Science for the Sendai Framework for Disaster Risk Reduction

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Outline

• the Sendai Framework for Disaster Risk Reduction 2015-2030

• Science needs and indicators identified

• 2011 earthquake, tsunami and Fukushima, Japan

• UK science to policy

• Concluding comments
DISASTER IMPACTS / 2000-2012

$1.7 Trillion Damage (USD)
2.9 Billion Affected
1.2 Million Killed

Disasters refer to drought, earthquake (seismological activity), epidemic, extreme temperature, flood, viral infection, mass movement (dry & wet), storm, volcano, and wildfire.

Data source: EM-DAT: The OFDA/CRED International Disaster Database, Data version: 12 March 2013 - v12.07
Find out more about UNISDR, http://www.unisdr.org

Challenges for Disaster Risk Reduction:
- Climate Change and Extreme Weather
- Urbanization and Displacement of Rural Population
- Water and Sanitation Infrastructure Vulnerability
- Humanitarian Assistance and Recovery

Earthquakes caused the most economic damage - this was also the year of the Sichuan earthquake in China.
Earthquakes killed the most people - this was also the year of the Haiti earthquake.
Storms killed the most people - this was also the year of Cyclone NARGIS.
Number of Climate-related Disasters Around the World (1980-2011)

- 3455 Floods
- 2689 Storms
- 470 Droughts
- 395 Extreme Temps

UNISDR
The United Nations Office for Disaster Risk Reduction
http://www.unisdr.org
Version: 13 June 2012

DATA SOURCES:
Organizing Partners

Major Groups

The concept of the nine Major Groups comes from Agenda 21. As will be remembered, the UN Conference on Environment and Development in Rio in 1992 agreed to understand civil society in the context of sustainable development negotiations at the UN as the nine Major Groups. Having made the decision to designate civil society into nine Major Groups, the outline and rationale was explained in detail in Chapter 23 of Agenda 21. The Major Groups as defined by Agenda 21 are:
Voluntary Commitments of the Major Group on Science and Technology

- **Assessment** of current data and scientific knowledge
- **Synthesis** of research to make it accessible to policy makers
- **Scientific advisory** to decision makers on policy and research gaps
- **Monitoring & Review** to ensure progress towards DRR goals and up to date information
- **Communication and engagement** involving policy-makers, multiple sectors and research disciplines
- **Capacity development** to ensure all countries can produce and/or have access to scientific knowledge
Why 2015 mattered so much

- 1989: International Decade for Natural Disaster Reduction (IDNDR)
- 1994: Yokohama Strategy and Plan of Action
- 1999: ISDR (International Strategy for Disaster Reduction)
- 2015: Sendai Framework for Disaster Risk Reduction
- 2015: Paris Agreement
- 2015: SDG's
Day 1 - Third UN World Conference on Disaster Risk Reduction
UNISDR Photo Gallery
Sendai, Japan 14 March 2015 Special Event: UN Secretary General Ban Ki-moon leads discussion on... See more
Sendai Framework for Disaster Risk Reduction 2015 - 2030
Sendai Framework for Disaster Risk Reduction 2015-2030

1 Global Outcome
13 Guiding Principles
4 Priorities for Action at all levels
7 Global Targets

Reduce
- Mortality/global population
  2020-2030 Average <= 2005-2015 Average
- Affected people/global population
  2020-2030 Average <= 2005-2015 Average
- Economic loss/global GDP
  2030 Ratio <= 2015 Ratio
- Damage to critical infrastructure & disruption of basic services
  2030 Values <= 2015 Values

Increase
- Countries with national & local DRR strategies
  2020 Value > 2015 Value
- International cooperation to developing countries
  2030 Values > 2015 Values
- Availability and access to multi-hazard early warning systems & disaster risk information and assessments
  2030 Values > 2015 Values
Outcome

The 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
Sendai Framework for Disaster Risk Reduction 2015-2030

Four priorities for action

1. Understanding disaster risk;
2. Strengthening disaster risk governance to manage disaster risk;
3. Investing in disaster risk reduction for resilience;
4. Enhancing disaster preparedness for effective response, and to “Build Back Better” in recovery, rehabilitation and reconstruction.

i) at National and Local Levels
ii) at Global and Regional levels
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;
Primary Categories of Macro-Threats

1 Financial Shock
2 Trade Dispute
3 Geopolitical Conflict
4 Political Violence
5 Natural Catastrophe
6 Climatic Catastrophe
7 Environmental Catastrophe
8 Technological Catastrophe
9 Disease Outbreak
10 Humanitarian Crisis
11 Externality
12 Other Shock

http://cambridgeriskframework.com/downloads
IV. Priorities for action

20. Taking into account the experience gained through the implementation of the Global Framework for Action, and in pursuit of the outcome at the recent action within and across sectors by States at local, national, and international levels, the following four priority areas:

Priority 1: Understanding disaster risk

Priority 2: Strengthening disaster risk reduction governance

Priority 3: Investing in disaster risk reduction for resilience

Priority 4: Enhancing disaster preparedness for effective response in recovery, rehabilitation and reconstruction

21. In their approach to disaster risk reduction, States, regional and local governments and other relevant stakeholders should take into consideration the following four priorities and should implement them, as appropriate:

22. In the context of increasing global interdependence, concerted international efforts aimed at improving understanding and enhancing science-based policy and practice contributions are critical to developing the knowledge, capacities and motivations for all levels, in particular for developing countries.

Priority 1: Understanding disaster risk

Priority 2: Strengthening disaster risk reduction governance

Priority 3: Investing in disaster risk reduction for resilience

Priority 4: Enhancing disaster preparedness for effective response in recovery, rehabilitation and reconstruction

23. Policies and practices for disaster risk management should be based on an understanding of vulnerability, exposure and hazard characteristics and the environment. Such knowledge can be used to define the local disaster risk, for prevention and mitigation and implementation of appropriate preparedness and effective response.

National and local levels

24. To achieve this, it is important:

(a) To promote the collection, analysis, management and use of information and ensure its dissemination, taking into account the needs of users, as appropriate.

(b) To encourage the use of and strengthening of baselines and indicators, vulnerability, capacity, exposure, hazard characteristics and their interactions at the relevant social and spatial scale on ecosystems, and in the context of event-specific hazard information.

(c) To develop, periodically update and disseminate, as appropriate, information, including risk maps, to decision makers, the general public and to disaster risk reduction policies.

(d) To systematically evaluate, record, share and make public understand the economic, social, health, education, environment, and all other impacts, as appropriate, within the context of event-specific hazard information.

(e) To make non-sensitive hazard-exposure, vulnerability, risk, and impact information freely available and accessible, as appropriate.

(f) To promote real-time access to risk data, make use of spatially explicit information systems (SIS), and use information technology innovations to enhance measurement tools, data collection and dissemination of data.

(g) To build the knowledge of government officials at all levels, communities, other relevant stakeholders and policymakers, on policy interface for effective decision-making in disaster risk reduction.

(h) To ensure the use of traditional, indigenous and local knowledge, and to develop and apply methodologies and models to enhance understanding and exposure to all hazards.

(i) To promote investments in innovation and technology developed in response to disaster risk management, and to contribute to developing, capacities and motivations for all levels, in particular for developing countries.

(j) To promote the incorporation of disaster risk knowledge in training, preparedness, response, recovery and rehabilitation education, as well as in civic education at all levels, as well as in training.

(k) To promote national strategies to strengthen public education and communication, disaster risk information and knowledge, social media and community mobilization, taking into account needs.

(l) To promote the incorporation of disaster risk knowledge into education, as well as in civic education at all levels, as well as in training.

(m) To promote national strategies to strengthen public education and communication, disaster risk information and knowledge, social media and community mobilization, taking into account needs.

(n) To apply risk information in all its dimensions of vulnerability, exposure, and impacts, as appropriate, and in the context of event-specific hazard information.

(o) To enhance collaboration among people at the local level and at various levels, in the context of community-based governmental organizations.

Global and regional levels

25. To achieve this, it is important:

(a) 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.

(b) To promote comprehensive surveys on multi-hazard disaster losses and risks and the development of regional disaster risk assessments and maps, including climate change scenarios.

(c) To promote and enhance, through international cooperation, including technology transfer, access to and the sharing and use of non-sensitive data and information, as appropriate, communications and geospatial and space-based technologies and related services, maintain and strengthen in situ and remotely sensed earth and climate observations, and strengthen the utilization of media, including social media, traditional media, big data and mobile phone networks, to support national measures for successful disaster risk communication, as appropriate, and in accordance with national laws.

(d) To promote common efforts in partnership with the scientific and technical community, academia and the private sector to establish, disseminate and share good practices internationally.

(e) To support the development of local, national, regional and global user-friendly systems and services for the exchange of information on good practices, cost-effective and easy-to-use disaster risk reduction technologies and lessons learned on policies, plans and measures for disaster risk reduction.

(f) To develop effective global and regional campaigns as instruments for public awareness and education, building on existing ones (for example, the “One million safe schools and hospitals” initiative, the “Making Cities Resilient: My city is getting ready” campaign, the United Nations’ Sustainable Development Goals and the Sendai Framework for Action), to promote a culture of disaster prevention, resilience and responsible citizenship, generate understanding of disaster risk, support mutual learning and share experiences, and encourage public and private stakeholders to actively engage in such initiatives and to develop new ones at the local, national, regional and global levels.

(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 and scientific and technical advisory groups, in order to strengthen the evidence base for the implementation of the framework, promote scientific research on disaster risk patterns, cause and effects, and disseminate risk information with the 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 official publication entitled “2019 UNISDR Terminology on Disaster Risk Reduction”, and post-disaster reviews as opportunities to enhance learning and public policy, and disseminate studies.

(h) To encourage the availability of copyrighted and patented materials, including through negotiated concessions, as appropriate.

(i) To encourage 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.
25 (g) 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:
Priority 1 Understanding Disaster Risk

• 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;
• promote and support the availability and application of science and technology to decision-making;
• use post-disaster reviews as opportunities to enhance learning and public policy; and
• disseminate studies
DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INDUSTRY
COMMITTEE FOR SCIENTIFIC AND TECHNOLOGICAL POLICY

Working Party of National Experts on Science and Technology Indicators

Natural Sciences          Agricultural sciences
Engineering and Technology Social sciences
Medical and health care sciences Humanities
UNISDR SCIENCE AND TECHNOLOGY CONFERENCE

Mobilising science to implement the Sendai Framework

27-29 JANUARY 2016 | GENEVA, SWITZERLAND
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.
Key statements in the Roadmap

• Synthesize, produce and disseminate scientific evidence in a timely and accessible manner that responds to the knowledge needs of policy-makers and practitioners.

• Develop partnerships between science and technology community and the disaster risk management institutes and agencies.
Reflections on a Science and Technology Agenda for 21st Century Disaster Risk Reduction


Amina Aitsi-Selmi¹ · Virginia Murray¹,² · Chadia Wannous³ · Chloe Dickinson¹ · David Johnston⁴ · Akiyuki Kawasaki⁵ · Anne-Sophie Stevance⁶ · Tiffany Yeung⁷

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Abstract The first international conference for the post-2015 United Nations landmark agreements (Sendai Framework for Disaster Risk Reduction 2015–2030, Sustainable Development Goals, and Paris Agreement on Climate Change) was held in January 2016 to discuss the role of science and technology in implementing the Sendai Framework for Disaster Risk Reduction 2015–2030. The risk reduction (DRR) science and technology. This article describes the evolution of the role of science and technology in the policy process building up to the Sendai Framework adoption that resulted in an unprecedented emphasis on science in the text agreed on by 187 United Nations member states in March 2015 and endorsed by the United Nations General Assembly in June 2015. Contrib...
Way forward

- Need for formal “national DRR science-policy councils/platforms” or a form of national focal points for science to support disaster risk reduction and management plans identified. Focal points could include platforms or chief scientific advisors function.
“Access to information is critical to successful disaster risk management. You cannot manage what you cannot measure.”

Margareta Wahlström, Former Special Representative of the Secretary-General for Disaster Risk Reduction and Chief of UNISDR (UNISDR, 2012).
UN backs accountability on disaster losses

Ambassador Cristián Barros Melet of Chile introduces the resolution at the United Nations General Assembly (Photo: UNISDR)

Sendai Framework for Disaster Risk Reduction 2015-2030

**Reduce**
- Mortality
  - Global population 2020-2030 Average << 2005-2015 Average
- Affected people
  - Global population 2020-2030 Average << 2005-2015 Average
- Economic loss
  - Global GDP 2030 Ratio << 2015 Ratio
- Damage to critical infrastructure & disruption of basic services 2030 Values << 2015 Values

**Increase**
- Countries with national & local DRR strategies 2020 Value >> 2015 Value
- International cooperation to developing countries 2030 Value >> 2015 Value
- Availability and access to multi-hazard early warning systems & disaster risk information and assessments 2030 Values >> 2015 Values
Global target A: Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020-2030 compared with 2005-2015.

<table>
<thead>
<tr>
<th>A-1 (compound)</th>
<th>Number of deaths and missing persons attributed to disasters, per 100,000 population.</th>
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<tr>
<td>A-2</td>
<td>Number of deaths attributed to disasters, per 100,000 population.</td>
</tr>
<tr>
<td>A-3</td>
<td>Number of missing persons attributed to disasters, per 100,000 population.</td>
</tr>
</tbody>
</table>

The scope of disaster in this and subsequent targets is defined in paragraph 15 of the Sendai Framework for Disaster Risk Reduction 2015-2030 and applies to 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 risk.
Public Health England

About  Process  Programme  Key documents  Practical info  News

22-26 MAY, 2017  |  CANCUN, MEXICO
2017 GLOBAL PLATFORM FOR DISASTER RISK REDUCTION
FROM COMMITMENT TO ACTION

HOW TO SURVIVE FROM EXTREME WEATHER

The Colombia region was hit last October’s Hurricane Eta, which highlight the need...
UN risk reduction forum in Cancun closes with call to harness data

29 May 2017 – We can't change nature, but we can be prepared if we have the right data.
Further progress is necessary to bridge the gap between science and technology and policy-making to ensure that the strategies required by 2020 are sound, including that they anticipate emerging risk patterns.
The 2011 triple disaster in Fukushima, Japan

1. Earthquake
   Magnitude 9.0

2. Tsunamis
   Height >15m
   Rose up to 41m
   Death toll >20,000

3. Nuclear accident
The Great East Japan Earthquake Disaster: Distribution of Hospital Damage in Miyagi Prefecture

Sae Ochi, MD, MPH, PhD;1,2 Atsuhiro Nakagawa, MD, PhD;3 James Lewis, MArch;4 Susan Hodgson, PhD;1 Virginia Murray, FFPH, FRCP, FFOM, FRCPPath1,5

Abstract

Introduction: In catastrophic events, a key to reducing health risks is to maintain functioning of local health facilities. However, little research has been conducted on what types and levels of care are the most likely to be affected by catastrophic events.

Problem: The Great East Japan Earthquake Disaster (GEJED) was one of a few “megadisasters” that have occurred in an industrialized society. This research aimed to develop an analytical framework for the holistic understanding of hospital damage due to the disaster.

Methods: Hospital damage data in Miyagi Prefecture at the time of the GEJED were collected retrospectively. Due to the low response rate of questionnaire-based surveillance (7.7%), publications of the national and local governments, medical associations, other nonprofit organizations, and home web pages of hospitals were used, as well as literature and news sources. The data included information on building damage, electricity and water supply, and functional status after the earthquake. Geographical data for hospitals, coastline, local boundaries, and the inundated areas, as well as population size and seismic intensity were collected from public databases. Logistic regression was conducted to identify the risk factors for hospitals ceasing inpatient and outpatient services. The impact was displayed on maps to show the geographical distribution of damage.

Results: Data for 143 out of 147 hospitals in Miyagi Prefecture (97%) were obtained. Building damage was significantly associated with closure of both inpatient and outpatient services. The geographical distribution of damage showed a higher likelihood in areas with high inundation and low economic development.
Seismic intensity, inundated area, and hospitals
Recommendations

• Public health research after disasters frequently lacks baseline data
• To support the most vulnerable, real time health impact data is needed.
• Sharing information systems can improve cooperation between response teams
Health Professionals

- Education
  - Individualised emergency plan
  - Medication lists & stockpile

Patients
- Bring medication

Policy makers
- Community emergency plan
- Insurance system

Researchers
- Evidence
Case 1: Abandonment in the evacuation zone

Over 80,000 people in Fukushima prefecture were forced to evacuate their homes following the nuclear accident.

- <20km: Mandatory evacuation zone (no-entry zone)
- 20-30km: Voluntary evacuation zone (Indoor evacuation)
Case 2: Impact of evacuation on nursing homes

Estimated pre and post-earthquake survival.

Case 3: Collapse of the healthcare system

The majority of hospital staff are women, who are more likely to evacuate
Concern for their children’s health and/or education
Unemployment of husbands
Licensed nurses could easily find jobs outside of Fukushima

Number of hospital staff in a disaster area of Fukushima

- Doctor
- Nurse
- Clerk
- OCS
- Total

Ochi S, et al. PLOS ONE 11(10): e0164952
Public health after a nuclear disaster: beyond radiation risks

Claire Leppold, Tetsuya Tanimoto & Masaharu Tsubokura

In the five years since Japan’s triple disaster there has been a growth in media coverage and public interest in disaster recovery. An earthquake in March 2011 triggered a tsunami that hit the Fukushima Daiichi nuclear power plant, leading to loss of the plant’s core cooling capacities, followed by hydrogen explosions and subsequent radiation leakage. The nuclear accident is often discussed, both within Japan and abroad, from a perspective of radiation leakage – as would be expected in the aftermath of such an accident. Yet this has led to confusion about the importance of radiation risks, due to conflicting reports and a lack of awareness of ongoing problems that are unrelated to radiation. These misunderstandings deserve attention. This paper provides a brief review on post-disaster health in Fukushima prefecutre – many members of the public, and even health professionals, continue to be confused by inconsistent results. This is unfortunate, in more ways than one. Controversy over radiation risk not only increases the difficulty in creating an appropriate public health response, but also diverts attention away from other post-disaster health problems that are unrelated to radiation, resulting in issues that are neglected in disaster awareness and response.

Over 80,000 people in Fukushima prefecture were forced to evacuate their homes following the nuclear accident. The event brought many changes to the affected region, including widespread social disruption through the breakdown of communities (due to the evacuation and the separation of families) and social stigma attached to being from among children and adults, it appears that the increasing burden of noncommunicable diseases and mental health problems may outweigh the burden of disease caused directly by radiation.

The multifaceted nature of the impact of nuclear disasters is exemplified in the issues faced by elderly residents of Fukushima. A study of 1215 elderly residents of care facilities followed up until 2013 found that those evacuated at the time of the disaster had a 3.37 times higher risk of mortality (95% confidence interval: 1.66–6.81) compared with those not evacuated; this suggests that the evacuation may have been more dangerous than the disaster itself for this population. This unexpected result illustrates the complexity of estimating disaster risks for elderly people, a challenge that has continued.
No deaths or acute health effects related to radiation exposure were reported in the general public immediately after the disaster.

Confusion of public health research findings and related messages to understand impacts adds complications - in October 2015, the results of two studies concerning the children of Fukushima were reported within two days of each other:

- one found no detectable internal radiation contamination
- while the other found an increased risk of thyroid cancer.

A comprehensive perspective on Fukushima is needed, to continue the process of local disaster recovery and to improve preparation for any future nuclear disasters.
'Fukushima nuclear plant' radiation found at UK sites

Low levels of radioactive iodine believed to be from the Fukushima nuclear plant in Japan have been detected in Glasgow and Oxfordshire.

Health protection officials said the concentration of iodine 131 detected in air samples was "minuscule" and there was "no public health risk in the UK".

The Fukushima plant was crippled after being hit by an earthquake and tsunami.
Integrated Emergency Management in the UK

Science and technical advice built into every step
SAGE provides rapid scientific advice to UK Government in crises

COBR: Cross Government Coordination

Scientific Advisory Group for Emergencies (SAGE)

- Government Scientists
- Industry
- Scientific Advisory Committees
- Academia
- Non-Governmental Organisations
When has SAGE responded?

2009: Pandemic Flu
2010: Volcanic Ash
2011: Fukushima
2013: UK Flooding
2014: Ebola Outbreak
2015: Nepal Earthquake

https://www.gov.uk/government/groups/scientific-advisory-group-for-emergencies-sage
The primary motivation for the UK Alliance for Disaster Research (UKADR) is to bring together the UK's rich and diverse disaster research community. This will facilitate collaboration and partnership to aid representation of the research community at government level in the UK, and, where appropriate, help with the implementation of the Sendai Framework for Disaster Risk Reduction.

The Alliance is independent and managed by voluntary contributions from the UK research community.

Membership is open to staff and PhD students of any research-and-capacity-building institute based in the UK that is active in researching disaster risk and its management. This includes universities and other educational institutions, charitable trusts, think tanks, non-governmental organisations, etc.
Science for the Sendai Framework for Disaster Risk Reduction

• The Sendai Framework provides a scientific method to enhance capabilities to plan and prepare for, respond to, and recover from disasters and other emergencies.

• Offers an opportunity to engage scientifically at a global level with stakeholders on science guidance and policy issues that could impact national and local preparedness.
Acknowledgement

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