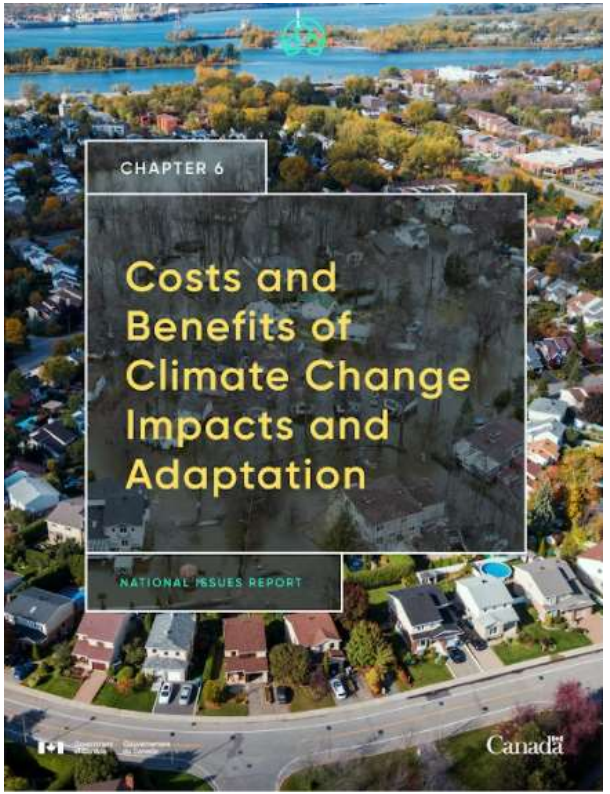
Chapter 6: Costs and Benefits of Climate Change Impacts and Adaptation

Government of Canada / Gouvernement du Canada
Canada

Outline

1. Introduction to the chapter
2. 7 key messages
3. Emerging issues and knowledge gaps
4. Q&A



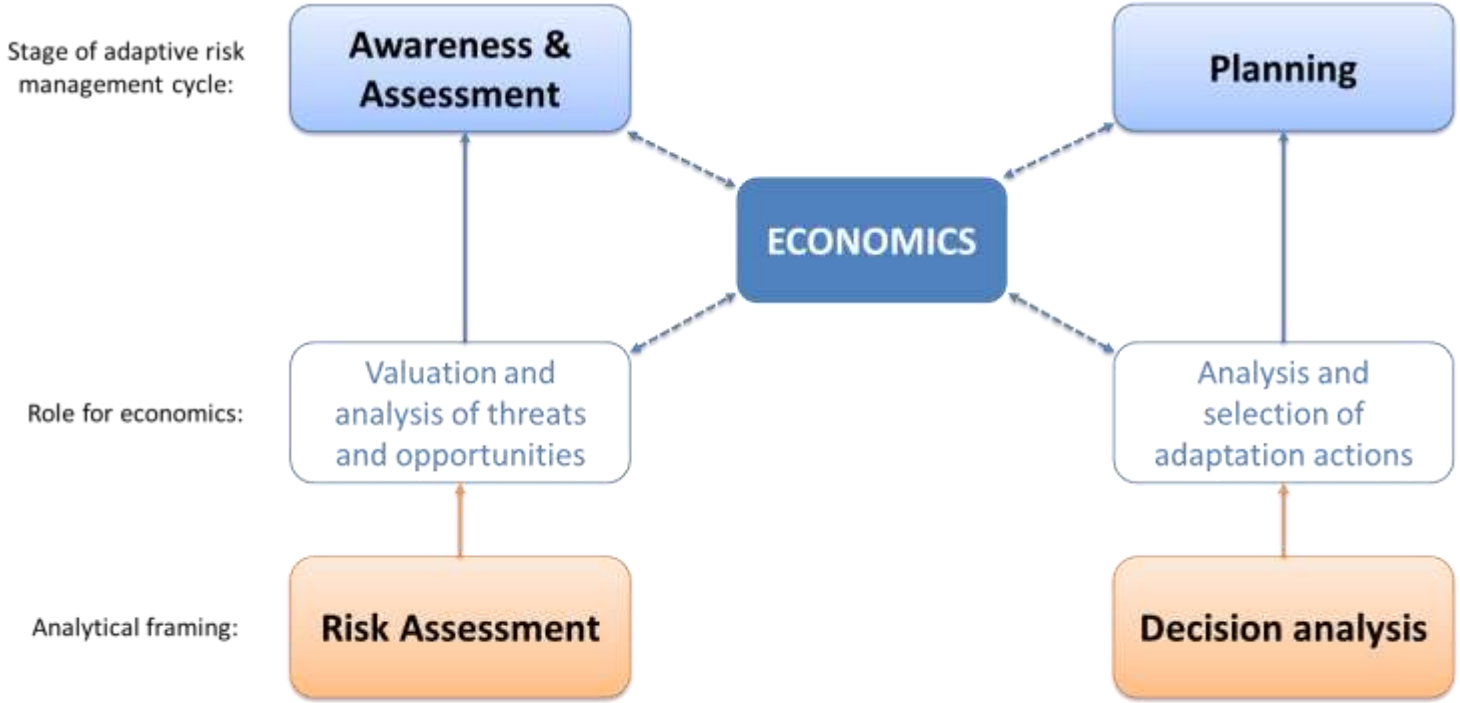
Introduction to the chapter

Objective of chapter was to address several key questions:

- How is economic analysis supporting adaptation planning?
- What do we know about the economic costs of climate change for Canada?
- How are these costs distributed?
- What is the return on investments in adaptation?
- How does economics shape the limits of adaptation?
- What economic tools are used to address these questions?

Key Message #1

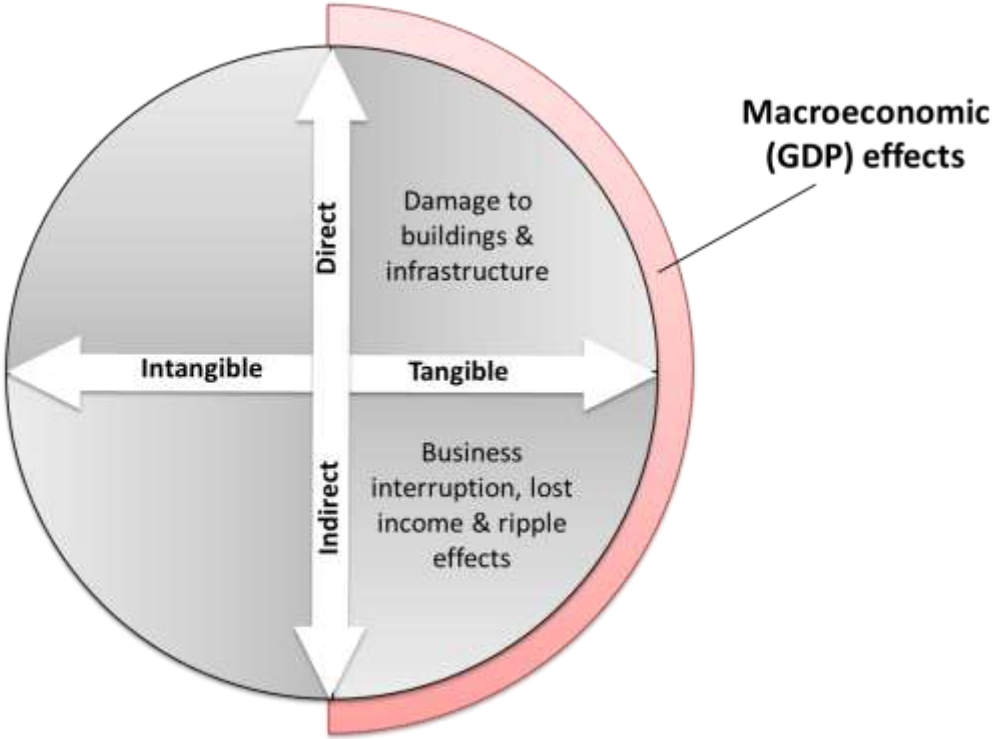
Economic analysis helps to inform adaptation planning



Source: Adapted from Jones et al (2013)

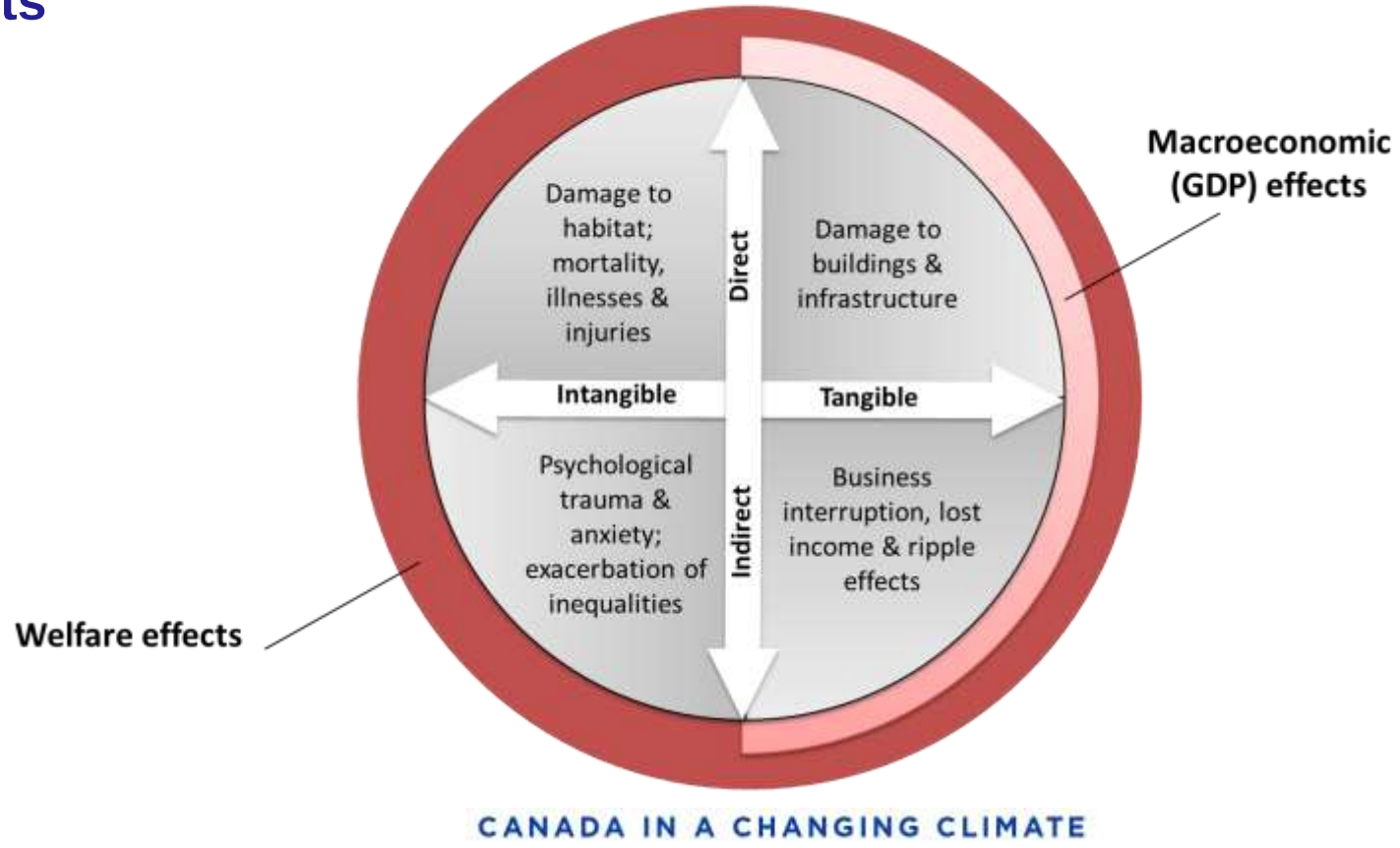
Key Message #2

Wide range of financial and social costs must be considered to understand the full economic impacts of climate change



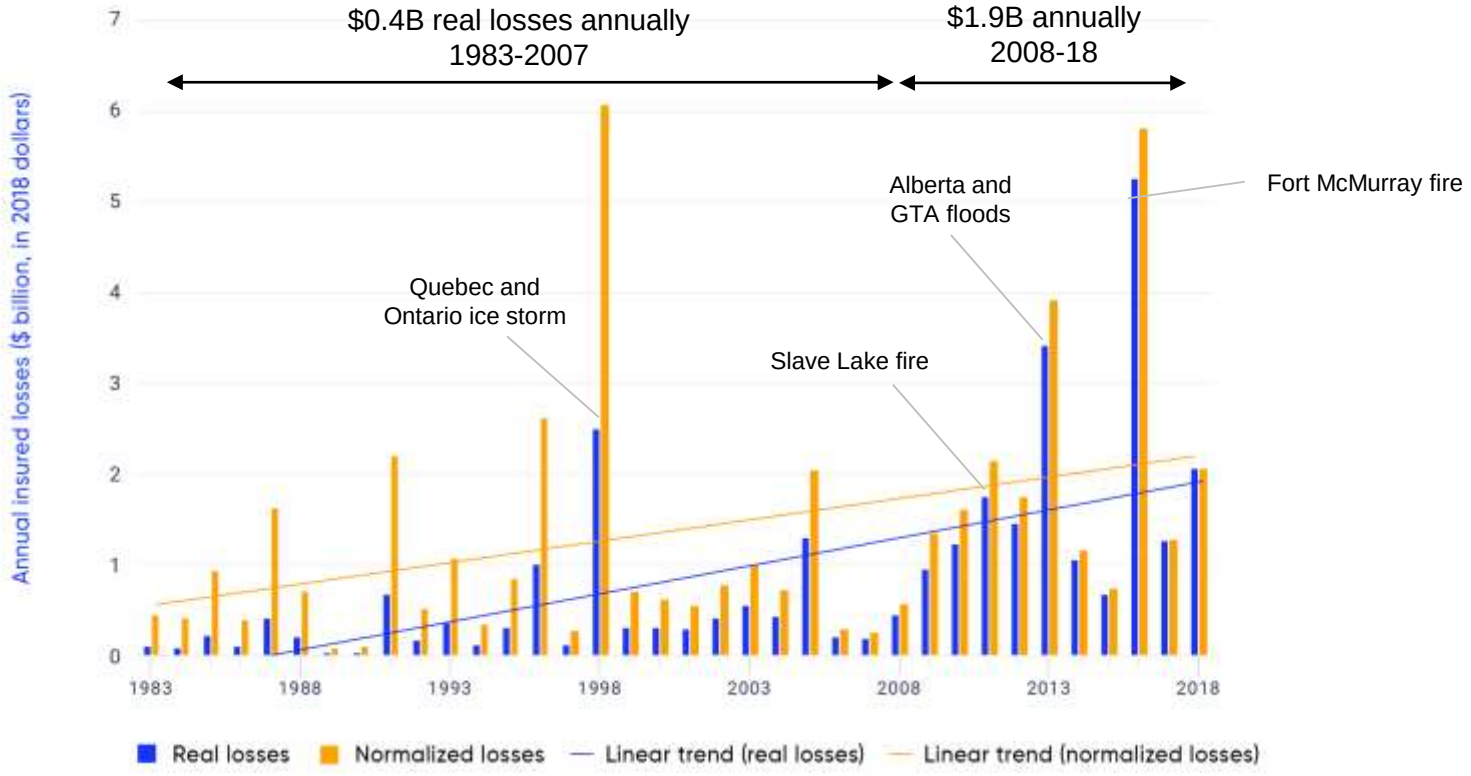
Key Message #2

… interested in the welfare costs of climate change, not just GDP costs



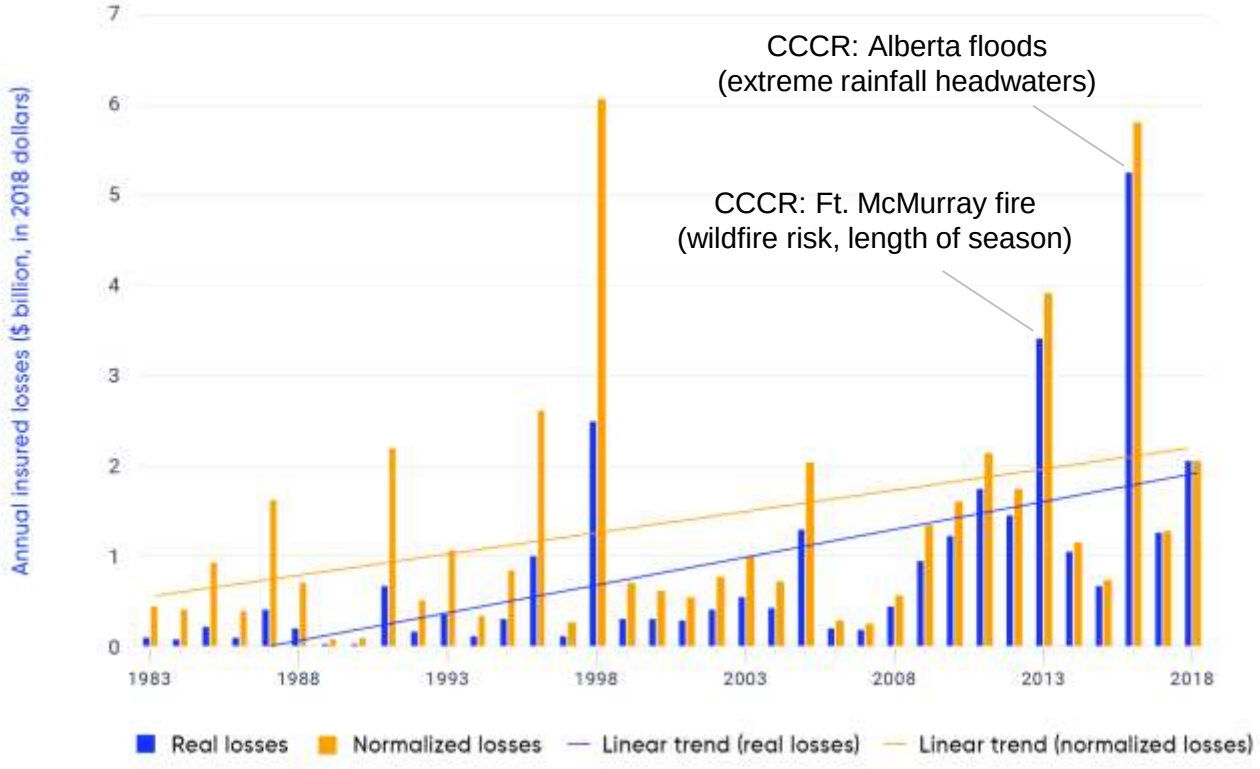
Key Message #3

Costs related to extreme weather events are significant and rising, suggesting an adaptation deficit or gap



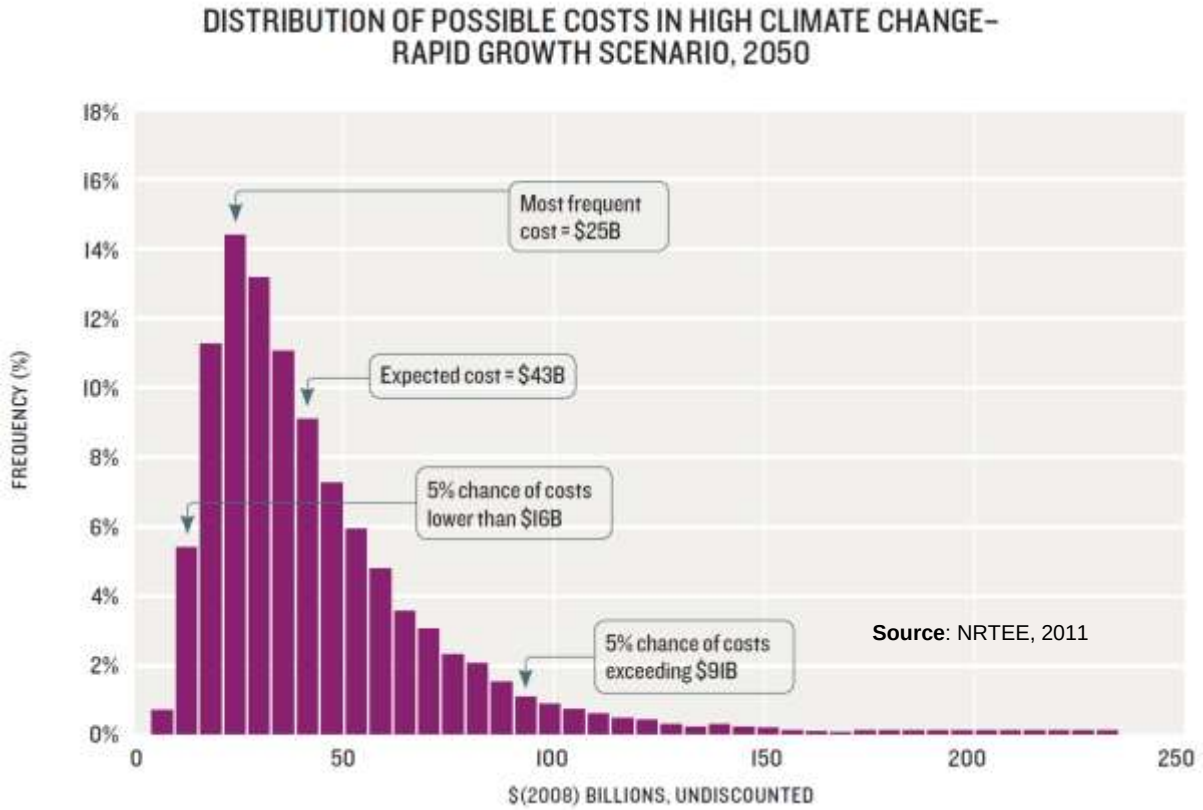
Key Message #3

… rising costs can't all be explained by growing exposures and increasing asset values



Key Message #4

Future economic impacts of climate change for Canada will be high and overwhelmingly negative



Source: NRTEE, 2011

Key Message #4

Projected national economic impacts - examples

Forestry - national

$4-459B PV GDP costs

(2010-2080; DR = 3%; 2008 $)

Impacts on timber supply from fire, pests and disease, and changes in productivity using CGE model

Economy - national

4.4% (2050) and 13.1% (2100) reduction in GDP per capita

Impacts from cumulative losses of labour productivity due to rising temps

Coasts - national

$109-$379B PV financial costs

(2011-2100; DR = 3%; 2008 $)

Damages to dwellings from SLR and storm surge

Crops - national

+1.7% change in PV of GDP

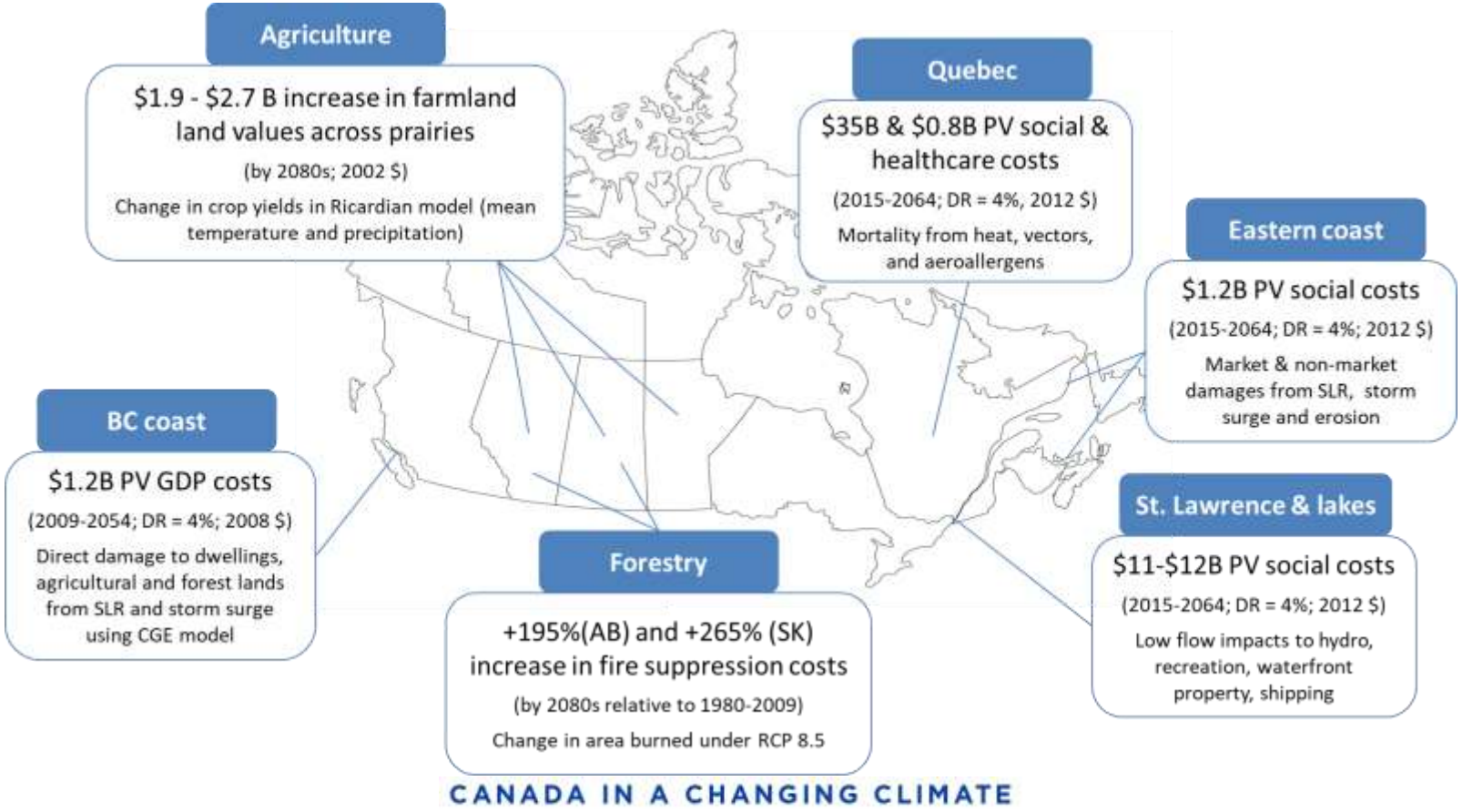
(2006-2051; DR = 4%)

Improvements in crop yields in CGE model (mean temp and precipitation)

CANADA IN A CHANGING CLIMATE

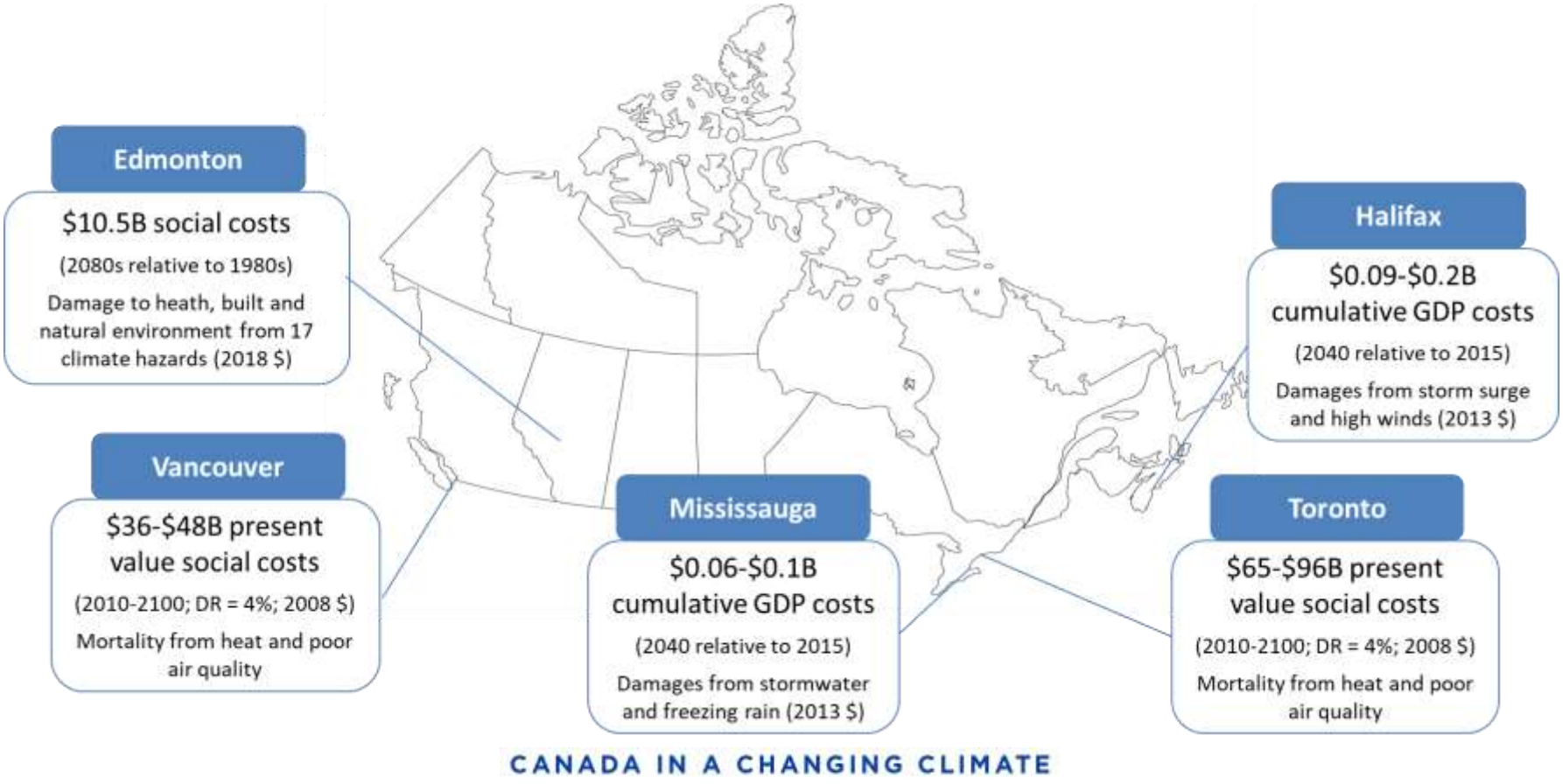
Key Message #4

Projected economic impacts for regions - examples



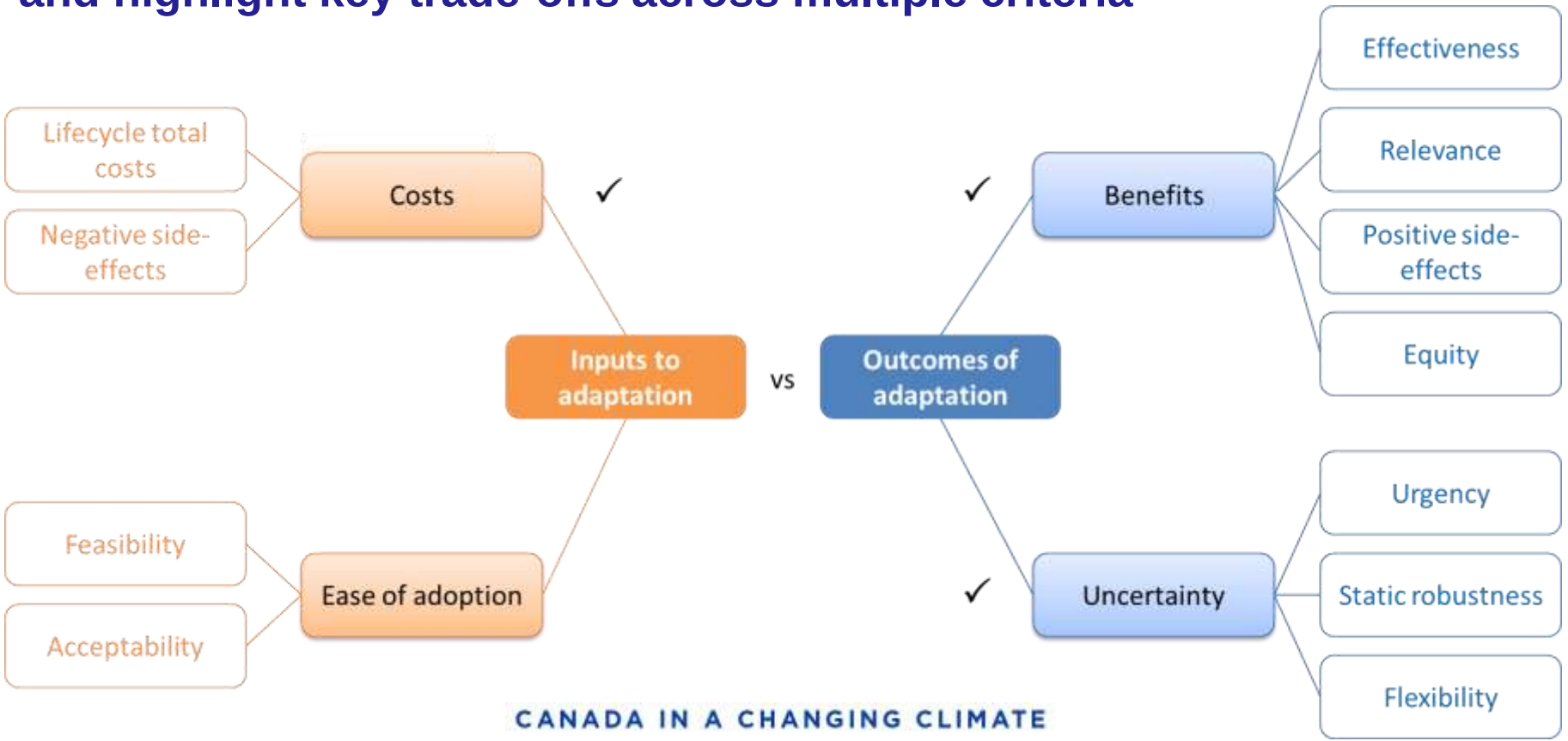
Key Message #4

Projected economic impacts for municipalities - examples



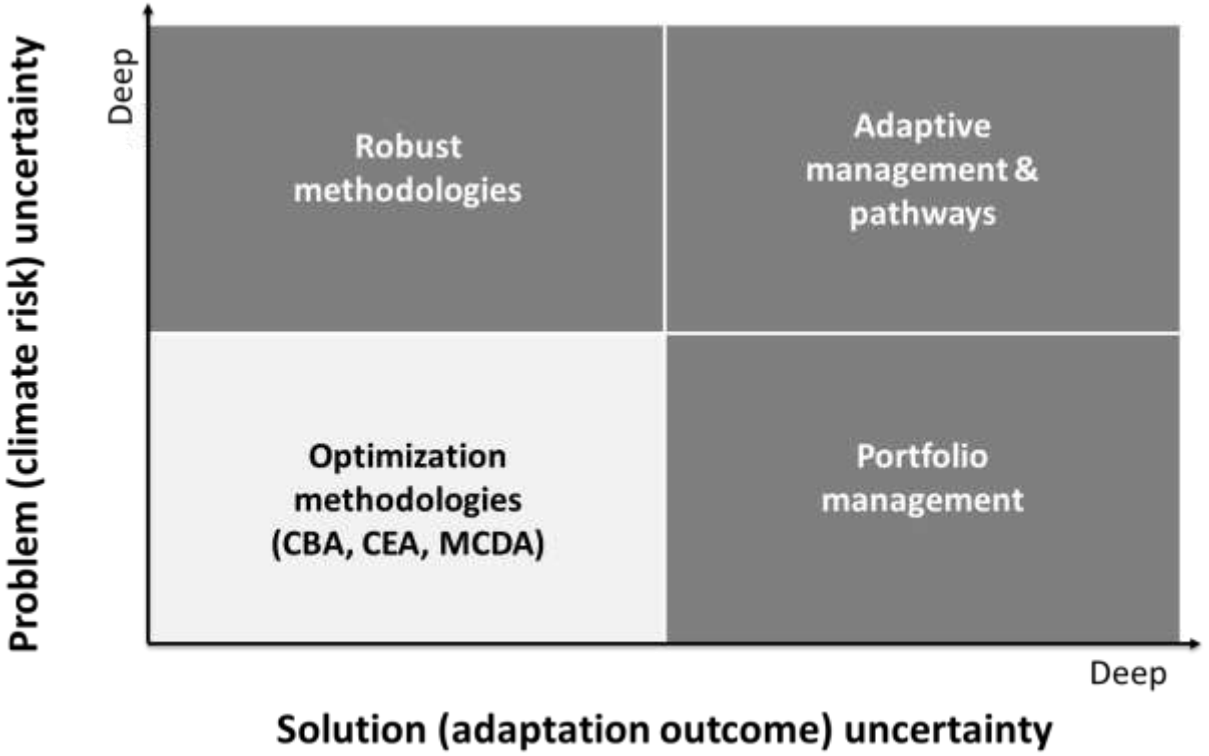
Key Message #5

Economic decision support tools can help assess adaptation options and highlight key trade-offs across multiple criteria



Key Message #5

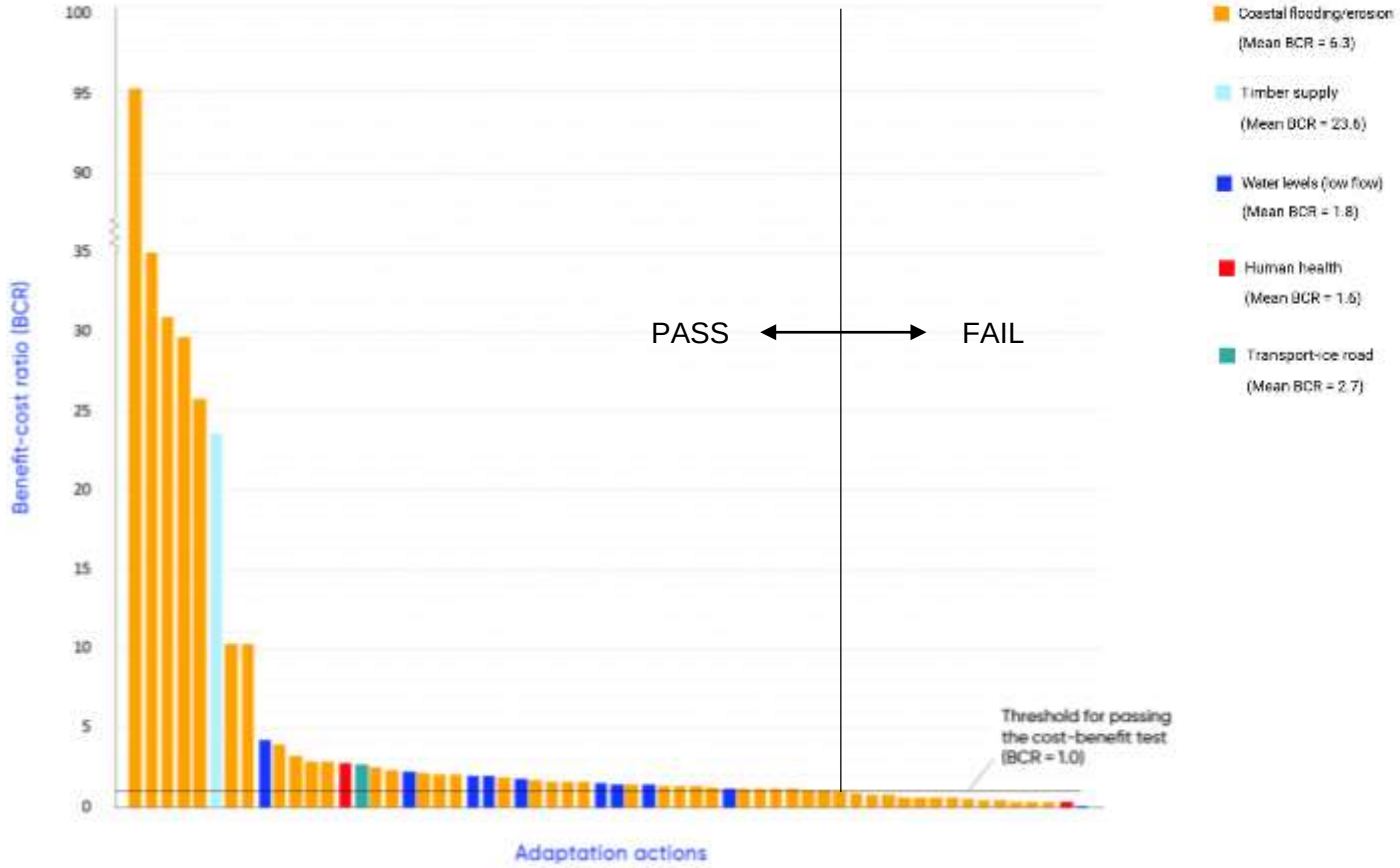
…. no one-size-fits all approach, the appropriate tool depends on the adaptation decision problem at hand … including level of uncertainty



Source: Adapted from Jones et al (2013)

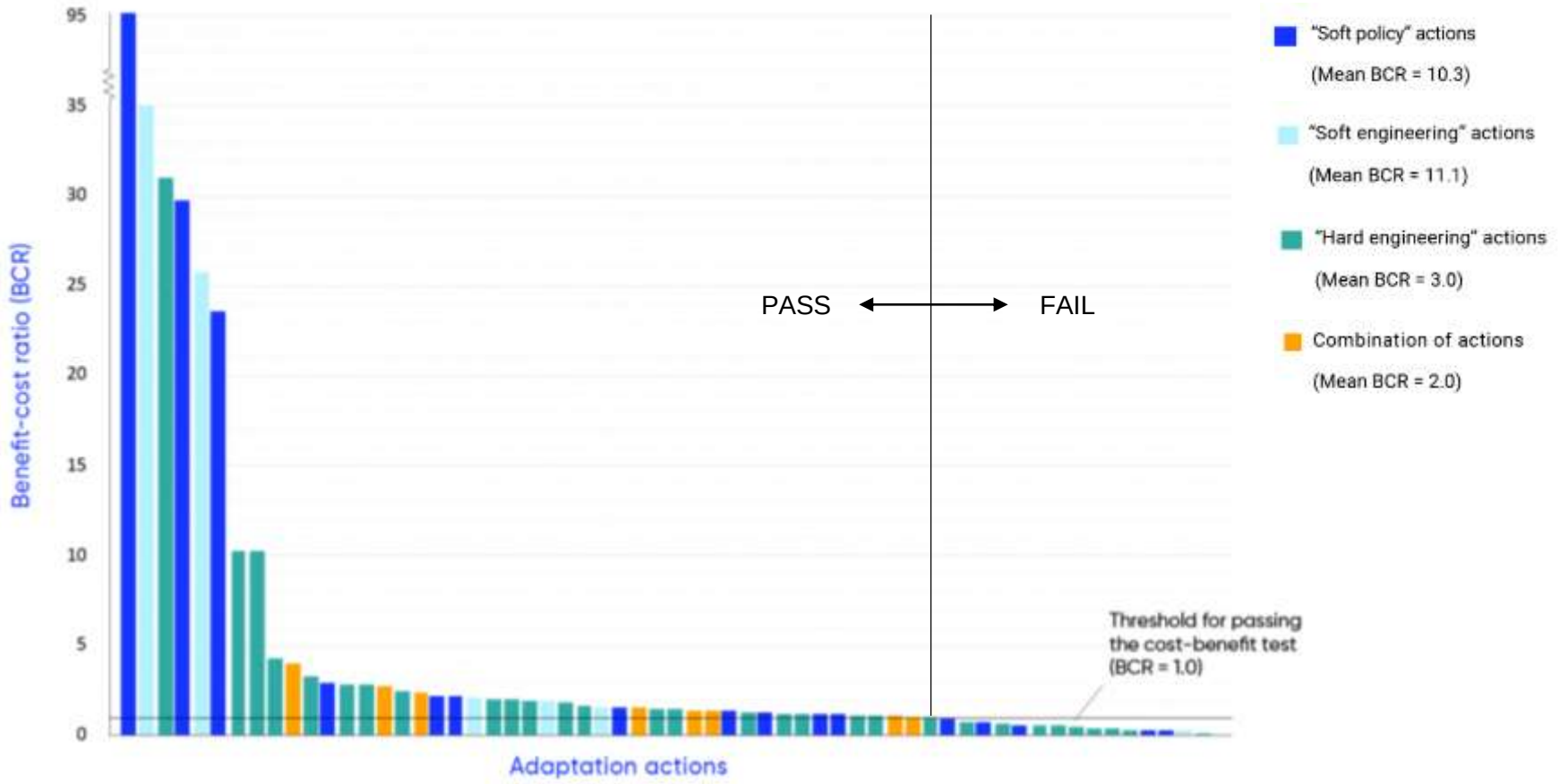
Key Message #7

Economic case for proactive investment in climate adaptation is strong



Key Message #7

Economic case for adaptation is context (project and site) specific



Key Message #7

Understanding of aggregate spending requirement is limited

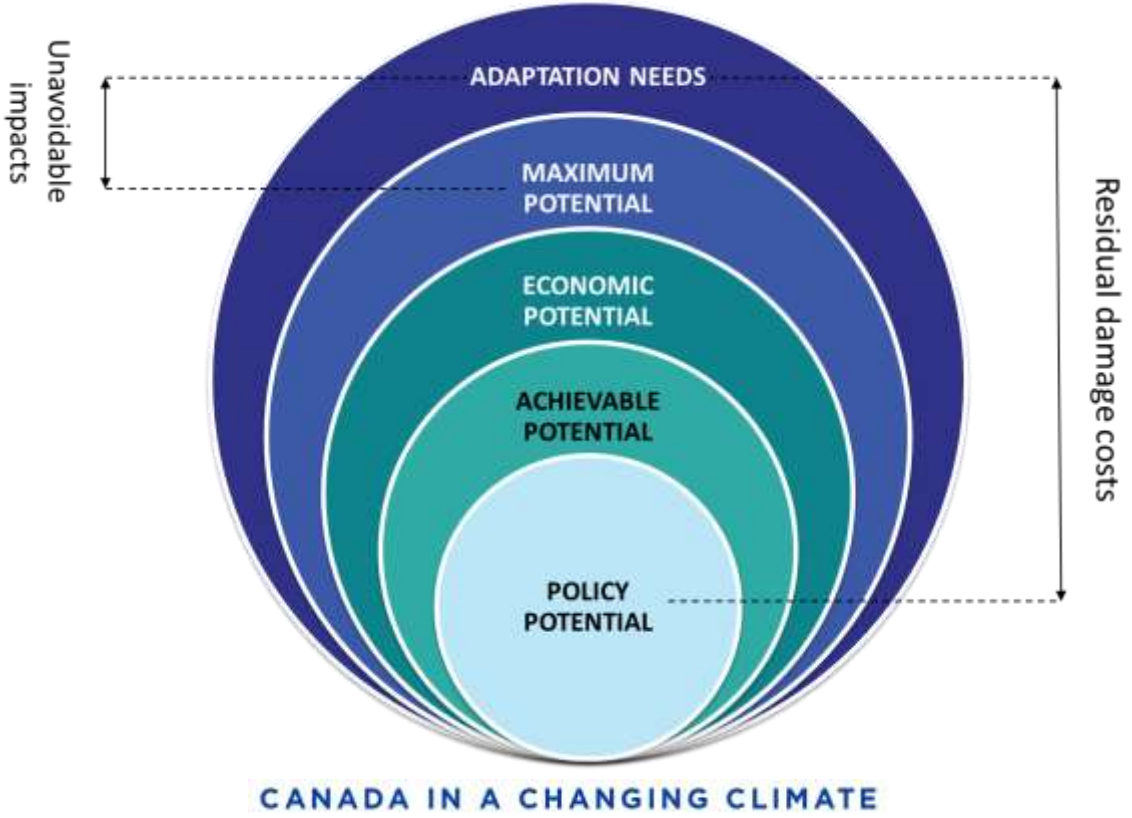
- **0.26%** of GDP per year nationally (expenditures in municipal adaptation plans; FCM & IBC, 2019)

- **0.12% - 0.25%** of GDP per year over next 5 years (expenditures on drinking water, sanitation, drainage, green infrastructure and roads in Quebec; Ouranos, 2019)

- **0.22% – 0.23%** of GDP in 2014/15 (public and private sector spend on adaptation in NYC, London and Paris; Georgeson et al., 2016)

Key Message #7

There are economic barriers and limits to meeting all adaptation needs, meaning residual costs can be expected



Key Message #7

… failure of market to equitably meet all adaptation needs creates a role for government

- Reform policies that impede efficient adaptation decisions by individuals and businesses
- Use regulatory and economic instruments to address market and behavioural failures, and provide incentives for efficient adaptation
- Provide “public goods” that support adaptation
- Help to reconcile distributional impacts

- Urgent need for strong, near-term reductions in GHG emissions to avoid exceeding adaptation limits

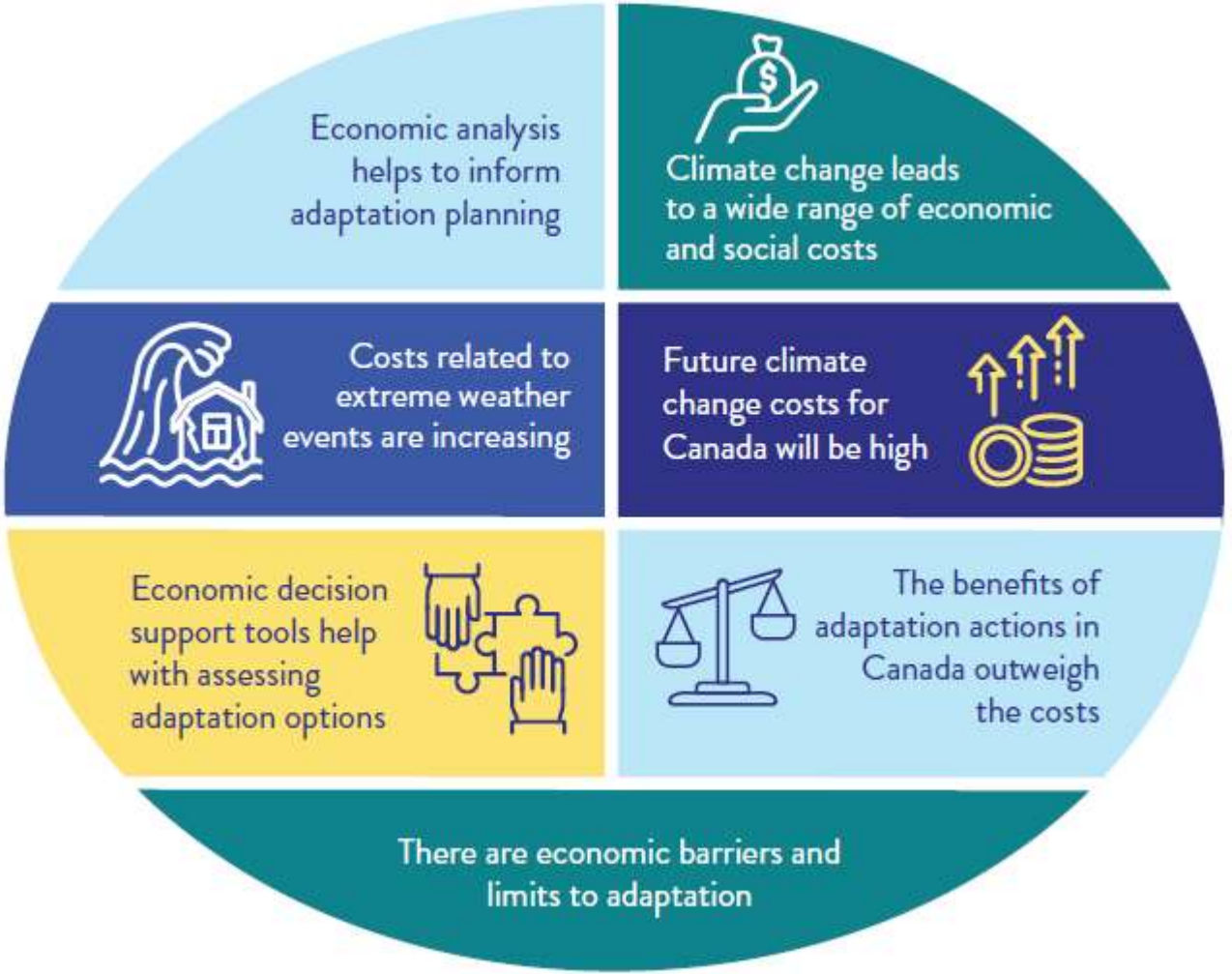
Knowledge gaps

- Climate-sensitive sectors – health, safety and security, labour, tourism, fisheries, energy, transportation, water resources [*some have been addressed since publication*]
- Understanding of extreme events and catastrophes
- Understanding of non-market impacts – mental health, ecosystem services
- Integration of socioeconomic futures into analysis
- Economic attractiveness of adaptation actions in all contexts
- Practical applications of economic decision support tools other than CBA

Emerging issues

- Arguments that the economic consequences of climate change are much higher than current estimates suggest
- Posited larger role for governments:
  - Support efficient private adaptation beyond providing funding and public goods
  - Manage distributional consequences of adaptation and residual losses
- Development of economic tools and applications to meet evolving needs of decision-makers:
  - How to avoid maladaptation when faced with “deep” uncertainties
  - How to assess “soft” adaptations and behavioural responses to government interventions

Question & Answer Period



Thank you!

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