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The Science and Technology Roadmap to Support the Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030

The Sendai Framework for Disaster Risk Reduction 2015-2030 was agreed at the Third UN World Conference on Disaster Risk Reduction in Sendai, Japan in March 2015 and endorsed by the UN General Assembly in June 2015.

The goal of the Sendai Framework is to prevent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, legal, social, health, cultural, educational, environmental, technological, political and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience.

The expected outcome till 2030 is to achieve substantial reduction in disaster risk and losses in lives, livelihoods and health in the economic, physical, social, cultural and environmental aspects of persons, private sector, communities and countries. There are four priorities, seven targets, thirteen principles and suggested actions for stakeholders at global, regional, national and local level.

The Sendai Framework sets out a path to ensure that disaster risk is factored into planning and development at all levels across all sectors as well as in disaster preparedness, recovery and reconstruction. The Sendai Framework is wide in scope. It applies to the risk of small-scale and large-scale, frequent and infrequent, sudden and slow-onset disasters, caused by natural or man-made hazards as well as related environmental, technological and biological hazards and risks.

A main feature of the Sendai Framework, in comparison to its predecessor (the Hyogo Framework of Action), is the shift of focus from managing 'disasters' to managing 'risks'. Such a shift requires a better understanding of risk in all its dimensions of hazards, exposure and vulnerability. Therefore the role of science and technology in providing the evidence and knowledge on risk features heavily in the Sendai Framework.

There are a number of references to science and technology in the Sendai Framework. Paragraph 36 (b) for example, requests: "A*cademia, scientific and research entities and networks to: focus on the disaster risk factors and scenarios, including emerging disaster risks, in the medium and long term; increase research for regional, national and local application; support action by local communities and authorities; and support the interface between policy and science for decision-making".*

More specifically, paragraph 25 (g) states: *"Enhance the scientific and technical work on disaster risk reduction and its mobilization through the coordination of existing networks and scientific research institutions at all levels and all regions with the support of the UNISDR Scientific and Technical Advisory Group in order to: strengthen the evidence-base in support of the implementation of this framework; promote scientific research of disaster risk patterns, causes and effects; disseminate risk information with the best use of geospatial information technology; provide guidance on methodologies and standards for risk assessments, disaster risk modelling and the use of data; identify research and technology gaps and set recommendations for research priority areas in disaster risk reduction; promote and support the availability and application of science and technology to decision-making; contribute to the update of the 2009 UNISDR Terminology on Disaster Risk Reduction; use post-disaster reviews as opportunities to enhance learning and public policy; and disseminate studies".*

Given the call in the Sendai Framework for science and technology-based DRR, in addition to a number of commitments made by the scientific and technology community at the Third UN World Conference on Disaster Risk Reduction, there is a need for a stronger partnership with a clearer direction and strategy for implementation as a mechanism to 'foster collaboration across global and regional mechanisms and institutions for the implementation and coherence of instruments and tools relevant to disaster risk reduction" around common goals and actions identified in the road map.

The science and technology community, as well as other stakeholders, came together at the UN Office for Disaster Risk Reduction (UNISDR) Science and Technology Conference held 27-29 January 2016 in Geneva. The 'Science and Technology Roadmap to Support the Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030' and accompanying partnerships are the main outcomes of the conference.

Structure of the Roadmap

The 'Science and Technology Roadmap to Support the Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030' includes expected outcomes, actions, and deliverables under each of the four priority of actions of the Sendai Framework. The science and technology community can then link to and plan around the implementation of the Roadmap.

Work plans for several of the deliverables (with responsibilities, outputs and a timeline) in the Roadmap can then be developed as appropriate. These can be developed on a needs basis with identified partners with the support of the UNISDR Science and Technology Advisory Group.

The partnerships that have been developed both for the Third UN World Conference on Disaster Risk Reduction in March 2015 and the UNISDR Science and Technology Conference in January 2016 are a core part of implementation of the Roadmap. The science and technology partnerships and initiatives help to complement and strengthen collaboration among the partners, within their respective mandates and expertise.

There are also a number of cross cutting actions like capacity development, gender equity, citizen engagement, public-private sector partnership, and coherence or alignment with other post-2015 global agenda like Sustainable Development Goals and climate change convention which will need to be linked with other stakeholders actions in the implementation of the Sendai Framework.

Summary of the expected outcomes of the Science and Technology Road Map

Sendai Framework Priority for Action	Science and Technology Expected Outcomes
1. Understanding Disaster Risk	1.1 Assess and update the current state of data, scientific and local and indigenous knowledge and technical expertise availability on disaster risks reduction and fill the gaps with new knowledge. 1.2 Synthesize, produce and disseminate scientific evidence in a timely and accessible manner that responds to the knowledge needs of policy-makers and practitioners. 1.3 Ensure that scientific data and information support are used in monitoring and reviewing progress towards disaster risk reduction and resilience building. 1.4 Build capacity to ensure that all sectors and countries have access to, understand and can use scientific information for better informed decision-making
2. Strengthening Disaster Risk Governance to Manage Disaster Risk	2.1 Support a stronger involvement and use of science to inform policy- and decision-making within and across all sectors at all levels
3. Investing in Disaster Risk Reduction for Resilience	3.1 Provide scientific evidence to enable decision-making of policy options for investment and development planning
4. Enhancing Disaster Preparedness for Effective Response, and to "Build Back Better" in Recovery, Rehabilitation and Reconstruction	4.1 Identify and respond to the needs of policy- and decision-makers at all levels for scientific data and information to strengthen preparedness, response and to "Build Back Better" in Recovery, Rehabilitation and Reconstruction to reduce losses and impact on the most vulnerable communities and locations.

Monitoring progress

The Roadmap is a strategic document and has a 15-year duration with a planned review to be carried out in the fifth year of implementation. The review will determine progress on implementation and facilitate course correction as needed to ensure relevance and flexibility in changing circumstances.

Progress can be tracked on a regular basis and reported back at the biennium Global Platforms for Disaster Risk Reduction. Progress can also complement the country reporting to the Sendai Monitor as developed by UNISDR.

The Science and Technology Roadmap for the Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030		
Sendai Framework Priority Action 1: Understanding Disaster Risk		
Expected Outcomes	**Actions**	**Deliverables**
1.1 Assess and update the current state of data, scientific and local and indigenous knowledge and technical expertise availability on disaster risks reduction and fill the gaps with new knowledge.	• Establish a global database of existing hazards, including information on exposure and vulnerability to build awareness and knowledge of changing disaster risk and to better disseminate risk information, including for public health emergencies. • Develop methods, models and tools including spatial for national risk assessments and monitor changes in disaster risk and risk profiling. • Archive disaster data, land use and information on social and economic activities and promote community engagement in risk data collection. • Conduct solution-driven surveys and research in disaster risk management and increase research for global, regional, national and local application. • Analyse the ethics of scientific input before, during and after disaster and address the ethical challenges in accessing science and technology for everyone.	• Network established for sharing disaster data and statistics. • Improved, open and accessible data and integrated metrics on exposure and vulnerability from local to global scale. • Periodic reports produced on the state of global risk. • Guidelines and standards developed for data archiving, recording and reporting disaster loss and disaggregated impact data. • Support implementation of national disaster loss and damage databases. • Guidelines developed for national and regional, multi-hazard, risk assessments, mapping and risk profiles. • Guidelines developed for national and regional disaster risk management capability assessment. • Periodic surveys on disaster risk management capability. • Analysis and practices on ethics disaster risk reduction disseminated.

1.2 Synthesize, produce and disseminate scientific evidence in a timely and accessible manner that responds to the knowledge needs of policy-makers and practitioners.	• Promote real-time and near real-time access to reliable data and use of information and communications technology. • Integrate traditional, indigenous and local knowledge and practices in disaster risk reduction. • Promote intergenerational partnership between scientists, policy makers, private sectors and community leaders. • Develop partnerships between science and technology community and the disaster risk management institutes and agencies. • Promote scientific focus on disaster risk factors and scenarios, including emerging disaster risks and public health threats. • Develop expertise and personnel to use the statistics to develop policies for disaster risk reduction.	• National and regional knowledge centres and hubs for disaster risk management established/and mapped. Methodologies for knowledge hubs linked. • Good practises and case studies on use of indigenous, traditional and local knowledge practices documented and disseminated. • Evidence of partnerships between science and technology community and disaster risk management institutes and agencies. • Studies conducted on gaps in disaster risk reduction evidence and knowledge. • National Statistical Offices roles and responsibilities identified and supported.
1.3 Ensure that scientific data and information support are used in monitoring and reviewing progress towards disaster risk reduction and resilience building.	• Develop and monitor a set of indicators, including a gender marker, to measure progress of use science and technology in disaster risk reduction. • Promote the development and use of standards and protocols, such as certifications, for national and regional levels. • Adopt a multi-hazard approach that integrate lessons learned, including from transboundary and biological and technological hazards. • Incorporate gender equality and integration in science and technology for disaster risk reduction partnerships.	• Indicators and terminology for use by the science and technology community in disaster risk reduction developed. • Data is gender-differentiated in disaster and climate risks. • Best practices for a multi-hazards approach developed and disseminated. • Challenges for women role in the science and technology and in disaster risk reduction identified and addressed in partnerships. • Tools (indicators and date collection) developed for

	• Promote coherence with disaster risk reduction and post-2015 agenda (in particular SDGs and climate change) in data collection and indicators to assist in monitoring and evaluation - so that they do not create additional reporting burden for countries.	monitoring and evaluation of disaster risk reduction that are mutually reinforced with post-2015 agenda (in particular SDGs and climate change).
1.4 Build capacity to ensure that all sectors and countries have access to, understand and can use scientific information for better informed decision-making	• Promote research on insurance and social protection and safety nets for developing countries. • Promote integrated and multi-disciplinary research that bridges social and natural sciences and uses both quantitative and qualitative data. • Involve the users of science in the earliest stages of research and technology. • Mobilize the research community to ensure design, implementation and improvement of risk reduction plans with the identification of metrics and methodologies. Standardize the monitoring of implementation. • Integrate risk assessments into disaster risk management across sectors. • Promote inclusiveness, interdisciplinary, and inter-generational participatory approaches. Engage young scientists in in applying science for disaster risk reduction.	• A mechanism to provide technical advice (e.g. help desks, knowledge centres and hubs) on disaster risk management. • Dialogues with communities and citizen groups and the use of scenarios that make science sensible to decision-makers and the general public. • Measure to build capacity development in knowledge management, innovation and learning, research and technology initiated. • Training and capacity building of science and technology in disaster risk reduction undertaken. • Guidance developed on integrated and multi-disciplinary research that bridges social and natural sciences, and supportive publishing practices enhanced. • User-friendly web-based interactive platforms used for science and technology capacity building and training. • Design and implement a young scientists forum at the Global Platform (including possible establishment of an Young Scientist award or scholarship).

Sendai Framework Priority Action 2: Strengthening Disaster Risk Governance to Manage Disaster Risk		
Expected outcomes	**Actions**	**Deliverables**
2.1 Support a stronger involvement and use of science to inform policy- and decision-making within and across all sectors at all levels	• Promote dialogue and networking on disaster risk reduction between scientists and policy-makers. • Raise scientific awareness and improve understanding of the impact of disaster risks on societies. • Promote disaster risk assessments in planning and development especially in land-use mapping (coastal areas, river basins, cities), rural development, and eco-system management. • Strengthen the engagement of science in national coordination mechanisms or platforms for disaster risk reduction.	• Establish national and regional multi-hazards knowledge centres for disaster risk management. • A created space for dialogue between scientists and policy makers. • Multi-sectoral platforms for post-disaster reviews • Use of scientific good practises and case studies on implementation of the Sendai Framework. • Science and technology expertise made available and used for regional and national platforms for disaster risk reduction.
Priority Action 3: Investing in Disaster Risk Reduction for Resilience		
Expected outcomes	**Actions**	**Deliverables**
3.1 Provide scientific evidence to enable decision-making of policy options for investment and development planning	• Provide funding and resources for science and technology to inform on understanding of risk, including through incentives and cooperation with the commercial sector and enhanced knowledge and technology transfer. • Present the impact of investment in disaster risk reduction based on the assessment on economic growth and the safety and wellbeing of the general public. • Support innovation in earth observation and geo spatial data for risk profiling and decision making.	• Design opportunities to promote cooperation and for funding and resourcing between academic, scientific and research entities and networks with the private sector to better use existing, and develop new products and services. • Develop and disseminate a periodic report on the state of science, including the role of social and anthropological science, in disaster risk reduction. • Established practices to include cost-benefit in risk reduction analysis.

	• Identify the role of social and anthropological sciences can play in the analysis of investing in disaster risk reduction. • Research that reviews guidelines and detects new challenges and vulnerabilities to disasters.	• Increased shared information on early warning systems, hazard maps and earth observation, geo spatial data. • A report on investments in research programmes on disaster risk reduction. • A dialogue between science and policy makers arranged at global and regional platforms for disaster risk reduction.
Sendai Framework Priority Action 4: Enhancing Disaster Preparedness for Effective Response, and to "Build Back Better" in Recovery, Rehabilitation and Reconstruction		
Expected outcomes	**Actions**	**Deliverables**
4.1 Identify and respond to the needs of policy- and decision-makers at all levels for scientific data and information to strengthen preparedness, response and to "Build Back Better" in Recovery, Rehabilitation and Reconstruction to reduce losses and impact on the most vulnerable communities and locations.	• Promote multi-hazard early warning systems with improved climate information, aerial and spatial data, emergency response services and communication to end users. • Identify and address the needs for early warning for Least Developed Countries and Small Island Developing states • Develop and share best practices on new threats and risks (including infectious diseases) to inform preparedness planning. • Develop, disseminate information and practices on contingency planning and protection of critical infrastructure, including promotion of the build back better approach in recovery, rehabilitation and reconstruction. • Institutionalize effective recovery and reconstruction as strategies to reduce risks and promote resilient development.	• An international conference to develop new thinking and approaches to multi-hazard early warning systems. • Evidence of progress on the delivering of more effective early warning systems including mechanisms that ensure timely early warning to communities. • Implementation of and increased support for the Climate Risk Early Warning System (CREWS) Initiative for Least Developed Countries and Small Island Developing states. • A disaster risk reduction and health conference to share best practices and approaches preparing for health risks (including infectious diseases). • Forums and research that promote contingency planning, the protection of critical infrastructure, and the institutionalizing of a gender sensitive build back better approach in recovery, rehabilitation and reconstruction.

	• Incorporate build back better in insurance policies. • Inform national diaster risk reduction plans and strategies that focus on community preparedness and awareness, including the needs of women, children, people living with a disability and the elderly in vulnerable situations. • Promote science based decision-making for resettlement processes.	• Deliver a special forum on insurance and build back better and other social protection mechanisms. • Simplified methodology developed for post disaster comprehensive needs assessment. • Dissemination of research and case studies on community preparedness and awareness, and resettlement processes to include the needs of women, children, people living with disability and the elderly in vulnerable situations.