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Overcoming Barriers to Meeting the Sendai Framework for Disaster Risk Reduction

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Key Points

- Canada's adoption of the Sendai Framework for Disaster Risk Reduction represents an important opportunity to manage flood risk, which is the most common and costly hazard facing Canadians.
- Fragmentation in the distribution of responsibility to manage disaster risk, limited stakeholder engagement and public awareness, and recovery financing that fails to encourage investment in risk mitigation are significant governance barriers that Canada must overcome to fully adopt the Sendai Framework.
- To overcome these barriers, the federal government should develop a national disaster risk strategy that standardizes risk assessment, coordinates and shares responsibility for risk management between governments and stakeholders, increases investment in risk mitigation at the local level, and encourages consumer demand for insurance in high-risk areas.

Introduction

The global governance of disaster risk is shaped by the governments participating in the United Nations International Strategy for Disaster Reduction (UNISDR). In 2015, a new agreement, the Sendai Framework for Disaster Risk Reduction, was adopted (UNISDR 2015). The Sendai Framework embraces a paradigm in disaster management policy that emphasizes the principles of risk management. Instead of policy objectives that focus on funding protection measures, such as structural defences (for example, dams in the case of flooding) that reduce the likelihood of disasters, risk management requires the use of a range of policies that prepare for, mitigate, respond to and aid in the recovery from disasters. This expansion in objectives requires a shift in authority from governments to a plurality of stakeholders with more capacity and expertise in these policy areas. For example, disaster mitigation (that is, actions taken before a disaster occurs to limit the consequences) requires cooperation between governments, land-use planners and developers to ensure property is constructed with measures capable of mitigating damage (Mees et al. 2016; Aven and Renn 2009).

Canada, like other participants in the UNISDR, has agreed to implement the Sendai Framework, based on the growing costs associated with damage from natural disasters. According to the Canadian insurance sector, 2016 was a record year for disaster losses, with insured

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losses reaching a historic \$4.9 billion (*Canadian Underwriter* 2017). Although this number excludes public losses, the Office of the Parliamentary Budget Officer (2016) has confirmed that costs are increasing as government expenditures on disaster recovery have risen significantly in recent decades, with an average of \$410 million per year between 2005 and 2014, compared to \$54 million per year between 1970 and 1994. This disaster risk is, for the most part, driven by flood damage, which makes up 78 percent of historical economic losses, and, it is estimated, will contribute to 75 percent of future losses (*ibid.*, 19).

The adoption of the Sendai Framework represents an important step in addressing potential flood damage, as it encourages Canada's existing disaster management regime to adopt flood risk management. The shift to flood risk management as envisioned by the Sendai Framework represents a significant policy challenge for Canada, and requires an increase in the coordination and diversity of stakeholders involved in flood management. This policy brief will describe the challenges involved in the adoption of the Sendai Framework in Canada by examining its application to the policy area of flood management. It will identify policy recommendations that can help reduce the barriers to successful implementation.

The Sendai Framework

The Sendai Framework for Disaster Risk Reduction 2015–2030 was adopted by 187 countries at the third UN World Conference on Disaster Risk Reduction in Sendai, Japan, on March 18, 2015. It is the third international framework on disaster risk reduction (DRR) since 1995. The 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 over the next 15 years” (UNISDR 2015).

The framework builds on its predecessor, the Hyogo Framework for Action 2005–2015, by emphasizing the use of disaster risk management. This embracing of risk management is motivated by evidence showing that allocating all resources toward the protection of people and property from natural disasters, at the expense of strategies that manage and mitigate the consequences of

disasters, is inefficient and ineffective (European Commission 2007; Hegger, Driessen and Bakker 2016). Historically, governments played the most significant role in disaster management through the adoption of a “hazard-based” approach, where public resources were allocated toward policies designed to prevent and protect people from natural disasters. For example, public funds would be used to build structural flood defences designed to protect communities and fund recovery in the event the floods exceeded this level of protection. The design of the protection was based on the “100-year flood,” which is the idea that, based on historical data, a major flood is expected to recur every 100 years, on average. The sustainability of this approach has come under scrutiny as disaster losses continue to increase in response to higher population and greater infrastructure density in vulnerable areas, and to changing weather patterns associated with climate change (Jakob and Church 2011).

The Sendai Framework responds to the growing costs and socio-economic vulnerability associated with natural disasters by promoting disaster risk management. There are four key innovations that characterize disaster risk management. First, risk management uses risk assessments to design policy that considers the consequences of hazards (for example, exposure and vulnerability of property and people) in addition to the likelihood of the hazard (Sayers et al. 2015; Krieger 2013). Second, flood risk management recognizes that absolute protection from damage is not possible and plans must be made to accommodate flooding that exceeds design standards of structural and non-structural defences. Third, risk management places equal priority on policy instruments that support mitigation, preparedness, response and recovery, instead of focusing exclusively on protection. Fourth, to accommodate a wider range of policy objectives and instruments and the technical complexity involved in risk assessment, risk management shares responsibility for implementation among a wide range of stakeholders beyond governments (for example, the insurance industry, developers and property owners) (Klijin et al. 2015; Simnovic 2012).

To encourage the adoption of DRR principles, the Sendai Framework identifies a set of “four priorities for action” that are required for the successful implementation of DRR and, in particular, flood risk management: understanding disaster risk;

strengthening disaster risk governance to manage disaster risk; investing in disaster reduction and resilience; and enhancing disaster preparedness for effective response to “build back better” (UNISDR 2015). These priorities represent an important framework for embracing DRR in Canada to limit the growing risks associated with flooding.

The following section will evaluate the challenges of implementing each of the Sendai Framework’s four priorities in Canada.

Understanding Disaster Risk

Assessment, dissemination and communication of risk information are critical for meeting the Sendai Framework’s first priority. Risk information, however, involves a wider range of data inputs than the existing hazard-based approach, and includes information on “vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment” (ibid., 14). “Exposure” refers to the property, infrastructure and people that could be affected by a flood, and “vulnerability” considers the “susceptibility of an individual, a community, assets or systems to the impacts of hazards.”¹ In Canada, most of the information available and used to inform policy is narrowly focused on hazard likelihood. For example, Canadian flood plain maps are accessible through the websites of government and flood management agencies (for example, conservation authorities in Ontario), but they are informed by a static standard associated with the hazard (100-year flood) rather than by information about vulnerability and exposure (Jakob and Church 2011; Sandink et al. 2010).

Risk information is also not widely communicated in Canada — surveys of property owners consistently demonstrate their lack of awareness of vulnerability and exposure to hazards. A recent survey conducted by the authors found that only half of respondents located in areas designated as “high risk” for flooding are concerned about their exposure to flood risk. Similar research conducted by Public Safety Canada found that 54 percent of respondents in all risk locations were not concerned about flooding and 74 percent had not taken any mitigation actions (Beeby 2007). Insurance firms, which have recently expanded their flood insurance to cover overland or riverine flooding, are developing models that generate risk

1 See www.unisdr.org/we/inform/terminology#letter-r.

information on vulnerability and exposure, but this information is used to set premiums and coverages and is not widely available to the public in a format that is accessible for a wide range of end-users.

The federal government's 2015 National Disaster Mitigation Program (NDMP) targeted the generation of risk information by offering funding to municipalities for risk assessments and mapping. While this is an important recognition that more resources are required to improve the understanding of risk among Canadian communities, the lack of a standardized assessment for the entire country remains a gap (Public Safety Canada 2015a). Natural Resources Canada and Public Safety Canada have published technical guidance on flood plain mapping with the objective of improving standardization, including a focus on risk assessment, although specific details have yet to be developed. Unfortunately, adoption of this guidance is voluntary unless it is funded by the NDMP, which means that provinces and local governments could pursue risk assessments and mapping that are not comparable across jurisdictions (Natural Resources Canada and Public Safety Canada 2017).

Strengthening Disaster Risk Governance

The second Sendai Framework priority requires that national governments strengthen disaster risk governance by coordinating responsibility across the stages of the risk management process, including prevention, mitigation, preparedness, response and recovery (UNISDR 2015). Each of these stages involves different stakeholders, expertise and levels of government. Without coordination and a clear delineation of responsibility, stakeholders can work at cross purposes, leading to gaps that limit the effectiveness of the overall management regime.

In Canada, fragmented responsibility for disaster management creates a significant barrier to effective disaster risk governance. The majority of the responsibility for management, including policy on standards for structural defences, land use, building codes, emergency management and recovery, is delegated to the provinces. Municipalities, however, are responsible for the implementation of provincial standards and often face incentives to limit enforcement. For example, many municipalities allow development in provincially mandated flood plains because

property taxes from new development represent a critical source of revenue (Henstra and Thistlethwaite 2016). Damage from the 2013 Alberta flood was attributed to inadequate enforcement of restrictions on development in the flood plain (McClore 2015). Provinces also face incentives that limit the implementation of flood risk management since they can apply for recovery financing through the federal government's Disaster Financial Assistance Arrangements (DFAA) (Thistlethwaite 2016). Access to recovery financing creates a "moral hazard," as there are no requirements to change provincial policy on disaster risk as a result of receiving recovery financing.

Investing in Disaster Reduction for Resilience

The third priority in the Sendai Framework outlines the need to increase investments in the structural (for example, dams) and non-structural (for example, land-use policy and green infrastructure) disaster reduction measures. The federal and provincial governments have supported both structural and non-structural flood reduction measures through initiatives such as the Canada Water Conservation Assistance Act (1953–1970) and the Flood Damage Reduction Program (FDRP) (1975–1999) (Sandink et al. 2010). The cancellation of the FDRP in 1999, however, positioned the provinces as the primary government level responsible for flood management. The absence of the federal government led to concerns among many experts that the provinces would struggle to maintain needed investments in structural and non-structural flood reduction measures (de Loë 2000).

Recent evidence confirms this assumption as the costs of flooding continue to increase and provinces and local governments fail to prioritize flood management due to shortcomings in capacity. For example, Ontario is considered to have a robust disaster management system — specifically for riverine flooding — but has been criticized by conservation authorities (who are responsible for flood management) for a budget shortfall of \$24.8 million for flood plain mapping, and \$77.7 million to address life-cycle costs of physical flood defences (Conservation Ontario 2013). Municipalities have also struggled to enforce non-structural measures, including land-use planning and development conditions, in high-risk flood areas (Henstra and Thistlethwaite 2016).

The 2017 federal budget has recognized that provinces and local governments lack the resources necessary to implement effective disaster risk governance by committing \$2 billion over 11 years to a Disaster Mitigation and Adaptation Fund. It is important to note, however, that these funds are allocated for structural mitigation, and the NDMP remains the only source of funding for non-structural measures (that is, risk assessments) (Government of Canada 2017). The Disaster Mitigation and Adaptation Fund represents an important commitment as it aligns Canada with spending commitments in comparable countries, such as the United Kingdom and the Netherlands. Unlike these countries, however, the federal government has traditionally relied on subnational governments (that is, the provinces) to allocate the funding rather than provided direct funding to local communities (Department for Environment, Food & Rural Affairs 2014; Carrington 2014). This funding mechanism limits the ability of the federal government to enforce national policy priorities that could meet other Sendai requirements, such as standardizing risk assessment to improve understanding of risk, and strengthening disaster risk governance by improving coordination among jurisdictions.

Enhancing Preparedness for Effective Response and Recovery

The Sendai Framework's final priority describes how policy actions that support preparedness before a disaster can improve the effectiveness and efficiency of the response and recovery. To meet this priority, the Sendai Framework emphasizes public awareness, through engagement with multiple stakeholders on disaster risk, in addition to the integration of risk management into the post-disaster recovery process (UNISDR 2015, 22). In the area of flood management, public awareness and stakeholder engagement focusing on flood risk represent a significant gap in Canada's current policy portfolio. The federal government has recognized this gap in its communications on flooding by launching a website that provides advice to homeowners on how to prepare for flooding.² While offering general information on flood risk in Canada, it lacks information on local risk exposure, which is critical for encouraging property owners to take actions that reduce

risk. Municipalities are in the best position to facilitate this exercise, given their role in enforcing land use, building codes, development requirements and stormwater guidelines.

A recent review of practices in Toronto and Calgary, however, revealed limited engagement with expert stakeholders, public participation in flood planning and use of technologies, such as geographic information systems, to communicate risk (Henstra and Thistlethwaite 2016). This outcome is problematic, given that Toronto and Calgary have more resources than the average municipality.

The incorporation of disaster risk into recovery policy faces an additional challenge in Canada due to the current design of the federal DFAA and individual provincial disaster recovery funding legislations. Under the current system, provincial governments are first responsible for delivering financial transfers to individuals in the event of an "extraordinary" disaster if the damage does not qualify for private insurance. In the event that these losses exceed a per capita threshold, the federal government's DFAA is triggered and covers a portion of the losses (*ibid.*). These programs are designed to provide minimum relief to ensure properties are "safe" and "livable" but do not require any investments in risk mitigation such as the installation of property-level flood-protection measures. Therefore, properties that are destroyed in high-risk areas can be rebuilt without any additional changes to construction.

The federal government has recently initiated research to explore how flood plain mapping and reforms to the DFAA, including the expansion of private insurance, could contribute to more effective recovery policy (Public Safety Canada 2016). Private insurers have also started to deploy additional coverage for overland flood damage, but most properties in areas exposed to high levels of risk do not qualify, or face limited availability and affordability (Thistlethwaite 2016).

² See www.canada.ca/en/campaign/flood-ready.html.

Policy Recommendations

An assessment of the Sendai Framework priorities reveals that there are significant challenges that must be overcome before the agreement can be successfully implemented in Canada. The following recommendations seek to minimize the barriers toward the adoption of the Sendai Framework.

Standardized and Mandatory Disaster Risk Assessment

To address gaps in the understanding of disaster risk, the federal government should develop and apply its own standardized approach for disaster risk assessment. Estimates and measurements of hazards, exposures and vulnerabilities need to be comparable between jurisdictions and communicated in a consistent and decision-useful way to stakeholders. To enforce a standard, the federal government could require that risk assessments are conducted at the provincial and municipal levels as a requirement to receive disaster assistance. The current approach, whereby municipalities and provinces can apply for funding to develop their own risk assessments, is fragmented and limits coordination among the different stakeholders and policy components of DRR. Under the 2009 UK Flood Risk Regulations, for example, Lead Local Flood Authorities are required to create flood risk management plans that include flood risk maps that have been developed based on national standards (United Kingdom 2009). This model should be replicated by the Government of Canada as it implements the Sendai Framework.

A National Coordination Strategy on DRR

A national strategy to coordinate DRR is a second important recommendation critical to improving the coordination among the multiple stakeholders and governments involved in DRR. The current national strategy on disaster management is contained within the Emergency Management Act (2007), which shares authority between the federal government and the provinces and territories. Expanding the role of the federal government would break this convention, but is justified based on the approach adopted in other jurisdictions where the national government coordinates other levels of authority (Hegger,

Diessen and Bakker 2016). In particular, the federal government should follow its European counterparts by directly funding local flood risk management plans using a standard methodology. A recent analysis on flood risk management in six European countries found that each country had adopted legislation guiding flood risk management in addition to financial commitments to support the implementation of the policy at different levels of government (Priest et al. 2016).

Risk-sharing through Flood Insurance in High-risk Areas

The final recommendation for the federal government involves reforming the DFAA to improve disaster recovery efforts by limiting the moral hazard that reduces incentives to take actions that mitigate future risks. Indeed, actions taken before a disaster, as opposed to in response, have proven to have a 4:1 return on investment, according to the federal government (Public Safety Canada 2015b). The expansion of insurance that is risk-adjusted, whereby premiums reflect risk exposure and vulnerability (that is, property protected from flooding pays a lower premium), represents an important first step in increasing incentives for property owners to adopt measures that reduce risk (Thistlethwaite 2016). Flood insurance is particularly critical in high-risk areas to offset the growing costs of flooding. In addition, expanded insurance will create cost savings through lower disaster assistance payments, which can be used to ensure coverage remains available and affordable in high-risk areas. These savings can be used to purchase reinsurance to cover losses that exceed what is covered in insurance contracts in high-risk areas. Insurers will have incentives to offer coverage at levels that are affordable since they will not be responsible for securing premiums necessary to cover significant flood events. A second needed reform to the DFAA involves an adjustment of the cost-sharing formula whereby the provinces agree to absorb a greater proportion of the financial burden for high-impact events. Greater financial responsibility for disaster recovery would create incentives for provinces to encourage the uptake of insurance by conducting risk assessments and communicating risk to property owners. Although the provinces are likely to oppose such a drastic reform, savings from the DFAA could be offered as federal investments that support risk management at the provincial level.

Conclusion

This policy brief analyzed the challenges involved in Canada's implementation of the Sendai Framework for Disaster Risk Reduction in the area of flood management. Canada faces several barriers before it can successfully implement the Sendai Framework's four main priorities of understanding disaster risk, strengthening disaster risk governance, investing in disaster reduction and resilience, and enhancing recovery and response. Fragmentation in the distribution of responsibility to manage risk between governments and stakeholders limits the coordination necessary to understand disaster risk and strengthen disaster risk governance. The federal government remains underutilized in supporting provincial efforts to invest in structural and non-structural policies. Finally, limited stakeholder engagement and public awareness, combined with recovery financing that limits investment in risk mitigation, challenge efforts to enhance disaster recovery. To overcome these barriers, this policy brief recommends a national disaster risk strategy that standardizes risk assessment, coordinates and shares responsibility for risk management between governments and stakeholders, increases investment in risk mitigation at the local level, and reforms the current DFAA framework.

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