



Annotated Bibliography

CIP Climate Change Committee, Issue 03

Title: Managing the Complexity of Climate Change through Planning

Preamble (to be included in all releases): The Canadian Institute of Planners Climate Change Committee is developing a series of annotated bibliographies as one of our deliverables for this year. Through these bibliographies we intend to tell a story that explores the dynamic and challenging issues that affect the ability of the planning profession to mitigate greenhouse gas emissions while adapting to the impacts of climate change. This story is the tale of a wicked problem, rooted in social complexity, policy and planning law, technological variability, and the geographic realities that define Canada.

Focus: Wicked problems are characterized by a range of factors, including complexity, rapidly changing characteristics, multi-sectoral impacts, and short response times. Embracing the complexity of the issue is fundamental to successful resolutions. Simplification of the issues will confound progress and foster the perception of win/lose outcomes rather than an ongoing balance of trade-offs. This annotated bibliography explores how complexity can affect planning for climate change.

Key Takeaways: The complexity of climate change is, somewhat ironically, challenging to define given the breadth of planning issues affected by increased climate variability and the ranging perspectives on what variables actually define the issue. However, if one defines “complexity” very simply in terms of spatial scale, uncertainty, and temporal scope, then the following takeaways are apparent:

- The complexity of climate change inhibits effective adaptation planning through the introduction of uncertainty and the effect of varying scales.
- Complexity is addressed through flexible planning methodologies that encompass many disciplines and scales to identify “no-regret” outcomes.
- Flexible and robust planning can occur through iterative adaptation processes that focus on more than one future - although issues exist with the credibility of such an approach.
- Participatory processes are an imperative part of planning for more than one future and can compensate for some of the issues with this approach.





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Title	Author(s)	Publication Date	Relevance to Planners	Link	Scope
How to embrace uncertainty in participatory climate change risk management – a roadmap	Doll, P. and Romero-Lanko, P.	2017	The article defines the many ways that uncertainty can inhibit effective planning. Uncertainty derives from multiple pathways including: ignorance of issues, imprecision in science, ambiguity in terms as they are applied across disciplines, and through risk perception. The authors propose an uncertainty framework to classify and understand uncertainty within a context of inter- and trans-disciplinary planning.	http://onlinelibrary.wiley.com/doi/10.1002/2016EF000411/full	International - adaptation
Adaptation pathways and real options analysis: An approach to deep uncertainty in climate change adaptation policies	Buurman, J. and Babovic, V.	2016	Policy making for adaptation is subject to many uncertainties from a variety of sources. These sources range from societal (e.g. economic growth) to technological (e.g. new technologies), to methodological (e.g. system assumptions), to practical (e.g. political priorities or budgetary restrictions). The authors propose to resolve this “deep uncertainty” through the use of tools, such as the Adaptation Pathways or Real Options Analysis approaches, that incorporate flexibility into planning.	http://www.tandfonline.com/doi/full/10.1016/j.polsoc.2016.05.002	International - adaptation
Planning for an unknowable future: uncertainty in climate change adaptation planning	Woodruff, S.	2016	This article assesses how planners recognize and manage uncertainty through an evaluation of 44 local climate change plans in US. Interviews suggest that adaptation planning can better manage uncertainty. Institutional barriers were viewed as a major challenge to this processes – specifically the “deeply embedded practice of planning for	https://link.springer.com/article/10.1007/s10584-016-1822-y (Abstract only)	International – adaptation



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			one future". Iterative adaptation and no-regret processes were identified as integral to flexible and robust adaptation strategies.		
Supporting adaptation decisions through scenario planning: Enabling the effective use of multiple methods	Star, J., Rowland, E., Black, M., Enquist, C., Garfin, G., Hawkins-Hoffman, C., Hartmann, H., Jacobs, K., Moss, R., and Waple A.	2016	Scenario planning is a technique used to inform decision-making under uncertainty, and is increasingly applied in the field of climate change adaptation and policy. This paper describes applications that combine previously distinct scenario methods in new and innovative ways. The paper concludes with a call for greater support for, and collaboration among, practitioners with the argument that mixed methods are most effective for decision-making in the context of climate change challenges	http://www.sciencedirect.com/science/article/pii/S2212096316300262	International - adaptation
Participation, scenarios and pathways in long-term planning for climate change adaptation	Campos, I., Vizinho, A., Coelho, C. and Penna-Lopes, G.	2016	This article describes a climate change adaptation planning process and the application of two methods: scenario workshops and adaptation pathways in the context of a participatory action research methodological design. Participatory action research and qualitative scenario methods are highlighted as accelerators of climate change adaptation processes. The experience leads to the conclusion that planning climate change adaptation has to go far beyond the technical dimension and take into account those affected (in the present and the future) by decisions made.	https://www.researchgate.net/publication/308012811_Participation_scenarios_and_pathways_in_long-term_planning_for_climate_change_adaptation	International – adaptation
The Problem of Fit: Scenario Planning and Climate Change	Rickardsm L., Wiseman, J., Edwards, T., and Biggs, C.	2014	The authors suggest, based on a scenario planning exercise in Australia, that scenarios are perceived as a valuable but awkward form of evidence in the contemporary environment	http://journals.sagepub.com/doi/abs/10.1068/c12106	International - adaptation



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Adaptation in the Public Sector			of evidence-based adaptation. Scenario planning introduces new substantive knowledge in an unfamiliar form, easily dismissed on credibility, legitimacy, and salience grounds. Therefore, while scenario thinking is a good fit with climate change adaptation, it clashes with more evidence-based decision-making modes.		
Planning the resilient city: Concepts and strategies for coping with climate change and environmental risk	Jabareen, Y.	2013	Planning for resilience is characterized by complexity. This complexity is driven by economic, social, spatial, and physical factors. Planning therefore a dynamic and flexible approach that can be modified on demand while staying true to its fundamental concepts. Effective stakeholder engagement is imperative to this process.	https://www.researchgate.net/profile/Yosef_Jabareen/publication/257097140_Planning_the_resilient_city_Concepts_and_strategies_for_coping_with_climate_change_and_environmental_risk/links/541abe3d0cf25ebee988bdcc/Planning-the-resilient-city-Concepts-and-strategies-for-coping-with-climate-change-and-environmental-risk.pdf	International - adaptation
Scenario planning for climate change adaptation: A guidance for resource managers	Moore, S. Seavy, N. and Gerhart, M.	2013	This document is intended to be a step-by-step guide to using scenarios to plan for climate change adaptation. The intended audience includes natural resource managers, planners, scientists and other stakeholders working at a local or regional scale to develop resource management approaches that take future possible climate change impacts and other important uncertainties into account.	https://glslcities.org/wp-content/uploads/2015/09/Scenario_planning_for_climate_change_adaptation_-_A_guidance_for_resource_managers_2013.pdf	International - adaptation



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<p>The role of uncertainty in climate change adaptation strategies—A Danish water management example</p>	<p>Refsgaard, J., Arnbjerg-Nielsen, K., Drews, M. Halsnaes, K., Jeppesen, E., Madsen, H., Markandya, A., Olesen, J., Porter, J., and Christensen, J.</p>	<p>2013</p>	<p>While uncertainty is manageable under most decision-making paradigms, the complexity of climate change inhibits effective adaptation planning through the uncertainty cascade, which introduces different forms uncertainty at multiple points of system interaction. Knowledge acquisition through dialogue and the sharing of information is critical to addressing uncertainty although some forms cannot be resolved.</p>	<p>https://link.springer.com/article/10.1007/s11027-012-9366-6</p>	<p>International – adaptation</p>
<p>Transforming barriers into enablers of action on climate change: Insights from three municipal case studies in British Columbia, Canada</p>	<p>Burch, S.</p>	<p>2010</p>	<p>Action on climate change is limited by a number of variables including resource constraints. Rather than relying on capacity development measures, such as new financial resources, municipalities should rely on existing means to plan for climate change. Such a reliance manages complexity and uncertainty by integrating shorter term considerations such as mitigation and sustainable development.</p>	<p>https://www.researchgate.net/profile/Sarah_Burch/publication/237944140_Transforming_Barriers_into_Enablers_of_Action_on_Climate_Change_Insights_from_Three_Municipal_Case_Studies_in_British_Columbia_Canada/links/53efa9e80cf23733e812d761.pdf</p>	<p>Local – British Columbia</p>
<p>Does public policy support or undermine climate change adaptation? Exploring policy interplay across different scales of governance.</p>	<p>Urwin, K. and Jordan, A.</p>	<p>2008</p>	<p>Policy makers have been working toward creating climate relevant policy for some time. This paper investigates the interplay between top-down and bottom-up policy development to assess how processes differ at various scales. The research reveals that neither approach offers a complete picture of the enabling or constraining effects of different policies on adaptation planning, but together they offer new perspectives on climate policy integration.</p>	<p>https://www.humphreyfellowship.org/system/files/Does%20public%20policy%20support%20or%20undermine%20climate%20change%20adaptation.pdf</p>	<p>International - adaptation</p>



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Uncertainty in adaptive capacity and the importance of scale	Vincent, K.	2007	Understanding different adaptive capacities is a prerequisite for targeting interventions to reduce the adverse impacts of climate change. Indicators and indices are common tools in this process, but their construction embodies many uncertainties, not least of which is their scale specificity. The research concludes that the central elements of adaptive capacity, based on institutional collective response and the availability of and access to resources, are common at different scales, although the structure of each index is scale-specific. Hence the findings of these apparently irreconcilable scales of analysis converge to demonstrate points of leverage for policy intervention to raise resilience and the capacity to adapt to the risks posed by climate change.	https://www.sciencedirect.com/science/article/abs/pii/S0959378006000884	International - adaptation
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Interested in the broader academic theory on planning and climate change and looking for additional resources? These libraries provide extensive reading the subject policy and planning as they relate to climate change:

- Planning Theory and Practice (<http://www.tandfonline.com/loi/rptp20>).
- Researchgate (<https://www.researchgate.net/>)

This annotated bibliography is intended to provide an introduction to the subject area and further exploration by the reader. It is not intended to be comprehensive. We have also focused solely on open source resources to ensure the referenced resources can be accessed by a broad audience. That said, we are interested in your feedback! If you have additional resources or themes you would like us to explore, please let us know through the Canadian Institute of Planners.

The Climate Change Committee is a volunteer committee established by the Canadian Institute of Planners provide current, cutting edge guidance and direction on how to address the impacts of climate change on our communities and within the professional practice of members.

Search terms:

- Uncertainty and climate change planning