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Canada’s Regional Adaptation Collaboratives and adaptation platform: The importance of scaling up and scaling down climate change governance experiments

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Canada’s Regional Adaptation Collaboratives and Adaptation Platform: The importance of scaling up and scaling down climate change governance experiments

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Abstract
Policy experiments have often been touted as valuable mechanisms for ensuring sustainability transitions and climate change adaptation. However, problems exist both in the definition of ‘experiments’, and in their design and realization. While valuable, most experiments examined in the literature to date have been small-scale micro-level deployments or evaluations of policy tools in which the most problematic element revolves around their ‘scaling-up’ or diffusion. The literature on the subject has generally neglected the problems and issues related to another class of experiments in which macro or meso-level initiatives are ‘scaled-down’ to the micro-level. This paper examines a recent effort of this kind in Canada involving the creation of Regional Adaptation Collaboratives (RACs) across the country whose main purpose is to push national level initiatives down to the regions and localities. As the discussion shows, this top-down process has its own dynamics distinct from those involved in ‘scaling up’ and should be examined as a separate category of policy experiments in its own right.

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Practical implications
Policy experimentation is becoming an important and necessary approach to developing innovative climate change adaptation policies. Such experiments come in a variety of forms but are potentially useful procedural policy tools for governments with limited policy capacities facing an increasingly complex policy making environment. They can provide an ex-ante evaluation, promote learning outcomes, and provide timely policy relevant information. In the absence of policy experimentation, policy managers and practitioners face the possibility of designing poorly designed large-scale programs or stuck with the status quo. One type of policy experiment is a procedural tool that seeks to change the policy process. Procedural policy tools are in contrast to substantive policy instruments (regulations, subsidies etc.).

Typically, policy experiments have been “scaled up”, that is, from a micro-level pilot study, and if successful may be applied at a macro-level policy level. The policy experimentation literature has generally neglected the importance of “scaled down” experiments where broad politically approved on-going initiatives are applied to concrete issues. Scaling down is closely related to concerns with climate change adaptation practitioners who seek to ‘mainstream’ climate change into existing policies. Due to the larger governance implications of climate change adaptation, procedural based experiments also permit the meaningful participation of stakeholders in policy design.

To examine scaling up and scaling down policy experimentation, a case study approach examined a multi-year Regional Adaptation Collaborative and National Adaptation Platform funded by the Government of Canada. Publically available government documents such as reports, assessments, evaluations and audits were used in the analysis.

Examining the Canadian case study lead to the following practical implications:

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Introduction: scaling up versus scaling down in policy experiments

Policy experimentation has been acknowledged as a useful policy tool to deal with complex and dynamic policy issues. Different types of policy experiments including pilot projects have been conducted in many sectors and these have provided useful insights to resource managers for policy design. Policy pilots may be scaled up in space, time or based on their purpose.

Without experimentation, as Ascher (2001) argued, the outcomes from deploying policy tools are likely to lead, at best, to a range of poor results, due to unintended consequences, the promotion of perverse incentives and other kinds of policy failures linked to the adoption of infeasible policy alternatives (Marsh and McConnell, 2010; McConnell, 2010).

In large part because of the complexities, uncertainties and ambiguities of resource and environmental issues, governments have increasingly chosen to try to construct policy consensus through more engaged and interactive forms of policy making and to allow non-state actors to implement those policies within a broad framework of incentives, benchmarking and private governance (Sprinz and Vahtoranta, 1994). Many of these efforts have involved policy experimentation and pilot projects but in the direction of moving from the macro to the micro, rather than vice versa.

In 2007, for example, under increasing pressure to address climate change in Canada, the then minority Conservative government rebuked previously existing international commitments made by its predecessors and sought to develop a “made in Canada” approach to reducing greenhouse gases. This came to fruition with the “Clean Air Regulatory Agenda” (CARA) and Bill C-30 (Canada’s Clean Air and Climate Change Act). Under this legislation, among other things, the federal government provided nearly $86 million to programs intended to improve information access and technical expertise to facilitate climate change adaptation in Aboriginal and northern communities, to produce improved climate change scenarios to support risk assessment, and to further research and engagement to address health impacts of climate change in northern First Nations and Inuit communities (Henstra, 2015). An additional part of this agenda set aside funding to enhance “horizontal collaboration in climate change adaptation”. The program that focused on this goal was the Regional Adaptation Collaboratives (RACs) led by Natural Resources Canada, which sought to enhance knowledge sharing networks located throughout the country by directly engaging provincial and municipal governments, industry, academia and NGOs in adaptation planning and decision-making.

RACs are thus policy experiments focused on enhancing what Howlett (2000) has referred to as ‘procedural’ policy tools, that is, those which are geared towards altering aspects of policy processes rather than ‘substantive’ delivery of goods and services on the ground. This type of experiment has rarely been examined in the still relatively sparse literature on the subject of policy experiments.

Most of this literature on policy experiments to date has examined instances of substantive tool deployment and has generally focused on small-scale micro-level employment or evaluation of such tools with the expectation that successful efforts may be generalized or “scaled-up” (Thrush et al., 1997; Hoffmann, 2011; Hartmann and Linn, 2007; Simmons et al., 2007; Callander, 2011; Spicer et al., 2014; Zhou et al., 2013). In these kinds of experiments the most problematic elements revolve around understanding why some experiments are “scaled-up” or diffused from the macro to the micro-level, while others are not. This literature has identified key factors such as the nature of political and administrative support for such initiatives and/or their technical merits in achieving policy goals as key variables affecting this process (Mei and Liu, 2013).

Existing studies, however, have generally neglected the problems and issues related to both procedural tools and to experiments in which macro or meso-level initiatives are ‘scaled-down’ to the micro-level; that is, in which they already have general political support and resources. Scaling down, however, is particularly significant in areas such as climate change policy, where initiatives often begin by developing broad strategic direction and overarching principles, such as a clean air act, and then attempt to “apply” them in an open-ended way to concrete circumstances such as control of specific emissions problems. Other problems with procedural tools, in particular, which may, as in this case, empower participatory policy-making at the regional level which is expected to in turn impact policy deliberations and development at the local, individual and firm levels, among others, are also poorly understood.

This paper examines the creation and implementation of six Regional Adaptation Collaboratives (RACs) in Canada whose main purpose has been to push national level adaptation to climate change initiatives to the regions and communities. Examination of publically available output (reports, workshop proceedings, management plans, presentations) of the RACs shows this top-down process has its own governance dynamics and problems distinct from those involved in ‘scaling up’ and must be examined as a separate category of policy experiments in its own right.

Policy experiments in theory and practice

Experiments form a potentially useful policy instrument with which to manage such complex policy issues by aiding in ex-ante evaluation of policies, generating learning outcomes and policy relevant information under dynamic conditions (McFadgen, 2013). In the development sector, for example, experimental projects are frequently used to assess alternative courses of action. These include (1) projects that focus on problem definition by assessing
evidence of “dissatisfaction or existence of a problem”, (2) projects that focus on problems which are partly or wholly undefined, (3) projects that explore the most effective way of achieving pre-set policy goals, (4) projects that aim at identification of gaps and barriers in situations where problems and goals are already well-known and (5) natural experiments that occur over a period of time without conscious intervention (Rondinelli, 1993). Enhanced experimentation and consequent learning can also aid in adapting to the “dynamic drivers and expressions of risk” in a changing policy environment (O’Brien et al., 2012).

While the importance of pilots as a form of experimentation for pre-testing policies and programs is well-acknowledged, however, there exist several challenges in translating or ‘scaling-up’ of experimental projects which affect their diffusion with which the contemporary literature on the subject has grappled (Sabel and Zeitlin, 2010; Stoker, 2010).

Political factors including the influence of diverse stakeholders, for example, have been found to impact scaling-up of policy experiments including pilots. Pilots might sometimes be used as an excuse to garner political acceptability, or maybe abandoned citing them as failures because the political milieu might not be conducive for it to move ahead. These political aspects of policy experiments including pilots are not very well researched. The presence of multiple stakeholders and their power positions can also influence the scaling up process. Policy pilots came under much scrutiny during the late 1980s and 1990s in the development realm, for example, as these were often seen as being ‘donor-driven’, dependent on external aid and less focused on local priorities and engagement than they should have been (Nair and Howlett, 2016).

Many policy experiments also depend on behavioral variables, making scaling up efforts more challenging as it requires an extrapolation of behavior observed at an individual level. While incentives can be used to regulate behavior to some extent, any mismatch of expectations or disagreement between stakeholders can impede the scaling up process despite successful results at the local level (Vreugdenhil, 2010; Vreugdenhil et al., 2012, 2014). If the experiments are challenging an established regime by suggesting innovative policy solutions and alternate pathways for resource management and transitions, collaboration between the key stakeholders is critical to break policy inertia and system lock-ins (Zhou et al., 2013).

Due to these and other factors, Spicer et al. (2014) argue that “scaling up is a craft not a science.” But it should also be noted that diffusion can occur in one of two possible directions: scaling “up” from local or micro-level initiatives or scaling “down” from more senior, macro-level ones. That is, pilots and other kinds of experiments are not restricted to small scale pilots and the local level but can in other cases involve governments in the effort to translate broad strategic direction and general principles (often derived from science-based assessments) into more localized policies and/or to engage potentially affected local stakeholders in a top-down fashion.

The desire of senior governments to promote more effective local-stakeholder solutions has led many government agencies to increasingly consider how best to ‘scale down’ findings and recommendations such as the adaptation solutions found in large-scale climate change assessment reports. As with ‘scaling up’, ‘scaling down’ is often treated in an experimental fashion, in which initiatives aim to test out various processes and outputs that combine good practices in the implementation of the central policy principles with sensitivity to local conditions and the potential for broader policy learning. Unlike scaling-up, however, ‘scaling-down’ has some distinct characteristics, such as arriving with pre-approved political status and already allocated resources for implementation. Prima facie, this suggests the two aspects of the ‘scaling’ process are distinct from each other and care must be taken in inferring from studies of scaling-up to the situation of scaling-down. To do so, we examine government documents such as reports and program evaluations and submissions made by non-government organizations.

### Scaling down versus scaling up: the Regional Adaptation Collaborative case

This paper examines this second type of top-down experiment, in the context of the knowledge that already exists concerning the first, more bottom-up, version. It derives several lessons that can be learned about scaling up on the basis of an examination of the national-level RAC program and the subsequent development of a “National Adaptation Platform” in Canada that has overseen and coordinated a number of down-scaling or mainstreaming climate change adaptation pilots, planning efforts, stakeholder forums, and community oriented research throughout the country. The case study suggests that indeed this is a separate category of policy activity, which deserves more attention in its own right and should not simply be melded into studies of ‘scaling-up’.

#### Precursors to the regional adaptive collaboratives and the Adaptation Platform

The RAC program and subsequent Adaptation Platform was developed in response to earlier programming and research efforts led by the Canadian federal government’s Department of Natural Resources (NRCan) and Environment Canada following the 1997 Kyoto Protocol commitments made by signatory countries to reduce greenhouse gas (GHG) emissions (Canada, 2000). A progression of programming efforts over the past 15 years is illustrated in Table 1 beginning with the Climate Change Action Fund (CCAF). This was followed by a shift to program-based, collaborative scaling down experiments beginning with the Canadian Climate Impacts and Adaptation Network (C-CAARN) followed by the Regional Adaptation Collaboratives. The latest initiative, the National Adaptation Platform is a distinctive departure, containing both scaling up and scaling down features.

NRCan established the Climate Change Action Fund (CCAF), a three-year $150 million initiative in 1998. The focus of the CCAF funding was on mitigation related research and activities but a modest Science Impacts and Adaptation (SIA) program (‘block’) was established undertake mostly impacts-related research. At the program’s conclusion, a departmental audit and evaluation concluded that “the Impacts and Adaptation block increased understanding of the potential impacts of climate change and options to adapt […] and 80 percent of the impact study projects reviewed filled a knowledge gap in this area. It also increased the awareness of the importance of this type of research. The majority of Impacts and Adaptation projects have good potential to contribute to planning and policy development” (Natural Resources Canada, 2005). Much of this research was highlighted in the 2004 national adaptation assessment.

In addition to increased awareness a second lessons was learned. The second lesson was highlighted by NRCan policy and planning staff who were responsible for project planning and research coordination during the program’s implementation. They noted the policy relevance of these projects, but concluded that “more research on the relevant topics needs to be conducted

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1. The funding was extended for another three years.

2. The CCAF was originally structured into four blocks of activity: Foundation Analysis; Science Impacts and Adaptation (SIA); Public Education and Outreach (PEO); and Technology Early Action Measures (TEAM).
before the results could be used to create new policies” (Natural Resources Canada, 2005).

Concurrent to the CCAF funded adaptation research program, NRCan's Climate Change Impacts and Adaptation Division, developed the Canadian Impacts and Adaptation Research Network (C-CIARN) program in 2001. The $8.25 million program, which ran from 2001 to 2007, was divided into six area 3 and seven sector-based 4 “nodes” with the intention developing of “cooperative resources” with the intention developing of “cooperation” (Natural Resources Canada, 2006). In other words, the gap between policy-relevant concerns into programs and policies. The evolution of these activities is set out in Table 3 below.

One of RAC’s program goals was to include a range of stakeholders from other orders of government” (Natural Resources Canada, 2005).

Specifically, RACs design local projects targeted to decision makers that integrate adaptation measures into regional planning, policies and programs. The development of region-specific knowledge and tools such as community development plans, building practices, and water and resource management are then shared across regions and sector to accelerate adaptation planning and decision-making nation-wide (NRCan, 2011).

The rationale for taking a ‘scaling down/scaling up’ approach was that the region-specific impacts of climate change create differences in the capacity to adapt by communities and local level stakeholders. Well-known measures of adaptation investigated by the RAC were: the timing (anticipatory, concurrent, reactive) adaptation actions, their intent (autonomous, planned), the spatial scope (local, widespread) and their form (technological, behavioral, financial, institutional, and informational) (Rayner and Jordan, 2011). The overall nature of the evolution of these activities is set out in Table 3 below.

One of RAC’s program goals was to include a range of stakeholders in order to understand and overcome the challenges of adopting critical adaptation measures. Collaboration was an explicit feature both in “accessing and applying the information and tools

### Table 1

<table>
<thead>
<tr>
<th>Year(s)</th>
<th>Initiative</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998–2000</td>
<td>Climate Change Action Fund</td>
<td>$150 million program implemented by Environment Canada and Natural Resources Canada</td>
</tr>
<tr>
<td>2001–2007</td>
<td>Climate Change Impact and Adaptation Network (C-CIARN)</td>
<td>$8.24 million capacity building funded by NRCan and implemented by six regional and seven sector “nodes” under the Action Plan 2000 program</td>
</tr>
<tr>
<td>2007</td>
<td>2007–2011 Federal adaptation funding</td>
<td>$85.8 million over four years ($35 million to NRCan) Government’s Federal Adaptation Policy Framework</td>
</tr>
<tr>
<td>2008</td>
<td>Clean Air Agenda</td>
<td>$1.8 Billion with 85.6 million for adaptation</td>
</tr>
<tr>
<td>2008–2012</td>
<td>Regional Adaptation Collaboratives (RACs)</td>
<td>Six RACs created with each focused on a particular climate change vulnerability</td>
</tr>
<tr>
<td>2011</td>
<td>Federal Adaptation Policy Framework</td>
<td>$148.8 million over five years ($35 million to NRCan)</td>
</tr>
<tr>
<td>2014</td>
<td>Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation assessment report</td>
<td>Focus on decision-making and barriers</td>
</tr>
<tr>
<td>2012–present</td>
<td>NRCan Adaptation Platform Regional Adaptation Collaboratives II (RACs)</td>
<td>Continued focus on scaling down decision-making initiatives Sector and regional emphasis on “mainstreaming” policies and policy barriers</td>
</tr>
</tbody>
</table>

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5. Based largely on a review of projects and key informant interviews.

**Scaling down: the Regional Adaptation Collaborative case**

Following the conclusion of the C-CIARN program, there was a call to establish Regional Adaptation Collaboratives (RACs) to be established across Canada. Led once again by Natural Resources Canada’s (NRCan’s) Climate Change Impacts and Adaptation Division, the $30 million Regional Adaptation Collaborative program initiative was designed to “catalyze coordinated and sustained adaptation planning, decision-making and action” (NRCan, 2014).

A national call for proposals was made in 2008. The two main criteria were that the RACs were to “focus on one or more key vulnerabilities of region and were able to clearly be able to advance to adaptation decision making stage by program end-date” (Spencer, 2008). The RAC program signified a shift “focus from research to adaptation action” and “create an enabling” environment for local adaptation action (NRCan, 2011). Once local adaptation actions have taken place, the RAC would facilitate that the ‘scaling up’ of the lessons learned across Canada:

Specifically, RACs design local projects targeted to decision makers that integrate adaptation measures into regional planning, policies and programs. The development of region-specific knowledge and tools such as community development plans, building practices, and water and resource management are then shared across regions and sector to accelerate adaptation planning and decision-making nation-wide (NRCan, 2011).
Often, private consultants and academics produced a variety of non-governmental agencies were contracted to lead projects. Provincial government departmental staff while in other cases collaborative undertaking, some projects were undertaken by undertook over the three-year course of the program. As a online. Table 4 presents some examples of the hundreds of projects the Northern RAC, all of this output was made publically available project; and technical and science reports. With the exception of management and community plans; case studies and pilot pro-

### Table 2: Regional Adaptation Collaboratives (RACs).

<table>
<thead>
<tr>
<th>Regional Adaptation Collaborative</th>
<th>Coordinating Organizations</th>
<th>Focus Areas</th>
<th>NRCan funding (millions of dollars)*</th>
<th>Number of Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparing for Climate Change: Securing British Columbia’s Water Future</td>
<td>Fraser Basin Council British Columbia Ministry of Environment</td>
<td>Water allocation and use Forestry and fisheries management Water supply and demand Flood Protection Community adaptation</td>
<td>3.8</td>
<td>18</td>
</tr>
<tr>
<td>Prairie Regional Adaptation Collaborative*</td>
<td>Prairies Regional Adaptation Collaborative</td>
<td>Drought and flood planning Forest and grassland ecosystems Community development planning Built environment and infrastructure Water management</td>
<td>3.3</td>
<td>10</td>
</tr>
<tr>
<td>Ontario Regional Adaptation Collaborative*</td>
<td>Ontario Ministry of Environment</td>
<td>Extreme weather risk management Water management</td>
<td>3.3</td>
<td>10</td>
</tr>
<tr>
<td>Regional Adaptaon Collaborative – Quebec*</td>
<td>Ouranos Inc.</td>
<td>Community development planning Built environment and infrastructure Water management Forestry, agriculture and tourism sectors Spatial planning for food and coastal areas Groundwater protection Enhancing capacity of practitioners</td>
<td>3.7</td>
<td>20</td>
</tr>
<tr>
<td>Atlantic Climate Adaptation Solutions</td>
<td>Atlantic Climate Adaptation Solutions Association</td>
<td>Community planning for food and coastal areas</td>
<td>3.7</td>
<td>66</td>
</tr>
<tr>
<td>Northern Regional Adaptation Collaborative</td>
<td>Government of Nunavut, Department of Economic Development and Transportation</td>
<td>Vulnerability assessment of Nunavut’s mining sector to climate change Documentation of good environmental practices for Northern exploration and mining</td>
<td>0.4</td>
<td>5</td>
</tr>
</tbody>
</table>

From Natural Resources (2011)* overlap with the C-CIARN program

* This was funding was matched by the RAC organizations.

### Table 3: Evolution of Climate Change Adaptation Downscaling Programs.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Scaling</td>
<td>Implicit down-scaling</td>
<td>Explicitly down-scaling</td>
<td>Down-scaling and up-scaling Sector level “Mainstreaming”</td>
</tr>
<tr>
<td>Focus</td>
<td>Initiation and specification of climate change adaptation issues</td>
<td>Continued specification through greater mobilization and expansion through collaboration</td>
<td>Senior official from federal and provincial/ territorial governments, and industry organizations</td>
</tr>
<tr>
<td>Main actors</td>
<td>Academic and government researchers</td>
<td>Provincial and territorial officials, NGO organizations, municipalities</td>
<td>Senior official from federal and provincial/ territorial governments, and industry organizations</td>
</tr>
<tr>
<td>Governance</td>
<td>Largely decentralized across 16 regional and sectoral nodes with a goal of engaging the research community</td>
<td>More centralized focused on specific vulnerabilities with defined project outcomes</td>
<td>Centralized under the direction of a plenary Part of larger program effort (National Platform)</td>
</tr>
<tr>
<td>Policy focus</td>
<td>Agenda setting Adaptive capacity (systems based)</td>
<td>Implementation of networks Climate specific impacts on policies (planning, assessments) Identification of policy barriers Programmatic level “mainstreaming” Collaboration capacity and stakeholder engagement</td>
<td>Re-focus implementation (Downscaling) Policy formulation and policy design (Upscaling) Policy capacity Policy mechanisms</td>
</tr>
</tbody>
</table>

The RAC and Tool Synthesis working group’s responsibility were to provide “a forum through which value-added RAC and Tools products can be identified and developed” (NRCan, 2013). The proposed outputs included guidance documents and decision support tools, methods (e.g. evaluation of risk), opportunities and vulnerability assessments, targeted capacity building, engagement, identification of barriers, drivers and opportunities for adaptation, and the identification of information needs and data availability and gaps. The RACs were to broaden and connect the outcomes with the priority sectors in the affected regions through targeted and strategic activities. These activities needed a more formal coordination mechanism and it would be provided by the creation of the Adaptation Platform.

In 2012, at the conclusion of the program, each RAC submitted a “Lessons Learned” document to NRCan. The lessons learned through the RAC process from Quebec and the Prairies are set
Examples of Lessons Learned by the RACs.

The RACs ultimately continued but were absorbed into a national “Adaptation Platform” which was part of Natural Resources Canada’s $35 million program, “Enhancing Competitiveness in a Changing Climate” (Henstra, 2015). The $11 million program followed the earlier RACs’ goals and sought to “understand better why to act and how to do it by learning from those in our sector or region who have done so already. Sharing those experiences, whether through case studies or peer-to-peer networks, can provide a powerful push to adaptation action” (Natural Resources Canada, 2013). To do so, approximately 40 senior representatives from federal departments (Natural Resources Canada, Environment Canada, Aboriginal Affairs and Northern Development, Transportation Canada), provincial departments, RACs, and industry organizations were invited to establish a plenary that sought to undertake six projects (Table 5). Eleven working groups involving nearly 250 experts were tasked with undertaking 85 projects (Table 5) (Natural Resources Canada, 2014) (Table 6).

An interesting development with the RACs and the National Platform displayed above was thus how they eventually grew to involve both scaling down and scaling up efforts. By 2012, there was a shift to an up-scaling focus with the creation of Natural Resource Canada’s Adaptation Platform. Its governance differed considerably from the RACs program with a centralized ‘Plenary’ consisting of senior members from federal government departments, provincial and territorial governments, national industry and professional organizations that met biannually “to identify critical and emerging adaptation priorities” (Natural Resources Canada, 2013).

Policy implications and conclusion: taking scaling-down seriously as well as bi-directional scaling

Within academic and practitioner circles, the importance of “mainstreaming” climate change adaptation is frequently raised in large-scale assessment frameworks. Simply put, mainstreaming
involves integrating climate adaptation measures into existing policies and programs through a form of "scaling-down" various pilot projects and policy processes to the local level (Lim and Spanger-Siegrfried, 2005).

There have been numerous climate change adaptation assessments and frameworks, be they at the international, national, or subnational levels, that address the problem associated with climate change impacts vulnerabilities (O'Brien et al., 2012). Although assessments produce a vast wealth of information, more information about risk, vulnerabilities, and the corresponding resilience of at-risk communities will not necessarily lead to better policies especially when addressing a complex issue such as climate change adaptation (Geyer and Rihani, 2010). It has been noted that these studies are strong in their analysis, but extremely weak on the policy implications of their analysis (Wellstead et al., 2013, 2014).

The ability of sectors to adapt to climate change has thus become an issue of concern reflected in national and subnational level sectoral plans for adaptation. How to develop these plans and what factors or variables to include and account for in order to achieve policy goals are, however, uncertain. Determining both what should be done and what is feasible in present circumstances is of great significance to both analysts and practitioners and many vulnerability assessments and climate change adaptation policies have turned to policy experiments in order to help develop realistic initiatives.

The use of experimentation by practitioners and resource managers as a tool for effective policy design under complex and dynamic conditions has been well-acknowledged both in theory and practice (Stoker, 2010; van der Heijden, 2013). Pilot projects are a common mode of policy experimentation and a widely used method to introduce major government policies or programs in a phased manner, allowing them to be "tested, evaluated and adjusted" beforehand (Cabinet Office, 2003). For issues such as water resource management policy experimentation, for example, pilot projects have played an important role in exploring alternate courses of action when faced with long-term uncertainty (Nair and Howlett, 2014, 2015).

The goal of the innovative and collaborative approach to climate governance that emerged through the RAC process was to "create an enabling environment for adaptation, where decision-makers in regions and key industries are equipped with the tools and information they need to adapt to a changing climate" (Natural Resources Canada, 2014). Designed specifically to find ways of bridging the gap between research and policy, the RACs can thus be viewed as process pilots (Jowell, 2003) because they attempt to address climate change issues "by targeting local and sustainable adaptation planning and decision-making" (Natural Resources Canada, 2014).

The weakness in Natural Resources Canada experimental efforts have the natural tendency for a science-based organization to focus on overcoming uncertainty in decision-making without little attention to policy ambiguity (Cairney et al., 2016).

The absence of political and policy research into such subjects maybe the most significant barrier in downscaling efforts. Javeline (2014) pointed out that:

[plenty of ecologists, geologists, engineers, and other non-political scientists are working on climate change adaptation and drawing on their expertise in relevant ways, and there is no need to duplicate that expertise. Instead, we need to fill a huge gap. It is our own expertise in politics that is lacking and should be applied to the many critically important and unanswered political questions about adaptation (429).

That is more data and information will not equip decision-makers to adapt to a changing climate. Future downscaling and upscaling efforts need to incorporate unpredictable policy making...
Adaptation Platform Working Groups and Outputs.

<table>
<thead>
<tr>
<th>Working Group</th>
<th>Objective</th>
<th>Projects (Examples)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal management</td>
<td>Increase understanding of the impacts of climate change on economic, human and cultural coastal assets and potential adaptation responses</td>
<td>Impacts of climate change and physical constraints resulting from coastal squeeze in the Gulf of St. Lawrence, and evaluation of adaptation measures</td>
</tr>
<tr>
<td>Economics of adaptation</td>
<td>Create economic knowledge and tools that help decision-makers in both the private and public sectors make better adaptation investment choices and policy decisions</td>
<td>Assessment of the Risk to PEI’s Coastal Residences, Infrastructure and Heritage from a Changing Climate</td>
</tr>
<tr>
<td>Energy</td>
<td>Advance adaptation and increase resilience to a changing climate in the electricity and oil and gas sectors</td>
<td>Evaluation Opportunities and Implications of Integrating Adaptation and Mitigation Programs within the Energy Sector</td>
</tr>
<tr>
<td>Forestry</td>
<td>Address sustainable forest management in the context of a changing climate</td>
<td>Understanding the Current State of Awareness and Action on Adaptation in the Electricity Generation, Transmission and Local Distribution Sector</td>
</tr>
<tr>
<td>Infrastructure &amp; Buildings</td>
<td>Build capacity, generate evidence and provide outreach to increase the capability of infrastructure managers, municipalities, builders, insurers, engineers and other relevant stakeholders to adapt and facilitate adaptation to climate change</td>
<td>Climate Change Impacts to the Oil and Gas Sector – Are we prepared?</td>
</tr>
<tr>
<td>Measuring progress in adaptation</td>
<td>Improve the ability of decision-makers to measure progress in the implementation and effectiveness of adaptation</td>
<td>Resilient Pipes and Wires: The Impact of Climate Change on Electricity Infrastructure Investments: A National Perspective</td>
</tr>
<tr>
<td>Mining</td>
<td>Address information gaps while developing tools and information that will help the sector to adapt</td>
<td>Analysis of indicators in climate change adaptation used in countries of the Organisation for Economic Cooperation and Development (OECD): the case of coastal management</td>
</tr>
<tr>
<td>Northern regions</td>
<td>Provide northern decision-makers with the information and tools necessary to advance adaptation</td>
<td>Economic Impacts of Climate Change Adaptations for Mine Access Roads in Northern Canada</td>
</tr>
<tr>
<td>Regional Adaptation Collaborative and Science assessment</td>
<td>Science assessment Improve how science assessments in Canada are developed, how they are communicated, and how they are used</td>
<td>Development of Climate Change Economic Case Analysis for the Mining Sector</td>
</tr>
<tr>
<td>Tools synthesis</td>
<td>Provide a forum through which value-added RAC and Tools products can be identified and developed</td>
<td>Climate Change Impacts and Adaptation Mining Survey</td>
</tr>
<tr>
<td>Water and Climate Information</td>
<td>Provide improved access to an inventory and tools for water and climate information products to support adaptation in Canada</td>
<td>Updating IDF curves to account for climate change impacts</td>
</tr>
</tbody>
</table>

References


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environment made up of many actors, notions of power, competing interests and beliefs, and unpredictable events. Better understanding efforts at scaling-down as a class of policy experiments can help efforts in this regard.

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Natural Resources Canada (2014).

Canada. 2003. Climate Change: We are at Risk. Standing Senate Committee on Agriculture and Forestry. Senate of Canada: Ottawa. 
(www.parl.gc.ca/Content/SEN/Committee/372/agri/rep/repfinnov03-e.pdf).


