

TIP OF THE ICEBERG EXECUTIVE SUMMARY

Over the past five decades, the costs of weather-related disasters like floods, storms, and wildfires have risen from tens of millions of dollars to billions of dollars annually in Canada. Insured losses for catastrophic weather events totalled over \$18 billion between 2010 and 2019, and the number of catastrophic events was over three times higher than in the 1980s.

The combined losses per weather-related disaster have also ballooned—rising from an average of \$8.3 million per event in the 1970s to an average of \$112 million between 2010–2019, including public and private costs. This change represents a staggering 1250 per cent increase.

As climate change makes weather patterns more extreme and volatile, disasters are becoming more frequent and more expensive. In previous decades, the cost of weather-related disasters was roughly equivalent to one per cent of Canada's annual gross domestic product (GDP) growth. In the last decade, disaster costs have climbed to between five and six per cent of annual GDP growth.

These examples offer a snapshot of the ways climate change is threatening economic growth and prosperity across the country today. Yet for everything we know about the current and likely future costs of weather-related disasters in Canada, the risks arising from what we don't yet know—outcomes that depend on too many other variables, or costs we can't fully calculate today—are even more profound.

It's time for a comprehensive reckoning with the costs of climate change in Canada. To that end,

the Canadian Institute for Climate Choices (the Institute) is undertaking a multi-year research program to identify and quantify key effects of a changing climate on prosperity in Canada and analyze the benefits of making adaptation and resilience a priority for policy and investment.

If we think of the costs of climate change as an iceberg ahead, this introductory paper aims to zoom in on the tip of the iceberg—the known and measurable hazards—as well as the contours of what lies below the water. As policy makers, business leaders, communities and individuals cope with the current impacts of climate change and prepare for a future defined by climate disruption, both parts of the iceberg should be top-of-mind in risk assessments, investment planning, and policy decisions.

Our analysis of existing data and research finds that climate change is already having noticeable impacts throughout our economy and our society, and those impacts are poised to grow dramatically. The full impacts of climate change will affect Canada in ways that have not yet been properly assessed or considered. Moreover, many climate-related impacts are difficult to quantify in dollar terms but have huge significance for the well-being of Canadians and Indigenous peoples.

INSIGHTS

1 The risk of weather-related disasters in Canada is growing, and climate change is a central force behind increasing damages.

While there have always been weather-related damages and disasters, changing climatic conditions are shifting hazards, driving damages above what we have seen in the past. Decades of insurance payouts and disaster spending by governments, prominent indicators of the cost of weather-related disasters, show a noteworthy rise in both the number of catastrophic events and their costs. Storm and disaster damages are growing faster than the rate of economic or population growth.

2 A changing climate is impairing prosperity and well-being in Canada through economic, social, and environmental impacts. Yet governments, businesses, and communities are overlooking many damages and are not focusing on how to navigate vulnerabilities.

Weather-related disasters and storms are big and visible sources of climate change risk, but these are just the tip of the iceberg. The damages from drawn-out impacts, such as sea-level rise, ocean acidification and permafrost thaw, are equally concerning. The literature signals that climate damages are beginning to grow, affecting the lives and health of people in this country, stretching government resources, exacerbating inequity, and disrupting business operations. Furthermore, many Indigenous communities have articulated damages to ways of life associated with shifting ecosystems, changing wildfire patterns, permafrost thaw, and floods. While there is evidence of growing climate damages and risks to Indigenous rights,¹ and to prosperity and well-being more broadly, there are much larger gaps in knowledge about how best to adapt to a changing climate. Numerous and often overlapping climate change hazards present a major challenge for charting a course to prosperity.

3 Costs that are difficult to quantify in economic terms must not be overlooked.

Not all climate costs are easy or appropriate to measure in economic terms. In particular, emerging economic risks and vulnerabilities will need to be addressed and prioritized for action, even if they can not yet be assigned a monetary value. Further, risks that cannot be given a price tag, such as risks to lands and ecosystems that are integrated into the spiritual lives and identities of Indigenous peoples, must be given at least equal consideration alongside monetary impacts. Our approach to identifying climate-related risks to prosperity and well-being highlights the broad range of impacts to what people and communities across Canada value and then seeks to monetize what is feasible and credible. To provide a comprehensive picture of what a changing climate in Canada may mean, our ongoing work includes quantitative analysis of economic, social, and environmental damages and costs but also highlights a broader scope of impacts beyond what can be quantified in monetary terms.

¹As Canada is a full supporter of the United Nations Declaration of Indigenous People, it is imperative that Canada ensure Indigenous people participate in decision-making matters that would affect their lands, territories, and resources (Article 18), especially in the context of these risks.

4 Prevention pays off, and governments, businesses, and communities across Canada need to invest more thoughtfully to reduce future climate change damages.

While costs associated with climate change are not fully understood, evidence shows the impacts are getting worse. Approaches that could help manage these risks—from private actions to public policy—remain broadly under-used. Yet experience suggests that prevention pays off, with small investments to reduce vulnerability to climate risks potentially delivering broad-based social, economic, and environmental benefits. Still, damages continue to mount as the changes in extremes and drawn-out climate impacts reduce asset values, impair natural and produced wealth, and increase social vulnerabilities and inequalities. This cycle needs to change. It will pay to continually ask: are risks to household, business, and community value understood? Is planning and investment oriented to build resilience at a scope and scale that is aligned with the evolving climate risks?

5 A successful pathway to climate change resilience requires embracing incomplete information.

All orders of government, all sectors, and all communities need to take action to prioritize resilience to the emerging impacts of climate change. Building resilience requires moving forward with addressing vulnerabilities and investing in solutions despite imperfect information about the impending climate change costs. The debate about whether and how to prioritize adaptive responses to climate change is not informed by reliable information. It's essential to transition from a state of ad hoc responses to a changing climate and weather-related disasters to one of building resilience. This includes continual learning about what works, what doesn't, and how to plan for uncertainty. Instead of waiting for more information, the uncertainty inherent in climate change requires acting decisively on what we already know while also developing improved foresight.

The imperative to reduce greenhouse gas emissions tends to dominate the debate over Canada's progress in addressing climate change. Yet, as a climate solution, adaptation—ensuring human and natural systems can adjust to the spectrum of effects of climate change—will have a critical impact on the well-being

and prosperity of all who live in Canada in the decades ahead.

Current adaptation policies and investments in Canada fall far short of what is needed to address the known risks of climate change, let alone those that are still unclear and unknown. This has to change.

RECOMMENDATIONS

Governments, businesses and communities must get serious about putting adaptation policies and practices into place now, while better identifying the physical and social climate risks threatening well-being and future prosperity. The following policy recommendations provide a starting point:

1 **All orders of government should significantly scale up public funding for implementing adaptation.**

A lack of foresight on climate change risks should not be a barrier to significantly scaling up adaptation investment. Addressing climate-related risk and building resilience implicates many, if not most, government activities and programs. Successful implementation therefore requires not only dedicated government capacity and expertise on adaptation, but mechanisms to integrate and fund adaptation in existing government programs and public investments, including infrastructure, health care, Indigenous affairs, Northern programs, economic development, energy, public safety, natural resource management, and environmental protection. To drive this change, government programs and investments should transparently evaluate their effects on current and future climate risks, and the costs and benefits of incorporating adaptation and resilience. As our analysis shows, adaptation faces barriers to implementation, but returns multiple benefits.

2 **The federal government should convene provincial, territorial, Indigenous and municipal governments to co-develop a more coordinated approach to governing adaptation.**

The need to deploy adaptation at the scale and speed that Canada requires transcends administrative, geographic, and sectoral boundaries. Adaptation must be tailored and implemented at a local level to reflect local context. Yet coordination can reduce overlap, inconsistencies, and gaps. A coordinated, collaborative approach could set adaptation priorities, goals, and measures of progress, establish roles and responsibilities, identify policies that are essential for driving adaptation at all scales, and coordinate and leverage finance.

3 **Governments and financial regulators should systematically enhance public disclosure and transparency of the economic and social implications of climate change risks across both the public and private sectors.**

As the Task Force on Climate-Related Financial Disclosures and Canada's Expert Panel on Sustainable Finance have highlighted, transparency about climate change risks is essential for allocating investment away from risk and towards resilience. This extends beyond disclosure rules for large, publicly traded companies; it also includes increased transparency around the climate risks that governments, communities, and individuals face. Whether incorporated into government credit ratings or real estate home inspections, this information will help governments, firms, and individuals better prepare for a changing climate. It will also shift investments toward resilient solutions, galvanizing a range of adaptation actions.

The Institute's ongoing research into the costs of climate change aims to bring clarity to both what we know about the changes ahead and what we don't. Our analysis will highlight the need to plan and design for a changing climate in how Canadians build, work, and live—even in the midst of uncertainty and imperfect information. And we will provide practical advice to governments regarding policies and investments that can mobilize smart adaptation across our economy and across the country.

Policy and investment decisions need to account for today's known costs that form the tip of the iceberg, as well as the less clear hazards that lurk below the surface. While the sheer scale of the threats ahead is daunting, improving foresight while also acting on the knowledge available today provides the chance to course correct en route to a resilient and prosperous future.

Over the next two years, our research into the costs of climate change will expand on and support these recommendations.



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Three ways governments should make climate change a national priority:



Dramatically scale up public investment in adaptation, given economic and other benefits.



Work with other governments in Canada to improve efficiency and coordination.



Systematically enhance disclosure of physical climate risks to mobilize planning and investment decisions.

The uncertainty inherent in climate change requires acting decisively on what we already know while also developing improved foresight.