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Managing Climate Change Risk in Coastal Canadian Communities through Sustainable Insurance

Jason Thistlethwaite and Andrea Minano

Key Points

- The expansion of property insurance has been identified as a key strategy for strengthening pre- and post-disaster management. Insurance can take some of the financial responsibility of disaster recovery away from governments, and the use of risk-adjusted premiums provide incentives for communities and individuals to adopt risk-averse behaviour.
- The viability and sustainability of insurance in coastal areas are put into question due to increasing exposures resulting from climate change impacts and the current fragmented policy approach to disaster management.
- Bridging mechanisms that improve coordination across governments and insurers, in addition to a stronger role for the federal government in managing climate change risk, are necessary to improve the viability of insurance in coastal regions.

Introduction

Governments around the world are increasingly searching for innovative solutions to effectively manage the growing financial exposures and damages resulting from natural disasters. Residents of coastal regions are particularly prone to the economic and financial damages of extreme weather events, such as hurricanes, floods, winter storms and climate change-driven sea-level rise and storm surges. The expansion of property insurance has been identified as a key strategy for strengthening pre- and post-disaster management (Krieger and Demerit 2015). For example, by collecting premiums from a wide pool of policyholders, insurers have the capital to quickly allocate funds to their clients for financial recovery. Premiums are also risk-adjusted, meaning that those living in high-risk areas pay a higher rate than those living in low-risk areas. This price signal creates an incentive for individuals and communities to adopt practices that reduce exposure and vulnerability to natural disasters.

Coastal communities face significant challenges that limit the deployment of insurance. Research on flood insurance, for example, identifies risk concentration as a factor that increases uncertainty within insurance markets and can limit the availability and affordability of coverage (Botzen and Van Den Bergh 2008). Risk concentration is intrinsic to coastal areas since risk increases in relation to the proximity to the coastline. The closer properties

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are to the coastline, the more at risk they are of suffering damages from coastal flooding, storm surges and high winds. Federal government policy, however, can play a significant role in reducing insurance uncertainty and expanding its role in local risk mitigation and disaster recovery. The objective of this policy brief is to assess the viability of private flood insurance in Canadian coastal communities and to identify measures necessary to expand the role of insurance as a source of disaster management in the era of climate change.

Although there is significant demand for improvements in disaster management in many coastal communities around the world, Canada was chosen as the case study for this brief based on the recent prioritization of expanding flood insurance by the federal government's Department of Public Safety (Public Safety Canada [PSC] 2015a). In addition, coastal communities, both urban and rural, offer a useful proxy for assessing the viability of insurance due to their relatively higher level of exposure and vulnerability to natural hazards. For this reason, the findings from this brief can be used to inform policy supporting insurability in other vulnerable communities. Finally, similar analysis on insurance has taken place in other countries, but an assessment of government policy and its relationship to insurability in coastal areas has yet to take place in Canada.

The first section of the brief will describe climate change risk in Canadian coastal communities and the benefits of expanding insurance. The second section will assess the market and institutional challenges that limit the potential of insurance in coastal areas. The third section will identify some policy recommendations that could improve the availability and affordability of insurance in coastal areas. The fourth section will conclude and identify implications for policy discussions at the international level on the benefits of insurance for climate change adaptation.

Climate Change Risk in Coastal Communities

Canada's coasts have been a central focus of climate change impact assessments. Through these initiatives, it has been possible to identify and understand the risks, hazards and vulnerabilities that coastal communities face as a result of climate change. Research in coastal communities, for example, has revealed how sea-level rise can impact low-lying municipalities and what types of adaptation options could be pursued by local authorities (for example, land-use changes) Sheppard et al. 2011). It is now known that coastal communities in Canada are susceptible to losing landmass, properties and assets to sea-level rise and coastal erosion. It has also been reported that "coastal communities are already coping with extreme water levels associated with climate variability...and storm-surge flooding" (Lemmen et al. 2016, 6). High water levels are leading to damages to infrastructure that residents depend on for their safety, such as washout of bridges and roads that lead to inaccessibility to communities during extreme weather events. Climate change impacts are not only affecting residents; they are also affecting livelihoods by damaging assets that are essential in local economies (for example, fishing infrastructure) (Ecology Action Centre 2013). Climate change impacts are introducing new financial obligations, such as the need for investment in coastal protection measures, that may be problematic for communities with limited funds available for adaptation (Atwood 2013; Partnership for Canada-Caribbean Community Climate Change Adaptation 2016).

To manage this growing risk exposure, policy makers have started to explore the role that insurance could play as a means of supporting compensation and recovery in the event of a flood, but also as a pre-disaster source of risk mitigation (Krieger 2013). PSC, for example, has argued that expanding property insurance could help reduce the growing cost of disaster financial assistance. In addition, PSC (2015a) has also advocated for the adoption of policies that use risk assessment as a principle for directing resources toward

prevention and recovery from natural disasters.¹ The expansion of insurance in coastal communities can help the government achieve both of these objectives. Insurance can take away some of the financial responsibility of disaster recovery from governments, and the use of risk-adjusted premiums provides incentives for communities and individuals to adopt risk-averse behaviour.

Although there are many benefits that arise from insurance, research on insurance questions whether coastal communities can sustain the market conditions necessary for coverage to be available and affordable (Lloyd's 2008). Industry experts consistently emphasize the need for climate change adaptation investments as a way to support insurability. Without these investments and a risk-averse culture, insurability can become an issue in certain regions, such as those that experience frequent and severe losses and where there continues to be development in high-risk areas. It is important to note that in Canada, coastal flood coverage is already limited as it is only offered to commercial properties, meaning that risk uncertainties introduced by climate change could further limit the availability of this coverage, rather than support its expansion to residential properties.

Exposure is likely to increase as a result of climate change (that is, more properties will be at risk of coastal floods), limiting the viability of insurance as a source of disaster management. Yet, government disaster management policy can act as a key mechanism for sustaining the availability of private insurance, encourage its use as a means of lowering government disaster assistance costs, and create incentives for risk mitigation (Botzen and Van Den Bergh 2008). As the next section will discuss, however, the insurability of Canadian coastal communities faces several policy barriers.

¹ See www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/dsstr-prvntn-mtgn/ndmp/index-en.aspx.

Disaster Management and Insurability in Coastal Communities

This section will briefly review Canada's approach to flood management, which represents the costliest category of natural disasters, as a proxy for understanding the policy barriers that limit insurability in coastal communities. Flood management embraces structural and non-structural policy mechanisms as a means of preventing and limiting damage, in addition to disaster assistance programs that offer financial support to help recovery in the aftermath of a significant event. Structural measures involve defences, such as dams, dykes, reservoirs and sea walls designed to separate the flood hazard from people and important infrastructure (such as wastewater treatment). Non-structural measures use information on flooding to guide policy on land use, building codes and local development requirements. In the event these policies fail to prevent flood damage, local communities can apply for provincial disaster assistance and, ultimately, federal disaster assistance if the damages exceed a per capita threshold.

Provincial governments are largely responsible for flood management policy by investing in and setting the standards for structural defences, land use and building codes (Sandink et al. 2010; Shrubsole et al. 2003). The federal government has historically played a role in supporting provincial flood management through the Flood Damage Reduction Program (FDRP). The motivation for the program was to empower provinces and municipalities through the development of flood plain maps to enforce land use designed to protect communities against flooding. For example, Nova Scotia used funding from the program to identify several flood plains throughout the province in which municipalities must restrict development (Nova Scotia 2013). Funding for this program, however, was phased out in 1998,² based on the assumption that it had established enough expertise at the local level to ensure a sufficient level of flood-risk protection and there was no longer a need for federal involvement

in flood plain mapping (Thistlethwaite 2016; Kumar, Burton and Etkin 2001; Watt 1995).

This division of authority among the federal, provincial and municipal governments for flood-risk management limits both enforcement and effectiveness. Although provinces have put in place land-use legislation designed to limit development in high-risk areas, the implementation of these policies at the municipal level is subject to the availability of flood maps or known floodways. In many cases, province-wide standards that restrict development in specific zones are not available due to the fragmented approach for producing and updating flood maps with current information.³ In addition, provinces and municipalities are burdened by the growing costs of maintaining and replacing flood defence structures that were not designed to cope with new climate change impacts (for example, magnified storm surges as a result of sea-level rise, and stronger wave action). Inconsistent application of provincial policy at the local level creates uncertainty for insurers, which limits their capacity to predict pricing for insurance products with confidence.

Although there is a recognition by governments that there are growing costs as a result of climate change, the federal government's policy approach to disaster assistance limits the incentives for more significant investments to improve policy implementation at other levels of government. In the event that damage exceeds the per capita thresholds established through a federal-provincial agreement, the provinces qualify for funding to cover a portion of the costs.⁴ The availability of disaster assistance creates a moral hazard for provinces since the costs associated with lack of policy enforcement and implementation are largely "bailed out" by the federal government. Arguably, an outcome of the existing moral hazard is that "municipal councils [continue to] have significant power to override their own land-use restriction bylaws to approve new developments, even if the developments are in recognized flood-prone areas" (Feltmate and Moudrak 2016). Political dynamics could come into play in cases where municipalities benefit from a growing tax base generated by new developments in high-risk areas, in particular

2 See www.ec.gc.ca/eau-water/default.asp?lang=En&n=08D7890E-1.

3 See www.env.gov.nl.ca/env/waterres/regulations/policies/flood_plain.html.

4 See www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/rcvr-dsstrs/dsstr-fncl-ssstnc-rrngmnts/index-eng.aspx.

since the financial responsibility of disaster recovery falls on other levels of government.

This fragmented approach to flood management limits the incentives for any level of government to address hazards, and climate change risk more broadly, in the design of both structural and non-structural policies. More specifically, Canada's existing approach to flood management uses historical hazard frequency as a design standard, and does not incorporate local exposure and vulnerability as information that should also inform policy. As a consequence, most of Canada's flood defences and design standards for land use and building codes are designed to prevent a flood that historically occurred once every 100 to 200 years, depending on the province (Jakob and Church 2011). This standard ignores the fact that some areas should embrace a much higher design standard due to the exposure and vulnerability of important assets, such as ports, downtowns or key transportation routes along coastlines. In addition, the standard does not take into account that climate change requires a differentiated approach to flood defence standards as some areas are likely to experience both increases and decreases in the historical frequency and magnitude of damage. Since insurance prioritizes lower exposure and vulnerability as two key factors that improve the availability and affordability of coverage, existing government policy largely fails to encourage conditions necessary for insurability. Uncertainty regarding the impacts of climate change on coastal floods is also, arguably, not instilling confidence in insurers to extend coverage in coastal regions.

Experts have consistently recognized that Canada's fragmented approach to flood management represents a significant source of vulnerability, in particular in coastal areas where exposure is higher (Kumar, Burton and Etkin 2001). PDC has recently tried to address these concerns through the National Disaster Mitigation Program (NDMP). To encourage municipalities to adopt risk-based flood management, the NDMP committed \$200 million to fund risk assessments, flood mapping, mitigation planning and small non-structural policy projects (PSC 2015b).

Unfortunately, the NDMP does little to address the fragmentation that limits the effectiveness of flood management in Canada. In fact, the process for allocating funding may make the problem worse. To access funding, municipalities need to fill out a complicated risk assessment

document that asks specific questions about the nature of the hazard the funding is trying to address. Many municipalities in vulnerable areas will struggle to find the expertise capable of providing the information, such as the return period and future risk exposure of the community, necessary to complete the document. Even if a municipality is successful in providing a comprehensive assessment, it must then get provincial approval before it is submitted to the NDMP. While some communities with sufficient resources will receive funding to improve flood management, the NDMP fails to provide coordinated improvement in the enforcement of risk-based land use and limit the moral hazard associated with disaster assistance or address the investment needed to improve structural defences. As a consequence, coastal and other vulnerable areas will continue to face gaps in insurability.

Policy Recommendations to Reduce Fragmentation in Canada's Disaster Management Policy

Develop “bridging mechanisms” among different levels of government in coastal areas to ensure there is accountability for disaster management decisions. Canada can improve insurability in coastal areas by looking at examples of policy in other developed nations that support risk management. For example, one key aspect that emerges from flood management in the European Union is the use of “bridging mechanisms” to minimize fragmentation between stakeholders and policies (Raadgever et al. 2016). Bridging mechanisms are needed to ensure that “actors, policies, laws and other tools and instruments...link and align [flood] strategies” (Raadgever et al. 2014). The lack of these mechanisms hinders collaboration between stakeholders and organizations (for example, engineers, planners, emergency managers, insurers) and prevents them from working toward a defined flood-risk management goal.

For example, the United Kingdom has developed a technological bridging mechanism through the implementation of online portals where

stakeholders can access information and share best practices (Alexander et al. 2016). The UK Environment Agency also provides standardized flood maps so that this information can serve as a foundation for other professionals, such as emergency managers and planners, who can take further steps in flood-risk reduction measures. The development of a technological bridging mechanism between the insurance sector and different levels of government could help identify areas where high levels of risk limit the affordability of insurance. This collaboration is important to improve risk management in coastal communities, both rural and urban; to fill information gaps; receive advice from experts in other jurisdictions; target risk mitigation where the highest risk is located; and understand the benefits of structural flood defences (for example, improved availability and affordability of insurance coverage).

The federal government needs to assume more authority in developing flood-risk standards and investing to help local governments establish risk-based standards. Although the federal government has limited its influence in flood-risk management, the anticipated financial liability associated with future damage generated by climate change justifies an expanded role. Coastal jurisdictions, in particular, face a greater risk exposure associated with sea-level rise and storm surges, but remain without a coordinated policy strategy for managing vulnerability. To address this fragmentation, the federal government could launch a program similar to the FDRP that also incorporates future climate change scenarios. Through this initiative, jurisdictions would have information on present and future impacts, where properties should not be built and where to focus mitigation efforts in relation to current infrastructure. This would help support long-term resiliency in communities and could control flood risk by strictly prohibiting construction in high-risk areas. In addition to helping communities become more resilient to coastal floods, this could then be followed by the expansion of insurance in coastal regions, which would aid in the recovery process after an extreme weather event.

The success of flood-risk management has been linked to a strong role for the national level of government. Flood policy analyses of European nations show the need for leadership from the national government to coordinate efforts across scales of governance. In the United Kingdom,

for example, the Environment Agency is a national-level organization that works with other governance actors to ensure that decisions and actions follow flood-risk policy (Alexander et al. 2015). In the Netherlands, flood-risk management is driven by national and regional water entities that work and exchange knowledge with other flood de-risk mechanisms (for example, spatial planning and emergency management) (Kaufmann et al. 2016). These types of governance models could be mimicked in Canada to integrate initiatives across the country and ensure a path toward a defined flood-risk management goal.

Conclusion

Climate change challenges the understanding of where hazards exist and how these hazards will impact citizens in the short and long term. There exists an opportunity for tackling the growing severity of floods across Canada and the growing burden of disaster assistance payments on Canadian taxpayers. Insurance represents an important mechanism that can improve pre- and post-disaster management in coastal areas. Policy fragmentation in Canada's approach to disaster management limits the viability of insurance in coastal areas, and other vulnerable communities with a higher exposure to climate change. To improve the availability and affordability of insurance, Canada can draw on the experience of the European Union, which has explored how governments can reduce fragmentation in their approach (Raadgever et al. 2014; Alexander et al. 2016). Bridging mechanisms and a stronger role for the federal government are identified as key policy approaches capable of ensuring there is a clear division of responsibility for managing the financial risks of natural disasters and climate change.

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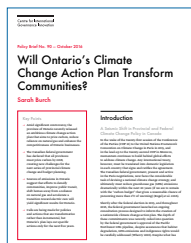
The decarbonization of the global economy sanctioned by the recent Paris Agreement to limit the average temperature increase to between 1.5°C to less than 2°C threatens to marginalize much of Canada's carbon reserves and points to a significant downsizing of oil sands operations in the future — and, potentially, of other fossil fuel industries in the country, including coal and possibly natural gas. This paper provides measures that should be considered by the federal and provincial governments in an effort to mitigate the adverse financial impacts of climate change on pension plans and banks.



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CIGI Policy Brief No. 82
Jason Thistlethwaite and Melissa Menzies

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Cyrus Rustomjee

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