

Risk management and climate change adaptation decision-making

Perhaps one of the biggest challenges for decision-makers in the North, including planners, resource managers, and industry, is the reality of uncertainty. For many decision-makers, climate change is an additional source of uncertainty. There is uncertainty about the impacts of a changing climate on our society, economy, and environment. This uncertainty stems from our imperfect

understanding of the climate system and how greenhouse gas emissions will change in the future.

Human activity can reduce or eliminate some risks, and can also create new and sometimes more hazardous risks. If we are to reduce the risk associated with the impacts of climate change, some important decisions will need to be made

about how our societies grow and develop. These decisions are called climate adaptation decisions. Climate change is expected to alter both the balance of risk and choices for managing risk, and will require many decision-makers to improve their management of risk to reduce vulnerability to a changing climate.

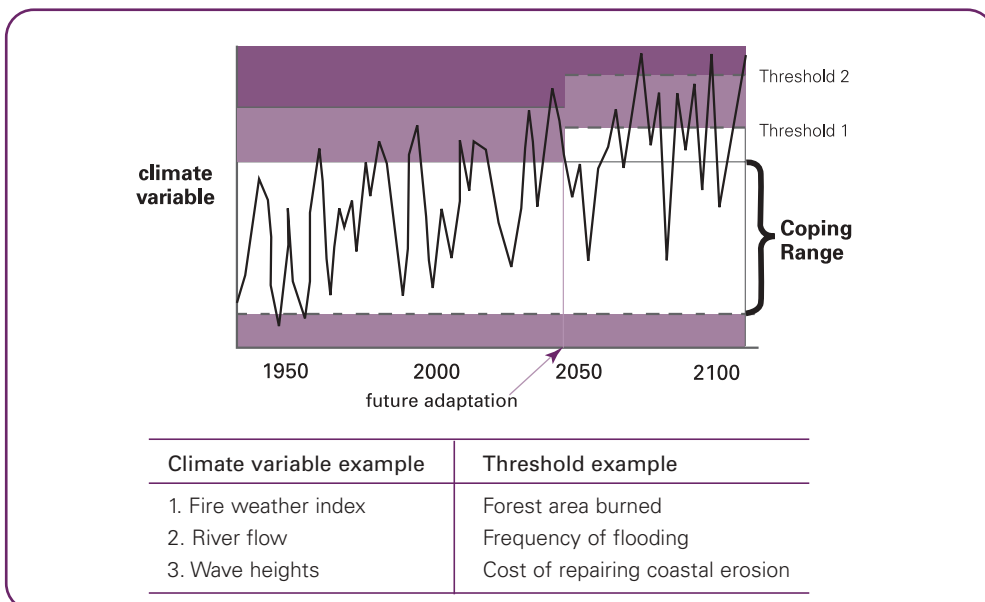


Figure 1. Risk assessment and coping range

SOURCE: Natural Resources Canada

Climate change: what is at risk?

Some climate risks can be anticipated, and the probabilities of others are associated with a greater degree of uncertainty. In northern Canada, climate change may pose risks to:

- Human and environmental health
- Community and environmental sustainability
- Security and sovereignty of the Northwest Passage
- Infrastructure such as buildings, pipelines, and roads
- Ecosystems
- Traditional lifestyles

What is a tolerable level of climate risk?

The threshold between tolerable and intolerable levels of risk may be based on past climate experiences (e.g., periods of significant drought or excessive rainfall).

This threshold can be used to provide a basis for assessing the various risk management options. New climate observations and climate change projections can be placed in the context of this threshold. Figure 1 demonstrates the concept of thresholds and coping ranges for three examples of climate variables.

What is risk management?

In an environmental context, risk is defined as the likelihood of undesirable effects on humans and/or the environment. Risk management is an approach to decision-making that explicitly considers the risks associated with decisions and investments in the face of an uncertain future. The intent of risk management is to help decision-makers judge the significance of risk and determine which measures are most appropriate in response to risk.

As a tool, risk management can be used to evaluate and prioritize options; help determine how to direct limited resources; determine which options provide the greatest return on investment; determine which aspects of social, economic, and environmental systems are most vulnerable; and/or determine what should be monitored for possible future intervention.



Climate adaptation and decision-making

Many decisions are climate sensitive. They are driven by the need to reduce anticipated climate risks. Climate change adaptation decision-making frameworks provide a flexible approach to decision-making for climate risk. The UK Climate Impacts Programme developed the following framework (Table 1).

Stages 1 and 2: These stages identify the nature of the problem, the values that are at risk, and the objectives and criteria that are used by the decision-maker to help differentiate between options. Clearly formulating and specifying the problem is perhaps the most important step in the risk management process. Rarely will processes be undertaken that are driven solely by climate change. More often, climate change will be one of several factors to be considered in a planning or decision-making process.

Stage 3: At this stage, climate risks associated with the decision are identified and assessed alongside other non-climate risks. The assessment identifies which aspects of climate change—e.g., average increases in temperature, shorter seasons, changes in extreme conditions—present the greatest risk to the values of concern to the decision-maker. The intent is to identify vulnerabilities, which may depend on

exposure to climate change or other non-climatic stresses, and on the adaptive capacity.

Stages 4 and 5: At this stage, the decision-maker identifies options and appraises the options to determine which provide the greatest likelihood of meeting the objectives and criteria described in Stage 2. The feasibility, suitability, acceptability, and effectiveness of the various options, which may differ according to local environmental, political, social, and economic circumstances, are important factors in the assessment process. Feasibility is how practical or easily carried out a particular option may be, suitability is a measure of how appropriate a management option is to local circumstances, acceptability is a measure of how willing stakeholders are to implement a particular option, and effectiveness is a measure of how that option reduces climate risk.

Stages 6, 7, and 8: Once the decision-maker forms a judgment, the preferred option (or suite of options) is implemented. The option is monitored for its effectiveness in reducing risk as well as the level of ongoing support in stakeholder groups. The decision may need to be revisited as knowledge, technology, and legislation evolve.

Table 1: Climate change risk-uncertainty-decision-making framework

1. Identify problem and objectives
2. Establish decision-making criteria
3. Assess risk using qualitative and quantitative measures
4. Identify options
5. Appraise options
6. Make decision
7. Implement decision
8. Monitor, evaluate, and review

SOURCE: UKCIP, 2003

Why manage climate risks?

Our understanding of climate change impacts is surrounded by uncertainty. Projecting impacts requires knowledge about climate and ecosystem inter-relationships and future development pathways, as well as considerations over very large temporal and spatial scales. Today, the lack of full scientific uncertainty is no longer an acceptable reason for postponing decisions where there is a risk of serious or irreversible harm (Privy Council Office, 2003). Within the context of scientific uncertainty and limited human and financial resources, risk management frameworks are becoming more commonly used as tools for decision-making.

Climate change and risk management resources

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