The Sendai Framework: A catalyst for the transformation of disaster risk reduction through adaptive governance?

The approval of the Sendai Framework for Disaster Risk Reduction 2015–2030 was a milestone for efforts to build resilience to natural and human-caused hazards around the world. In an unusual coincidence, world leaders adopted three critical global agreements in a single year: the Sendai Framework, the 2030 Agenda for Sustainable Development, and the Paris Agreement on climate change. Addressing these issues at once highlighted the close interconnections among them.

The Sendai Framework aims to achieve "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".[1] Far more than its predecessor, the Hyogo Framework for Action 2005–2015, the Sendai Framework highlights the importance of broad-based collaboration to realize this goal: among governments, with the private sector and other stakeholders, reaching well beyond the traditional disaster risk reduction (DRR) community.

Putting this vision into practice will require robust and innovative approaches. This discussion brief examines how one promising approach, adaptive governance, already informs the Sendai Framework, and the potential benefits of developing it further.

The concept of adaptive governance emerged from environmental management and resilience research as a way to achieve flexible, multi-level, inclusive governance systems that can deal effectively with complex social-ecological systems, in the face of uncertainty and even abrupt change. Key aspects include coordination and linking relevant actors and institutions across scales; collaboration with stakeholders; experimentation and innovation; and deliberate learning and reflection.

We examine the elements of adaptive governance aspects that are built into the Sendai Framework, and how they could serve as a catalyst for transforming DRR. We also outline key opportunities and challenges in taking an adaptive governance approach in the implementation of the Sendai Framework.

The Sendai Framework and post-2015 disaster risk challenges

The Sendai Framework was adopted at the Third World Conference on Disaster Risk Reduction (WCDRR), held in March 2015 in Sendai, Japan. In the same year, the fourth edition of the UN Global Assessment Report on Disaster Risk Reduction (UNISDR 2015) was released. The report showed that disaster risks are increasing, and so are disaster-related losses, which had reached an annual average of US$250–300 billion. Escalating disaster losses pose an "existential threat" in some countries, the report found, especially for Small Island Developing States.

A man in Santo Niño, Cagayan, the Philippines, rebuilds the roof of his house after it was blown away by Typhoon Haima in October 2016.

The report also highlighted the increasingly unequal distribution of risk; a financing gap when there are inadequate resources to shield against large but infrequent disasters; increasing risks due to climate change; and mispricing of risk, and the paradoxical relationship between development and disaster risk: Although development is crucial to reducing vulnerability – by alleviating poverty and providing adequate infrastructure and public services – more often in the world, poorly planned development is exacerbating risk.

Against this background, the Sendai Framework reiterates world leaders' commitment to DRR and resilience-building "with a renewed sense of urgency in the context of sustainable development and poverty eradication and, as appropriate, to be integrated into policies, plans, programmes, and budgets at all levels and considered within relevant frameworks" (para. 2).

Figure 1 synthesizes the vision, central goal and priorities for action of the Sendai Framework. In the sections that follow, we explain why adaptive governance approaches are crucial to achieving those goals and priorities and addressing the multitude of disaster risk challenges.

Adaptive governance for transformative DRR

Adaptive governance offers potential mechanisms through which to fundamentally change DRR, with implications for science, policy and practice. Approaches based on this concept have been applied in natural resources and environmental governance for years, so they have been studied and analysed extensively (Chaffin et al. 2014).

In resilience research, adaptive governance has evolved as an analytical framework for understanding the social, institutional, economic and ecological foundations of adaptive, multi-level governance that are successful in building the resilience of social-ecological systems (Folke et al. 2005).

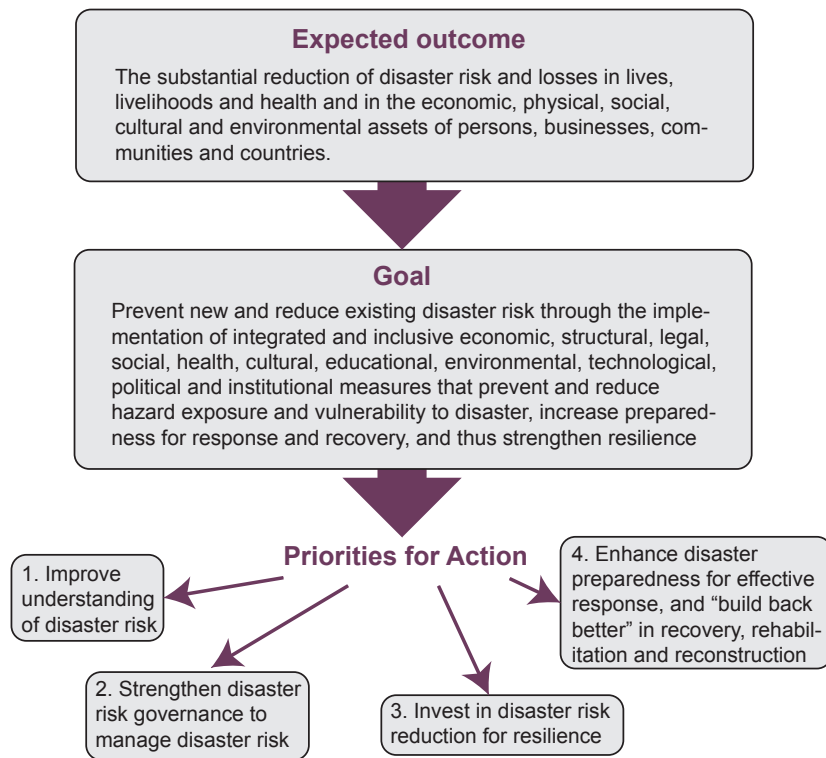1   For an overview and the full text of the Sendai Framework, see http://www.unisdr.org/we/coordinate/sendai-framework.

Expected 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.

Goal

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

Priorities for Action

1. Improve understanding of disaster risk

2. Strengthen disaster risk governance to manage disaster risk

3. Invest in disaster risk reduction for resilience

4. Enhance disaster preparedness for effective response, and "build back better" in recovery, rehabilitation and reconstruction

Figure 1: The Sendai Framework's expected outcome, central goal and priorities for action.

Koontz et al. (2015) have termed it a "leading approach to successfully meet the challenges of changes in social-ecological systems" (p.140). Table 1 presents an overview of how adaptive governance applies to science, policy and decision-making.

A key benefit that adaptive governance brings to DRR is its potential to enable stakeholders to understand and deal with the complexity and uncertainty associated with social-ecological systems and disaster risks. Through open and cooperative decision-making structures, adaptive governance also provides a framework for integrating science and other

Members of the North Carolina Army National Guard help a hospital to evacuate bedridden patients amid flooding due to Hurricane Matthew in October 2016.

forms of knowledge, such as traditional ecological knowledge, into policies and practices to advance disaster resilience.

Because adaptive governance recognizes the interdependence of the social and ecological components of the social-ecological systems in which disasters and their impacts are experienced, it is arguably a good approach for the governance of DRR. The literature on adaptive governance identifies several characteristics that make it particularly suitable for achieving transformative DRR. Four have been found to be particularly important in this regard: polycentric and multi-layered institutions, participation and collaboration, self-organization and networks, and learning and innovation. Figure 2 summarizes an analysis by Djalante et al. (2011) of how these characteristics of adaptive governance interact in efforts to build resilience.

As summarized in Table 2, and discussed in more detail below, those characteristics are also evident in the articulation of the Sendai Framework. This highlights the potential for its implementation using an adaptive governance approach. Indeed, the adoption of the Sendai Framework creates an opportunity to promote the transformation of DRR through adaptive governance.

For instance, the Sendai Framework recognizes that disaster risks and development are closely interrelated. An adaptive governance approach could facilitate a holistic evaluation of multiple hazards, human vulnerabilities and exposure, options to reduce disaster risks, and capacity gaps. A multi-hazard approach has been advocated in several policy frameworks, from the 1992 Agenda 21 for Sustainable Development, to the Sendai Framework, but implementing it has proven to be challenging (see, e.g., Kappes et al. 2012).

Adaptive governance promotes both retrospection and forward-thinking, which together are critical aspects of building disaster resilience (IFRC 2016; Boyd et al. 2015; Conway 2009; Berkes et al. 2003). Lessons from experience are used to improve systems to deal with emerging or anticipated problems. The usefulness of this approach is embodied in early warning and response systems. For example, early warning systems made it possible to evacuate communities in the path of Hurricane Matthew, reducing the risk to human life and health (Charles et al. 2016; Schneider et al. 2016). Experience with past disasters can also help people to better prepare for and respond to disasters.

A key challenge in dealing with disaster risks is that social-ecological systems are inherently complex and uncertain (Liu et al. 2007; Armitage et al. 2009; Frensch and Funke 1995). The adaptive governance approach can help stakeholders engaged in DRR to better understand these complexities, by fostering collaboration and the consideration of multiple perspectives, disciplines, types of knowledge, experiences and possible actions.

Adaptive governance does not favour a specific organizational or administrative structure – centralized or decentralized, top-

Table 1: Key aspects of adaptive governance, as applied in different realms

	Science	Policy	Practice/decision-making
Adaptive governance approach	Relations evolve; the behaviours of living forms depend on the context (contextual).	Multiple goals are to be integrated if possible or traded off if necessary; they depend on judgements in the particular context and are subject to change.	Policy integration proceeds from the bottom up, under fragmented authority and control.
	Multiple methods are necessary, including qualitative, interpretive and integrative.	Problem definition depends on human interests and other contextual considerations, including law and policy.	Participation is always open to almost any person or group with a significant interest in the issue.
	Verifiable explanations of behaviours differ from one particular context to the next.	Local and scientific knowledge are both relevant to solving policy problems	Community-based initiatives can compensate for the limitations of bureaucracies.
	Knowledge of open systems is recognized to be contingent and incomplete; surprises are seen as inevitable.	Modest incremental steps minimize the unintended consequences of policies	Local knowledge, mutual respect and trust are seen as key resources for success.
		Policy process often depends on monitoring and evaluating policies and terminating those that do not work as expected	Successful policies are diffused and adapted elsewhere, at the same and higher levels.
			Politics are unavoidable and actually desirable to the extent that they identify and advance common interests.

down or bottom-up, formal or informal, based on science or on local knowledge and traditions. Instead, it promotes iterative, context-specific problem-solving processes that can respond to new insights and changing conditions (Brunner et al. 2005).

The emphasis on learning and experimentation makes adaptive governance particularly suitable to dealing with (and reducing) *uncertainties* (Berkes 2007). The Sendai Framework recognizes the usefulness of such approaches in dealing with complex disaster risks. For example, it recommends the use of disaster risk modelling to consider different scenarios, which makes it possible to better address the complexity of the systems involved.

Another aspect of the Sendai Framework that is aligned with the principles of adaptive governance is that it calls for an "all-of-society engagement and partnership" (para. 19(d)) from

the local to the global level, among state and non-state actors. This fits well with Koontz et al.'s (2015) description of how adaptive institutions work: they interact horizontally and vertically, through formal and informal networks, and help to foster learning, knowledge-sharing and innovation.

Koontz et al. (2015) also note that adaptive institutions are "participatory, inclusive, integrative, risk tolerant, flexible, legitimate, accountable, diverse, creative, learning, iterative, autonomous, resourceful, self-assessing, collaborative, transparent, reflexive, and integrated with broader processes" (pp.141–2).

Adaptive governance can help draw attention to important cross-cutting issues that might not be always considered in a conventional risk management approach, such as power relations, culture, and social capital. Other cross-cutting issues
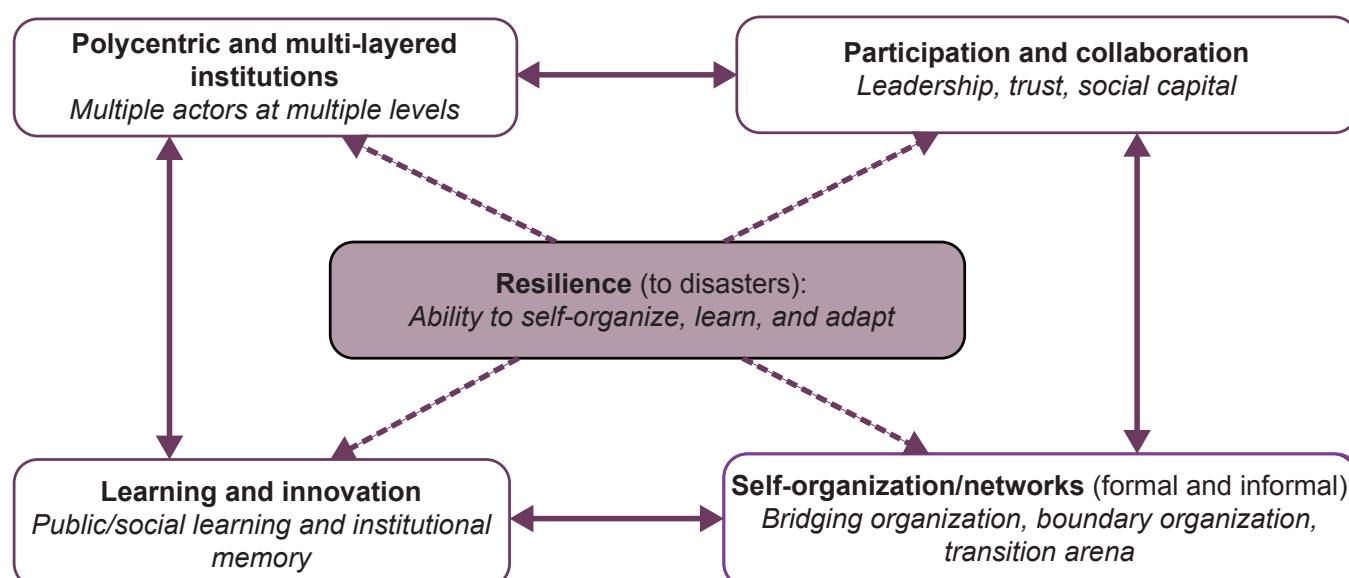

Figure 2: Interconnections between characteristics of adaptive governance with regard to building disaster resilience

Table 2: Adaptive governance language in the Sendai Framework

Section	Key adaptive governance language
Section I: Preamble	Assessment, review, indicators and measurement systems, experience, knowledge and mutual learning, cooperation, coordination, collaboration, "full and meaningful" participation, integration, commitment, institutional awareness, good governance, planning, levels
Section II: Expected outcome and goal	Assessment, integrated and inclusive … measures, all levels, international cooperation, disaster risk information, resilience, institutional…, priorities, compared to, strategies, plans, warning systems, indicators, targets
Section III: Guiding principles	Responsibility; mandate; accountability; all-of-society engagement and partnership; coordination mechanisms; national circumstances and systems of governance; context; coherence; risk-informed decision making; complementarity; "Building Back Better"; effective and meaningful global partnership; technology transfer and capacity building; open exchange and dissemination of …data,
Section IV: Priorities for action	Understanding disaster risk in all its dimensions, experience, levels, disaster risk governance, "build back better", resilience, knowledge leveraging, risk assessment, relevant data and practical information, baselines and periodical assessments, social and spatial scale, in line with national circumstances Collaboration, cooperation, coherence, coordination, risk transfer and sharing mechanisms and instruments, anticipated demographic and environmental changes
Section V: Role of stakeholders	Responsibility, in accordance with national policies, laws and regulations, role, knowledge, goodwill, experience, resources, commitment, synergies.
Section VI: International cooperation and global partnership	International cooperation, partnerships, support, technological innovation, research, skill, knowledge, ideas, know-how, technology transfer, national priorities and needs, specific characteristics, unique and particular vulnerabilities, coordination, mutually agreed, review, follow-up.

that are likely to arise in implementing the Sendai Framework include communication among stakeholders, funding, technological advancement, and technology transfer.

In the sections that follow, we briefly discuss how each of the four key adaptive governance characteristics suggested by Djalante et al. (2011) appear in the Sendai Framework.

Polycentric and multi-layered institutions

The Sendai Framework explicitly acknowledges that effective disaster risk governance involves multiple actors operating at different levels. Consequently, it contemplates multiple centres of power in disaster risk governance, with stakeholders at each level assigned different roles and responsibilities. References to institutional "polycentricism" and "multi-layeredness" are found throughout the framework, but especially under sections V and VI. The Sendai Framework also highlights the importance of institutions being accountable and seen as legitimate.

Volunteers from the Myanmar Red Cross Society meet with members of a community affected by floods in September 2015.

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Participation and collaboration

The Sendai Framework calls on different levels of actors to "coordinate" and "engage" in the governance of risks, each drawing from its competitive advantage, to create synergies, even if overall responsibility for DRR remains with the state. The words "participation" and "collaboration" are used multiple times in the framework, as are related and synonymous terms, such as "engagement", "involvement", "participate", etc.

Self-organization and networks

There is explicit mention in the Sendai Framework of "academic, scientific and research entities and networks and the private sector", whose cooperation is encouraged in the development and promotion of DRR products and services. There is recognition of boundary or bridging organizations at different levels that facilitate inter-level operations. Related terms and concepts that come up in the text include coordination, communication, mechanisms, strategies, plans, procedures, schemes, codes, standards, support, operational guides, and guidance instruments.

Learning and innovation

The Sendai Framework builds on lessons learned through the implementation of the Hyogo Framework for Action and, looking ahead, places a greater emphasis on learning and innovation. Learning is described mainly as "peer learning" or "mutual learning". Innovation in all its forms is a key recommendation of the framework, with particular attention to technological and scientific innovations. Other concepts that arise are research, assessment, (peer) review, monitoring, technology transfer, sharing experiences, communication, capacity-building, training and education.

An important aspect of adaptive governance incorporated in the Sendai Framework is the promotion of holistic, continuous and contextualized learning. As illustrated in Figure 3, we argue that more contextually significant learning and innovation happen in collaborative environments that encourage
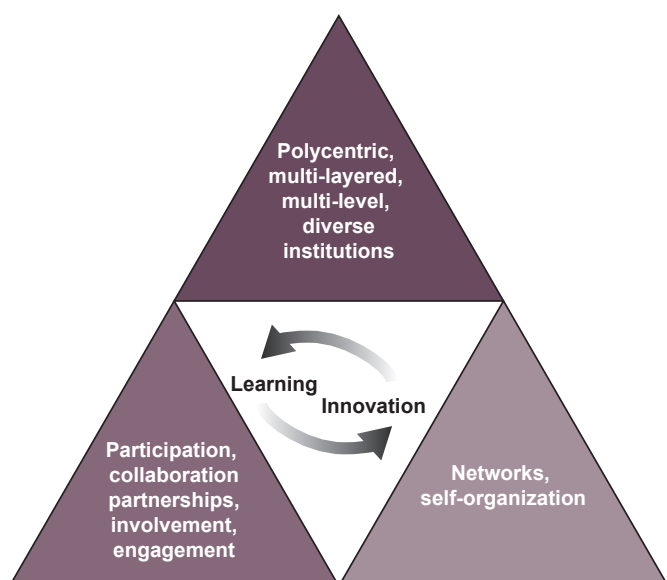
Figure 3: How the characteristics of adaptive governance interact to enable learning and innovation

diversity, participation and self-organization. Participation and collaboration between formal and informal institutions and networks across scales fosters learning and innovation, especially by promoting sharing of useful knowledge, ideas and experiences for reducing disaster risks. Thus, learning and innovation are central motivations for, and desired outcomes of, adaptive governance.

Realizing the full potential of adaptive governance in DRR

The Sendai Framework provides an important "window of opportunity" for transformative change in the way DRR is governed. In particular, it invites governments and the broader DRR community to reflect on lessons learned in the implementation of the Hyogo Framework for Action; rethink DRR policies, plans, tools and approaches; mobilize investments for/in DRR; mainstream DRR in climate change adaptation and sustainable development (including poverty reduction); and facilitate the transformation of development and DRR.

All these key elements can help enhance disaster resilience and foster equitable, sustainable development that directly addresses social vulnerability (e.g. due to poverty, illiteracy, power imbalances). Yet in our view, the potential benefits of adaptive governance in DRR go beyond what is already articulated in the Sendai Framework.

An important consideration is that the Sendai Framework is, first and foremost, a tool to mobilize and prioritize investment in DRR. Recognizing that many investments that are crucial to building resilience and reducing disaster risk occur outside DRR institutions, the Sendai Framework suggests that DRR and resilience should also be considered in other "relevant frameworks" (para. 2). And indeed, the Paris Agreement and the 2030 Agenda both refer to disaster risks and the need to build resilience, as does the New Urban Agenda approved in 2016.[2]

Coordinating across institutions and stakeholder groups in DRR alone is quite a challenge, and making those broader connections, even more so. An adaptive governance approach

2 See https://habitat3.org/the-new-urban-agenda/.

to DRR and development could help. By enhancing collaboration and coordination, it could facilitate resource mobilization and promote the establishment of joint initiatives that simultaneously address development needs and reduce climate and disaster risks. Adaptive governance could help to identify areas of intervention where targeting resources would yield the most resilience value, and also help ensure that development reduces disaster risks instead of exacerbating them.

There is also a unique value in having so many global sustainability policy agendas take shape and be implemented at once. As governments apply these agendas within their own countries, they have an unprecedented opportunity to better align DRR, climate policy and development (overall and within cities in particular). Improved policy coherence could go a long way towards transforming DRR.

More coherent polices can support transformative change in DRR by a) improving rule compliance, leadership and deliberation; b) facilitating effective resource mobilization and utilization; c) reducing multiplication of efforts and unnecessary redundancies; and d) enabling streamlined monitoring, evaluation, learning and reporting.

The Sendai Framework emphasizes context-specificity and flexibility, and avoids rigid prescription of DRR policy and practice. This means it is inherently adaptable, allowing for creativity, experimentation and novelty in the design and implementation of DRR policies and practices tailored to each context. It also allows room for stakeholders to shape these policies and practices. This could enable the creative development and application of DRR measures that may be unorthodox or not mainstream, but are effective in specific contexts.

Furthermore, the Sendai Framework takes a holistic perspective. The first Priority for Action, for instance, calls for understanding disaster risks in all "dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment" (para. 23). Achieving an in-depth understanding of disaster risks within their unique contexts is in itself an unarticulated catalyst for adaptive governance, especially because it produces new knowledge that could potentially advance DRR efforts. Continuous learning, in turn, brings about the "adaptive" aspect of adaptive governance that leads to innovative, context-appropriate approaches (Folke et al. 2005).

Women on a community emergency response team in Afghanistan practice first aid techniques during a disaster response drill.

© Luke Bastian, Aga Khan Foundation, via USAID / Flickr

The Sendai Framework encourages research, access, support and "investments in innovation and technology development" for disaster risk management (para. 24). It emphasizes the use of innovations in information and communication technologies (ICTs) to "enhance measurement tools and the collection, analysis and dissemination of data", and it underscores the importance of research and science to inform DRR policy and practice. This creates room for continuous improvement and learning beyond what is already common practice.

The "build back better" concept embraced by the Sendai Framework is a good example of learning at work. It treats post-disaster recovery and rebuilding as an opportunity to learn from experience (including past mistakes) and incorporate a range of innovations, adapted for the local context. These include new technologies, insurance, innovative coordination mechanisms, early warning and early response systems, and new policy and decision support systems, among others.

The Sendai Framework derives its strength from partnerships, cooperation, and collaboration among a wide range of actors across different levels. The first guiding principle recommends prevention and reduction of disaster risks through "international, regional, subregional, transboundary and bilateral cooperation" (para. 19(a)). A key goal of such cooperation is to support countries with limited capacity to address serious risks, such as the developing African countries and Small Island Developing States.

The Sendai Framework's multi-stakeholder, multi-level approach to DRR is also meant to help ensure that countries with high levels of vulnerability and/or low capacity get the assistance they need, and can seize opportunities and explore new avenues to reduce disaster risk. Thus, the Framework also calls for the participation of the private sector in DRR and climate change discussions and activities. Generally, the Sendai Framework promotes complementarity, which could build momentum, particularly to finance DRR and climate action, facilitate technology transfer, improve access to important information, and support efforts to "build back better" after disasters.

An EU-funded project in Samoa put the "build back better" concept into practice, providing building materials and training carpenters to ensure rebuilt homes would be sturdier, and installing rooftop rainwater harvesting systems.

Challenges

Despite the progressive aspects of the Sendai Framework, a number of challenges are likely to arise in its implementation. For one, the articulated goals are both very broad and ambitious. Below we identify key challenges and propose ways to avoid some of them or to reduce their potential negative impacts.

Enhancing collaboration: Successful implementation of the Sendai Framework will require close collaboration between state and non-state actors, and robust logistical arrangements. The requirement of inclusive and "all-of-society" management and reduction of disaster risks demands increasing organizational capacity in terms of skills and resources to support operational costs.

Organizations that traditionally employ different operational approaches will need to come together in pursuit of the goals of the Framework. Some of these organizations will not have traditional working relationships with one another, and their mandates and ways of working may be very different. This is one of the issues that adaptive governance is meant to address, but that does not mean that coming together will not be challenging. The ability to communicate well and find ways to collaborate and, if needed, compromise, will be crucial to success.

Mobilizing resources for adaptive governance: Implementing the Sendai Framework through an adaptive governance approach is likely to increase organizations' operational costs, at least in the short term. Additional transaction costs relate to ensuring or enhancing the extent and quality of participation, maintaining polycentric and multi-layered institutions and networks across different scales, and facilitating the required learning and innovation.

New coordination and collaboration efforts will compete for scarce resources at all levels, but especially at the local and national levels. This could be a particular burden in developing countries (and especially Least Developed Countries) with fiscal deficits that make it difficult to address even the most immediate development priorities, such as education and public health. A greater challenge will be faced by the non-state actors who have traditionally lacked a consistent, predictable revenue stream to fund their work. The Sendai Framework does not have a dedicated funding mechanism.

Financing DRR: A single fund for financing activities that support sustainable development and resilience to climate change and disaster risks could make a big difference to the success of the Sendai Framework and would make an adaptive governance approach to DRR more achievable. To create a joint DRR fund, existing mechanisms would need to be streamlined, and common criteria for funding, monitoring and evaluation would need to be developed. However, such a move would likely face considerable resistance from actors operating in existing institutions with their own finance streams. To achieve the collaboration among policy-makers, practitioners and researchers across all levels and scales envisaged by the Sendai Framework, such tensions will need to be overcome.

Addressing power relations: Power is at the centre of governance for DRR, development and climate change. Adaptive governance requires cross- and multi-level linkages and a high degree of cooperation. Even though the Sendai Framework

Italian Red Cross rescuers with specialized equipment and sniffer dogs search through the rubble after an earthquake in central Italy in August 2016.

making informed decisions will require knowledge and understanding of the Sendai Framework that may be beyond many people's reach.

First, the Framework is written in a technical language that is not easy to understand outside the DRR community of practice. Second, municipal government actors, NGOs and CSOs, and communities at risk may not be fluent in English or any of the other languages in which the Framework is available. In addition, large disaster risks may overwhelm people's own ability to act (and/or their confidence in that ability). Finding ways to engage with stakeholders at the sub-national and local level through adaptive governance will be an important component of the implementation of the Sendai Framework.

recognizes this, it does not provide an adequate assessment of the challenges in actually achieving it. Such power relations are evident in the approval of separate global agreements on development, climate change and DRR, in which the custodians of each agreement protect their own identity, mandate and resources, rather than creating a single agreement together.

At the same time, at the national and local levels, social networks, organizations and processes of implementing the Sendai Framework are vulnerable to elites taking advantage of their power to further their own interests. The self-organization aspect of adaptive governance would thus be hampered by social stratification, inequality and social injustices in different communities. Some political economies/ecologies and governance systems that are more autocratic than democratic are likely to feel threatened by an adaptive governance arrangement of DRR, since it requires participation and inclusion of all peoples and knowledges.

Overcoming hegemony: Policy-makers are expected by their communities to provide solutions to public concerns, including development issues and climate and disaster risks. They tend to be more directly confronted with difficult questions when disasters strike and adversely affect large numbers of people. Such events often reveal that they may not have answers to all questions. By asking policy-makers to share their power with other stakeholders, including the people at risk, to jointly identify risks and jointly develop solutions, an adaptive governance arrangement for DRR will challenge their hegemony. This may result in resistance from policy-makers and prevent their cooperation with the communities they are supposed to serve.

The implementation of the Sendai Framework will thus require the development of mechanisms that detect and resolve such tensions at the earliest opportunity. This could be done by engaging neutral partners such as independent research organizations.

Tailoring and contextualizing solutions to the local level: Another challenge will be to apply adaptive governance at the sub-national and local scales, especially at the individual, household and community levels. This will be difficult because

Achieving flexibility and adaptability: Adaptive governance is predicated on the ability of systems and institutions to be flexible in order to "manage adaptively". This means that, depending on the type of system disturbance or change (e.g. a disaster), stakeholders need to adjust to anticipate, cope with or adapt to the disturbance, or transform to a different state. To achieve this is challenging, especially within institutions that are governed by stringent codes, standard operating procedures and bureaucracy. Due to the sheer size of governments, it is usually difficult to effect drastic changes or transformations. Electoral cycles can also pose challenges, as they can lead to early reversal of policies due to political disagreements.

Measuring resilience: The success of the Sendai Framework in building resilience can only be measured through proper monitoring and evaluation. The challenge of measuring resilience remains, even as the implementation of the Framework begins (Mitchell et al. 2014). Although indicators may be approved by the appointed working group, it is highly likely that they will not be expressly agreeable to all actors in the research, policy and practice communities. In addition, collecting all of the required data is labour- and resource-intensive. This is likely to be a major challenge for the cash-strapped developing nations and Least Developed Countries, and thus compromise the validity and reliability of data or variables in the places most at risk.

Scale-appropriateness: Policies and measures to reduce disaster risk need to be developed and implemented at the right scale, to ensure that they reflect knowledge of the relevant context. Yet what the Sendai Framework calls the "local" level is not well-defined – it could mean many different things, depending on the governance system in each country. While this reduces tensions between the incumbent and any proposed system, the efficiency of this scale in triggering DRR efforts and finding what is doable within these levels may be problematic. Larger regions described as "local" levels might have more complex dynamics compared to smaller "local" levels. What works at the international level may or may not work at a much lower level. Finding the right balance between scale-appropriateness and policy and practice balance is a continuing challenge.

Conclusion

The presence of attributes of adaptive governance in the Sendai Framework creates potential to serve as a catalyst for transformative change in DRR. However, as is clear from the discussion above, there are several challenges which must be overcome in order for adaptive governance to achieve such a transformation. Finding solutions to these challenges will depend on political will and the presence and actions of engaged citizens and empowered social movements; the protection of advocacy groups and whistle-blowers; opportunities for collaborative learning; and the sustained combined effort of all DRR stakeholders.

More research will play an important role in identifying opportunities for transforming the relationship between development and disaster risk and in enabling, navigating and institutionalizing deliberate transformations that lead to sustainable, equitable and resilient development for all.

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