UNISDR
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 1

Sharing Standards, Protocols and Practices for Data Collection and Reporting

Overview

Effective achievement and assessment of progress in the implementation of the Sendai Framework will depend on clear and agreed metrics. Disaster loss and damage data is essential, but only covers part of what needs to be measured and addressed. Progress in disaster risk reduction involves measurement of risk in all its facets, including hazards, vulnerability and capacity. Effective policy design requires mainstreaming of Disaster Risk Reduction/Disaster Risk Management (DRR/DRM) into all sectors and the embedding of a preventive, multihazard approach. The latter includes public and private capabilities for avoiding new risk creation and managing existing risk.

The Sendai Framework is one of the international frameworks interested in disaster risk and loss data. The Sustainable Development Goals have at least three indicators related to reducing disaster risk and increase resilience. The UN Framework Convention for Climate Change (UNFCCC) looks at possible trends in future extreme weather events and their impacts. Clearly, common standards are needed to ensure synergy among these frameworks.

There are many good practices around. At international level, the Hyogo Framework for Action 2005-2015 (HFA) enabled the collection of DRR-specific data through the self-assessments. To meet the objectives, UNISDR developed an online tool (HFA Self-Assessment Tool[1]) to assist governments to assess their progress in building resilience to disaster. While these data are qualitative and subjective in nature, they have contributed to understanding governments' capabilities. Another example of good practice involving 17 countries, is the Inter-American Development Bank[2] Indicators of Disaster Risk and Risk Management, that allow countries self-assessment of disaster risk, defining the potential economic losses in case of natural disaster. At national level, up to 100 countries have established disaster loss databases for one or more hazard types. Although not all databases use the same data standard, a lot of lessons have been learnt in the design and running of these databases that can inspire a global standard for loss data.

Apart from the DRR policy area, other policy areas have developed practices and standards for dealing with consequences of extreme events. In the climate change domain, the focus lies on assessing future disaster risk and disaster loss, which leads to considerations of changes in the likelihood of hazards, in exposure, building stock, and land use planning but also in civil protection policies and resilience building efforts.

In addition to governmental sector active involvement in disaster risk management, the private sector has long-standing experience and expertise with assessing and costing risk. Some industry standards and models developed in the private sector can be considered as good practices, and concepts such as Annual Average Loss are key in the dialogue on risk management (Velasquez et al., 2014).

Finally, there are emerging scientific fields in which standards are being developed that may become relevant (or de facto standards) for the DRR domain. A Big Data approach aims at deriving emerging characteristics from massive and unstructured information pieces. This may be

[1] www.preventionweb.net/english/hyogo/hfa-monitoring
[2] http://www.iadb.org

a future way for collecting data on local vulnerability, its underlying factors, and coping strategies of people and local governments: three critical aspects in disaster risk, that need to be considered in order to avoid the construction of new risk. This information needs to reach policy makers in a way that can be understood.

The Work Stream 3, Working Group on 'Use of science, technology and innovation tools, methods and standards to support the implementation and reporting of Sendai Framework' will explore existing good practices and promising standards for disaster loss and risk data. It will enable governments and other stakeholders to take away practical solutions as well as research challenges for collecting and reporting on disaster risk and loss data for the Sendai Framework, but also for the Sustainable Development Goals and the Paris Climate Change Conference (COP21).

1) Stock taking

A scientifically-sound, effective and participatory accountability mechanism is crucial to underpin the full implementation of the Sendai Framework, while building on the achievements over the Hyogo Framework implementation period. At the same time, the new system of indicators must strive to overcome the challenges encountered by the precursor HFA monitor. An analysis of HFA progress reports submitted in 2011 and 2013 (UNISDR, 2014) 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 the subjectivity and the lack of precision of the self-assessment tool, prevents benchmarking and leads to different interpretations of the progress in DRR by governments[3]. Besides, the lack of a link between the HFA monitor and the Millennium Development Goals or the UNFCCC could not allow for the gauging of the contribution of HFA to MDGs and climate change roadmaps and vice versa (Ishigaki and Mochizuki, 2014).

Disaster loss and damage data

Loss accounting is not new. It is the business of the insurance industry, which has developed industry standards for recording losses. However, insured losses are only a fraction of total losses in most countries, it doesn't cover all disaster types equally, and the method depends largely on customers filing insurance claims. Human losses have been recorded systematically and for the purpose of humanitarian action at national and international levels. Since 1988 the WHO Collaborating Centre for Research on the Epidemiology of Disasters (CRED) has been maintaining an Emergency Events Database (EM-DAT[4]), which is the most cited database. It is an initiative aimed to rationalise decision making for disaster preparedness, as well as providing an objective base for vulnerability assessment and priority setting.

In 1994, DesInventar[5] was developed and first launched in 1996-97 in the Latin American Caribbean (LAC) Region. It was then promoted by the United Nations beyond the LAC region and fostered the development of national databases. The idea is that more accurate measurements are made at higher scales (i.e. at lower administrative levels), and to give visibility to small scale

[3] http://www.preventionweb.net/files/31307_svn_NationalHFAprogress_2011-13.pdf
[4] www.emdat.be
[5] www.desinventar.org

disasters that in a cumulative way take efforts and resources from local level. There are now more than 80 countries that have implemented DesInventar-based loss recording systems, and more capacity building is underway. The Global Assessment Report (GAR, 2013) has indeed shown that more accurate measurements reveal 50% more losses than previously accounted for. Also in developed countries there has been an increased interest in systematically collecting disaster loss data for better disaster risk management. The EU has published guidance on sharing disaster loss and damage data (Corbane et al., 2015), which is based on a scientific analysis of existing loss data and requirement for loss data (De Groeve et al., 2013).

From an international perspective, having a common framework for damage and loss data recording with comparable datasets would bring significant value and advantages to the systematic reporting on indicators for global disaster risk reduction targets, envisaged to Sustainable Development Goals and to the Sendai Framework. It also responds to recommendation of the Organisation for Economic Co-operation and Development (OECD) to develop standardized accounting frameworks for expenditure on disaster risk reduction and disaster losses in order to evaluate the economic benefits from their disaster risk investments (OECD 2014).

Biological and technological hazards

The broadening of the scope of the Sendai Framework beyond natural hazards will be challenging to integrate existing standards in the field of technological and biological hazards. These well-regulated fields have rich datasets and standards, which may or may not be compatible with DRR practices. The new scope is an opportunity to foster dialogue across the borders of disciplines and sectors that inform an all-hazard DRR systems.

Standards developed by standards organizations and other entities

The Sendai framework is an opportunity for renewed cooperation with standards organizations, such as ISO and IEC, among others. Important points of reference include:

- ISO 31000:2009, Risk management – Principles and guidelines[6], provides principles, framework and a process for managing risk. It can be used by any organization regardless of its size, activity or sector,
- ISO 22300:2012 Societal Security – Terminology[5]),
- ISO 22320 on Emergency management,
- ISO 22301 on Continuity management
- Standards on critical infrastructure including electrotechnical infrastructure, such as power plants and utilities – given the critical importance of retaining electrical power in the wake of a disaster

Cooperation with standards organizations could also aim at identifying new potential standards. [7]

Good practices have emerged such as the Global Risk Assessment[6] underlying the Global Assessment Report, but also composite indicators such as INFORM[7]. Science plays a big role in how these are developed (see Work Stream 2), but the uptake by policy makers and practitioners

[5] http://www.iso.org/iso/home/standards/iso31000.htm

[7] See UNECE "Standards and Normative mechanisms for disaster risk reduction" background paper for the GAR15 http://www.unece.org/fileadmin/DAM/trade/wp6/AreasOfWork/RiskManagement/paper_UNECE_final.pdf

is another challenge. Presenting risk information in useful ways and providing frameworks for risk interpretation are important challenges for implementing the Sendai Framework.

Standards go beyond risk assessment. There are a number of standards on hazard, vulnerability and risk assessment of various assets, codes and standards for engineering design and construction of various infrastructures, guidelines and methodologies for retrofitting of various structures, hazard monitoring and early warning systems instrumentation, etc. Excellent examples of new standards in this area include the IRDR[8] Peril Classification and Hazard Glossary (IRDR, 2013).

Further, there are many good practices which may become de facto standards. The indicators for disaster risk and risk management of the Inter-American Development Bank (IDB) with 26 national governments (and during more than a decade) is a great example for SFA follow-up. Another example is the IDB countries' risk profiles of most countries of the Americas, based on probabilistic approaches and with relevant details for the dialogue with the countries. Risk calculation platforms such as CAPRA (Cardona et al.), based on sound theoretical grounds and with proven application at international and national level, can lead to standard software.

Response capacities and resources

Risk assessment is often linked to response capabilities (e.g. expertise and technology) and capacities (how much of them is available). Risks that cannot be avoided must be dealt with by emergency management services, and part of the preparation is to establish adequate response capacity, either at national level, or – through regional agreements – through sharing resources at regional level. Emerging standards and protocols (such as EU Risk Management Capability Assessment Guidelines[9]) must be shared and further developed.

Role of National Statistical Offices and specialized technical agencies

In very few countries are data on disaster consequences systematically collected by National Statistical Offices (NSO). Typically, NSO collect data when requested by legislation or government offices. For disaster loss data, the role of National Statistical Offices must be examined carefully: they can play an enabling role to provide a common evidence base for various policies scattered over different government departments. NSOs also have the experience and tools to systematically and sustainably collect data. In the Asia-Pacific region, UNECE and the UNESCAP statistical committee is playing a leading role in this area. Also in Europe, the INSPIRE legislation can enable the link between statistical offices and domain experts. The latter are represented by national technical agencies (meteorological, hydrological, geophysical, biological, etc.) and their UN counterparts, and some agencies are standard-setting bodies (e.g. WMO).

Crossing scientific disciplines and policy boundaries

Because of the different policy objectives, discussions on standards for loss and risk data focus on different elements in the three frameworks. The Sendai Framework focuses on measuring the consequences in all its aspects: killed, injured, affected, economic losses, disruption, etc. (targets A-D). The Sustainable Development Goals (SDGs) focus on the disaggregation of loss data by

[8] Integrated Research on Disaster Risk. http://www.irdrinternational.org/2014/03/28/irdr-peril-classification-and-hazard-glossary/

[9] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2015.261.01.0005.01.ENG

gender, age, people with disabilities, etc. in order to address the development goals (targets 1.5, 11.5 and 13.1). The climate change community focuses on trends in losses and causes of hazards, mainly following an economic paradigm, which allows modelling the future. It is necessary to bring the different discussions together and to encourage synergy, such as the close link between climate change adaptation and DRR. It is also necessary to focus on the causes of vulnerabilities to provide input to policy makers for better decisions for sustainable development. “Building back better” will also need the input of data. A challenge to find out the kind of information needed to advice on improved ways to build back better.

Private sector

The private sector has been developing industry standards on risk assessment and financing for decades. These are largely based on probabilistic risk assessment. Metrics such as Annual Average Loss and Maximum Probable Loss are well known, and are valuable standards to transfer to the public sector. Although several countries are using such measures in national risk assessments (e.g. some in the EU), these metrics are not widespread in the public sphere. Alliances are needed to promote collaborative initiatives that can promote research and practice.

Communication and dissemination of knowledge, experience and best practices

In a multi-disciplinary, multi-sectoral and international field like disaster risk management, communication and dissemination of knowledge, experience and best practices is challenging. Common terminology is essential and the HFA terminology has been key to many of the successes. A revision of this terminology under the Sendai Framework will improve this even more. Considering the request in the Sendai Framework to update DRR terminology, informal expert consultations have taken place in partnership and cooperation with the UNISDR Scientific and Technical Advisory Group and its member the European Commission Joint Research Centre (EC-JRC) to revisit and update the 2009 UNISDR terminology on disaster risk reduction. As a result a background paper “Proposed updated terminology on disaster risk reduction (August 2015): A technical review” is provided to the recently established Intergovernmental Open Ended Working Group on Indicators and Terminology. The Working Group will complete its objectives by end of 2016.

Knowledge centres, specifically designed to pool research results, translate them into actionable information, and build networks across disciplines, are essential instruments for the science-policy interface. New initiatives, such as the European Commission’s Disaster Risk Management Knowledge Centre[10] or the Japanese Global Centre for Disaster Statistics[10], can help bridge the gap between science and practitioners.

2) The way forward

The conference participants are asked to discuss and hopefully agree on the following research areas and mechanisms outlined in the draft UNISDR Science and Technology Road Map for collecting and reporting on disaster risk and loss data to improve the monitoring and reporting of the Sendai Framework; emphasising measurement of risk in all its facets, including hazards, vulnerability and capacity.

[10] http://drmkc.jrc.ec.europa.eu/

Priority for Action 1: Understanding Disaster Risk		
Expected Outcome	**Key Action**	**Recommendation**
1.1 Assess the current state of data, scientific knowledge and technical availability on disaster risks reduction and fill the gaps with new knowledge.	Record and share disaster losses and disaggregated impact data and statistics	Develop global standard Sharing knowledge and experience
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;	Promote real-time and near real-time access to reliable data and use information and communications technology;	Open data policies Global aggregated data sets
	Engage scientific focus on disaster risk factors and scenarios, including emerging disaster risks	Develop standard hazard and disaster scenarios
1.3 Ensure that scientific data and information can support and be used in monitoring and reviewing progress towards disaster risk reduction and resilience building.	Develop and monitor a set of core indices and indicators to measure progress	Coherent, science-based development of indicators across Policy Frameworks (SDG, Sendai, UNFCCC)
	Promote the development of quality standards, such as certifications particularly at national and regional levels.	Share quality standards
Priority for Action 3: Investing in Disaster Risk Reduction for Resilience		
Expected Outcome	**Key Action**	**Recommendation**
3.1 Provide scientific evidence to enable decision-making of policy options for investment and development planning	Promote the mainstreaming of disaster risk assessments and mapping into land-use planning and other policy development and implementation, and rural development planning and management	Clear standards and protocols, terminology
	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	Engage with private sector to share toolsets and methodologies
Priority for Action 4: Enhancing Disaster Preparedness For Effective Response, and to "Build Back Better" In Recovery, Rehabilitation and Reconstruction		
Expected Outcome	**Key Action**	**Recommendation**
4.2 Build capacity to ensure that all sectors and countries	Enhance knowledge and technology transfer and promote	Develop technology standards, protocols and

understand, have access to, and can use scientific information for better informed decision-making	the use of global technology pools to share know-how, innovation and research	practices

Can these proposals be strengthened further? Are there specific next steps to strengthen approaches to standards and protocols that help to achieve the targets of the Sendai Framework at local, national, regional and global levels? What specific initiatives and partnerships can be put in place to support this? How can these actions inform the activities outlined in the Road Map to guide implementation?

- **Record and share disaster losses and disaggregated impact data and statistics** using a global standard based on sound scientific and technical considerations. This can be achieved through sharing of knowledge and experience on standards, protocols, capability and good practises to support data collection and reporting. It also implied sharing knowledge and experience on implementation of data collection at technical level (data types, data infrastructure) as well as at operational level (quality control, funding, product development).
- **Promote real-time and near real-time access to reliable data and use information and communications technology.** Open data policies greatly enhance the utility of data, in particular in the field of disaster risk management, where risk depends on local factors that are hard to capture. Global datasets aggregated from national and local datasets have a huge potential to create a step change in risk modelling.
- **Engage scientific focus on disaster risk factors and scenarios, including emerging disaster risks.** Scientifically constructed standard hazard and disaster scenarios can be an important tool to have comparable risk assessments, and thereby foster communication and learning across government levels, geographic borders and policy areas. Special attention must be given to data that can provide input on underlying risk factors, and that will allow not only to avoid the construction of new risk, but also to build back better after disasters.
- **Develop and monitor a set of core indices and indicators to measure progress.** Several international framework (Sendai Framework, Sustainable Development Goals, and Climate Change) follow the approach first piloted by the Millennium Development Goals to develop standard indicators that are used to monitor progress in policy objectives. It is of utmost importance that these indicators are developed in a coherent way across these frameworks, in order to produce strong empirical evidence with a minimum burden on collecting States while maximizing the utility of the data.
- **Promote the development of standards and certification particularly at national and regional levels.** Existing practices on certification and quality standards should be widely applied to start generating data of sufficient quality to inform policies. An important step in this process is to assess, record and disseminate the uncertainty of measures and indicators. Data with known uncertainty levels is more useful than data of which the uncertainty is not known.
- **Promote mainstreaming of disaster risk assessments and mapping into land-use and other policy development and implementation, and rural development planning and**

management. With clear standards and protocols for disaster risk and loss information as well as a clear terminology, mainstreaming of disaster risk assessments and mapping becomes feasible.

- **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.** The private and public sector have common interests in better risk management, and the toolsets and methodologies can be shared for mutual benefit. Collaboration on data and methodology standards will enable this process.
- **Enhance knowledge and technology transfer and promote the use of global technology pools to share know-how, innovation and research.** The development of standards and protocols and practices reduces the variety of technologies, and facilitates the transfer of knowledge.
- **Need to support participatory approaches:** 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 (Sendai 19(d)).

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Annex: Relevant text from the Sendai Framework

Priority 1: Understanding disaster risk

25 (g) To 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 in all regions, with the support of the United Nations Office for Disaster Risk Reduction Scientific and Technical Advisory Group, in order to strengthen the evidence base in support of the implementation of the present Framework; promote scientific research on 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 publication entitled “2009 UNISDR Terminology on Disaster Risk Reduction”; use post-disaster reviews as opportunities to enhance learning and public policy; and disseminate studies;

27 (j) (j) To promote the development of quality standards, such as certifications and awards for disaster risk management, with the participation of the private sector, civil society, professional associations, scientific organizations and the United Nations;

Priority 4: Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction

34 (b) (b) To promote the further development and dissemination of instruments, such as standards, codes, operational guides and other guidance instruments, to support coordinated action in disaster preparedness and response and facilitate information sharing on lessons learned and best practices for policy practice and post-disaster reconstruction programmes;

34 (g) To promote regional protocols to facilitate the sharing of response capacities and resources during and after disasters;

V. Role of stakeholders

36 (c) 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;

VI. International cooperation and global partnership

48 c) The United Nations Office for Disaster Risk Reduction, in particular, to support the implementation, follow-up and review of the present Framework by: preparing periodic reviews on progress, in particular for the Global Platform for Disaster Risk Reduction, and, as appropriate, in a timely manner, along with the follow-up process at the United Nations, 26 supporting the development of coherent global and regional follow-up and indicators, and in coordination, as appropriate, with other relevant mechanisms for sustainable development and climate change, and updating the existing web-based Hyogo Framework for Action Monitor accordingly; participating actively in the work of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators; generating evidence-based and practical guidance for implementation in close collaboration with States and through the mobilization of experts; reinforcing a culture of prevention among relevant stakeholders through supporting development of standards by experts and technical organizations, advocacy initiatives and dissemination of disaster risk information, policies and practices, as well as by providing education and training on disaster risk reduction through affiliated organizations; supporting countries, including through national platforms or their equivalent, in their development of national plans and monitoring trends and patterns in disaster risk, loss and impacts; convening the Global Platform for Disaster Risk Reduction and supporting the organization of regional platforms for disaster risk reduction in cooperation with regional organizations; leading the revision of the United Nations Plan of Action on Disaster Risk Reduction for Resilience; facilitating the enhancement of, and continuing to service, the United Nations Office for Disaster Risk Reduction Scientific and Technical Advisory Group in mobilizing science and technical work on disaster risk reduction; leading, in close coordination with States, the update of the publication entitled “2009 UNISDR Terminology on Disaster Risk Reduction”, in line with the terminology agreed upon by States; and maintaining the stakeholders’ commitment registry;