships should be encouraged and supported for improving the dialogue to facilitate a science-policy interface for effective decision-making **(see Work Stream 4 Working Group 1 on Leveraging Science for a more detailed discussion).**

4. Example of community-based innovation: integrating local information in DRR decision-making

Community-based innovation and practices play a significant role in improving the dialogue and partnership between vulnerable communities and other actors in DRR, including government authorities, NGOs, international agencies, academia and the private sector. Community-based participatory action is integral to fully operationalizing the Sendai Framework into practice in an inclusive manner and to build more resilient spaces that minimize the impact of disasters.

Tracking of indicators in real time would allow for identifying early warning signs, give time to enact risk-reduction programs, and more accurately measure disaster impacts to build-back-better. Furthermore, such a bottom-up approach will promote context-specific, fit-for-purpose, eco-friendly, and human centered technology and innovation that are locally sourced and smoothly integrated into the existing sociocultural framework.

The key challenges in this area are twofold:

1) better engagement of communities for identifying risks during normal situations, providing early warning prior to disaster and assessing disaster damage and loss during and after disasters; and

2) providing appropriate conditions that allow for the up-scaling of successful community innovations including their incorporation into the policy making process.

How to harness the power of Information and Communication Technology tools and applications (e.g. Ushahidi, Open Street Map (HOT), Twitter) for community mobilization in view of measuring the indicators and monitoring the progress of Sendai is a key area of inquiry that the conference is invited to explore.

5. Example of innovation through inclusiveness and participatory approaches: young scientists perspective

One of the guiding principles of The Sendai Framework is that: *"Disaster risk reduction requires an all-of-society engagement and partnership. It also requires empowerment and inclusive, accessible and non-discriminatory participation, paying special attention to people disproportionately affected by disasters, especially the poorest. A gender, age, disability and cultural perspective should be integrated in all policies and practices, and women and youth* *leadership should be promoted. In this context, special attention should be paid to the improvement of organized voluntary work of citizens".*

Furthemore, it calls on scientists (under Priority 1 -Understanding Risk): *"to ensure the use of traditional, indigenous and local knowledge and practices, as appropriate, to complement scientific knowledge in disaster risk assessment and the development and implementation of policies, strategies, plans and programmes of specific sectors, with a cross-sectoral approach, which should be tailored to localities and to the context".*

As an example of the importance of the diverse contributions in DRR, youth from various disciplines in DRR, from science to policy, have been identified as important players in creating more inclusive societies, while building-capacity for a resilient new era of development[2] in science, technology, and innovation (STI) and have also been viewed as drivers for people and planet-centered policies, as well as enablers for its implementation and systematic monitoring and evaluation (United Nations, 2015). In order for young people to fulfill their generational responsibility as drivers and contributors to development, they must be equipped with the necessary knowledge, tools, and resources needed to drive resilient change. Therefore, expanding the scope of science-driven, empirically-oriented policy design, implementation, monitoring, review, and reporting by institutionalizing the role of young scientists in SPIs is crucial to meet current challenges and address emerging ones.

6. Innovation through policy coherence and improved monitoring

The year 2015 is an opportunity to align concepts but also practices, targets and monitoring indicators across three major areas of global policy: the Sendai Framework for Disaster Risk Reduction 2015-2030, (agreed in March 2015); 2) the Sustainable Development Goals or SDGs (September 2015); and the climate change agreements (December 2015). The rare coincidence of three agreements of such global significance is an opportunity for building coherence across the different but overlapping policy areas. The new system of DRR indicators must strive to overcome the challenges encountered by the precursor HFA monitor and link across with these areas

An analysis of HFA progress reports submitted in 2011 and 2013 revealed a number of limitations of the HFA monitor as a tool for monitoring progress in DRR: not only were the 22 HFA core indicators input rather than output or outcome related, but subjectivity and lack of precision of the self-assessment tool also prevents adequate benchmarking and led to different interpretations of the progress in DRR by governments. Significantly, the lack of linkage between the HFA monitor and the Millennium Development Goals (precursors of the SDGs) or the climate change agreements prevented the assessment of contributions of the HFA to MDGs and climate change roadmaps and vice versa (Ishigaki and Mochizuki, 2014).

[2] http://www.un.org/sustainabledevelopment/blog/2015/08/on-youth-day-un-officials-urge-member-states-to-make-young-people-drivers-of-change/

3) The way forward

The outcomes of the discussion of the conference participants around the proposed research areas and mechanisms will hopefully be influential in informing and enriching the Science and Technology Road Map to ensure its operationalization in line with other related processes, current needs, and emerging risks. The following table links the expected outcomes of this Working Group to the relevant priorities and key actions of the Science and Technology Road Map:

Priority for Action 1: Understanding Disaster Risk		
Expected outcomes	**Key Actions**	**Recommendations**
1.1 Assess the current state of data, scientific knowledge and technical availability on disaster risks reduction and fill the gaps with new knowledge.	Enhance access to environmentally sound technology, local knowledge and inclusive innovation	Ensure a better access and use of earth observation and geospatial data
	Promote community engagement in risk data collection.	Harness the power of community-based innovation practices for community mobilization
Priority For Action 2: Strengthening Disaster Risk Governance to Manage Disaster Risk		
Expected outcomes	**Key Actions**	**Recommendations**
2.1 Ensure a stronger involvement of science in policy- and decision-making at all levels	Promote and improve dialogue to facilitate a science-policy interface for effective decision-making	Enhance the uptake of scientific knowledge in policy making and operations to strengthen the evidence-base to support the implementation of the three international frameworks: SFDRR, SDGs and UNFCCC
Priority For Action 3: Investing in Disaster Risk Reduction for Resilience		
Expected outcomes	**Key Actions**	**Recommendations**
3.1 Provide scientific evidence to enable decision-making of policy options for investment and development planning	Promote cooperation between academic, scientific and research entities and networks and the private sector to develop new products and services to help reduce disaster risk	Institutionalize the dialogue between the scientist and policy makers through national and regional knowledge centres for disaster risk management

Priority for Action 4: Enhancing Disaster Preparedness For Effective Response, and to "Build Back Better" In Recovery, Rehabilitation and Reconstruction		
Expected outcomes	**Key Actions**	**Recommendations**
4.1 Identify and respond to the scientific needs of policy- and decision-makers at all levels to strengthen preparedness and resilience	Support the development of resilient systems and services	Develop a metric for measuring resilience and integrate resilience indicators into the Sendai monitoring system
4.2 Build capacity to ensure that all sectors and countries understand, have access to, and can use scientific information for better informed decision-making	Build local knowledge and the use of existing training and education mechanisms and peer learning	Engage young people and young scientists and institutionalize their roles in establishing and maintaining a DRR science-policy interface
	Incorporate disaster risk knowledge in formal and non-formal education	
	Promote transdisciplinary work in disaster risk reduction research	
	Strengthen public education and awareness in DRR	

Participants in this working group are invited to consider whether these proposals should be strengthened further? Are there specific next steps to strengthen the innovation sharing at local, national, regional and global levels in DRR? Where urgent and longer term investments should be made? A few additional elements to inform considerations are described below.

Innovative methods and tools

- What are the innovations in methods, tools and analyses that can help in improving the monitoring system of the Sendai Framework?
- How can we advocate the use of space-based innovations and other technologies (Unmanned Aerial Vehicles (UAVs), ICT, novel in situ surveying techniques, etc.) in delivering explicit datasets that can be relevant to the implementation and monitoring of the three frameworks (Sendai Framework, Sustainable Development Goals (SDGs) and climate change agreements (UNFCCC))?

Mechanisms for enhancing knowledge sharing and uptake

- Identify ways to track in real-time the indicators through community-driven impact assessments to better react proactively to early warnings.
- Identify the mechanisms for actively assisting governments and others in the uptake and use of scientific knowledge (e.g. by fostering stronger and more inclusive partnerships across scientific institutions, governments, public-private networks to scale up the application of science to decision-making at all levels).

- Consider how to strengthen existing technology facilitation initiatives that promote networking, information sharing and knowledge transfer to improve implementation and reporting of the Sendai Framework.
- Consider how to encourage more systematic and reinforced science/policy and science/practitioners interfaces including foresights and scenario studies to address future risks and challenges;
- Promote more systematic dissemination of scientific information, identify ways of translating it into practical methods that can be readily integrated into DRR policies and regulations,

Mechanisms for improved policy coherence (see Work Stream 1 Concept Note for a specific discussion on the role of scientific partnerships and networks)

- Consider how to operationalize technology transfer mechanisms within DRR and build coherence with other processes (i.e. SDGs and UNFCCC): Paragraph 123 of the Addis Ababa Agenda Action [3]and Paragraph 70 of the 2030 Agenda Outcome Document[4] call for establishing an international Technology Facilitation Mechanism. This will form a UN inter-agency task team on science, technology and innovation for the SDGs; curate an annual multi-stakeholder forum, and develop an online platform for sharing initiatives, mechanisms and programs.

[3] Addis Ababa Agenda Action: http://www.un.org/esa/ffd/ffd3/wp-content/uploads/sites/2/2015/07/Addis-Ababa-Action-Agenda-Draft-Outcome-Document-7-July-2015.pdf

[4] Transforming our world: the 2030 Agenda for Sustainable Development: http://www.un.org/pga/wp-content/uploads/sites/3/2015/08/120815_outcome-document-of-Summit-for-adoption-of-the-post-2015-development-agenda.pdf

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Annex: Relevant text from the Sendai Framework

Sendai statements on technology innovations
Priority 1:
(f) To promote real time access to reliable data, make use of space and in situ information, including geographic information systems (GIS), and use information and communications technology innovations to enhance measurement tools and the collection, analysis and dissemination of data;

(k) To promote investments in innovation and technology development in long-term, multi-hazard and solution-driven research in disaster risk management to address gaps, obstacles, interdependencies and social, economic, educational and environmental challenges and disaster risks;

(i) To enhance access to and support for innovation and technology, as well as in long-term, multi-hazard and solution-driven research and development in the field of disaster risk management

VI. International cooperation and global partnership

40. In addressing economic disparity and disparity in technological innovation and research capacity among countries, it is crucial to enhance technology transfer, involving a process of enabling and facilitating flows of skill, knowledge, ideas, know-how and technology from developed to developing countries in the implementation of the present Framework

47(b). To enhance access of States, in particular developing countries, to finance, environmentally sound technology, science and inclusive innovation, as well as knowledge and information-sharing through existing mechanisms, namely bilateral, regional and multilateral collaborative arrangements, including the United Nations and other relevant bodies

(c)To promote the use and expansion of thematic platforms of cooperation, such as global technology pools and global systems to share know-how, innovation and research and ensure access to technology and information on disaster risk reduction.