



**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 2, Working Group 3

Risk Assessment and Management

1) Overview

The ability to assess risk using an all-hazard approach in a timely, technically sound, and easily communicated fashion is the foundation to develop the necessary understanding by key stakeholders tasked to manage and reduce disaster risk as outlined in the Sendai Framework for Disaster Risk Reduction (UNISDR 2015). Performing these assessments at any scale (local (individual, neighbourhood, and community), national, regional or global) requires considerable expertise, time, and resources. Furthermore, disaster risk is increasingly complex and multi-faceted (hazard, exposure, vulnerability and capacity), with interdependencies that may be overlooked and cause cascading effects over time and space.

Additionally, once risk assessments are available, their uptake and use requires effective communication and dissemination to leverage science and ensure that risk information is useful, usable and used. This goal will demand both cutting edge scientific methods and technological tools, integration and translation of scientific findings that are already available, and the fostering of a network of relationships across the science-policy-practice landscape.

Work Stream 2, Working Group 3 (WS2 WG3) on **'Risk Assessment and Management'** will address the use and advancement of science and technology to yield the necessary methods for 'fit for purpose' risk assessments that inform sound risk management plans. These capabilities provide the basis for the Understanding of Disaster Risk described by Priority of action 1 of the Sendai Framework for Disaster Risk Reduction and is the key enabler to achieve progress for Priority of action 2 on Strengthening Disaster Risk Governance to Manage Disaster Risk.

2) Stock Taking

Risk Assessment is defined by the UNISDR terminology (UNISDR 2009) as "*A methodology to determine the nature and extent of risk by analysing the potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihood and the environment on which they depend*". Hence, risk assessment combines a characterization of the hazards with the level and extent of exposure with an assessment of differentials in vulnerability (and its converse – capacity) providing a calculated estimate of the risk of disaster in terms of impacts and their probability.

Risk assessment methods frequently cite immediate challenges in acquiring the necessary data. Although data sources for disaster-related events and impacts are often limited by the complexity of task, sources exist and are improving (see WS3 WG2). In addition to data gaps, the methodologies for modelling risk face some of the following challenges:

- 1) Methods are largely confined to a single hazard, with little or no ability to aggregate risks from different perils.
- 2) Assessments are generally focused on specific consequences (relevant to the objectives of agencies or interested parties), rather than multiple consequences that produce a more holistic assessment of risk.

- 3) Methods are often variable, resulting in a lack of transparency, understanding of uncertainty, and scientific rigour necessary for publication, replication by other scientists and, most importantly, application by decision makers.
- 4) Risks may be measured on a subjective scale (moderate, high, very high) which hampers prioritisation alongside other competing priorities for resources.
- 5) Risk assessments seldom provide cost information for cost-effective risk reduction which also hampers prioritisation alongside competing needs.
- 6) Risk assessments are frequently performed without the engagement of all relevant stakeholders at the outset and without sufficient communication and dissemination upon completion.

To improve disaster risk reduction, risk assessments should provide for advances in risk management, defined (UNISDR 2009) as “*The systematic approach and practice of managing uncertainty to minimize potential harm and loss*”. Disaster risk management then follows as implementation of policies, processes and actions to prevent new risk, reduce existing disaster risk, and manage residual risk, all of which contribute to the strengthening of resilience.

In light of the above, participants in the group are invited to:

- **Discuss and identify main gaps and challenges** in the application of current risk assessment methodologies for assessing physical, socio-economic, institutional and environmental risks and providing risk information that answer to the questions faced by DRR decision makers.
- **Identify mechanisms and opportunities to improve risk assessment methods** (both in the near term for immediate use, and over the course of the tenure of the Sendai Framework) to provide;
 - technically sound, transparent and accepted **characterization of all hazards, methods to determine vulnerability**, including combined and potentially cascading effects, as well as country specific characteristics
 - means of **combining risks** to provide an overall assessment,
 - the ability to **scale methods to local, regional and national levels**,
 - the capability to **scale methods to available capacity** to ensure use.
- Define **how results can be delivered** in a form that is understood and can be applied to **develop and implement risk management practices** for disaster risk reduction.

3) The way forward

The UNISDR Science and Technology Road Map (UNISDR n.d.) outlines expected outcomes and key actions defined to date where science and technology will support each of the four priorities of the Sendai Framework for Disaster Risk Reduction (UNISDR 2015). Hence, following discussion of the main issues that currently challenge risk assessment and

risk management included in the above section, key actions in the Road Map that relate to risk assessment and risk management will be further refined and expanded to take full advantage of the benefit provided by science and technology.

The way forward will focus on, for the key actions, answering the following two questions:

- 1) How will science and technology support the successful completion of the key actions relating to methods of risk assessment and risk management?
- 2) With regard to risk assessment and risk management, what can the conference attendees identify as near term objectives (that should be put place immediately) and what can be identified as goals that need to be, and can be, developed in the next 15 years?

The following main areas of focus will be over the next 15 years, which are linked to the UNISDR ST Roadmap key actions as outlined in the table below

Priority for Action 1: Understanding Disaster Risk		
Expected Outcomes	Key Actions	Review Progress and Needs
1.1 Assess the current state of data, scientific knowledge and technical availability on disaster risks reduction and fill the gaps with new knowledge.	<ul style="list-style-type: none"> • Develop, update periodically and disseminate risk information, including on exposure and vulnerability, to build awareness and knowledge of disaster risk • Record and share disaster losses and disaggregated impact data and statistics • Conduct solution-driven surveys and research in disaster risk management and increase research for global, regional, national and local application; 	<ul style="list-style-type: none"> • Guidelines for national and regional, multi-hazard, risk assessments and mapping. • Guidelines for national and regional disaster risk management capability assessment • Periodic national and regional surveys on disaster risk management capability
1.2 Synthesize, produce and disseminate scientific evidence in a timely and accessible manner that responds to the knowledge needs from policy-makers and practitioners;	<ul style="list-style-type: none"> • Promote partnership between scientists, policy makers, private sectors and community leaders to establish, disseminate and share good practices and lessons learned. • Engage scientific focus on disaster risk factors and scenarios, including emerging disaster risks; 	<ul style="list-style-type: none"> • National and regional knowledge centres for disaster risk management. • Good practises on use of indigenous and local knowledge

Priority For Action 3: Investing in Disaster Risk Reduction for Resilience		
Expected outcomes	Key Actions	Review Progress and Needs
3.1 Provide scientific evidence to enable decision-making of policy options for investment and development planning	<ul style="list-style-type: none"> Promote mainstreaming of disaster risk assessments and mapping into land-use planning and other policy development and implementation, and rural development planning and management 	<ul style="list-style-type: none"> Guidance on disaster risk and impact assessments
Priority for Action 4: Enhancing Disaster Preparedness For Effective Response, and to “Build Back Better” In Recovery, Rehabilitation and Reconstruction		
Expected outcomes	Key Actions	Review Progress and Needs
4.1 Identify and respond to the scientific needs of policy- and decision-makers at all levels to strengthen preparedness and resilience	<ul style="list-style-type: none"> Develop, maintain and innovate technology for people-centred, low cost early warning systems and emergency communication mechanisms. 	<ul style="list-style-type: none"> Periodic national and regional reporting on early warning systems and emergency communication mechanisms; in place and planned
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	<ul style="list-style-type: none"> Establish / strengthen existing training and education mechanisms and peer learning Develop the workforce capacity in all sectors in understanding disaster risk Enhance knowledge and technology transfer and promote the use of global technology pools to share know-how, innovation and research 	<ul style="list-style-type: none"> National and regional help desks for technical advice on risk assessment and risk management capability National and regional training and capacity building programmes in DRR

Participants are invited to discuss how to strengthen these proposals further, and define specific next steps for immediate actions in this regard. Participants are also invited to discuss what specific initiatives and partnerships that need to be put in place to take this forward?

A few proposals are made below for consideration during the discussions to advance the application and further development of methodologies and to form consensus on

commitments to improve the multi hazards early warning systems, their normative guidance, their technology and innovation use, and the accuracy of their information.

Risk Assessment Key Action Set 1.1

In support of Priority for Action 1: Understanding Disaster Risk, expected outcome 1.1 is to: *“Assess the current state of data, scientific knowledge and technical availability on disaster risks reduction and fill the gaps with new knowledge”*.

Additional refinement on how S&T can best support these key actions (including scope, scale and time) in a fashion that addresses the challenges in the prior section is an expected significant outcome of the working group. Vital items to address include:

- 1) Methods for acquiring, storing and disseminating consistent, technically sound hazard information (including open and consistent, access to data and reduction methods) for both natural and man-made (technical and biological) hazards.
- 2) Means to integrate and coordinate of risk assessment methods ranging in scale from global and national quantitative assessments to local-scale qualitative participatory approaches. This should include the ability to avoid conflicting information, maximize utility, and to implement all available risk information based on the purpose of the analysis (hazard and consequence of concern), the time and geographic scale involved, and the resources available.
- 3) Harmonization of risk information, even if at the level of best practices and ‘mosaic information’ across the globe, is needed for each and all relevant hazards to define practical guidelines.

Risk Assessment Key Action Set 1.2

In support of Priority for Action 1: Understanding Disaster Risk, expected outcome 1.2 is to: *“Produce and disseminate scientific evidence in a timely and accessible manner that responds to the knowledge needs from policy-makers and practitioners”*.

For risk assessments to have impact on improved risk management, they must not only be performed in a technically sound and accepted fashion, but the results should be presented and communicated in a manner that the appropriate parties (policy makers, business decision makers, public officials, and the public at large) can understand and act upon (see WS4 WG1). Hence for these key actions, the manner, time frame and delivery message for risk assessment needs to be addressed. A vital part of this action will include addressing methods for the risk assessment value chain from science all the way to action. For example, traditional scientific communication means of refereed journal publications fall we short in terms of time scales and reach. Better means of developing and delivering science and technology that engages the stakeholders and works for the metrics of success of scientists, policy makers, private sectors and community leaders need to be implemented/developed, and illustrated. A significant short-term need is to develop methods, models and tools for national risk assessments.

Risk Assessment Key Action Set 3.1

In support of Priority for Action 3 “Investing in Disaster Risk for Risk Reduction and Resilience”, expected outcome 3.1 is to “*Provide scientific evidence to enable decision-making of policy options for investment and development planning*”.

A vital part of this action includes methods for producing risk information that is actionable for users well beyond traditional disaster response organization to improve overall resilience. These users require more quantitative measures to allow (and justify) long term investments in overall risk reduction. Hence methods to perform assessments which provide the ability to motivate and prioritize investments and make long term land use and development decisions need to be defined and improved. A significant long-term need is to develop risk modelling tools and databases so that risk models may be used to assist in monitoring progress in DRR.

For each of these key actions, significant knowledge has developed, and many successes have been achieved to date relative to the assessment and management of risk. This working group has the opportunity to gather and communicate them to have immediate impact. Furthermore, progress over the next 15 years will require that the S&T community refine and develop methodologies and disseminate results that increase the quality, availability and utility of risk assessments as well as promote their use for risk management.

References

UNISDR science and technology Road Map for the UNISDR science & technology partnership supporting the implementation of Sendai Framework for DRR 2015-2030. Available at http://www.preventionweb.net/files/45270_unisdrscienceandtechnologyroadmap.pdf

UNISDR. 2009. Terminology on Disaster Risk Reduction. Available at <http://www.unisdr.org/we/inform/publications/7817> [Accessed 19 June 2015].

UNISDR. 2015. Sendai framework for disaster risk reduction 2015–2030. In: UN world conference on disaster risk reduction, 2015 March 14–18, Sendai, Japan. Geneva: United Nations Office for Disaster Risk Reduction; 2015. Available at http://www.unisdr.org/files/43291_sendaiframeworkfordrren.pdf

Annex: Key statements in the Sendai Framework for Disaster Risk Reduction

The following text from the Sendai Framework is relevant to this working group on risk assessment and risk management;

14 - Against this background, and in order to reduce disaster risk, there is a need to address existing challenges and prepare for future ones by focusing on monitoring, assessing and understanding disaster risk and sharing such information and how it is created; strengthening disaster risk governance and coordination across relevant institutions and sectors and the full and meaningful participation of relevant stakeholders at appropriate levels; investing in the economic, social, health, cultural and educational resilience of persons, communities and countries and the environment, as well as through technology and research; and enhancing multi-hazard early warning systems, preparedness, response, recovery, rehabilitation and reconstruction. To complement national action and capacity, there is a need to enhance international cooperation between developed and developing countries and between States and international organizations.

18g - Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030.

19g - Disaster risk reduction requires a multi-hazard approach and inclusive risk-informed decision-making based on the open exchange and dissemination of disaggregated data, including by sex, age and disability, as well as on easily accessible, up-to-date, comprehensible, science-based, non-sensitive risk information, complemented by traditional knowledge;

23 - Policies and practices for disaster risk management should be based on an understanding of disaster risk in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. Such knowledge can be leveraged for the purpose of pre-disaster risk assessment, for prevention and mitigation and for the development and implementation of appropriate preparedness and effective response to disasters.

24b - To encourage the use of and strengthening of baselines and periodically assess disaster risks, vulnerability, capacity, exposure, hazard characteristics and their possible sequential effects at the relevant social and spatial scale on ecosystems, in line with national circumstances

24j - To strengthen technical and scientific capacity to capitalize on and consolidate existing knowledge and to develop and apply methodologies and models to assess disaster risks, vulnerabilities and exposure to all hazards;

24k - 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;

24n - To apply risk information in all its dimensions of vulnerability, capacity and exposure of persons, communities, countries and assets, as well as hazard characteristics, to develop and implement disaster risk reduction policies;

25a - To enhance the development and dissemination of science-based methodologies and tools to record and share disaster losses and relevant disaggregated data and statistics, as well as to strengthen disaster risk modelling, assessment, mapping, monitoring and multi-hazard early warning systems;

25b - To promote the conduct of comprehensive surveys on multi-hazard disaster risks and the development of regional disaster risk assessments and maps, including climate change scenarios;

25i - 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

27c - To carry out an assessment of the technical, financial and administrative disaster risk management capacity to deal with the identified risks at the local and national levels;

27g - To establish and strengthen government coordination forums composed of relevant stakeholders at the national and local levels, such as national and local platforms for disaster risk reduction, and a designated national focal point for implementing the Sendai Framework for Disaster Risk Reduction 2015–2030. It is necessary for such mechanisms to have a strong foundation in national institutional frameworks with clearly assigned responsibilities and authority to, inter alia, identify sectoral and multisectoral disaster risk, build awareness and knowledge of disaster risk through sharing and dissemination of non-sensitive disaster risk information and data, contribute to and coordinate reports on local and national disaster risk, coordinate public awareness campaigns on disaster risk, facilitate and support local multisectoral cooperation (e.g. among local governments) and contribute to the determination of and reporting on national and local disaster risk management plans and all policies relevant for disaster risk management. These responsibilities should be established through laws, regulations, standards and procedures;

28f - To promote the strengthening of, as appropriate, international voluntary mechanisms for monitoring and assessment of disaster risks, including relevant data and information, benefiting from the experience of the Hyogo Framework for Action Monitor. Such mechanisms may promote the exchange of non-sensitive information on disaster risks to the relevant national Government bodies and stakeholders in the interest of sustainable social and economic development.

30g - To promote the mainstreaming of disaster risk assessment, mapping and management into rural development planning and management of, inter alia, mountains, rivers, coastal flood plain areas, drylands, wetlands and all other areas prone to droughts and flooding, including through the identification of areas that are safe for human settlement, and at the same time preserving ecosystem functions that help to reduce risks;

33j - To promote the incorporation of disaster risk management into post-disaster recovery and rehabilitation processes, facilitate the link between relief, rehabilitation and development, use opportunities during the recovery phase to develop capacities that reduce disaster risk in the short, medium and long term, including through the development of measures 22 such as land-use planning, structural standards improvement and the sharing of expertise, knowledge, post-disaster reviews and lessons learned and integrate post-disaster reconstruction into the economic and social sustainable development of affected areas. This should also apply to temporary settlements for persons displaced by disasters;

36c - Business, professional associations and private sector financial institutions, including financial regulators and accounting bodies, as well as philanthropic foundations, to integrate disaster risk management, including business continuity, into business models and practices through disaster-risk-informed investments, especially in micro, small and medium-sized enterprises; engage in awareness-raising and training for their employees and customers; engage in and support research and innovation, as well as technological development for disaster risk management; share and disseminate knowledge, practices and non-sensitive data; and actively participate, as appropriate and under the guidance of the public sector, in the development of normative frameworks and technical standards that incorporate disaster risk management;