

The Sendai Framework for Disaster Risk Reduction: the challenge for science

Conclusions and recommendations of a meeting at the Royal Society on 24 – 25 June 2015

Background

1. The World Conference on Disaster Risk Reduction held in Sendai, Japan on 14 – 18 March 2015 resulted in governments adopting a new international framework – the Sendai Framework for Disaster Risk Reduction 2015 – 2030 – with the aim of achieving a ‘substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries’. The application of science (both natural and social) and technology to disaster risk reduction is far more prominent in the new framework than in its predecessor, the Hyogo Framework for Action 2005 – 2015. The United Nations Office for Disaster Risk Reduction (UNISDR) is responsible for coordinating, monitoring and reviewing the implementation of the new framework, supported by its Science and Technical Advisory Group (STAG). As part of the post-Sendai process, UNISDR/STAG seek to engage the international science and technology community in identifying the most effective means of realising the Sendai Framework.

2. On 24 – 25 June 2015 the Royal Society hosted a meeting of international disaster risk experts in collaboration with UNISDR, the International Council for Science (ICSU), its Integrated Research on Disaster Risk (IRDR) programme, and the UK Collaborative on Development Science (UKCDS). The meeting was co-chaired by Margareta Wahlström, Special Representative of the Secretary-General for Disaster Risk Reduction, and Professor Geoffrey Boulton FRS on behalf of the Royal Society. The meeting aimed to a) initiate detailed discussions about the Sendai Framework, its scientific elements and its implementation, b) identify principles for scientific engagement in the Sendai Framework, and c)

suggest processes for the development of a ‘road map’ to guide this engagement. See Appendix I for attendees, and II for the meeting agenda.

3. A draft road map for science and technology in the implementation of the Sendai Framework is being developed by UNISDR. An important milestone in the post-Sendai process will be a meeting in Geneva in February 2016 to discuss the draft road map, develop it further and agree the principles and priorities for its implementation. Acknowledging this important milestone, the final part of the Royal Society meeting focused on ways to maximise the impact of the Geneva meeting.
4. This note summarises the principal conclusions and recommendations of the Royal Society meeting. It does not represent the positions of the Royal Society or the meeting co-organisers.

The context for scientific engagement

5. There are several high-level issues that provide important context for the Sendai Framework and that need to be recognised in order to elicit a strong and effective response from the scientific community.

The global climate and sustainable development agendas

6. The awareness and readiness of the science and technology community to reduce disaster risk is relatively high in the immediate aftermath of a major disaster, but falls away as the event recedes. Disaster risk reduction can also be seen as a niche concern, in contrast to higher profile scientific research into climate

change. The post-Sendai process should therefore aim to ‘mainstream’ disaster risk reduction; framing it as a perennial priority that is fundamental to sustainable development, and making it a higher priority for scientific research and funding. Close alignment between the Sendai Framework, Financing for Development discussions, and the forthcoming Sustainable Development Goals, climate change agreement and 2016 World Humanitarian Summit will be essential.

Supply and demand for science and technology

7. Successful implementation of the Sendai Framework will require clear articulation of both disaster risk reduction needs and scientific and technological possibilities. The two should be effectively linked, with science and technology developments focusing on specific needs at local, national, regional and global levels. Risk assessments, particularly at the local level, should be communicated using the latest widely available communications technologies, in a manner that is responsive to the perceptions and priorities of different stakeholder groups.

Specific challenges for science

8. Participants discussed the areas of science that need greater attention or investment in order to deliver the commitments in the Sendai Framework, as well as the organisations or networks required.

Gaps in scientific knowledge

- Disaster risk reduction research should be interdisciplinary, intersectoral, transboundary and transnational, and should address multiple hazards.
- Greater emphasis should be placed on understanding how to prevent disasters, in addition to understanding how to respond to and recover from them.
- Our current understanding of how risks escalate is poor and would benefit from further research, including into the social, economic and institutional factors that contribute to risk, and into the transfer of risk between different stakeholder groups. Further research into how risks are initially created – with the aim of anticipating and mitigating risk creation – would also be beneficial.
- Greater support for monitoring, early warning and response technologies is needed. As remote sensing technologies increase in resolution and scope, a more strategic approach to the planning and provision of such systems is required.

- Data on risk-related phenomena – including people’s changing vulnerability and exposure to hazards over time – are essential inputs to disaster risk reduction efforts. Systematic and regularly updated approaches to data collection and communication, including risk and hazard maps, are therefore essential.
- There is a lack of awareness of existing scientific research, partly due to limited funds for collating it and limited mechanisms, beyond peer-reviewed journals and formal publications, for sharing it freely.
- The gaps in scientific knowledge and capacity differ between countries. A country-by-country capability analysis would be a useful way of identifying future priorities and areas for investment. It would also help generate more accurate national and local risk assessments.

Translating and applying research

9. The most significant scientific gap appeared to be in translating and applying existing research. The following observations and recommendations were made:
 - The questions posed by policymakers may not be those that scientists can or want to answer. Risk governance frameworks should include forums that allow these communities to work together to develop questions and answers.
 - Scientists, policymakers and stakeholders from civil society should collaborate in the co-design, co-production, and co-delivery of knowledge.
 - Scientific advice provided to policymakers in the aftermath of disasters should be scrutinised more closely to understand how risks can be reintroduced or escalated.
 - The synthesis of scientific knowledge should take into account practicalities such as the timing of funding cycles (for planning new research) and the implementation timelines of the Sendai Framework and other associated frameworks.
 - Universities could be more effective at providing scientific advice to local authorities and city administrations. More education and training (eg through e-learning and summer schools) for civil servants and scientists at local levels would be helpful and could be integrated into UNISDR’s ‘Making Cities Resilient’ campaign.

- Intermediaries such as publishers, the media and national statistical offices should help translate science into other societal contexts. They should help disseminate research and metrics, as well as shifting the disasters narrative towards lives saved, damage prevented and return on investment.
- Scientists or intermediaries need to more clearly convey the uncertainty (and implications of uncertainty) around scientific findings. They also need to provide more complete cost-benefit analyses that reflect the long-term implications of actions (eg how building a flood defence can encourage more development, which in turn can increase the risk and thus the cost associated with it).
- There should be incentives for scientists to share their research in an accessible and timely manner, demonstrating its impact on policymakers and consumers.
- There is currently a major international drive towards 'open data' and 'open science'. The post-Sendai process should take advantage of this, for instance by engaging with ICSU's Committee on Data for Science and Technology (CODATA).

Organisational arrangements

- UNISDR is in the process of establishing a scientific and technical partnership for the implementation of the Sendai Framework, consisting of major scientific and technical institutes, research centres and networks as well as UN scientific organisations. The scope and functions of STAG are also being enhanced, as well as its representation of disciplines, regions and gender. The terms of reference for the partnership and STAG are being finalised.
- UNISDR is working with relevant UN agencies to develop a joint UN proposal on disaster risk reduction indicators for the Sustainable Development Goals.
- UNISDR/STAG should work closely with UN-HABITAT which is responsible for monitoring Sustainable Development Goal 11 (make cities and human settlements inclusive, safe, resilient and sustainable).
- STAG is already reviewing the terminology in the Sendai Framework to ensure that terms such as 'affected people' and 'man-made hazards' are commonly understood. In order to monitor and evaluate progress against the Sendai Framework, UNISDR/STAG could work with CODATA to develop a strategy for collecting, storing and analysing data, and produce a standardised set of disaster risk information. A UNISDR/STAG-convened working group could also oversee a formal

review process of disaster risk reduction undertaken by member states every 3 – 5 years. An annual informal peer review process, supported by nominated 'champion' states, should also take place.

- International 'networks of networks' could be created through the convening power of existing organisations (eg ICSU/ISSC/IRDR, IAP/TWAS, IPCC/SREX).
- Other international organisations (eg WMO, WHO, World Bank, FAO, EU, AU) could serve as useful models for incorporating disaster risk reduction science into their respective programmes and into the sustainable development agenda.
- Good practice should be collected and shared through existing bodies and platforms, such as UNISDR regional offices and PreventionWeb.
- A professional body/bodies could be created to convene the disaster risk reduction science community and ensure it is represented and supported across all sectors.

Developing the 'road map' for science and technology in the implementation of the Sendai Framework

10. The February 2016 meeting in Geneva will be an important opportunity to re-engage the science and technology community in the implementation of the Sendai Framework. The meeting aims to discuss and agree the road map and develop an implementation plan. Suggestions regarding preparations for the Geneva meeting, representation, format and follow-up are summarised below.

Preparation

11. The central questions for the Geneva meeting are listed below.
 - What capacity do individual countries have to anticipate, prepare for, mitigate and respond to disasters?
 - How has our understanding of disaster risk reduction improved in recent years, and what are the major remaining needs?
 - Which recent advances and novel approaches in science and technology might respond to those needs?

12. Two important mapping studies should be undertaken in preparation for the meeting:
 - the capacity of individual countries to anticipate, prepare for, mitigate and respond to disasters, and to act on scientific advice; and
 - disaster risk reduction needs against actual and potential scientific and technological responses to those needs.
13. An international network of Chief Scientific Advisors to national governments has recently been created by ICSU. This group has the potential to be an excellent interface between national needs and the coordination of international responses. Its advice should be sought in preparation for the Geneva meeting.
14. High-level bodies that represent the international science community, such as ICSU and IAP (the global network of science academies) should be content with and committed to preparations for the Geneva meeting.
15. National governments should be briefed once the draft meeting programme is ready in order to encourage their participation and preparation of commitments.

Representation

16. The wider science and technology community should be represented at the meeting. Policymakers and practitioners in all geographical regions and at global, regional, national and local levels should also be represented. In particular:
 - Relevant representatives of all the major science and technology partnerships should be invited to attend the meeting, present their experience and indicate their contributions towards implementing the Sendai Framework.
 - National government representatives, who would outline national capability and needs, could be nominated through national members of ICSU.
 - Low and middle income countries should be represented and funding should be provided to enable their attendance.

Format

17. In order to foster a productive discussion, the following should be considered:
 - The topics and panelists for the main sessions should be developed by the focal points and the organising teams so that they have a coherent structure and narrative.
 - A high-level segment of the meeting should be organised for government representatives to express their needs, discuss their disaster risk reduction national plans and announce commitments and initiatives.

Implementation

18. Following the Geneva meeting, a planning committee should develop detailed plans for implementing the science and technology road map.

For all enquiries please contact

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Appendix I: Attendees

Name	Organisation
Sophie Abraham	Willis Research Network
Amina Aitsi-Selmi	Public Health England
Delilah Al-Khudhairi	Joint Research Centre of the European Commission; INFORM network
Steve Barnes	UK Cabinet Office
Kevin Blanchard	Public Health England
Geoffrey Boulton	University of Edinburgh
Dave Britton	UK Met Office
Julie Calkins	UKCDS
Elizabeth Carabine	Overseas Development Institute
Phil Child	Royal Society
Matt Dixon	Wellcome Trust
Rowan Douglas	Willis Research Network
Wadid Erian	League of Arab States; Cairo University
Belinda Gordon	The Royal Society
Julia Hall	RMS
Fadi Hamdan	DRMC
David Heymann	Chatham House
Ailsa Holloway	Stellenbosch University; PeriPeri U
Rüdiger Klein	IRDR
Toshio Koike	University of Tokyo
Alexandros Makarigakis	UNESCO
Tom Mitchell	Overseas Development Institute; CDKN
Junko Mochizuki	IIASA
Robert Muir-Wood	RMS
Yacob Mulugetta	University College London
Derek Murphy	The Royal Society
Virginia Murray	Public Health England
Chloe Onoufriou	NERC
Mark Pelling	Kings College London; IRDR
John Rees	RCUK
Susanne Sargeant	BGS
David Satterthwaite	International Institute for Environment and Development
Antonio Sgamellotti	IAP
Swenja Surminski	London School of Economics
Peeranan Towashiraporn	ADPC
Sally Tyldesley	The Royal Society
Margareta Wahlström	UNISDR
Chadia Wannous	UNISDR
Jack Wardle	GO-Science
Jenny Wilson	UKCDS
Emma Woods	The Royal Society

Appendix II: Agenda

Science and the Sendai Framework

Meeting on 24 – 25 June 2015 at the Royal Society

Approximately 45 participants

Co-chaired by Margareta Wahlström and
Professor Geoffrey Boulton

Wednesday 24 June

Wolfson Suite (first floor), 9.30am – 5pm

9am Onwards – Registration – refreshments available

9.30am Welcome from Tony McBride (Director, Science Policy Centre, The Royal Society)

9.35am Introductory remarks from Geoffrey Boulton FRS

9.40am Introductory remarks from Margareta Wahlström, including aims for the meeting:

- Initiate detailed discussions about the Sendai Framework and how it can be implemented;
- Focus on the scientific elements of the Sendai Framework – interpret their meaning, discuss the function that they will play in practice, and discuss what (new) science and institutional arrangements will be needed to facilitate their implementation; and
- Suggest next steps and ways of ensuring that these are co-ordinated globally.

9.50am Short presentations and plenary discussion – setting the scene

Mark Pelling, Kings College London (5 mins)

Statement on behalf of ICSU

Tom Mitchell, ODI (10 mins)

Considerations beyond the Sendai Framework, including the role of science in the Sustainable Development Goals and climate change agenda

Rudiger Klein, IRDR (10 mins)

Science after Sendai: early signals from scientific communities

David Heymann, Chatham House (10 mins)

The seven Sendai Framework targets and their implications for science

Chaired discussion among participants (20 mins)

10.45am Break for tea and coffee (15 mins)

John Rees, RCUK (5 mins)

Update on discussions about implementation since Sendai

Junko Mochizuki, IIASA (10 mins)

Update on the development of joint DRR/sustainable development indicators

Virginia Murray, STAG (5 mins)

Update on plans to revitalise STAG

Delilah Al-Khudhairy, STAG (10 mins)

Update on STAG's review of terminology

Chaired discussion among participants (20 mins)

11.50am Short presentation and plenary discussion – background paper**Julie Calkins, UKCDS (15 mins)**

Introduction to the background paper and the 4 (+2) scientific functions (which form the basis of the breakout exercises in the afternoon):

- Assessment of current state of scientific knowledge on disaster risks and resilience (what is known, what is not known, what are the uncertainties, etc.)
- Synthesis of scientific evidence in a timely and accessible manner
- Scientific advice to decision-makers through close collaboration and dialogue to identify needs from policy-and decision-makers, including at national and local levels, and review policy options based on scientific evidence
- Monitoring and review, ensuring that scientific data and information can support and be used in monitoring progress towards DRR and resilience building.

Cross-cutting issues

- Communication and engagement of policy-makers and stakeholders in science to ensure needs are identified and met, and conversely, a stronger involvement of scientists in policy processes to provide scientific evidence and advice.
- Capacity building to ensure that all countries can have access and ability to effectively use scientific information.

Chaired discussion among participants (20 mins)

Explanation of the breakout exercises (5 mins)

12.30pm Lunch**1.30pm Breakout groups – scientific functions**

Breakout groups to discuss the practicalities of implementing the Sendai Framework (35 mins):

- What are the existing gaps in (the use of) scientific knowledge and/or scientific capacity?
 - What are the specific requirements at local, national and international levels?
 - What types of scientific knowledge (disciplines, scales, methodologies) and functions will be required over the next 15 years?
 - How will communication, engagement and capacity building support the delivery of this scientific function?
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2.05pm Plenary discussion – feedback from breakout groups

Feedback from breakout groups (four 5 – minute presentations)

Chaired discussion among participants (30 mins)

2.55pm Break for tea, coffee and biscuits**3.10pm Breakout groups – institutional arrangements**

Ailsa Holloway, Stellenbosch University (10 mins) Higher education, training and networks to connect DRR scientists for implementation

Breakout groups to discuss the practicalities of implementing the Sendai Framework (35 mins):

- What institutional arrangements are in place to deliver this scientific function at local, national and international levels, and what will be needed over the next 15 years?
- How will communication, engagement and capacity building support the delivery of this scientific function?

3.55pm Plenary discussion – feedback from breakout groups

Feedback from breakout groups (four 5-minute presentations)

Chaired discussion among participants (25 mins)

4.40pm Wrap up from Co-Chairs

Emerging themes from day one

Outline of activities for day two

5pm Close

Thursday 25 Jun

Conference Room (first floor), 9am – 12noon

8.45am Onwards – tea, coffee and pastries

9am Welcome from Geoffrey Boulton

9.05am Breakout groups – PowerPoint slides

Breakout groups to further develop ideas from day one and to produce two PowerPoint slides outlining:

- Areas of science that need greater attention/investment in order to deliver the commitments in the Sendai Framework; and
- Key organisations/networks that will drive implementation.

9.35am PowerPoint presentations and plenary discussion

PowerPoint presentations (four 5 – minute presentations)

Chaired discussion among participants (50 mins)

10.45am Break for tea and coffee

11am Plenary discussion and wrap-up from Geoffrey Boulton and Chadia Wannous

Summary of the meeting

Key areas of consensus/disagreement

Next steps

What other implementation activities are planned and how could this meeting feed into them?

12noon Close