

2013 ADAPTtool Application

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Strengthening Adaptive Capacity in Four Canadian Provinces: ADAPTtool analysis of selected sectoral policies A synthesis report

Prepared by:

Livia Bizikova, Stephen Tyler, Dimple Roy, Darren Swanson
with inputs from Daniella Echeverria and Karla Zubrycki



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With the support of Natural Resources Canada through the Adaptation Platform.



For more information on climate change impacts and adaptation in Canada, please visit: Adaptation.NRCan.gc.ca

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These results were presented in an online webinar and a video recording of this is available at:https://cullbridge.adobeconnect.com/_a782512023/p95pd8if28q/

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Executive Summary

Introduction

Policy-makers and the public are increasingly aware of the potential impacts of climate change, increasing vulnerability to climate change and adaptation needs. *Adaptation* is defined as an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects in order to reduce harm or take advantage of opportunities (Intergovernmental Panel on Climate Change, 2007). Part of the growing efforts to plan for climate adaptation includes the mainstreaming of adaptation into policies, regulations and programs in multiple sectors. As a practical concern, governments want to know whether existing policies and programs, which were developed to address other goals and objectives, are themselves adaptive to changes, including a changing climate. Policies that are not adaptive are likely to fail to achieve their intended objectives as circumstances change, such as in the case of climate change.

In 2013 the Saskatchewan Water Security Agency and the International Institute for Sustainable Development (IISD), in collaboration with the provinces of British Columbia, Nova Scotia and Manitoba, acquired Natural Resources Canada funding to assess the adaptability of diverse sectorial policies to climate change. A version of the Adaptive Design and Assessment Policy Tool (ADAPTTool) was used to undertake the analysis. The ADAPTTool was developed by the International Institute for Sustainable Development (IISD), Adaptive Resource Management Ltd and The Energy and Resources Institute (TERI) with financial and in-kind support from the International Development Research Centre, Natural Resources Canada's Prairie Regional Adaptation Collaborative, Manitoba Conservation, Manitoba Agriculture and Rural Initiatives, and the Saskatchewan Watershed Authority. The ADAPTTool is based on Swanson and Bhadwal (2009), which describes seven key guidelines for adaptive policies.

The ADAPTTool assesses the adaptability of policies or programs in relation to any defined stressor or external change, such as climate. It produces two kinds of assessments: 1) it gauges the ability of existing policies or programs to support adaptation measures undertaken in response to the specified stressor by the policy target groups and 2) it assesses the general adaptability of the policies or programs themselves: are they likely to respond well under the influence of the anticipated as well as unanticipated changes?

The **objective of the project** was to test the ADAPTTool in a broader range of contexts in order to refine and enhance the tool for wider application. Within each of the provincial ADAPTTool pilots, or cases, provincial agencies sought to better understand the potential for the selected policies and programs to respond to changing climate conditions while still delivering their intended policy goals. In addition, the analysis was to help "mainstream" awareness and consideration of climate adaptation in policy processes.

The project has generated a large number of products for diverse audiences. In each of the provinces, at least one analytical report was produced describing the results and the implications for policy adaptability. This synthesis report summarizes those results and presents aggregated analytical scoring results across all 27 of the policies assessed in four different provinces and four different sectors. The focus of this report is on the conclusions and lessons that can be drawn about how the tool worked in these applications, what it tells us about policy adaptability in these cases and what lessons we can draw from these diverse pilot cases using the ADAPTTool.

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Methods

There are two kinds of information that are important in any assessment of policy adaptability to climate change. The first is to understand the degree to which existing and proposed policies and programs can contribute to anticipated adaptation needs in specific sectors. This information illuminates potential policy gaps and identifies existing policies and programs that are particularly well suited for supporting adaptation efforts and ways to strengthen them even further. The second aspect to consider is to understand the ability of an existing policy or program to adapt itself to changing socioeconomic and environmental conditions brought on by climate change—both anticipated and unanticipated.

The ADAPTool is structured as a series of Excel spreadsheets that lead analysts through a step-by-step process of interaction and deliberation to generate scores for policy or program adaptability to anticipated and unanticipated changes. The tool starts with scoping the geographic scale, defining the stressor, and selecting policies for analysis and the sectors to which those policies are applicable. The analysis proceeds by identifying vulnerabilities in these sectors to the identified stressor (climate change, in most cases) and then listing potential adaptation actions likely to be taken to respond. Focus then shifts to the policies themselves. Given that most of the policies are unlikely to have been designed specifically to respond to these stressors, the analysis first interrogates how the policies support potential adaptation measures. It then examines other ways that the policy has been designed and implemented to deal with anticipated and unanticipated changes. The process is described in more detail in the separate ADAPTool guidebook (Tyler, Tyler, Roy, & Swanson, 2014).

This standardized tool allowed the project team to work with a number of policy-makers across Canada following the same methodology and allowed a comparison of the results across the assessments. The ADAPTool was applied in British Columbia, Manitoba, Saskatchewan and Nova Scotia. In each province, the application followed a broadly similar process based on collaboration between the research team members and policy-makers within the provinces to discuss and review the assessment results. Depending on the engagement of provincial partners, there were also varying provincial-level processes to interpret and apply the results of the analysis internally, some of which will continue after completion of the project.

In order to gain specific insights about the ADAPTool process, IISD also conducted a series of semi-structured interviews. This enabled us to explore key processes, challenges and lessons learned from applying the ADAPTool. Provincial participants shared their feedback on the experience, as well as insights gained about climate adaptation, the roles of sectorial policies in addressing adaptation needs and building policy adaptability.

Overview of the Analyzed Policies

In this assessment, 27 policies were analyzed, including 20 discrete policies and seven goals from Saskatchewan's 25 Year Water Security Plan. The policies covered diverse sectors, including agriculture, forestry, water, and parks and protected areas management. The analysis studied regulations within a limited number of policies focused on economic instruments, institutional measures, and measure-focused information dissemination and expert advice.

The set of policies were analyzed across a series of 23 sectors covering agriculture, from plant to animal production; water consumption in sectors such as agriculture, mining and hydroelectricity; and municipal water use. The specific climate stressors chosen, against which to assess the policies, included variability of precipitation, including drought, heavy rainfall and flooding. These stressors were then used to identify potential vulnerabilities across the various sectors. In total, 168 vulnerabilities were identified across the 23 sectors (Table ES1).

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TABLE ES1. OVERVIEW OF THE SECTORS, VULNERABILITIES AND ADAPTATION ACTIONS IDENTIFIED ACROSS THE FOUR PROVINCES

PROVINCE	NO. OF SECTORS	NO. OF VULNERABILITIES	NO. OF ADAPTATION ACTIONS
British Columbia	11	60	154
Manitoba	1	6	85
Nova Scotia	2	5	31
Saskatchewan	9	97	198

Aggregate Results of Policy Analysis

Having identified sectors relevant to the policies being analyzed, and the climate change vulnerabilities and adaptation actions for those sectors, the analysis returns to the policy suite and compares policy coverage to the list of potential adaptation actions. Across this entire suite of diverse policies, the policies were considered not applicable to more than half of the total potential adaptation actions. This means that while the identified actions are potentially helpful to reduce vulnerability in the sectors identified, these policies did not have any relation to such actions. Considering the diverse nature of the sectors and adaptation measures identified, and the relatively small sample of policies, this is not too surprising. From those actions that were relevant for the analyzed policies, approximately 20 per cent were supported directly by a policy explicitly enabling the identified action. The highest direct support was given to adaptation needs focusing on economic policy and strategy and monitoring measures. The lowest direct support was given to research, awareness raising and providing information.

In the adaptability component of the analysis, about an equal number of these policies were judged to be vulnerable to climate change as were judged not vulnerable. In terms of capacity building, the policies in aggregate tended to support information and skills development, along with linking to institutions and networks. While all types of capacity were supported by some policies, the least supported capacities were infrastructure and technology. Over half of all the policies used foresight and multistakeholder deliberation methods in policy design, adding to their adaptability to anticipated stresses. While climate change was sometimes mentioned as a stressor in policy development, only B.C.'s Water Act modernization and Saskatchewan's 25 Year Water Security Plan included more formal climate impact assessments as part of their design.

In terms of unanticipated stresses, the policies generally provide a high level of direct and indirect support to self-organization and social networking. This is consistent with a policy approach of encouraging initiative on the part of private organizations. Most of the policies are also at least partially decentralized, allowing for greater responsiveness to local variation and change. Less than half of the policies had formal review procedures.

Comparison and Conclusions

There are limits to making comparisons in adaptability across the various cases because of their diversity. Scoring results tell only part of the story, and much of the benefit of the tool came from the discussion and interpretation of results by program staff in the specific context of local conditions.

A visual summary of policy adaptability scores across all policies is shown in Figure ES1. This figure shows the scores of each policy along two axes: planned adaptability (adaptability to anticipated stressors) and unplanned adaptability (adaptability to unanticipated stressors). The matrix is coloured to show scores lower than three in the red zone, and scores above six in the green zone. Of the 27 policies/programs assessed across all cases, only six scored in the green zone for both planned and unplanned adaptability. There were three policies that scored no higher than three in one dimension of the adaptability assessment.

The figure demonstrates a spread of results across all the policies, which suggests that the tool is capable of distinguishing policies with different adaptive characteristics. Overall, there is a clustering of the policy scores: policies that score highly on one dimension typically also tend to score well on the other and policies that score low on one dimension also score low on the other. As this is the first time we have tried to compare such a large number of diverse policies, this is an interesting outcome. It may suggest the need for further exploration to determine whether this is a random result of these particular policies, an artefact of the way the tool works or simply a function of typical policy processes.

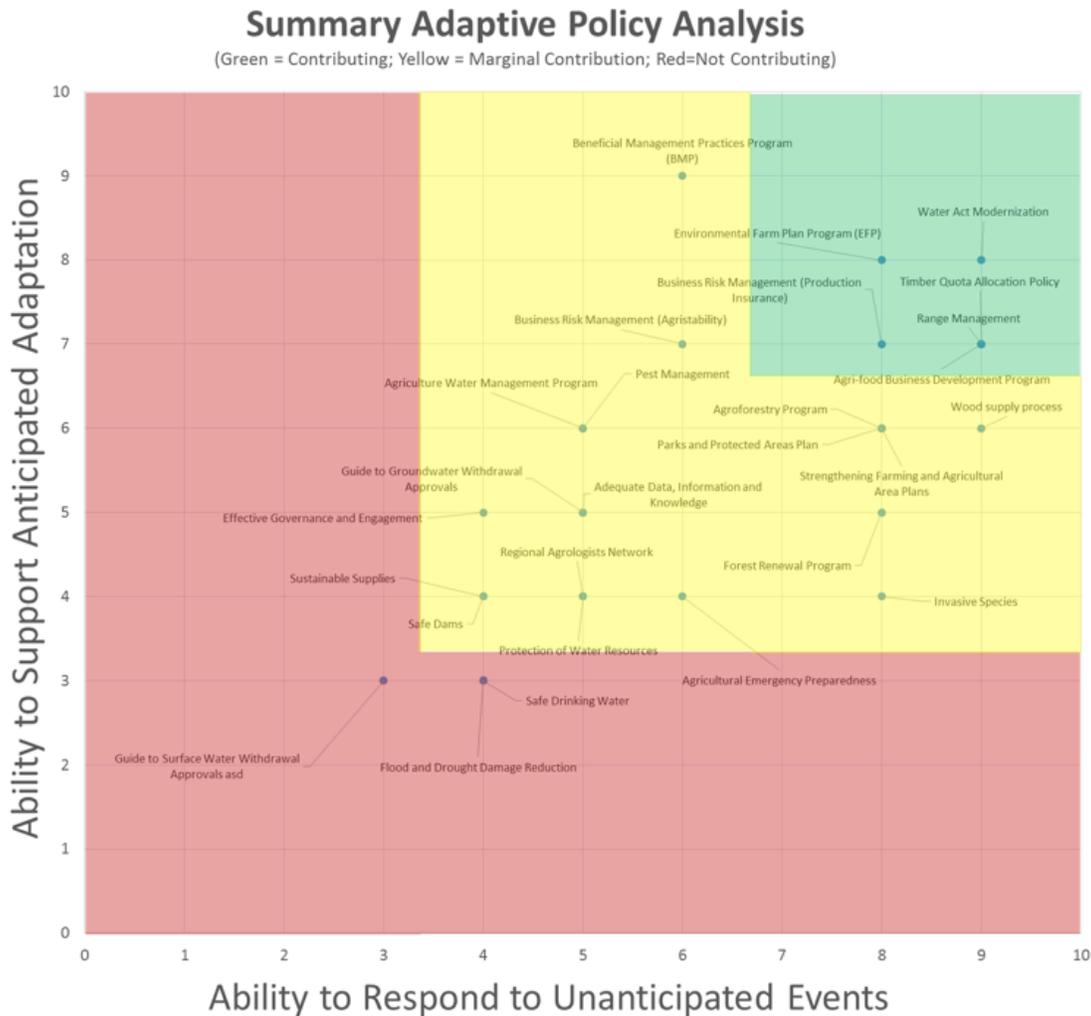


FIGURE ES1. AN OVERVIEW OF THE ADAPTOOL SCORING RESULTS FOR ALL 27 POLICIES IN THE FOUR CASES

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Comparative analysis is easiest when a large number of policies in the same sector have all been analyzed, as in the case of B.C. This approach ensures that a broad range of policies is assessed in relation to diverse sectoral vulnerabilities, and allows easier comparison between scores within a common sectoral and geographical context. The suite of 14 policies assessed in B.C. displayed a generally moderate to good level of adaptability. The suite included several policies that scored highly on both planned and unplanned adaptability. This means that, even though climate adaptation is not a specific policy priority for the Ministry of Agriculture, the ministry's main programs are already reasonably adaptable to climate. In the B.C. case, the ADAPTool analysis was successful in showing a clear range of adaptability between different policies, and in the discussion of results it was not difficult for provincial technical staff to understand why this was this case. Even in the case of policies or programs that are closely related to climate adaptation (such as water modelling), program design and implementation may still make them vulnerable, especially to unanticipated impacts.

The Manitoba forestry case is similar to B.C.'s agriculture case, although a smaller number of policies were analyzed. In this case as well, the most adaptable policies are largely responsive to decentralized decision making and stakeholder engagement, through building capacity and enabling social organization, and have built-in review processes. The programs also provide support for many potential climate adaptation actions because they are intended to be responsive to ecological conditions. Scores suggest they are fairly adaptable to climate change as a result.

These cases demonstrated that policies of broad support for informed decision making by producers such as information, risk management, environmental management promotion and flexible, responsive, locally driven resource management approaches are likely to be fairly adaptable to climate change. Some programs themselves are at risk of being vulnerable to climate change due to increased demand for limited services.

In the case of Saskatchewan, where the analysis focused on policy goals that were not yet fully implemented instead of operational programs already in place, the tool proved to be less helpful in revealing insights on policy adaptability. This was partly because it was difficult to assess in some cases how the broad goals would support specific adaptation actions (or not) and partly because it was difficult to assign specific scoring to policy goals when their implementation details were not yet confirmed.

The ADAPTool was modified for application to the design of new policies, and applied in the case of Manitoba's emerging wetlands policy. In this case, the wetlands policy has been a work-in-progress for a while and has been through multistakeholder deliberations and consultations with key stakeholders. Provincial analysts were more concerned with drafting details and setting up effective monitoring mechanisms than with considering climate adaptation on top of what had already been a long and complicated policy development process, so it was difficult to align the focus of the ADAPTool analysis with their interests.

It is interesting to note that where climate adaptation analysts were heavily involved with the cases (especially in B.C., Manitoba forestry policies and Nova Scotia), they found the process of undertaking the ADAPTool analysis to be very helpful in engaging with sectorial experts and highlighting issues relevant to their objective of mainstreaming adaptation in provincial policies.

A corollary to this observation is that in some of the cases where the policies could be expected to be sensitive to climate change (e.g., water management, wetlands), sectorial policy analysts did not find the focus on climate adaptation to be helpful in the development and implementation of emerging policies. In these cases, the feedback was primarily that this was not a policy priority in that sector. Although there are many valid reasons why policy analysts should be

focused on other policy issues, and the sample in this project is small, this observation suggests that even in climate-sensitive policy sectors, many provincial agencies see climate adaptation as an “add-on” feature not directly related to policy implementation and success.

Those cases where there were a large number of adaptation actions not directly supported by any of the policies analyzed flag a potential concern for provincial climate adaptation policy. These actions may not draw interest during stable climate conditions, and hence they can be safely ignored in mainstream policies. But if climate adaptation becomes an increasing issue in these sectors, policy-makers might want to further explore those unsupported adaptation actions to determine whether: a) they are likely to be undertaken by the relevant actors without support anyway or b) they would be difficult to undertake without policy support, but are already supported under other policies not included in the analysis suite. Actions that did not meet either of these two criteria might be subject to further review. The ADAPTool analysis is helpful in flagging these potential adaptation gaps, but it cannot on its own provide analytical information on whether or not unsupported adaptation actions require support.

This also demonstrates how the ADAPTool analysis can be used to sort adaptation actions. The adaptation analysis component of the tool shows how many of the potential adaptation actions in any sector are already supported by the policies being analyzed. This is important information for adaptation analysts, who may want to know the proportion of actions that are beyond the jurisdiction or scope of the policy suite under assessment, in order to perform further analysis. An understanding of which actions are already linked to policy measures and programs can also be helpful in designing targets and indicators to monitor adaptation efforts.

Conclusions on the ADAPTool Process

Participants in the ADAPTool analysis reported that the interaction of different program and sectorial experts with climate adaptation analysts generated the most useful insights from ADAPTool use. This interaction is inevitably time consuming because it requires technical experts in different fields to explain their knowledge and experience with policy design and implementation in order to interpret the implications for adaptability. This appears from participant feedback to be both the strength and the weakness of the ADAPTool application. Analysts rarely have the time to sit down together, learn a new tool and then apply it jointly, debating the interpretation of the tool and data. Yet they report that the greatest benefits from the process came precisely from this process of shared learning. Those cases in which the provincial staff was most involved proved also to be the most valuable in generating policy and adaptation insights. Experience in the pilots suggests that in the B.C., Nova Scotia and Manitoba forestry cases, where provincial staff were heavily involved in undertaking the ADAPTool analysis, subsequent applications for additional policies will be much less time consuming and require only minimal external vetting and support.

Based on a comparison of experiences in different policy contexts and the feedback from participants, it seems that an explicit policy mandate for climate adaptation can advance the work considerably. Such a mandate, for example, could include a province-wide or departmental climate adaptation policy. In British Columbia, the province’s explicit Climate Change Strategy created a clear demand for this kind of sectorial policy analysis. A provincial-level adaptation policy creates a much higher degree of executive level buy-in and engagement across the relevant departments to assess all relevant programs and feed the outcomes of the assessment into a broader framework. In the case of Manitoba, a recently recruited climate change specialist in the forestry department championed the analysis and managed the process to benefit the branch and its current priorities.

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The experience with using ADAPTool to help mainstream climate adaptation in various sectorial policies points to the value of the tool as a collaborative analytical platform for engaging experts from diverse policy, disciplinary and sectorial backgrounds in shared learning about climate adaptation. In this application, the tool works best if linked both to an overall adaptation policy framework and to previous or ongoing climate impact and adaptation analyses within each of the relevant sectors. In this way, it serves as a useful tool to support the ongoing cross-disciplinary and cross-sectorial discussions that will be essential to mainstreaming climate adaptation in government policies at multiple levels.

Key Lessons from the ADAPTool Pilots

When does the ADAPTool work best? The tool seems to be most effective when applied to a suite of policies within the same sector that are already being implemented. Addressing a number of relevant policies at the same time provides better coverage of sectorial adaptation measures and allows for comparative analysis. For new policies, the tool seems best to apply at an early stage in policy development, when it is more likely to yield insights for policy design. The ADAPTool analysis also proved to be most useful and effective in these pilot cases when applied under a climate adaptation policy mandate. Without this clear motivating rationale, the goal of assessing policy adaptability is not widely understood or shared by participants, making the exercise less relevant and results less likely to be applied.

What policies are most adaptable to climate change? Policies that are responsive to user priorities, that help enable and build adaptive capacity, that allow for decentralized implementation and support social networking and problem-solving, and that have regular public program reviews are likely to be most adaptable. In addition, policies that are intended to respond to changing regional ecological conditions are also likely to be adaptable. Narrowly focused, centrally designed and implemented programs with limited resources and infrequent review, even if they are directly relevant to climate adaptation actions, may actually be less adaptable to uncertainties *including* climate changes.

What were the greatest benefits of using the ADAPTool? The greatest benefits to policy analysis and design came from staff engagement in the analysis itself, which allowed analysts to become familiar with the tool. With this kind of familiarity, further application of the tool becomes much simpler, recognition of adaptive features comes more easily, and general conclusions for adaptive policy design can be formalized and integrated into standard operating procedures with accumulated experience.

The ADAPTool has two main functions, each of which corresponds to a slightly different target group of policy decision-makers and analysts. The first function is to gauge the ability of existing policies or programs to support (in this case) climate adaptation actions and adaptive capacities of the actors who are primary targets of the policy in question. This part of the analysis is most relevant to those involved in planning and mainstreaming climate adaptation. The second function of the tool is to assess the general adaptability of the policies or programs themselves, particularly to unanticipated changes. This part of the analysis is probably most useful to policy designers and program managers attempting to build the most effective programs. Connecting these two audiences in deliberation and discussion is a central benefit of applying the tool.

Future Applications

Along with this synthesis report, IISD has produced a revised version of the ADAPTool (v. 2) that incorporates some of the lessons learned through pilot implementation. This version of the tool is available online at <http://www.iisd.org/foresightgroup/adapt.aspx>. To accompany public release of the ADAPTool v. 2, IISD has also produced a guidebook for ADAPTool users, covering not only the content and process of analysis using the spreadsheet tool, but also considerations of project design and organization to help ensure effective analysis. In addition, IISD has generated a beta version of an ADAPTool for new policy design, which would benefit from further testing. In addition to these products, detailed technical reports on the separate provincial ADAPTool analyses generated for each of the pilot cases are also available from IISD.

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The ADAPTTool was developed by the International Institute for Sustainable Development (IISD) with support from Adaptive Resource Management Ltd, Novel Futures Corporation and The Energy and Resources Institute (TERI) and with financial and in-kind support from the International Development Research Centre, Natural Resources Canada's Prairie Regional Adaptation Collaborative, Manitoba Conservation and Water Stewardship, Manitoba Agriculture, Food and Rural Initiatives and the Saskatchewan Water Security Agency. The ADAPTTool is based on the 2009 book *Creating Adaptive Policies: A guide for policy-making in an uncertain world* (Swanson & Bhadwal, 2009).

In 2013 IISD partnered with the Water Security Agency (Saskatchewan) and Natural Resources Canada to conduct a multi-province analysis using the ADAPTTool. The provinces of British Columbia, Saskatchewan, Manitoba and Nova Scotia collaborated on the project team to assess the ability of diverse sectorial policies to contribute to both anticipated and unanticipated adaptation needs. The analysis was performed by IISD personnel with the intensive support and engagement of policy-makers from all four provinces.

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1.0 Introduction

Policy-makers and the public are increasingly aware of the potential impacts of climate change, increasing vulnerability to climate change and adaptation needs and the role that policies play in fulfilling this growing need. There is a growing body of knowledge on the importance of planned adaptation actions in national and subnational strategies for reducing vulnerability to climate change (Intergovernmental Panel on Climate Change [IPCC], 2012; Biesbroek et al., 2010). *Adaptation* is defined as an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects in order to reduce harm or take advantage of opportunities (IPCC, 2007). In order to address adaptation needs, these efforts could include developing adaptation strategies encompassing specific targeted measures (Eriksen et al., 2011). In addition, adaptive capacity could be built through actions such as strengthening institutions, establishing programs that support adaptation actions and mainstreaming adaptation considerations into national and sectorial strategies (IPCC, 2012; European Commission, 2013).

Approaches to adaptation planning and policy-making vary globally. Part of these efforts is mainstreaming adaptation needs into policies, regulations and programs in multiple sectors. As a practical concern in climate adaptation policy, governments want to know whether existing policies and programs, which were developed to address other goals and objectives, are themselves adaptive to climate change.

The ADAPTool assesses policies or programs in relation to a defined stressor or external change, such as climate change. It produces two kinds of assessments: 1) it gauges the ability of existing policies or programs to support adaptation measures undertaken in response to the specified stressor by the policy target groups and 2) it assesses the general adaptability of the policies or programs themselves: are they likely to respond well under the influence of the anticipated as well as unanticipated changes?

Public policy operates in a dynamic and complex environment. As conditions change, policies and programs may become less effective or even counterproductive. Adaptive policies and programs help avoid these kinds of failures. While policies aim to achieve certain objectives—for example, improve water quality or regulate forest harvesting—they also should avoid policy failures and unintended consequences as conditions change (Walker et al., 2002). Swanson and Bhadwal (2009) describe seven key guidelines for adaptive policies, based on observations of policies that perform well in the face of change and on insights from the recent policy literature dealing with complex systems. The Adaptive Design and Assessment Policy Tool (ADAPTool) was developed by IISD based on these guidelines, which are summarized below.

Integrated and Forward-looking Analysis

Integrated and forward-looking analysis can identify key factors that affect policy/program performance and scenarios for how these factors might evolve in the future, so that policies and programs can be made robust to a range of anticipated conditions. These tools can also be used to develop indicators that will trigger adjustments when needed. Modelling tools of varying sophistication can be used to support this kind of analysis, which is often integrated through scenario planning.

Multistakeholder Deliberation

Multistakeholder deliberation is a collective and collaborative effort to examine an issue from different points of view as part of a decision-making process. Deliberative processes strengthen policy and program design by building recognition of common values, shared commitment and emerging issues, and by providing a comprehensive understanding of causal relationships. The key aspects of this process are that it involves participants, including the public, in sharing multiple perspectives in an attempt to reach consensus on a relevant decision. This goes beyond stakeholder consultation.

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Automatic Policy Adjustment

Automatic adjustment mechanisms can speed up the process of response to conditions that are more or less anticipated. They can be used in complicated policy/programmatic environments by separating the various issues into units (both qualitative and quantitative) in which the understanding of the system is high, allowing for fine-tuning and making adjustments that help reduce risks and maintain performance. Automatic adjustment can be both fully and semi-automatic.

Enabling Self-Organization and Social Networking

The intent of this characteristic is to ensure that policies do not undermine existing social capital, but instead create forums that enable social networking, facilitate the sharing of good practices and remove barriers to local self-organization. Local responses, self-organization and shared learning all strengthen the ability of stakeholders to respond to unanticipated events through innovation.

These practices take advantage of the capacity of complex adaptive systems to generate solutions beyond external input or formally organized interventions. The ability of individuals and groups to self-organize in response to stresses, crises or unexpected problems is well documented in social and ecological literature, and a key aspect of healthy adaptation. For policy-makers and program managers, the idea is to foster self-organized responses to unexpected conditions by enabling and supporting interaction, learning and networking, without trying to control or dictate outcomes. This includes facilitating sharing and copying of best practices, providing resources to reduce barriers to self-organization and creating spaces for adaptive collaboration.

Decentralization of Decision Making

In governance terms, the principle of “subsidiarity” means decentralizing decision making to the lowest effective and accountable unit of governance. This has adaptive advantages because there are better opportunities for feedback and information sharing to ensure that decision-makers are aware of unexpected problems and the effects of proposed interventions, as well as the nature of different interests. For policies/programs directly concerning natural resources and ecosystems, field staff typically notice significant change earlier and can mobilize affected local interests to address these changes more simply. Because local conditions vary widely, decentralization provides a way to implement policies and programs more flexibly, to ensure effectiveness and adaptation to change. The potential for decentralization in any particular policy or program area will depend on the scale of intervention needed, the extent of local knowledge and capacity, and the structure of governance mechanisms for accountability and coordination.

Promoting Variation

Given the complexity of most policy settings, implementing a variety of policies to address the same issue increases the likelihood of achieving desired outcomes. Diversity of responses also forms a common risk-management approach, facilitating the ability to perform efficiently in the face of unanticipated conditions. Variation may be actively designed, to provide a range of alternative options to meet the diverse needs of different stakeholders. This can be facilitated by:

- Using a mix of policy instruments
- Exploring synergies with other policies
- Providing opportunities for risk-spreading

Another approach is to use policy tools to facilitate variation by removing barriers to alternative solutions and providing information to support exploration of options.

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Formal Policy Review and Continuous Learning

Regular review, even when the policy or program is performing well, and the use of well-designed pilots throughout the life of the policy/program to test assumptions related to performance, can help address emerging issues and trigger value-added policy adjustments. Formal review is different than automatic adjustment, where triggers and responses may be determined in advance. Formal review is a mechanism for identifying and responding to unanticipated circumstances and emerging issues. This assessment process can be very useful in detecting emerging issues that can have an impact on the policy's performance. A formal review mechanism can include triggers for the review (such as time intervals or other performance triggers), definition of the nature of the review and a learning process—that is to say, deciding who needs to be involved in the review, who will take action on the results and what kinds of actions are to be considered.

Together, these seven characteristics of adaptive policies are relevant in the planning and design of policies and programs, as well as in their implementation and evaluation. The ADAPTool is intended to encourage assessment and discussion of these characteristics in various phases of the policy cycle.

The purpose of this project was to support mainstreaming of climate adaptation into sectorial policies at the provincial level. The project provided an opportunity to test the ADAPTool in diverse policy sectors, including emerging policies, and different contexts across Canada.

The objectives of the provincial analyses were:

- To provide the respective provincial agencies with a systematic assessment and understanding of the potential for their policies and programs to support climate change adaptation across a number of sectors, such as agriculture, forestry and water.
- To build the capacity of provincial program managers, raise awareness and “mainstream” consideration of climate adaptation into the policy process.
- To assess the general adaptability of the policies or programs themselves to determine if they are likely to achieve their goals in the face of anticipated and unanticipated stressors.

The next section of the report provides an overview of the methodology followed for the different provincial case studies. In subsequent sections, we synthesize the conclusions from the case studies, analyze feedback from the participating analysts on the experiences of the policy assessment and describe lessons from the application of the four cases.

2.0 Methodology

2.1 Using the ADAPTool

The ADAPTool is meant to stimulate discussion and to expose knowledge that organizations such as the B.C. Ministry of Agriculture already hold. The tool provides a new way to understand how policies or programs work, using the lens of adaptability. The tool is intended to draw out the interactions between policies/programs and major stressors likely to have systemic effects that are difficult to predict. The scoring and analysis used in the ADAPTool is intended to be indicative, rather than precise or highly quantitative. Therefore, scoring is mostly on a simple ordinal scale (0, 1, 2). The spreadsheet is designed with conditional formatting that automatically assigns a red, yellow or green colour to the scoring cell depending on the entry value. This allows the analyst an at-a-glance visual overview of dozens of scores in a complex sheet.

877 Plan to regularly renew the overall plan every 5 years is mentioned in the introduction. Also mentioned is that "action areas and commitments to action will be re...

Sector Analysis

8. Is the policy itself vulnerable to the stressor?

Policies and Programs	Is the policy itself vulnerable to the stressor? (score 2 if no; 1 if marginally; and 0 if yes)	Score
Sustainable Supplies	Yes- as water supply is expected to vary significantly with climate-related stresses	0
Safe Drinking Water	Our climate change scenario includes increased floods, droughts and severe storms. Due to a close relationship between floods and nutrient loads, this goals might itself be vulnerable to climate	0
Protection of Water Resources	Water quality and ecosystem functions are related to increased floods, droughts and severe storms.	0
Safe Dams	The safety, need and effectiveness of dams will likely be affected by more floods, droughts and more severe storms projected in a future with changing climate.	0
Flood and Drought Damage Reduction	This is clearly vulnerable to increasing floods and droughts	0
Adequate Data, Information and Effective Governance and Engagement	Not vulnerable to stressor	2
	Not vulnerable to stressor	2

9. Does the policy enhance the capacity of actors within the sectors to adapt?

Policies and Programs	Contribution to Adaptive Capacity (2 - yes; 1 - partially; 0 - no) (based on Smit et al 2001)*						Value
	Access to Financial Resources	Access to Relevant Technology	Access to Relevant Info and Skills	Access to Relevant Infrastructure	Access to Institutions and Networks	Equitable Distribution of Resources	
Sustainable Supplies	No explicit mention of funding, but does	Mentions the development of	The WaterSense labelling system will	2	The WaterSense labelling system will	Mention of at-risk locations during	1
Safe Drinking Water	Goal mentions "support research on certain water testing"	Provincial labs provide	"As part of regulatory requirements,	2	Provincial labs provide certain water testing	Mentions an updated Safe Drinking Water	1
Protection of Water Resources	The province provides funding support to the	implies technology upgrades for municipal	11 source water protection plans	2	"encourage renewal of municipal wastewater	Mentions many new and existing	1
Safe Dams	2012-2013 budget included \$1.4M	n/a	WSA and SaskPower have adopted	1	Dams themselves provide relevant	Reservoir operating plans and emergency	1
Flood and Drought Damage Reduction	Emergency flood damage reduction	"develop flood forecasting tools")	"encourage municipalities to map	2	n/a	"develop a strategy to ensure communities	1
Adequate Data, Information and Effective Governance and Engagement	"support the work of the Global Water	"geographically referenced database	1	Develop an integrated geographically	2	n/a	1
	n/a	n/a	n/a	1	identify opportunities to collaborate with	emphasize on sharing of information so that focus on local, regional and federal	1
				1	Develop modern and comprehensive water		1

1. Scope of Evaluation 2. Vul. & Adap. Analysis 4. Adaptive Capacity 5. Synthesis

FIGURE 1. EXAMPLE OF SCREENSHOTS FROM THE EXCEL SHEETS OF THE ADAPTOOL

The tool is structured as a series of four Microsoft Excel-based spreadsheets. An illustrative example of the Excel spreadsheet used in the ADAPTool is shown in Figure 1 and an overview of the key questions is presented in Box 1. In the first sheet, analysts decide on the scope of the analysis and articulate the geographic scope, stressor and policy(ies) to be analyzed using a combination of analytical and deliberative techniques. Literature review and analysis were used, for example, to determine the most relevant and concrete stressors related to climate change. Deliberative techniques were used to determine which policies should be analyzed based on provincial priority, authority to affect

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change, policies relevant to a sector prioritized in adaptation planning, etc. In the second worksheet, the tool presents a series of questions to assist with adaptation response and adaptive capacity of the policies. In sheet two, questions five through seven help to identify major vulnerabilities, adaptation needs and to score the policies according to their ability to support the adaptation needs identified. The third worksheet assesses and scores policies for their ability to meet the key characteristics to support unanticipated adaptations through a series of questions. The spreadsheet also asks about the ability of policies to support actors' adaptive capacities to respond autonomously to adaptation when needs arise. Finally, all the scores and recommendations are summarized in the tool's final Excel worksheet. Box 1 summarizes the content of the worksheets and the questions therein.

Each policy's level of involvement was scored using a five-level scale: "2" is highly supportive, "1" is partially supportive, "0" means not supportive and "non-applicable" indicates the actions/characteristics are not relevant for the analyzed policy. As applicable, we also included a -1 score that identifies areas where particular policies actually act as barriers or deterrents for a necessary adaptation actions.

BOX 1. ADAPTOOL QUESTIONS AND WORKSHEET STRUCTURE

I. Scope of Evaluation Worksheet:

- 1) What is the geographic scope of the analysis (e.g., watershed, conservation district, municipality, region, province)?
- 2) What is the stressor of concern (i.e., climate change, market price instability)?
- 3) What are the policies/programs to be assessed?

II. Vulnerability & Adaptation Analysis Worksheet (for planned adaptability):

- 4) What are the main sectors active in the geographic area?
- 5) In what ways are the sectors vulnerable to the stressor?
- 6) What adaptation actions might be necessary if this stressor becomes more severe in the future?
- 7) Are the identified adaptation actions supported by the policies/programs?

III. Adaptive Capacity Analysis Worksheet (for both planned and autonomous adaptability):

- 8) Is the policy itself vulnerable to the stressor identified?
- 9) Does the policy enhance the capacity of actors within each sector to adapt (with respect to access to finances, technology, infrastructure, information and skills, institutions and networks, and equitable access) (Smit & Pilifosova, 2001)?
- 10) Were foresight methods and multistakeholder deliberation used in the scoping and design of the policy?
- 11) Are foresight methods and multistakeholder deliberation used in the implementation of the policy?
- 12) Does the policy enable self-organization and social networking among affected stakeholders? (Does the policy provide mechanisms for the sharing and copying of best practices and lessons learned?)
- 13) Is decision making for policy implementation adequately decentralized?
- 14) Is there adequate variety in the suite of policies and programs directed at the policy issue (e.g., economic, regulatory, expenditure, institutional policy instruments)?
- 15) Does the policy have a regular formal review process in place that can detect emerging issues?

IV. Synthesis Worksheet

An aggregate ranking of planned adaptability and autonomous adaptability is provided for the overall suite of policies, as well as for each individual policy.

Note: The wording and order of some questions or question components were changed in the subsequent version of the online tool and Excel-based workbooks to improve clarity and analysis quality.

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2.2 Application of the ADAPTool

This standardized tool allowed the project team to work with a number of provincial policy-makers to follow a standard methodology and compare results across the assessments. The ADAPTool was applied in British Columbia, Saskatchewan, Manitoba and Nova Scotia. In each province, the application followed a similar process based on collaboration between the research team members and policy-makers within and across the provinces to discuss and review the results of the assessments. A detailed overview of the application in each of the provinces is presented in Table 1.

TABLE 1. AN OVERVIEW OF THE APPROACHES USED TO COMPLETE THE ADAPTOOL ACROSS THE FOUR PROVINCES

	Building capacity to use the ADAPTool	Identifying vulnerabilities and adaptation needs for the ADAPTool	Policy assessments using the ADAPTool	Final report development
Nova Scotia	Workshop format for the policy-makers from various departments	Half-day workshops to identify the options and then review them	Done by provincial policy-makers with support from IISD	Developed by IISD and reviewed by the provincial leads
British Columbia	Two full-day training workshops for the program staff from Ministry of Agriculture and other ministries	Based on detailed Climate Risk and Opportunity Assessments conducted prior to this study	Led by ministry staff and IISD; results reviewed by program staff	Led by ministry staff with IISD input
Manitoba	Workshop to train policy analysts from various departments	Meetings and email reviews with key stakeholders	Done by IISD and provincial analysts and reviewed by analysts from both agencies	Developed by IISD and reviewed by provincial leads.
Saskatchewan	Training to Saskatchewan project lead	Teleconferences and email reviews with key stakeholders	Conducted by IISD researcher	Developed by IISD analyst

The methodology for the provincial case studies was similar, with variations to suit the different contexts. In all cases, the ADAPTool was introduced to relevant provincial government staff through a one-day training session that introduced the book *Creating Adaptive Policies: A Guide for Policy-Making in an Uncertain World* (Swanson and Bhadwal, 2009) and the seven strategies for adaptive policy-making as criteria for policy assessment.¹ This introduction emphasized that policies or programs were not being evaluated against program objectives, but merely analyzed for their adaptability to a defined external stressor (climate change, in this case). In all cases, it was important to clarify to program managers that the analysis had nothing to say about whether the programs were performing well or not. Most of the training was devoted to gaining familiarity with the ADAPTool spreadsheet, which was introduced and explained using short exercises.

After the training, provincial program staff worked with IISD to implement the analysis. In each case, a different set of policies or programs was analyzed, according to provincial priorities. Provincial staff contributed to the analysis led by IISD in each case. The main tasks of the analysis were to define target sectors and identify each sector’s vulnerability to the specified stressors. This stage was completed through in-person interviews (in Manitoba, Nova Scotia and British Columbia) and/or a series of phone conferences and emails to identify key vulnerabilities and adaptations. At this point, the outcomes of already-developed climate change impacts and vulnerability assessments were included in the analyses to inform the chosen stressors, identified vulnerabilities and needed adaptations.

¹ In B.C. there were two one-day training sessions, one of which involved a number of other ministries.

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Once the adaptation needs were identified and entered in the ADAPTTool, the leads in each of the provinces or IISD analysts began assessing the policies. The project team helped to clarify the questions, give details about the scoring and provide examples from already-assessed policies. In Manitoba and British Columbia, the assessment was led by the provincial policy-makers who consulted with the project team and provided the outcomes for review. In British Columbia the IISD project team provided support to enable Ministry of Agriculture staff to lead the analysis, including technical guidance, training, interview design and some of the interviews, as well as collection and synthesis of data. In Saskatchewan and Nova Scotia, the policy assessment began with a project team member who then consulted the provincial policy-makers about scoring and the key characteristics of the analyzed policies. Once the ADAPTTool process was complete, the project team developed a report for each of the four provinces, which were provided to the provincial policy-makers for review. In B.C., where follow-up actions are planned, there was an extensive review process that included all program managers in iterative reviews of summary results, draft reports and final documents prior to briefings for the Ministry of Agriculture's senior executives. Once approved, these reports, the completed Excel spreadsheets and the outcomes of a series of interviews formed the basis of this synthesis report.

2.3 Interviews with Provincial Policy Analysts and Program Managers

In order to gain specific insights about the process of using the ADAPTTool, we conducted a series of semi-structured interviews with provincial staff who had been directly involved in the ADAPTTool pilots. This enabled us to explore key processes, challenges and lessons learned in using the ADAPTTool. Specific insights included how policy analysts used the climate adaptation tool, as well as the roles of sectorial policies in addressing adaptation needs and meeting adaptive policy characteristics. We also asked about processes of interactions between policy-makers within and across sectors, challenges encountered during the application of the tool and suggestions for improving potential future applications.

We interviewed the leads of each team working on the ADAPTTool. The lead of each application then referred us to other candidate interviewees involved in the applications. We conducted 12 interviews across the four provinces (Nova Scotia, Saskatchewan, Manitoba and British Columbia). Our long-distance interviews (conducted by phone) lasted between 60 and 90 minutes. During the interviews, notes were taken, and afterwards, a report outlining the findings was provided to all interviewees for review. Results of this feedback are incorporated into the findings presented below, in section 3.8 (Feedback from Participants).

2.4 Developing the Synthesis Report

The four provincial case studies are reported primarily through province-specific reports that have been published separately. Provincial findings have been compared and collated in this synthesis report. In addition to brief summaries of each of the four cases, the report collates the various scores of all policies to demonstrate how the scoring function worked and to synthesize results across a heterogeneous group of policies. Policy recommendations and conclusions from each of the provincial analyses are summarized and compared. An important element of the synthesis report is to draw conclusions on the use of the ADAPTTool based on these cases and explain how these insights have been used to update the tool and produce the guidance manual.

The results reported in this synthesis report will be presented to Canadian policy analysts and adaptation experts in an online seminar planned for January 2014.

3.0 Results of the ADAPTool Cases

This section of the report will first summarize the experiences in each of the four provincial cases. The conclusions and lessons from each case will be described and the experience with ADAPTool application compared. This section will be brief because each of the cases is reported in full in its own separate report. In the comparative section of the report, we discuss the differences between the ADAPTool cases and assess how the conclusions from the ADAPTool analysis have provided insights to the relevant provincial government partners. That section of the report will also describe how the experience of the case studies led to improvements in the ADAPTool itself, and clarified the process for application of the tool in varied conditions. These refinements have been captured in the new version of the tool (ADAPTool v. 2) and in the accompanying guidebook manual for application.

After reviewing the case study experiences and the comparative lessons from the ADAPTool application, we then summarize the scoring for all the policies assessed, across all four cases. The policies are quite heterogeneous, and because this aggregate scoring covers multiple policy domains that address different policy goals and are being evaluated against different climate stresses and different geographic areas in each case, we cannot easily draw policy conclusions from aggregate scoring. However, the exercise of summarizing all the scores shows the range of analytical results encountered in all four cases, and provides an illustration of how data analysis would be handled for more homogeneous policy contexts.

3.1 British Columbia – Agriculture Sector

The Province of British Columbia approved a climate adaptation strategy in 2010 that specifically includes a commitment to integrate adaptation into government policies, legislation and regulations. Climate adaptation was already identified as a policy priority for consideration in the Ministry of Agriculture’s programming, but the ministry had not yet established a framework for how to proceed with this work. The Climate Action Secretariat in the Ministry of Environment identified the collaboration opportunity with IISD and Saskatchewan Water Security on this project and the Ministry of Agriculture was enthusiastic about participating. The B.C. case therefore included the participation of both the Climate Action Secretariat and the Ministry of Agriculture’s Innovation and Industry Development Branch. The project was led by Ian McLachlan, the only Ministry of Agriculture staff member with formal job duties that include climate action.

The first steps of the analysis are to define the stressor, geographic scope and the policies to be analyzed. In the case of B.C., the geographic scope chosen was the entire province. This meant that the climate stressors were very diverse (excess moisture, drought, heat, flooding, variability and sea-level rise) and the agricultural sector and programming across the province are also very diverse. The Ministry of Agriculture selected programs for analysis in the ADAPTool case based on these criteria: importance to the sector, relevance to climate adaptation, whether changes to the program were being considered (which the analysis could influence) and whether there were “champions” willing to participate in the analysis. A total of 14 programs were selected for analysis. These are described in detail in the provincial case study report.

For the purposes of assessing climate vulnerability, the policy target sector was divided into 10 different agricultural subsectors, covering the major types of production systems and farm operations throughout the province. To some extent, the different subsectors are prominent in different regions of the province, so that climate impacts are somewhat correlated to the different production sectors. For example, drought is a potential climate impact for producers in the Okanagan region and on Vancouver Island, where the main subsectors are tree fruits, berries, dairy and field crops. Agricultural subsectors and climate vulnerabilities were assessed with the benefit of a series of studies undertaken

by the B.C. Agricultural Council's Climate Action Initiative. These Climate Risk and Opportunity Assessments were published in 2012, and provided timely and recent data for the climate vulnerability and adaptation analyses. The analysis of subsector climate vulnerabilities using the available Risk and Opportunity Assessments pointed to 158 adaptation measures that would be relevant for producers across the 10 different subsectors.

Results of the Analysis

In general, the program suite (all 14, taken together) assessed in this pilot provided broad *indirect* support to farm operators in B.C. who will be facing more frequent climate adaptation decisions. The suite of programs was strong on information for producers, with some limited financial backstopping for risk management. These strengths are consistent with a programming approach that provides information and risk management to enable producers to make informed decisions in their own context. There is concern, however, that some of these programs may face challenges as the impacts of climate change become more pronounced.

Few of the programs scored highly in responding directly to the potential adaptation needs of producers. This is not surprising: because the scope of the analysis is province-wide and the agriculture sector and regional climate impacts are so diverse, one would expect to find few programs that support many specific climate adaptation measures. In applying the ADAPTTool, broad and flexible programs tend to score better than narrow, targeted ones because they can provide indirect support across a range of activities. However, the adaptation analysis worksheet showed that 54 out of the 158 adaptation measures identified have *no direct program support*. These include:

- Development and testing of new crop varieties and cultivars.
- Diversification of feed sources, feed management, nutritional monitoring and new varieties of feed across sectors.
- Better information on emerging animal and plant disease threats, information and practices on disease management across sectors.
- Adaptation actions related to improving drainage and being prepared for flooding.

Five of the 14 programs are rated as highly adaptive in relation to climate change (Range Management, Environmental Farm Plan, Beneficial Management Practices, Water Act modernization and Agri-Food Business Development). This means that, even without explicit ministry policy priorities for climate adaptation, these programs provide good support for producers to adapt to *anticipated* climate changes. In addition, these programs can be expected to adapt well to *unexpected* external stressors at multiple scales, whether in climate or other areas, due to their inherent design and structure. It should be noted that two of these five highly rated program areas are managed outside the Ministry of Agriculture (Range Management and Water Act modernization).

Despite the generally satisfactory adaptability of this suite of programs, there are four areas of concern in the context of climate change:

1. Across the entire suite of programs, there are few examples of support for building adaptive capacity, beyond access to information and financing. Support for technical innovation, infrastructure, new institutions and networks is limited. This suite of programs also does not address the increasing pressure on producer margins imposed by growing climate risks in future. This changing profile of climate risk and vulnerability will not be equitably distributed, but will increase pressure on some producers to exit the sector.

2. Risk management programs may be stressed by the increasing impacts of climate change. As the risk profile of production practices changes in response to climate variability, it is likely that gaps in risk management and financial support will become more evident. This will not only affect actuarial risks (production insurance), but also fiscal risks for disaster response and other production risks.
3. The support available for producer-level disaster risk reduction through adaptation planning and preparedness will need greater focus as climate risks increase. The ministry's emergency management program is well established and effective in planning for disaster response, but there is an emerging need to support producers taking proactive on-farm risk reduction and avoidance measures. This is in addition to the need for regional and local infrastructure that reduces risk—infrastructure that has significant fiscal implications beyond the Ministry of Agriculture.
4. There is a significant gap in research and information to help the agriculture sector respond to the impacts of climate change. Falling into this gap are development and testing of new crop varieties and cultivars, information on emerging disease threats, information and practices on disease management across sectors, and nutritional monitoring and new varieties of feed across sectors.

There are specific recommendations for monitoring and studies related to climate impacts on various programs, in particular the four top priority areas for ministry attention where the analysis flagged potential adaptation weaknesses: AgriStability, Production Insurance, Agricultural Emergency Management and Pests and Invasive Plants. In addition, the analysis recommends that the ministry:

- Create a climate adaptation contact group with a designated representative from each program area, coordinated by the ministry's climate action team to support the government's strategic direction to mainstream adaptation across ministry programs.
- Repeat this assessment using the latest version of the ADAPTool by 2016, timing the next assessment to inform negotiations for Growing Forward 3.
- Include the Agricultural Land Commission in the next ADAPTool assessment, because of the potential changes in the value and use of agricultural land implied by climate change and related adaptation measures.
- Working with industry/producers, further develop the list of adaptive actions in the vulnerability assessment, to ensure identified vulnerabilities and adaptation actions reflect on-the-ground experiences and priorities.

Marine fisheries and seafood programs were treated as a single policy and analyzed separately from the terrestrial agricultural programs because of the very different climate stressors and adaptation actions in this sector. The main conclusion from the analysis of this sector is that it the program is less adaptable to climate change than the suite of agriculture programs. It scores lower in terms of both anticipated and unanticipated adaptation needs, and only provides direct support to three of 54 adaptation actions. In comparison to other Ministry of Agriculture programs, the Marine Fisheries and Seafood program is limited in both its own adaptability and its support for sectoral adaptation. This is because: a) the ministry has limited jurisdiction and authority in this area, b) the program is small relative to likely increases in demand generated by climate change and c) the program has limited policy and programming tools in its portfolio with which to influence sector activities or mitigate climate impacts. It is important to note that while there is a separate report for the fisheries sector analysis, the results of that analysis are not incorporated in this synthesis report.

Lessons from this Case

The main benefits of the ADAPTool came from the discussion and interaction with different ministry staff in defining key climate change impacts on the different sectors, expected adaptation actions and each program's ability to support or hinder these adaptation actions. Data collection interviews with program managers allowed the interviewers and interviewees to reflect on the past, current and potential future role of their programs in relation to the list of 158 adaptation actions. The interviews took 1-2 hours, which some participants initially found intrusive. However, after the process most of the feedback was positive.

Scores were based primarily on current involvement, but the associated commentary also captured where there was greater future potential to support adaptation actions. The process was more difficult for those programs that had weaker and less direct links to climate adaptation, because it was more challenging to identify the potential connections.

The scoring for each question was undertaken jointly in the interview, and both interviewer and interviewee agreed on the score. Many participants were reluctant to attribute zeros or a negative score, as this was perceived as a criticism of their program. It was therefore important throughout the process to repeat that the purpose was not an evaluation to rate programs as "effective" or "ineffective," but rather an assessment of whether the program supports or does not support climate adaptation. It took some discussion for the program leads to become comfortable that low scores on certain questions did not necessarily reflect poorly on their program, but rather reflected the mandate and objectives of the program or policy more than its performance. Interviewers had to point out that a high score was not necessarily a good thing either, because it might actually increase expectations for program performance in a new dimension (climate adaptation).

The analysis included feedback of preliminary results to program managers to validate results and discuss the synthesis of the entire suite of programs. The comparative dimension of this feedback allowed participants to better witness and understand the purpose of the tool. Differentiation and comparison of autonomous adaptability and planned adaptability across the entire suite of programs enabled a discussion of similarities and differences between programs, strengths and gaps. This step appeared to be the most meaningful and revealing to the participants. Sharing this feedback in a conference call also provided the opportunity for participants to step outside their own program area to look at a climate adaptation across the broader range of ministry programs.

The ministry team supporting the analysis had several observations on the process that would be helpful in future applications:

- They found it very useful to have experienced advisors (from IISD and the Province of Manitoba) who had worked with the tool in previous applications.
- Before going into any ADAPTool analysis, the policy team should have a clear goal and an understanding of how the results will be used. Early engagement of senior policy-makers is vital.
- It is important to allow time for significant discussion and back and forth with program leads in developing and refining the vulnerability analysis, especially in a province as diverse as B.C.
- It is a particular challenge in undertaking a province-wide assessment of this type to also account for the high level of geographical specificity in terms of both climate impacts and agriculture sector vulnerabilities.
- It is difficult to explain and teach the tool by showing the spreadsheets, which are large and complex. The spreadsheet concepts could be simplified or rendered in more abstract graphics for training purposes.

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In conclusion, the B.C. ADAPTool pilot achieved its purposes: broadening the application of the ADAPTool; providing a systematic and comprehensive assessment and a baseline understanding of the potential for the Ministry of Agriculture's policies/programs to support climate change adaptation in the agriculture sector; training ministry program managers and staff in adaptive programming, and generating related discussion, networking, and understanding among key staff, program leads and colleagues in other ministries. The project has had a significant benefit in building capacity and raising awareness about climate change adaptation right across the ministry, helping to mainstream adaptation in alignment with the B.C. government's climate change adaptation strategy. There are now 23 Ministry of Agriculture staff members trained in the principles of adaptive policies (and another 30 staff members in other provincial agencies).

3.2 Saskatchewan – Water Sector

The Province of Saskatchewan has been working on climate adaptation-related issues actively through its provincial processes and its involvement with the Prairies Regional Adaptation Collaborative. Adaptation is being actively considered in sectors such as agriculture and water resource management where climate change impacts are expected to affect decision making, management and planning.

Saskatchewan's water resources are critical and foundational elements affecting the province's performance in economic and human development. However, climate change impacts such as changes in temperature, precipitation and runoff regimes affect the quantity, quality and availability of water in lakes, wetlands, reservoirs and watersheds in general. Early in the course of this project, it was decided that the ADAPTool would be used to analyze water-related policies in the province in relation to key economic sectors such as agriculture, hydroelectricity and mining.

Partly in response to climate change needs and for long-term planning of water resources management, the Water Security Agency at the Province of Saskatchewan created a 25 Year Water Security Plan to project future water demands and stresses and provide a long-term framework for all aspects of water management provincially.²

Saskatchewan's Water Security Agency partnered with IISD under the scope of this analysis to determine if the seven goals under this 25-year plan were a) contributing to adaptation needs for key sectors in the province and b) if the goals and plans developed under this plan were themselves adaptive and flexible in light of uncertainty and change. This study was initiated by Tom Harrison, the Director of the Saskatchewan Water Security Agency and colleagues, including Benjamin Brodie and subsequently Terry Hanley, who replaced Tom towards the end of the project.

The first steps of the analysis involve defining the geographic scope, stressor and the policies to be analyzed. In the case of Saskatchewan, the geographic scope selected was the entire province. Based on a review of literature, a climate scenario was presented that could be summarized as more frequent and severe floods, droughts and severe storms in the future.

Analysts from the Water Security Agency (WSA) and IISD selected policies for inclusion in this analysis based on their relevance to the chosen climate stressor and whether there were "champions" willing to participate in the analysis. After a number of face-to-face and email discussions with key WSA staff, it was decided that the province's 25 Year Water Security Plan, which is intended to replace a number of older or absent/unwritten policies or strategies on water management would be analyzed with the ADAPTool. The seven goals within the 25-year plan would be analyzed as though they were existing policies and their contribution to provincial adaptation needs and their adaptive capacity

² <https://www.wsask.ca/About-WSA/25-Year-Water-Security-Plan/>

would be assessed using the ADAPTool. These seven goals include: sustainable supplies, safe drinking water, protection of water resources, safe dams, flood and drought damage reduction, adequate data, information and knowledge, and effective governance and engagement.

For the purposes of listing the key vulnerabilities, the economic sectors most dependent on or limited by water resource management were selected as the target sectors. These were: mining, municipal, hydroelectricity and agriculture. The mining sector was divided into subsectors based on phases of mining including mining exploration and siting, mining development (construction of infrastructure), mining operations, (processing and waste management, extractions, etc.), mining closure and remediation. The agricultural sector comprised agricultural subsectors including cattle, grain and perennial pasture-unimproved.

Results of Analysis

Based on our analysis, all goals or policies within the scope of the analysis (and comprising the 25-year plan) provided indirect support to various sectors in Saskatchewan facing increasing climate change impacts requiring adaptation actions. A number of sectoral adaptation actions were unsupported by any of the policies selected for this analysis. Examples of such unsupported adaptation actions included those relating to mining exploration and siting, such as the need for appropriate transportation; and others relating to mining operations, such as need for alternative technologies to deal with increased evapotranspiration from waste piles and tailing, increased the need for energy efficiency to cope with increased energy demands in municipalities, health assistance for those affected by the impacts of climate stressors such as West Nile virus, contingency planning such as insurance backup or regional trading for decline in hydroelectric power in short/medium term and issues such as improved feedlot design for agriculture-cattle to cope with a shortage of feed and feed quality issues. The adaptation analysis worksheet showed that 111 out of the total 174 adaptation actions are not directly supported by the water security goals. Twenty-five of the 174 adaptation actions are directly supported by one more of the policies.

Based on the final synthesis of adaptive capacity, five of the seven policy goals are moderate in their contribution to both planned and autonomous adaptability. The remaining two score low on both their planned and autonomous adaptability. This means that they have low abilities to cope with climate change and other unanticipated stresses.

This analysis needs to be contextualized by the fact that the “policies” being assessed in this case are actually components of a larger strategy and all present prospective language for what “will be done” within specific timelines and target objectives. As a result, while they score well on conceptual intent and variation of policy instruments, for most of the adaptive capacity analysis, they are indirect contributors due to their conceptual nature, lack of detail and lack of implementation progress.

While most of the analysis demonstrates balanced overall strategy, there are five areas of concern in the context of climate change:

1. A number of the policies are themselves vulnerable to the stressor. The policies related to sustainable supplies, safe drinking water, protection of water resources, safe dams and flood and drought damage reduction are vulnerable to higher instances and severity of floods, droughts and storms.
2. In support for determinants of adaptive capacity, the policies score particularly well on providing access to relevant information and skills but score relatively lower on providing access to relevant infrastructure. This ability could be enhanced in the specific programming developed under the goals.

3. There is no explicit mention of either foresight or multistakeholder deliberation in the development of safe drinking water systems as well as in the goal pertaining to adequate data, information and knowledge. These need to be enhanced in the development of the specific plans and policies and their implementation.
4. There is a gap in the provision of enablers for self-organization and social networking. This should explicitly be considered in the development of new policies to enhance autonomous adaptability and is missing from being explicitly addressed in the goals on sustainable supplies, safe drinking water and safe dams.
5. In the formal review mechanism, while the 25-year plan itself is to be renewed every five years, it is important to include a review of subgoals given the overall breadth of the plan. While five of the seven goals have specific review components, there are noticeable gaps for planned review of the goal on flood and drought damage reduction, and effective governance and engagement.

Given the generality and the prospective nature of the plan that was analyzed, the recommendations from our analyses are fairly broad and are included in the detailed report from the Saskatchewan analysis. Overall, the 25-year plan modestly supports adaptation needs of related sectors in the province and could incorporate more of the identified adaptation needs in the detailed planning and implementation. As well, highlighting the gaps through the process can serve as guidance when specific plans and policies are being written under the goals of the plan.

Lessons from this Case

A number of significant events and changes contributed to this being a less-than-ideal analysis. While the decision to analyze policies related to water were made early in the course of this work in discussion with provincial policy-makers, it was challenging to find the right policies. Saskatchewan currently has very few updated, written policies and this came up in a number of interviews with staff from the WSA. Finally, based on a number of suggestions, the recent 25 Year Water Security Plan was selected as a combined water policy for a renamed and restructured agency. However, we did note that this is a prospective plan with some detail on planned programs and policies but often not enough to have a complete picture of what is planned. Another significant change during the course of the project was a change in the project lead for Saskatchewan. This contributed to a lack of conviction on the appropriateness of this plan for this analysis. Consequently, the results of this analysis were shared but not reviewed in detail by Saskatchewan partners and should be used with that caveat. Another consequence was that the benefits of this analysis have not been shared widely and have not helped build capacity within Saskatchewan stakeholders as expected.

Some strengths of the process remain in that the list of adaptation needs for the various sectors is robust and was developed through a combination of literature reviews and consultations with sector-specific stakeholders. As a result, we generated a reasonably comprehensive list of sector-specific adaptation needs that can be used for guidance as this water security plan is developed further to help with its response to adaptation needs. In addition, the identified gaps still act as guidance or even a checklist of the developers of detailed programs under this plan and act as a reminder to explicitly incorporate these key elements of adaptive policy-making.

3.3 Manitoba – Forestry and Wetlands

The Province of Manitoba has been actively looking at climate adaptation needs primarily through its involvement in the Prairies Regional Adaptation Collaborative. Manitoba's involvement in climate adaptation has been focussed on the role of water and resource management through the Department of Conservation and Water Stewardship (CWS), as well as in agriculture through Manitoba Agriculture, Food and Rural Initiatives. Initiatives are also currently underway in sectors such as transportation and municipal government.

IISD applied the ADAPTTool previously to a suite of seven agricultural policies in Manitoba. The report for this earlier pilot, published in 2012,³ has been a catalyst for understanding adaptation needs within Manitoba's agricultural sector, as well as among provincial counterparts on the use and value of the tool. For the current study, we built on the previous analysis and chose to focus on a different sector.

As the first steps of the analysis are to determine the geographic scope, specific stressor and specific policies, IISD analysts worked with provincial climate change adaptation analysts from CWS to determine the most timely and useful sectors and policies for this analysis based on opportunities for review, and the availability of a champion related to the specific policies or suite of policies. As part of the original proposal for this study, the Manitoba component was to focus on modification of the ADAPTTool analysis to address a new policy in a stage of design and development, rather than existing policies and programs. As a result, a Manitoba wetland policy that is being developed by CWS was selected as the primary focus of the Manitoba portion of this cross-country work. In addition, due to interest and timeliness, three existing forestry policies were also selected for analysis with the original ADAPTTool.

The geographic scope for both these analyses was the entire province. A common climate scenario was developed for both analyses and was summarized as "more frequent drought, excess moisture and storms." Specific projections can be found in the detailed provincial report and analysis.

Forestry

A series of three forestry policies were selected for analysis based on their appropriateness for climate change adaptation and the presence of a champion who would assist with this analysis. The three policies included the Timber Allocation Policy, the Forest Renewal Program and the Wood Supply process. These are described in some detail in the provincial case study report.

A combination of research (a review of literature), discussions and review with experts generated a list of vulnerabilities and adaptation actions for the forestry analysis. An initial list of subsector, vulnerabilities and adaptations was suggested to a team of forestry experts in a workshop setting and these were reviewed and revised significantly to reflect more realistically the overlaps and distinctions between the stages in forestry management. Six key vulnerabilities were finalized and a total of 86 adaptation actions were identified to respond to these vulnerabilities.

Based on a detailed review conducted primarily by staff from the forestry branch, a few barriers to adaptation were identified in the selected policies. For example, the forest renewable program prescribes maintenance of previous stand types in forest renewal, while adaptation might recognize a need to diversify forest species to cope with changes in forest growth and productivity. Analysts also found that the timber allocation policy was not contributing significantly to adaptation needs, although most of the identified adaptation actions were either directly or indirectly supported

³ The report, *Adaptive Policy Analysis of Drought and Excess Moisture Programmes in Manitoba*, can be found here: http://www.parc.ca/rac/fileManagement/upload/MB_DEM_Adaptive_Policy_AnalysisSummary_Report_June_2012.pdf

by one of the three selected policies. We found that 36 per cent of the identified adaptation actions were directly supported by at least one of the policies. The policies that were identified as potentially hindering 13 of the adaptation actions are recommended for review to consider remedial actions as necessary.

There was a high degree of *direct* support for adaptation actions observed from the selected policies. For example, a vulnerability such as tree mortality caused by increased forest insects and pathogens in light of climate change could be addressed in part by an adaptation action of northern expansion of managed zones and this is supported *directly* by two of the three chosen policies and *indirectly* by the third. One reason for this might be the close correlation between the sectors chosen for the vulnerability assessment (stages of forestry) and the policies chosen for review (related to forestry). As a result, the timber quota allocation policy, forest renewal program and the wood supply process policies demonstrate direct support to 50 per cent, 30 per cent and 24 per cent of applicable adaptation actions respectively; indirect support to 36 per cent, 32 per cent and 53 per cent of the actions with only 14 per cent, 38 per cent and 22 per cent of actions respectively unsupported. Twenty of the 86 adaptation actions are unsupported by any of the policies. These policies largely relate to the vulnerabilities around increased frequency of fire and extreme weather events and reduced access for winter logging.

Based on the adaptive capacity analysis, we found that all three selected policies scored fairly high on both autonomous and planned adaptability. This implies that these policies are fairly flexible in light of uncertainty and have built-in mechanisms that allow them to be responsive to the anticipated and unanticipated climate changes. The timber quota allocation policy scored highest in both categories, probably because it provides the most support for applicable adaptation actions, is least vulnerable to the stressor itself and has a built-in formal review mechanism.

Specific areas of concern and related recommendations include:

- Despite the high degree of support for adaptation actions, there are elements in the three policies that actually hinder necessary adaptation in the forestry sector. As well, 20 of 86 adaptation actions are completely unsupported by these three policies. These need further review to determine whether they are supported by other sector policies. If not, and if these actions cannot easily be undertaken autonomously by industry, further analysis is needed to determine whether these actions are important enough to require additional policy support.
- Specific areas of climate vulnerability include vulnerability to increased frequency of fire and extreme weather events, and well as reduced access from winter logging. These ought to be considered in future reviews of these and other complementary policies to ensure that forest sector policies continue to meet policy goals as climate conditions change.
- While the need for consultation is built into all the policies to some extent, broader multi-perspective deliberation is lacking and would contribute to more robust program adaptability.
- Consider broadening this assessment to other forestry sector policies to get the full picture on mainstreaming adaptation and adaptive features of policies. The forestry branch conducted most of the analysis itself and have the capacity and expertise to conduct further analyses with some guidance and support from experts in the use of the tool.

Wetlands

As part of this multi-province study, a modified ADAPTool version was developed for new policies in design and development stages. The tool was modified in an iterative process based on needs identified through application to an unwritten wetlands policy in Manitoba. As a first step, like the other processes, staff from CWS were trained in a workshop in Winnipeg in the spring of 2013. This training workshop focussed on the climate-adaptation-related work in the province, as well as the need for adaptive policies, and included a short discussion about the value gained from the previous application of this analysis tool for agriculture-related policies in Manitoba in 2012. This training workshop was also used as a first point of discussion between IISD analysts and provincial staff relevant to the wetlands policy. Based on the current process of ADAPTool application for *existing policies*, we discussed the scope of the analysis.

Since the goal of the ADAPTool for new policies is to enable policy-makers to think through questions and analyses that will allow them to clearly mainstream adaptation needs in development of their policy, as well as build in features of adaptive policy-making, the series of questions asked were changed slightly to reflect this exploratory nature of this version of the tool. The four worksheets and the questions are as follows:

Policy Objective Worksheet:

- 1) What is the policy objective? What are its specific purposes?
- 2) What sectors and stakeholders are meant to be affected? Who are the beneficiaries?
- 3) What specific policy instruments are already envisaged (regulatory, expenditure, economic or institutional)?

Stressor Worksheet:

- 4) What stressors or drivers might affect the performance of the policy in the years and decades ahead?
- 5) How might this stressor evolve in the years and decades ahead?

Vulnerability & Adaptation Analysis Worksheet:

- 6) What are the main sectors affected by this policy?
- 7) In what ways are the sectors vulnerable to the stressor?
- 8) What adaptation actions might be necessary to address the identified vulnerabilities?
- 9) Could the policy objective and instruments potentially support this adaptation action?

Adaptive Capacity Analysis Worksheet

- 10) How can the policy be designed to be resilient to the stressors?
- 11) In what ways could the policy potentially enhance the capacity of relevant stakeholder groups to adapt to the stressors?
- 12) How could multistakeholder engagement be used in the scoping, design and implementation of the policy?
- 13) In what ways could the policy enable self-organization and social networking?
- 14) How could the policy be decentralized to ensure responsiveness to the adaptive needs of stakeholder groups?
- 15) What should be the mix of policy instruments directed at the policy objective and purposes?
- 16) What type of formal policy review process could be put in place to help ensure the long-term adaptability of the policy (including performance indicators and outcome frameworks)?

Policy Design Synthesis Worksheet

An executive summary of the recommended adaptive policy design features is provided in this worksheet.

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Through a combination of research, analysis, collaborative workshops and discussions, these questions were carefully considered for the wetlands policy case for Manitoba.

With the same geographic scope and stressor as the forestry analysis, the wetland policy was better defined based on background papers prepared for public consultations and from recommendations made by the Manitoba Water Council. In addition to the climate change stressor identified earlier, the wetlands policy analysis also led to the articulation of a second non-climate stressor, labelled “land-use competition and conversion,” which represented the land-use pressures on wetlands including land prices, agricultural commodity prices, land taxes and other such land-based economic pressures that acted as pressures for wetland conversion.

The sectors selected as relevant to the wetlands policies were municipal, agriculture (subsectors based on a list created for previous agricultural ADAPTool analyses included beef cattle, forage, cropping – annual grains and oil seeds, forage seed, hogs, dairy cattle, poultry, potatoes), forestry, recreation and environment (including biodiversity and species, and water).

For the first stressor on climate change, we listed 264 total adaptation actions included in the selected sectors and determined that 124 of these were applicable in some way to the wetland policy. Of these, 90 per cent could indirectly be supported by the wetland policy, 7.3 per cent could be directly supported and about 1 per cent were clearly not supportable. The large number of adaptation actions were derived from previous and companion analyses and were deemed by some analysts to be useful as a long checklist to ensure that the new policy is as responsive as possible to regional adaptation needs. Others felt like the list was too long and onerous and having a long list of “not applicable” actions was not useful.

It was determined that the environmental sector was the primary “beneficiary” of the policy while other sectors were indirectly supported and demonstrated co-benefits. A couple of potential areas where the policy could deter the adaptation actions—such as in the case of wetland-based parasites and diseases—were seen as potential points to be considered during the design and mitigated as possible.

For the second stressor related to land-use competition and conversion, the same relevant sectors were used (including municipal, agriculture, forestry, recreation, and environment). For these sectors, there were 48 vulnerabilities and 67 adaptation actions identified, of which 62 were applicable to the proposed policy. With the experience of the climate adaptation stressor, as described above, the adaptation analysis for the land-use stressor was undertaken differently and designed to be more directly relevant to the wetland policy, and on land-use conversion issues and actors. Since this list was intended only for this analysis and to explore the response of the wetland policy, this high degree of applicability was not surprising. Of these, 84 per cent of actions were indirectly supported, 13 per cent were directly supported and 3 per cent were not supported. An important aspect of this analysis was that it helped articulate primary and secondary objectives of this new policy—actions directly supported were directly complementary to the policy and those indirectly supported were somewhat related to the policy and were seen as “co-benefits” to be enhanced as possible through instruments design and related programming. One example of this was to enable wetland-based recreation judiciously through policy design to improve understanding of the value of wetlands among the public.

Based on the adaptation analysis, the primary sectors of focus for the proposed policy can be discerned. The environmental sector (including specifically biodiversity and water) is a primary focus of the wetland policy; however, municipal and agricultural sectors are affected and, in turn, affect the impact of the proposed policy and must be carefully considered. While this link is unsurprising, the analysis does provide specific entry points for linkages between wetland conservation and management and climate change adaptation objectives for the province.

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The adaptive capacity analysis asked the questions about the key elements of adaptive policies but in a way intended to provide guidance rather than to score current practices. As a result, the responses were in the form of recommendations on how this policy could be enhanced. For instance, the analysis suggested specific recommendations to allow the policy to be less vulnerable to the selected stressors. As well, examples of how the policy could strengthen adaptive capacity were identified, such as aerial photography and wetland inventory under access to relevant information and skills. Specific agencies such as the provincial Wetland Council and Ducks Unlimited Canada were identified as potentially helping decentralize the implementation of the policy. The analysis also identified instruments that would contribute to a high level of potential variation in the policy, and potential components of a formal review process.

Lessons Learned from Manitoba

The Manitoba case was diverse and provided sectoral as well as process-related lessons from the application of the two versions of the ADAPTTool. From the application in the forestry sector, the main benefits came from the discussion and interaction with the different forestry experts. Forestry staff took an active leadership role in the analysis and found that it helped them understand and analyze their policies in relation to climate change. The staff assessment was supported and reviewed by IISD analysts familiar with the tool and discussed in iterative workshops to unpack different perspectives.

Scoring for each question went through a number of changes based on these discussions. The presence of the climate change adaptation experts from within the forestry group as well as from related provincial branches also helped greatly in the effective utilization of this tool for the analysis.

The team had a few observations about the process that would be useful for future applications:

- The combination of IISD (ADAPTTool expert) analysts and provincial analysts was seen as useful.
- Clarity in the purpose of the analysis is a prerequisite: Is it a policy review for performance? How the analysis feeds into policy review and change was a significant question.
- The analysis took longer than provincial analysts anticipated. A clearer articulation of the steps, level of engagement and how this could expand based on interest and priority given to the tasks might be helpful for future applications.

For the ADAPTTool analysis of the new wetland policy, the following observations were made:

- In this case, the tool was applied to a policy whose main purposes included dealing (directly or indirectly) with the two stressors identified. Conservation of wetlands is a climate adaptation strategy and a strategy for addressing land competition. Therefore, the tool did not so much provide new information, as validate from a different perspective that the policies were likely to achieve these purposes and contribute directly to climate adaptation needs in the province. However, this process was deemed only mildly useful to the program analysts and not worth the effort of analysis, review and workshop participation.
- There were a number of points where information was incorporated into the worksheet based on new insights from this shift in perspective—for example, the inclusion of a new vulnerability other than climate change, the understanding of the environmental sector as a key beneficiary of the policy and the need for its inclusion in the vulnerability sheet, as well as inputs about wetland being resilient to changing water regimes under climate change.

- The analysis did shed some light on the main objectives and the co-benefits of the policy through direct and indirect support of adaptation actions. The adaptation actions “directly” supported can be seen as primary policy goals, while those indirectly supported can be further examined for their relevance and be treated as secondary goals or clear co-benefits.
- ADAPTool analysis is not intended to provide specific policy design recommendations, such as a list of wetland policy effectiveness indicators. Instead, the recommendations and guidance was fairly broad and focussed on ways to incorporate indicators as part of a formalized review process. Policy analysts wanted more specific information—for example, related to indicators for policy success.

3.4 Nova Scotia – Water and Protected Areas

In Nova Scotia, the Climate Change Directorate of Nova Scotia Environment was the project partner interested in using the ADAPTool to systematically understand the potential adaptability of a small number of existing policies and programs in key aspects of environmental management in the face of climate change in order to help mainstream adaptation into program implementation.

An initial workshop was held in Halifax where IISD analysts, a representative of the Manitoba Climate Change Branch and representatives of Nova Scotia Environment (NSE) met to discuss the Nova Scotia portion of this project. NSE staff were trained on adaptive policy-making and the use of the ADAPTool and discussions were held on the scope of this assessment.

The geographic scope of the project was the province of Nova Scotia and climate change was selected as the stressor. More specifically, it focused on the increased variability of precipitation leading to lack of water causing droughts and excessive moisture (flooding). The project team identified three broad subsectors of key interest to NSE: water and wastewater, protected areas and wetlands, and air. After discussion with the team in Nova Scotia, the air subsector was removed from the analysis, as it was challenging to link the studied stressor with the potential vulnerability and adaptation needs in this subsector. Based on interest, opportunity and the availability of a program-related champion, three programs were selected for analysis using the ADAPTool. In the case of Nova Scotia, the policies selected for analysis are represented in the form of key documents intended to explain to the public the policy requirements and regulatory procedures in several different sectors. The selected program documents are:

- *Guide to Surface Water Withdrawal Approvals*: The purpose of this guide is to describe the recommended submission requirements, supporting documentation and the criteria to evaluate surface water withdrawal applications.
- *Guide to Groundwater Withdrawal Approvals*: The purpose of this guide is to describe the minimum submission requirements, supporting documentation and the criteria used by NSE to evaluate groundwater withdrawal applications.
- *Our Parks and Protected Areas*: This document is the province’s proposed plan to ensure that these areas continue to thrive. It delivers on two important government commitments: updating Nova Scotia’s park system to secure and strengthen its long-term success and increasing Nova Scotia’s legally protected landmass to at least 12 per cent by 2015. This plan proposes to protect more than 13 per cent of Nova Scotia’s outstanding lands.

As a basis for gauging the ability of the suite of policies to support anticipated actions, a rapid expert-based assessment was undertaken that included key policy-makers of the government agency. Four vulnerabilities were identified for the environmental management sector, along with 31 adaptation actions to address them. Adaptation actions were identified using a range of regional documents that are listed in the detailed provincial analysis report. A key challenge

that arose while reviewing these and various other Province of Nova Scotia guidelines was that the policies were built using old data, which raised concern for the safety of infrastructure based on today's climatic conditions (e.g., increases in severity of rainfall amounts create a challenge with culverts). Various policies must incorporate more recent data to enable accurate assessment and planning.

Once the vulnerabilities and potential adaptation actions were identified, the project team proceeded to review each of the three identified documents using the ADAPTTool workbook. This review was then shared with representatives from government who are well versed in the day-to-day workings of the policy and who provided feedback on the analysis, through in-person or telephone discussions and via email.

Finally, there were additional adaptation needs identified, including issues such as human and infrastructure safety and insurance needs in the context of climate change that were not directly or indirectly supported by any of the analyzed policies.

Results of Analysis

Of the 31 adaptation actions considered, 24 were supported by at least one policy in the suite. The assessed policies performed well in terms of adaptation measures involving stakeholder collaborations and awareness raising, permit issuing in protected areas and mapping current water withdrawals. Specifically, support for adaptation actions was strong in the water and wastewater sectors, especially those addressing the impacts of precipitation changes due to climate change on water, mapping of water withdrawals and support for the development plans for different stakeholder groups to address climate change impacts (especially droughts).

The two policies focusing on water management performed less successfully in addressing adaptation needs such as ensuring reviews, updating guiding documents for surface and groundwater withdrawals, making decisions on the allocation of wells and evaluating proponents' requests for water withdrawals in light of climate change impacts.

Adaptation needs addressed in the plan on protected areas and wildlife included those focusing on incorporating climate scenarios into planning processes, awareness raising about climate change impacts on potential species movements and accounting for potential climate change impacts in research licences, trail development and bridges. The plan performed less successfully in monitoring and addressing impacts of climate change on wetlands/other types of natural habitat, exploring the potential roles of wetlands in promoting adaptation to climate change and taking into account these issues when planning for infrastructure with potential consequences on wetlands and other types of natural habitat.

Overall, the three assessed policies performed very well in the series of questions on adaptive capacity. They performed well in terms multistakeholder deliberation during policy development and implementation, promoting self-organization and social networking, and promoting a suite of instruments to achieve the policy goals.

The analyzed policies, however, presented only a narrow spectrum of potential instruments mostly focused on regulation, which made it challenging to ensure diversity in terms of supported actors' capacities. Actors' capacities that focused on economic resources, technology and infrastructure were not well served by this suite of policies.

The NSE policy analysis suggests that these policies are fairly adaptive in general and to climate change in particular. They have weaknesses in terms of monitoring and adjustment mechanisms. The water management policies also are vulnerable to climate change themselves, due to their reliance on old data to establish standards, which could pose substantial issues for achieving policy objectives in the future. A relatively narrow sample of policies was selected for this exercise, and more robust conclusions could be derived from a broader review.

Finally, all the analyzed policies utilize practices that build adaptability such as stakeholder consultations, informal reviews and approaches to decentralization; however, many of these processes, even when applied successfully, are not well documented or formalized. They have been adopted as a matter of good practice by experienced officials, but they have not been formalized as practices to be applied regularly in other policies and plans in the province and elsewhere. The ADAPTool analysis exposed these practices and led to recommendations to standardize and formalize them for broader and more consistent application.

Lessons from this Case

Even though Nova Scotia Environment's Climate Change Unit (CCU) has been conducting ongoing outreach to various branches of NSE to factor in climate change considerations into operational activities, this has been (and continues to be) an ongoing challenge. This application of the ADAPTool helped support CCU's efforts by providing other program units with insights on how climate change will affect the implementation of their programs and policies.

NSE participants in this analysis expressed that the discussions and analysis involved in this application of the ADAPTool allowed them to better understand a number of vulnerabilities and impacts of climate change stressors on infrastructure and other aspects of environmental management. Together with an unrelated parallel study, the results suggest that more efforts are required to build climate change into NSE policies. This analysis has led to a broader effort to begin assessing policies, and since the time of this analysis, executive approval to assess another five policies has been received.

In addition, the exercise of bringing multiple technical disciplines together through the analysis was felt to be beneficial in providing integrative and holistic insights to program managers, and this type of multidisciplinary deliberation will be more broadly encouraged through further ADAPTool applications. As always, constraints of time and human resources are limiting factors.

3.5 Combined Vulnerability and Adaptation Actions

This section of the report shows the analytical results for all the policies, in all four provinces and across four different sectors, to illustrate the range of results and demonstrate comparative results from the ADAPTool analysis. Four different policy categories are recognized:

- Regulatory policies that specify or constrain actions under certain conditions (e.g., land-use regulations).
- Economic support policies that reduce risk, compensate for specific losses or structure markets and incentives (e.g., crop insurance).
- Institutional policies that create rules, processes or information to support economic activity (e.g., water licensing procedures for surface water extraction).
- Expenditure policies that provide infrastructure, extension, administration or oversight for sectoral activity (e.g., marketing or business development programs).

TABLE 2. A LIST OF ALL THE ANALYZED POLICIES GROUPED BY THEIR SECTORIAL FOCUS. A DETAILED OVERVIEW OF THE POLICIES WITH KEY REFERENCES IS PRESENTED IN APPENDIX A.

TITLE AND SECTOR	PROVINCE	TYPES OF POLICY
Timber Quota Allocation Policy	Manitoba	Regulatory, economic, expenditure.
Forest Renewal Program	Manitoba	Regulatory, institutional
Wood supply process	Manitoba	Regulatory, institutional
Saskatchewan's 25 Year Water Security Plan with 7 goals	Saskatchewan	
Sustainable Supplies	Saskatchewan	Economic; regulatory; Expenditure; Institutional
Safe Drinking Water	Saskatchewan	Regulatory; institutional ; expenditure
Protection of Water Resources	Saskatchewan	Institutional; Expenditure
Safe Dams	Saskatchewan	Regulatory; institutional; expenditure
Flood and Drought Damage Reduction	Saskatchewan	Regulatory; Institutional; Expenditure.
Adequate Data, Information and Knowledge	Saskatchewan	Expenditure; institutional
Effective Governance and Engagement	Saskatchewan	Institutional; Regulatory
Guide to Surface Water Withdrawal Approvals	Nova Scotia	Regulatory, Economic
Guide to Groundwater Withdrawal Approvals	Nova Scotia	Regulatory. Institutional. Expenditure
Our Parks and Protected Areas	Nova Scotia	Regulatory. Institutional. Expenditure, Economic
Business Risk Management (Agristability)	British Columbia	Economic
Business Risk Management (Production Insurance)	British Columbia	Economic
Regional Agrologists Network	British Columbia	Institutional
Strengthening Farming and Agricultural Area Plans	British Columbia	Institutional
Agroforestry Program	British Columbia	Expenditure, regulation
Range Management	British Columbia	Regulation, institutional, expenditure
Invasive Species	British Columbia	Expenditure, regulation
Pest Management	British Columbia	Regulation, expenditure, institutional
Environmental Farm Plan Program (EFP)	British Columbia	Expenditure
Beneficial Management Practices Program (BMP)	British Columbia	Economic, expenditure
Agricultural Emergency Preparedness	British Columbia	Expenditure
Agriculture Water Management Program	British Columbia	Institutional, expenditure
Water Act Modernization	British Columbia	Regulatory
Agri-food Business Development Program	British Columbia	Expenditure, institutional

The set of policies was evaluated across a range sectors including: agriculture, forestry, water and 23 subsectors such as plant and animal production; as well as water consumption in sectors such as agriculture, mining, hydroelectricity and municipalities. The major stressors chosen to assess the policies included variability of precipitation, including drought, heavy rainfall and flooding. In the four provinces, the specific climate stressors were defined slightly differently, according to the issues most relevant to the sectors involved and the climate characteristics of those areas. However, all considered the impacts of variable and extreme precipitation. These stressors were then used to identify 80 potential vulnerabilities across the identified 23 subsectors (Table 3).

TABLE 3. A QUANTITATIVE OVERVIEW OF THE SECTORS, VULNERABILITIES AND ADAPTATIONS IDENTIFIED ACROSS THE FOUR PROVINCES

PROVINCE	NO. OF SECTORS	NO. OF VULNERABILITIES	NO. OF ADAPTATION ACTIONS
British Columbia	11	60	154
Manitoba	1	6	85
Nova Scotia	2	5	31
Saskatchewan	9	97	198
Total	23	168	468

3.6 Policy Performance to Address Anticipated Adaptation Needs

During the application of the ADAPTool, a large number of anticipated adaptation actions (468) were identified for 168 specific vulnerabilities. This large number of adaptation actions can be explained by the fact that for each listed vulnerability and the subsector of the analyzed policy, numerous potential adaptation actions could apply. Some adaptation options were listed in multiple places but in specific contexts were framed by a particular context—for example, insurance for grains, berries, cattle and other livestock.

We distinguished between eight major types of potential identified adaptation actions that target groups within these sectors could take, including:

- **Technological changes:** implementing new and/or improved technology to address the vulnerabilities; for example new infrastructure technologies to address thawing permafrost, efficient new/improved irrigation systems.
- **Infrastructure development:** investing in new built infrastructure or expanding and/or modifying existing infrastructure and maintenance practices; for example, expanding and modifying hydroelectric facilities, modifying construction in bridges, developing alternative water sources.
- **Economic instruments:** to provide financial resources directly or indirectly to stakeholders to reduce vulnerabilities; for example, offering insurance and risk mitigation options for agricultural production, providing financial support (loans and grants) to cover input costs, diversifying production and overcoming transition barriers to different, less vulnerable management options.
- **Management options:** to change how procedures are implemented without additional support in terms of financial resources, policies or technology. This includes, for example, changing working hours to avoid heat, changes in crop rotation practices, planting times and pest and fertilizer applications

- **Policy and strategy development and revision:** aim to change currently mandated rules and guidelines that either exaggerate vulnerabilities and/or prevent actors from undertaking adaptations; for example, revising forest management /reforestation, water withdrawal regulations, building codes, water storage guidelines.
- **Monitoring:** focuses on identifying additional actions to monitor climate change impacts and vulnerabilities; for example, monitoring pests, water use or rainfall levels.
- **Information and awareness:** provide information to the public and specific stakeholder groups (such as producers and operators of technology and infrastructure) on possible impacts and vulnerabilities to climate change and possible adaptations so they can adjust their decisions and actions; for example, information on emerging threats (pests and diseases) for producers and farmers.
- **Research:** to identify new breeds, species, infrastructure and technological choices that could help in reducing vulnerabilities; for example, research on tree improvement in forestry, developing genotypes that are drought tolerant and resist insects and diseases, selecting and breeding varieties and species to enhance traits that may be more suited to changed environmental conditions.

Adaptation actions across all the analyzed categories were identified. The highest number of actions was listed under management, which includes mostly changing practices in agriculture, forestry, water use and operations (Table 4). These options represented 31 per cent of the total number, and were followed closely by a group of actions on changing and reviewing policies, as well as strategies and infrastructure development and technology. Economic instruments and research represented approximately 8 per cent of the total number of actions. Finally, monitoring and creating/using information to raise awareness among public and specific stakeholders represented the least number of needed actions. This last group included groups such as farmers, representatives of specific industries and users of specific resources such as water and land.

TABLE 4. NUMBER AND PERCENTAGE OF THE IDENTIFIED ADAPTATIONS ACCORDING TO DIFFERENT CATEGORIES

TYPES OF ADAPTATIONS	NUMBER OF ACTIONS	PERCENTAGE OF TOTAL ADAPTATION ACTIONS
Technology	57	12.2
Monitoring	20	4.3
Infrastructure	70	15.0
Economic Instruments	41	8.8
Information, Awareness	20	4.3
Policy, Strategy	77	16.5
Management	145	31.0
Research	38	8.1

Across all the provinces, when the policies were scored against these adaptation actions, respondents found that many policies were not applicable to the adaptation actions identified. For each category, between 40 and 65 per cent of the adaptation measures had no applicable policies (Figure 2). This means that the analyzed policies do not focus on many of the identified actions for adaptation. In other words, the policy suite overall was not well matched to the set of identified climate adaptation actions. This is not surprising, as the policies were not designed to support climate adaptation, but it does show that many anticipated adaptation actions lie outside the purview of this set of policies.

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Of the actions that had relevant policies in the analysis suite, approximately 20 per cent were supported directly by one or more policies (Figure 3). Direct support of the analyzed policies followed when: the adaptation option is specifically what the policy is intended to support, or the action is covered by the analyzed program. The highest direct support was given to adaptation needs focusing on risk management, policy, and strategy and monitoring measures. The lowest direct support was given to research and awareness raising and providing information.

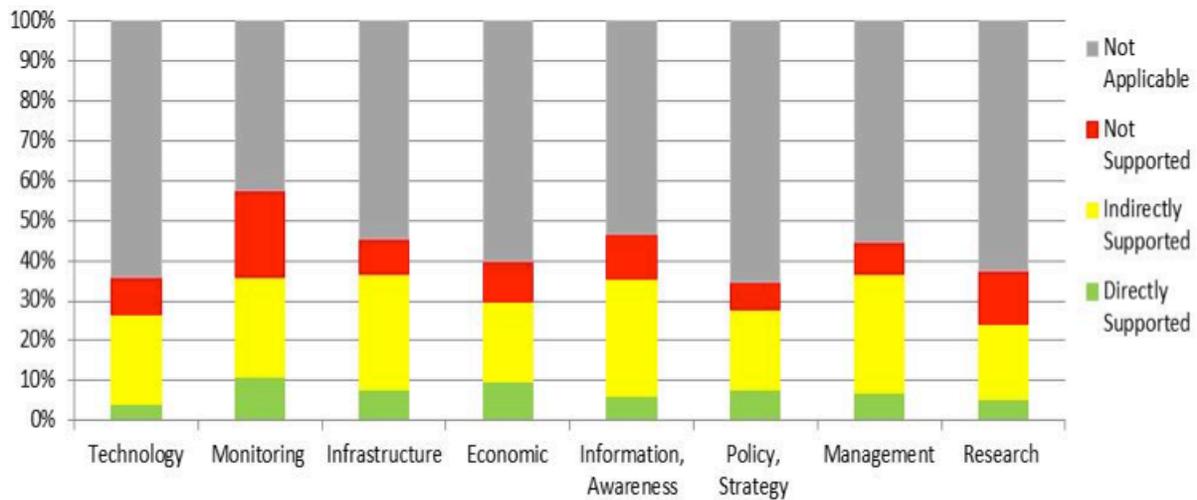


FIGURE 2. AN OVERVIEW OF THE IDENTIFIED ADAPTATION MEASURES SCORING PRESENTED BY TYPES OF ADAPTATIONS ACROSS ALL THE ANALYZED POLICIES

For cases in which the policy being assessed was relevant to the adaptation action(s), there were more actions that were NOT supported than were directly supported by the policies. This aggregate total covers a lot of differences between the policies in different provinces, but it is interesting that the aggregate result suggests that the suite of policies is not well suited to supporting climate adaptation actions in these sectors.

A larger number of adaptation options were supported indirectly across all the analyzed types of adaptation actions. In these cases, the policy does not mandate the adaptation actions but it does enable them in some way. In this context, other reasons for indicating partial/indirect support were described in interviews as follows:

- In the analyzed policy, seed zone boundaries are set but could be adjusted with an approval process.
- The “policy” does not inhibit the action, but the lack of data and information likely would; information and extension materials exist, but policy-makers are not actively working on this currently.
- The policy allows this action, but it is not part of the current work plan.
- The policy permits work with local governments on improved flood protection, drainage etc., but it does not support a bigger leading role.
- The policy does not provide insurance but can help producers utilize insurance as part of their business planning.
- The policy supports increasing riparian buffers to moderate the intensity of flooding events, but these have to be part of a larger suite of flood management options, which is outside the scope of the analyzed policy.

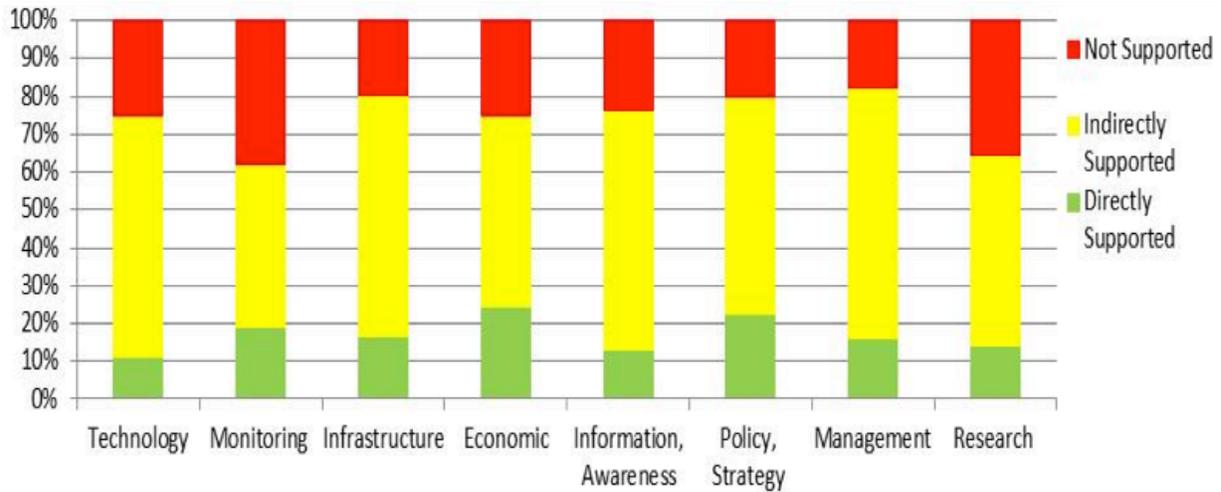


FIGURE 3. AN OVERVIEW OF THE SUPPORT FOR ADAPTATION ACTIONS WITH THE EXCLUSION OF NON-APPLICABLE POLICIES

In five cases out of the 498 actions, policy-makers noted that a policy discourages adaptation—not by directly prohibiting the actions, but because the policy supports previous practices in production, water withdrawals and forestry. In other words, the policies in these cases discourage innovative types of management, technology and other choices that are not in line with past and current actions and therefore inadvertently hinder adaptation actions.

3.7 Adaptive Policy Analysis

3.7.1 Policies Vulnerable to Climate Change

All the policies were assessed to determine their adaptability to anticipated and unanticipated climate stresses. The first issue examined was whether climate variability and climate change could affect the performance of the policy directly. For example, if the stressor is increased incidence of flood and the program provides emergency flood response, the program could be unable to meet demand in the future or may not have adequate financial resources. On the other hand, programs focussed on research or data management are unlikely to be affected directly by climate change impacts.

Vulnerability of the analyzed policy to the stressor

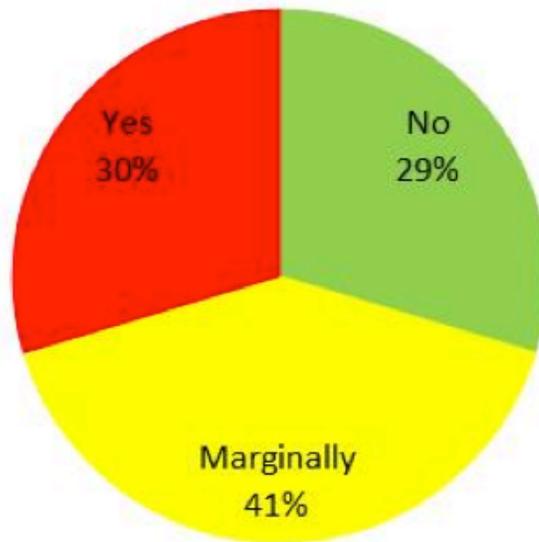


FIGURE 4. IS THE POLICY VULNERABLE TO THE CLIMATE STRESSOR AS DEFINED?

Major policy vulnerabilities were identified for policies focused on the water and forestry sectors. Our analysis revealed that current understanding of climate change impacts is not sufficiently integrated into rules and guidance provided by the policies, as they are based on historic trends (Figure 4). For example, in the water sector, climate stressors influence water allocations that depend, in turn, on the water available. Climate change impacts could jeopardize commitments under these policies. Similarly, in the case of forestry, the policy *may not be able to meet renewal standards with increasing climate change impacts*, and thus the policy targets are vulnerable. A majority of policies assessed were not directly vulnerable to the climate stressors identified.

3.7.2 Supporting Adaptive Capacity

There is a growing body of literature on the importance of adaptive capacities that stakeholders can utilize when facing climate variability and climate change (see Belliveau, Smit, & Bradshaw, 2006; Nelson et al., 2010). Since its appearance in the literature, the concept of adaptive capacity has been closely linked to levels of economic development, based on factors such as the range of technological options available, the availability of resources (including economic resources and available infrastructure) and the stock of human capital (Smit & Pilifosova, 2001). Recently, the importance of the social and institutional dimensions of adaptive capacity has been emphasized in order to reflect a broader view of the human abilities required to effectively use information and promote collaboration through formal and informal institutions and networks (Swanson et al., 2009; Adger et al., 2011). Finally the importance of the equitable distribution of resources is being recognized. Communities with the aggregate potential for high apparent adaptive capacity could hide sub-groups who are marginalized or otherwise excluded from access to resources, and hence more vulnerable

(IPCC, 2012; Adger et al., 2011). Programs that specifically target vulnerable or marginalized groups will reduce these kinds of inequity.

Bringing these recent understandings of adaptive capacity together, we focused on six core adaptive capacity areas and assessed policies against their support to these key determinants of stakeholders' adaptive capacities (Figure 5). From the analyzed policies, the greatest number provided stakeholders with information, skills, access to information and networks. Examples of this support included:

- *The programs provide information about pest management and best management practices to farmers.*
- *The policies provide information about methods of accessing water withdrawals.*
- *There is regular reporting about changes in water use and climate variability.*
- *There are efforts made within the program to disseminate information about training.*
- *In some programs, the stakeholders interested in participating in the provided programs must take part in workshops to learn how to use and share information within the community.*
- *Programs suggest support by testing services provided by the experts working in the provincial governments.*

The lowest level of support by the policies was for access to technology and infrastructure. In this context, the policies mostly focused on *providing information and skills about new technology, enabling access to infrastructure and enabling access to financial resources to engage in technology use.*

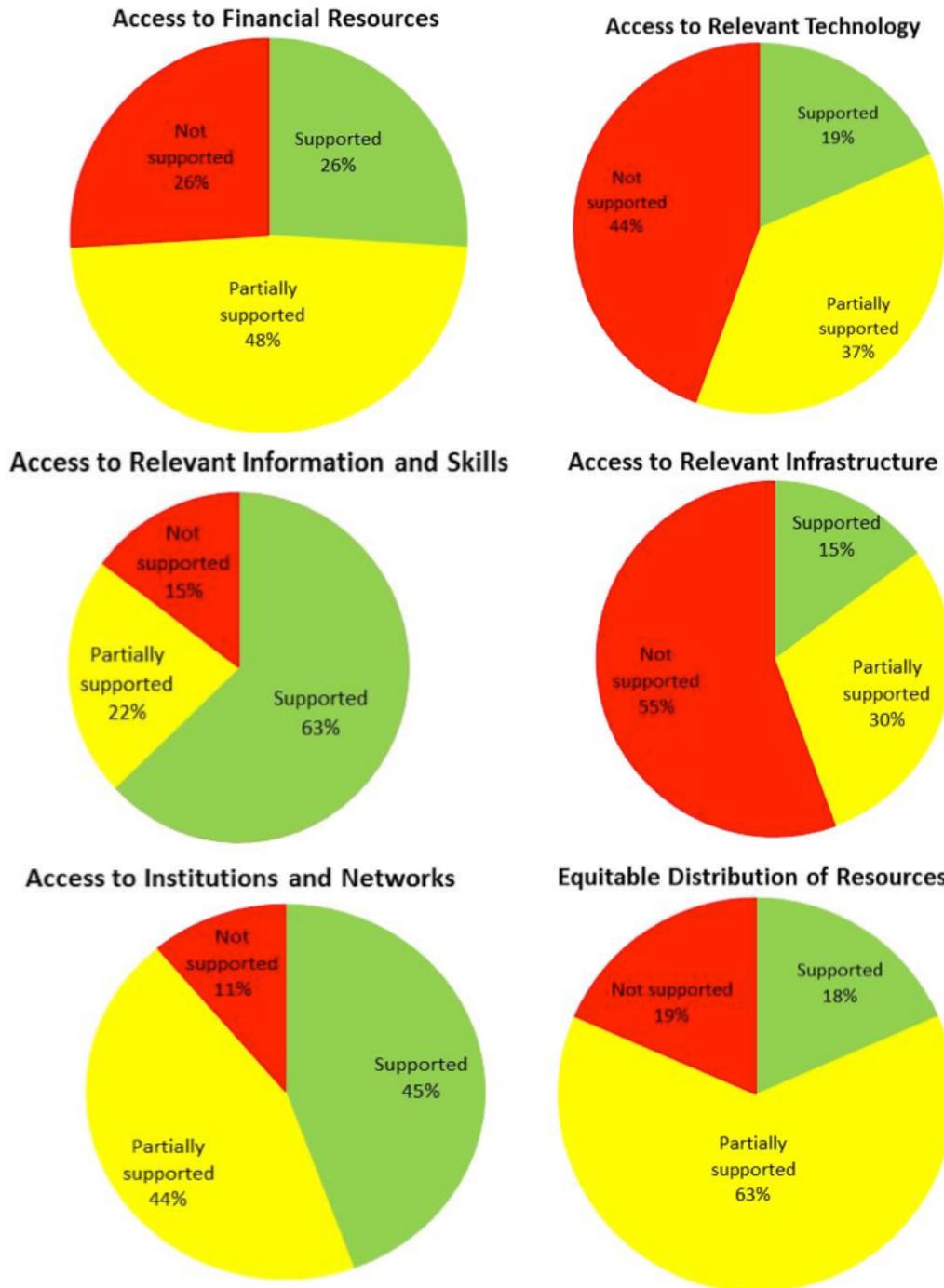


FIGURE 5. OVERVIEW OF THE SUPPORT PROVIDED BY THE ANALYZED POLICIES TO THE SET OF ADAPTIVE CAPACITIES

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3.7.3 Use of Foresight Methods and Multistakeholder Deliberation

A key aspect of planned adaptability is expending efforts to understand the policy context; past, present and future stresses; and other issues that may affect policy performance. Two ways of doing this are through analytical assessments such as developing and examining future scenarios and through deliberative processes incorporating multiple perspectives. It is important to note that multi-perspective deliberation helps with autonomous adaptation by identifying issues that may be just emerging unnoticed through analytical processes.

Questions 10 and 11 in the ADAPTTool examine the use of the foresight methods and multistakeholder deliberation (the B.C. analysis was completed before the foresight question was added). The main role of the foresight methods, including integrated and forward-looking analysis, is that they can identify key factors that affect policy/program performance and scenarios for how these factors might evolve in the future. These tools can also be used to develop indicators that will trigger adjustments when needed. Modelling tools of varying sophistication can be used to support this kind of analysis, which is often integrated through scenario planning.

Multistakeholder deliberation is defined as a collective and collaborative public effort to examine an issue from different points of view as part of a decision-making process. In this context, this approach goes beyond stakeholder consultation. Deliberative processes strengthen policy and program design by building recognition of common values, shared commitment and emerging issues, and by providing a comprehensive understanding of causal relationships. The key aspect of this process is that it involves participants in sharing multiple perspectives in an attempt to reach consensus on a relevant decision. In the analyzed policies, stakeholders' deliberations and consultations and/or foresight methods were used in close to 80 per cent of the analyzed policies (Figure 6).

For the recently developed policies, formal multistakeholder consultations were often guided by municipal/provincial regulation on stakeholder consultations. Most of the analyzed policies undertook major formal consultation efforts, both by conducting face-to-face consultations and by providing opportunities for stakeholders to comment and provide input through designated websites. These consultations also included expert and non-expert consultations covering different sectors' interests. For example, advisory groups of diverse stakeholders often deliberated *on different perspectives to examine the issues prior to making a decision*.

To include some of the forward-looking approaches, assessment of current trends and projections for the future provided insights about possible demands for land, forest products and water, but climate change was not a factor in these assessments. Rather, these assessments were mandated because of the linkages between the analyzed policies and programs with broader provincial planning processes, such as those driven by the province's sustainable development vision. These methods also included quantitative projections for different management options, but again without considering climate change impacts. Finally, in 10–20 per cent of analyzed policy documents, a need to assess climate change impacts and potential impacts on water stress, biodiversity and other issues was identified, but this was not included in a formalized forward-looking assessment during the policy development and/or implementation process.

Use of foresight methods and multi-stakeholder deliberation (in %)

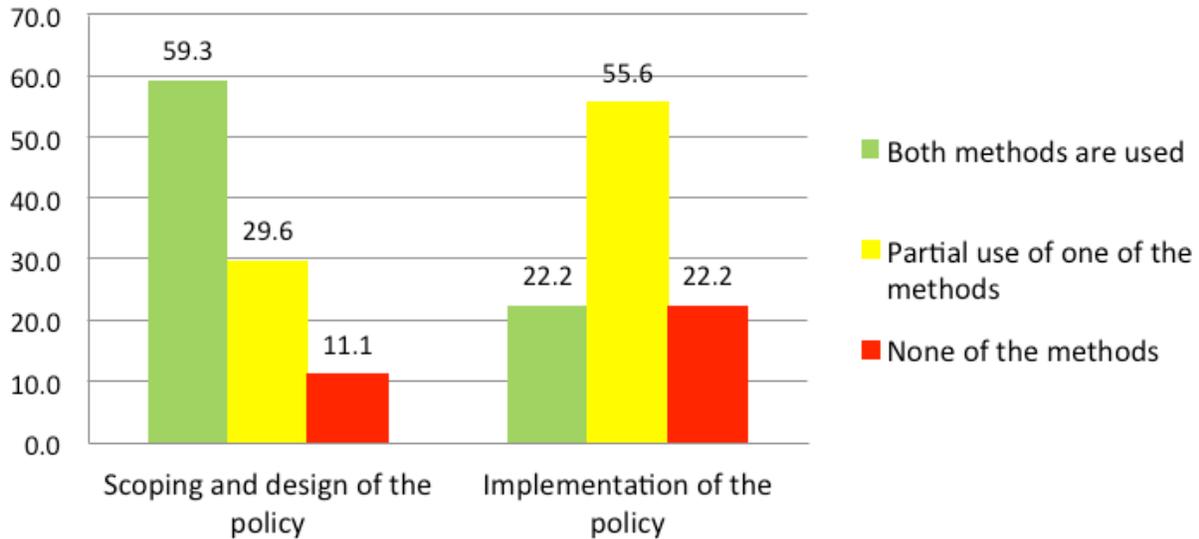


FIGURE 6. AN OVERVIEW OF THE ASSESSMENT OF THE POLICIES IN TERMS OF USING FORESIGHT AND STAKEHOLDER DELIBERATION IN DIFFERENT PHASES OF THE POLICY CYCLES

NOTE: The 14 B.C. policies were assessed earlier, using a version of the ADAPTool that did not include foresight in this question.

3.7.4 Enabling Self-Organization and Social Networking

An important component of autonomous adaptability is the ability of policies to enable self-organization and social networking. This ensures that policies do not undermine existing social capital, but instead create forums that enable social exchange, facilitate the sharing of good practices and remove barriers to local self-organization. Local responses, self-organization and shared learning all strengthen the ability of stakeholders to respond to unanticipated events through innovation. These practices take advantage of the capacity of complex adaptive systems to generate solutions without external input or formally organized interventions. For policy-makers and program managers, the idea is to enable self-organized responses to unexpected conditions by enabling and supporting interaction, learning and networking, without trying to control or dictate outcomes. This includes facilitating sharing and copying of best practices, providing resources to reduce barriers to self-organization and creating spaces for adaptive collaboration.

Across the analyzed policies, high levels of direct and partial support were provided for enabling self-organization and social networking (almost 90 per cent). The inputs provided about the reviewed policies indicate that they support social networks and self-organization in a variety of ways: *extension by field days and meetings—bringing ranchers together, discussing science, pilot application of suggested practices, supporting local agriculture advisory committees, offering workshops in key areas such as new standards and guides*. Partial support was given through information dissemination and sharing, but only across selected groups such as other policy-makers and industry representatives.

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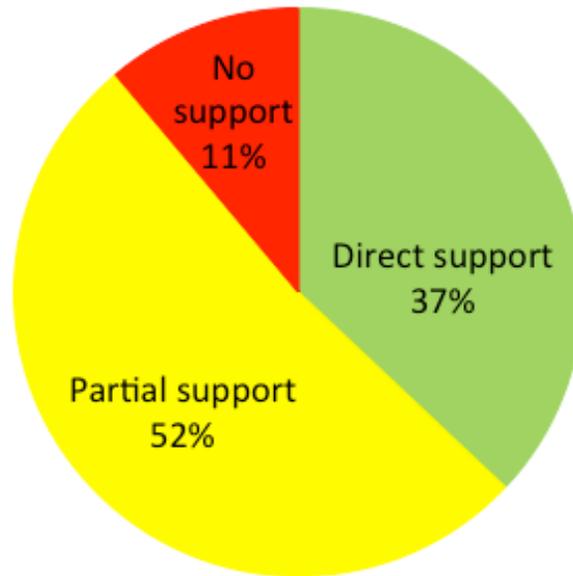


FIGURE 7. POLICY SUPPORT FOR ENABLING SELF-ORGANIZATION AND SOCIAL NETWORKING

3.7.5 Decentralization of Decision-Making

In governance terms, the principle of “subsidiarity” means decentralizing decision making to the lowest effective and accountable unit of governance. This has advantages for adaptive policy-making because there are better opportunities for feedback and information sharing to ensure that decision-makers are aware of unexpected problems, the effects of proposed interventions and the nature of different interests. For policies/programs directly concerning natural resources and ecosystems, field staff typically notice significant change earlier and can mobilize affected local interests to address these changes more simply. Because local conditions vary widely, decentralization provides a way to implement policies and programs more flexibly, to ensure effectiveness and adaptation to change. The potential for decentralization in any particular policy or program area will depend on the scale of intervention needed, the extent of local knowledge and capacity, and the structure of governance mechanisms for accountability and coordination. Effective decentralization is accompanied by resource allocation and appropriate accountability and autonomy.

Based on the outcomes from the conducted policy assessments, this group of policies support decentralization (Figure 8). In terms of direct support, the decisions and actions outlined in the policies and programs were frequently devolved to regional and local offices often through technical committees to ensure inputs and feedback from the lower level of governance. As an example, some programs were implemented by forest or water resource managers in collaboration with farm operators and other specific stakeholders’ groups such as First Nations and rural municipalities. Partial decentralization relates to a lack of clear implementation guidelines and/or informal rules for decision-making, which may include consulting with research partners, federal government agencies and industry groups. Finally, some policies used more centralized procedures—for example, needing to obtain provincial approvals for decisions and signatures and going through complex approval procedures.

Decision-making for policy implementation adequately decentralized

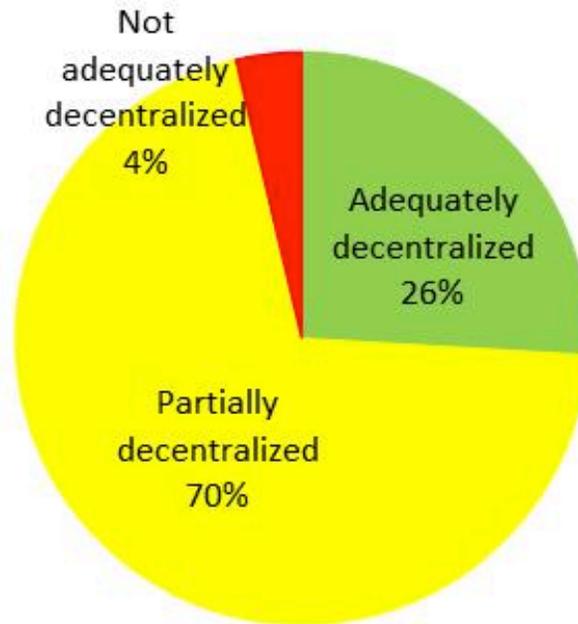


FIGURE 8. POLICY SUPPORT FOR DECENTRALIZATION OF DECISION MAKING IN THE SPECIFIC POLICY CONTEXT

3.7.6 Formal Policy Review and Continuous Learning

Another important aspect to autonomous adaptability is a formal review of the policy to facilitate continuous learning and improvements. Even when the policy or program is performing well, regular review and well-designed pilots implemented throughout the life of the policy to test assumptions related to performance can help address emerging issues and trigger value-added policy adjustments. Formal review is different than automatic adjustment, where triggers and responses may be determined in advance. Formal review is a mechanism for identifying and responding to unanticipated circumstances and emerging issues. This assessment process can be very useful in detecting emerging issues that can affect the policy's performance. A formal review mechanism includes triggers for the review, definition of the nature of the review and a learning process (i.e., who needs to be involved in the review, who will take action on the results and what kinds of actions are to be considered), thus incorporating both analytical and deliberative processes.

In the conducted assessment, almost 40 per cent of policies use formal review procedures and 52 per cent use partial review procedures (Figure 9). For example, the Manitoba Timber Quota Allocation policy is reviewed every five years. Partial support for review procedures means they include reviews of only some of the issues and outcomes of the policy—the forest renewal charge rates in the Manitoba Forest Renewal Program are reviewed every year. Partial support could also indicate using only internal reviews involving small groups of experts and policy-makers and/or conducting a small, internal review and not publishing the results for broader deliberation and response.

Regular formal policy review of the policy

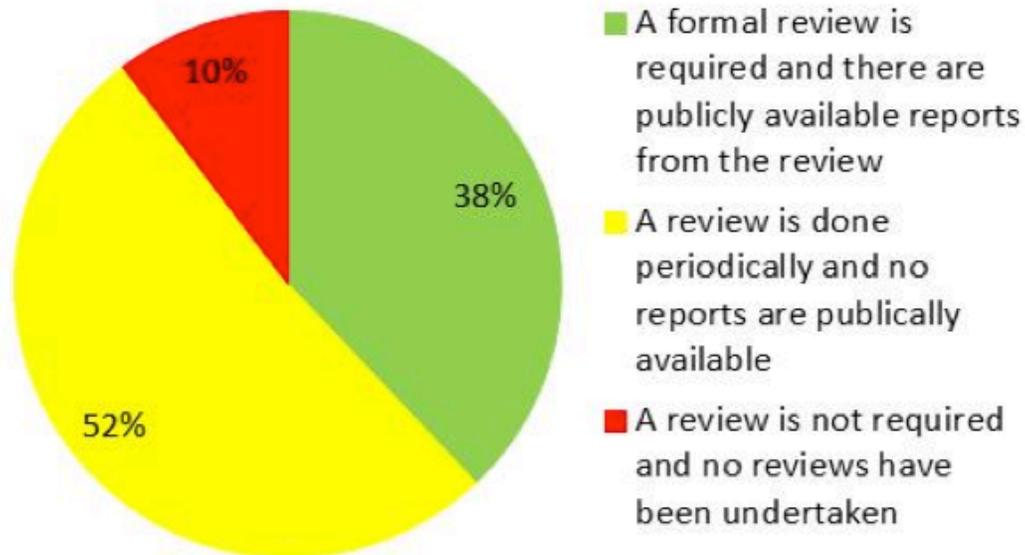


FIGURE 9. AN OVERVIEW OF THE FORMAL REVIEW PROCEDURES APPLIED TO THE ANALYZED POLICIES

3.8 Feedback from Participants on the Policy Assessment Process

In the previous sections, we focused on summarizing outcomes from the policy assessments across the provinces. In this section, we present feedback provided by the provincial program staff involved in the process, collected in the course of interviews after completion of the analysis. Overall, program staff felt that the application of the tool provided learning opportunities about vulnerability to climate change and adaptation needs in the context of their work. In this sense, the ADAPTool did not so much generate *new information* as it provided a *different perspective* on information that was familiar, but had never been considered through an adaptation lens.

The ADAPTool process specifically provided a new way for adaptation policy analysts to advance their work on climate change mainstreaming in a structured manner. The tool was a way to legitimize discussion of adaptation issues in programs that otherwise would have been difficult to surface. The process of applying the tool brought such issues/actions forward. The application of the tool also created a discussion platform and forum with key groups of program staff. This provided “*a common ground*” to bring together and initiate adaptation planning with members of relevant departments. As many of the issues were cross-cutting and needed to be discussed with larger groups, the application of the tool also pointed out further needs for cross-sectorial collaboration, in order to realize adaptation potential in any given sector.

Most of the program staff participants felt that the tool pointed out the adaptive capacity weaknesses and strengths of their policies and programs in a balanced manner. They reported that they were “*positively surprised how their policies turned out to be adaptive*” when they scored well in the categories of assessing unanticipated adaptation. They felt that many of the policy practices that performed well should be explicitly captured and shared with other analysts along with the lessons learned about the weaknesses to guide future policy development. In terms of weaknesses, most of the interviewees felt that the tool helped them recognize that they did not pay enough attention during policy development and implementation to think about how the policies could enable stakeholders to act when challenges occur. In general, the ADAPTool helped them recognize the importance of building the capacities of targeted stakeholder groups such as farmers, water users, businesses and citizens.

Even though the results from the assessments were considered useful, most of the pilot case participants found the exercise unexpectedly time consuming. For future applications, they felt that the level of effort required to complete the tool should be more clearly explained—including time needed to develop cross-sectorial participation. Finally, the participants also felt that the purpose of conducting the assessments needed to be better articulated. Since many of the departments are going through re-structuring and program reviews of various kinds in the face of fiscal restraint, *it needs to be clear that the tool does not evaluate the normative performance of the policy* in relation to costs or program objectives. The ADAPTool only assesses the adaptability of policies and programs to defined stressors.

4.0 Summary and Conclusions

This report has summarized the results from provincial pilots that broadened the experience with IISD's experimental ADAPTool. This section focuses on the conclusions of the policy analyses, comparing differences in analytical results between provincial cases and interpreting the results in context. We draw conclusions here on the relevance and limits of the tool in these diverse applications.

Altogether, the cases assessed 27 different policies and programs across five different sectors (agriculture, water, fisheries, forestry and water) in four provinces for their adaptability. More than half of these policies and programs were in the B.C. case alone. Each policy was assessed independently, but in each case several policies in the same sector were also compared to each other in terms of their relative adaptability. This comparison was especially useful in B.C. where a large number of policies in the same sector were analyzed. Comparisons between policies in the same province and sector are mostly addressed in the separate provincial case study reports. This synthesis includes some general observations comparing the different policies between cases.

There are limits to making comparisons in adaptability across the various cases because of their diversity. This diversity was intentional, in an effort to test the effectiveness of the tool in a wide range of policy situations to determine the limits of its applicability. Lessons from testing the tool in these diverse settings are illuminated further in Section 5. Here we restrict our comments to the issues related to policy adaptability to climate stressors.

A visual summary of policy adaptability scores from the ADAPTool analysis is shown in Figure 10. This figure shows the scores of each policy along two axes: planned adaptability (adaptability to anticipated stressors) and unplanned adaptability (adaptability to unanticipated stressors), corresponding to the two main categories of adaptive policy characteristics. The matrix is coloured to show scores lower than three in the red zone, and scores above six in the green zone. Of the 27 policies/programs assessed across all cases, only six scored in the green zone for both planned and unplanned adaptability. The figure demonstrates a spread of results across all the policies, which suggests that the tool is capable of distinguishing policies with different adaptive characteristics.

The highest-scoring policies in this group were not necessarily those that supported the largest number of identified climate adaptation actions in these sectors, although high-scoring policies all supported a significant proportion of the actions for which they were relevant. Rather, these policies had in common that they were generally not vulnerable themselves to climate change; they helped to build the adaptive capacity of target groups; and they had been designed using deliberative, multistakeholder processes and/or foresight methods. The implementation of these policies also mostly enables self-organization and social networking, provides opportunities for deliberative and decentralized decision making, and the policies have regular formal review procedures. Similarly, low-scoring programs generally shared low scores across most of these dimensions. There were three policies that scored no higher than three in one dimension of the adaptability assessment. Overall, there is a clustering of the policy scores: policies that score highly on one dimension typically also score well on the other and policies that score low on one dimension also score low on the other. As this is the first time we have tried to compare such a large number of diverse policies, this is an interesting outcome. It may suggest the need for further exploration to determine whether this is a random result of these particular policies, an artefact of the way the tool works or simply a function of typical policy processes.

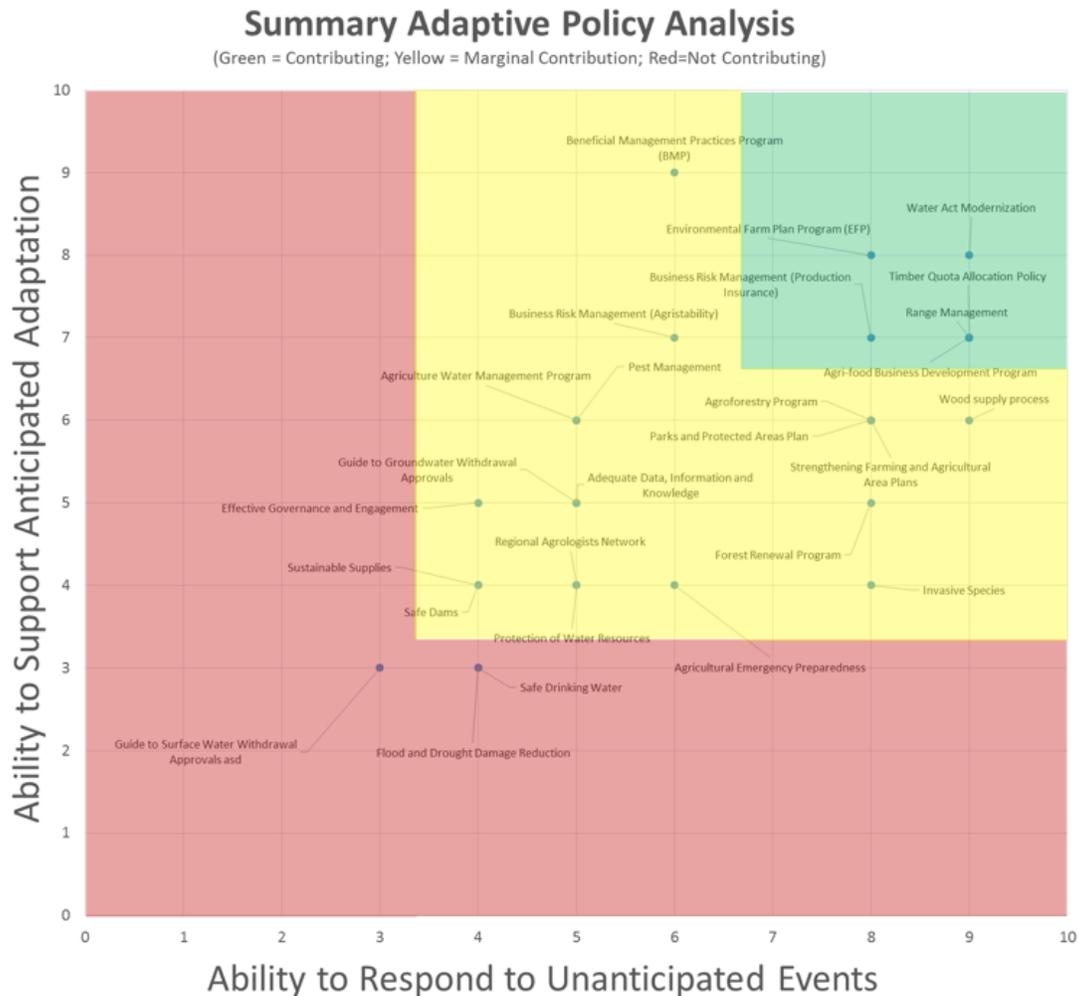


FIGURE 10. AN OVERVIEW OF THE ADAPTOOL SCORING RESULTS FOR ALL 27 POLICIES IN THE FOUR CASES.

These cases were all selected to apply the ADAPTool for the assessment of provincial policies with respect to climate change stressors. Therefore, it is appropriate to draw some comparative conclusions here on the general adaptability of provincial policies to climate change, given the diversity of policies analyzed under these cases. As a caveat, it is important to remember that the policy environment everywhere is a dynamic one, and that these analyses represent snapshots at a particular point in time. Some of the policies and programs analyzed in these cases have changed since the analysis, so detailed conclusions for specific policies are clearly time-bound.

The clearest comparative case is probably that of British Columbia, where the Ministry of Agriculture essentially chose to analyze almost all of the policies within its mandate that had any relation to climate change, as part of their fulfillment of the province’s overall climate adaptation policy. This approach ensures a broad range of policies that is assessed in relation to sectoral vulnerabilities, which allows easier comparison between scores within a common sectoral and

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geographical context. The ADAPTool analysis was successful in showing a clear range of adaptability between different policies, and in the discussion of results it became clear to provincial technical staff why this was this case. The analysis also reinforced considerations that were already underway in some cases to extend program activities related to climate change. For example, in the case of the province's Agriculture Emergency Management program, the analysis helped increase the priority for planned efforts to engage more fully with local governments and producers around the issue of flood risk reduction measures (personal communication, L. MacDonald, December 12, 2013).

One interesting example from B.C. was a small program to support local water balance modelling in a context where hydrological impacts of climate change are likely to be significant, and where irrigation is often the largest water using sector. This program will undoubtedly be directly supportive of adaptation measures linked to on-farm water use. However, because of its centralized design, narrow focus, limited capacity and modest engagement of users, its overall adaptability score was only moderate. Even when policies or programs are closely related to climate adaptation, program design and implementation may still make them vulnerable, especially to unanticipated impacts.

The B.C. case demonstrated that policies of broad support for informed decision making by producers—such as information, risk management, environmental management promotion and flexible, responsive, locally driven resource management approaches—were likely to be fairly adaptable to climate change. Some programs themselves were at risk of being vulnerable to climate change due to increased demand for limited services.

The Manitoba forestry case is similar to B.C.'s agriculture case, although a smaller number of policies were analyzed. In this case as well, the most adaptable policies are largely responsive to decentralized decision making and stakeholder engagement, through building capacity and enabling social organization, and have built-in review processes. The programs also provide support for many potential climate adaptation actions, because they are intended to be responsive to ecological conditions. Scores suggest they are fairly adaptable to climate change as a result.

In Nova Scotia, the policies assessed ranged widely in their adaptability. On one hand, the Parks and Protected Areas plan, with broad multistakeholder and regional management inputs, has many adaptive features for the same reasons as those above. However, the guidebook for surface water withdrawals scored low in adaptability not only because it was vulnerable to climate change itself (as policies were based on out-of-date historical hydrological conditions), but also because it was centrally controlled, relatively unresponsive to local variability and had no built-in review mechanisms.

In the case of Saskatchewan, where the analysis focused on policy goals that were not yet fully implemented instead of operational programs already in place, the tool proved to be less helpful in revealing insights on policy adaptability. This was partly because it was difficult to assess in some cases how the broad goals would support specific adaptation actions (or not); and partly because it was difficult to assign specific scoring to policy goals when their implementation details were not yet confirmed.

In addition, it is interesting to note that where climate adaptation analysts were heavily involved with the cases (especially in B.C. and Nova Scotia), they found the process of undertaking the ADAPTool analysis to be very helpful in engaging with sectorial experts and highlighting issues relevant to their objective of mainstreaming adaptation in provincial policies. This feature is elaborated below in comments on the process of the ADAPTool analysis. A corollary to this observation, also discussed below, is that in some of the cases where the policies in question could be expected to be sensitive to climate change (e.g., water management, wetlands), sectorial policy analysts did not find the focus on climate adaptation to be helpful in the development and implementation of emerging policies. In these cases, the

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feedback was primarily that this was not a policy priority in that sector. Although there are many valid reasons why policy analysts should be focused on other policy issues, and the sample in this project is small, this observation suggests that even in climate-sensitive policy sectors, many provincial agencies are not actively considering climate adaptation as part of their planning and programming.

Across all the policies, we observed a large number of adaptation actions that were either not relevant or not directly supported by any of the policies being assessed. This varied substantially from case to case. This result is indicative in part of how many policies are being analyzed, and in part how closely the specific policy goals match the objective of climate adaptation by sectoral actors. In the case of B.C., for example, with 14 policies covering a wide range of agriculture sector issues, two thirds of all adaptation actions were directly supported by at least one of the policies. In the Manitoba forestry case, even with only 3 policies assessed, almost the same proportion of adaptation actions were directly supported, because the policies themselves were responsive to changing ecological conditions and so were well aligned with adaptation actions. In other cases with a smaller number of policies, the adaptation actions directly supported could be anticipated to be fewer.

In most cases, the policies in question were not designed specifically to respond to climate change, but for completely different purposes. The proportion of adaptation actions that align with these policies essentially demonstrates the degree to which the policy goals happen to overlap with adaptation actions. Those cases where there were a large number of adaptation actions not directly supported by any of the policies analyzed flag a potential concern for provincial climate adaptation policy. For example, in B.C., some of the unsupported adaptation actions that might be considered important to the agricultural sector, such as research on new cultivars and varieties better suited to variable climate conditions; information on emerging plant or livestock disease threats; and investment in improved drainage. These issues may not draw attention during stable climate conditions, and hence they can be safely ignored in mainstream policies.

But if climate adaptation becomes an increasing issue for policy-makers, they might want to further explore those unsupported adaptation actions, to determine whether: a) they are likely to be undertaken by the relevant actors without support anyway; or b) they would be difficult to undertake without policy support, but are already supported under other policies not included in the analysis suite. This might include policies in related sectors. For example, infrastructure or research policies could be relevant to adaptation actions in industry or transportation. Actions that did not meet either of these 2 criteria might be subject to further review by climate adaptation analysts to determine their significance and assess the potential need for adaptation support in future. The ADAPTool analysis is helpful in flagging these potential adaptation gaps, but it cannot on its own provide analytical information on whether or not unsupported adaptation actions require support.

This also demonstrates how the ADAPTool analysis can be used to sort adaptation actions. In some cases, analysts complained that they spent a lot of time identifying adaptation actions in their sector and ended up having no policies relevant to many of those actions. These unsupported actions seemed irrelevant to the rest of the analysis. However, the point of this effort is that it shows how many of the potential adaptation actions in any sector are already supported by the policies being analyzed. This is important information for adaptation analysts, who may want to know the proportion of actions that are beyond the jurisdiction or scope of the policy suite under assessment, in order to perform the type of analysis described above. In addition, the ADAPTool assessment can be followed up with additional analysis such as economic valuation or trade-off analysis to better assess adaptation choices for policy-makers or private actors. An understanding of which actions are already linked to policy measures and programs can also be helpful in designing targets and indicators to monitor adaptation efforts.

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4.1 Process of the ADAPTool Analysis and Collaboration

Based on the completed policy assessments, it seems that in all the provinces the analysis was a considerable effort for the department staff and consultants. At the same time, however, participants report that the interaction of different program and sectorial experts with climate adaptation analysts generated the most useful insights from ADAPTool use. This interaction is inevitably time consuming, because it requires technical experts in different fields to explain their knowledge and experience with policy design and implementation in order to interpret the implications for adaptability. This appears from participant feedback to be both the strength and the weakness of the ADAPTool application. Analysts rarely have the time to sit down together, learn a new tool and then apply it jointly, debating the interpretation of the tool and data. Yet they report that the greatest benefits from the process came precisely from this process of shared learning. It led to deeper insights into actual program operation, vulnerability to climate change, and potential for future adaptation measures because the experts from different sectors and disciplines brought diverse knowledge to these deliberations. Without this direct interaction, the value of the scoring exercise itself would be limited and the insights for technical analysts much reduced.⁴ In the cases where there was limited provincial staff engagement, there was also limited understanding of the meaning and value of the analysis. Those cases in which the provincial staff was most involved proved also to be the most valuable in generating policy and adaptation insights.

However, the time requirements are a serious consideration. Some economies can be achieved through streamlining the learning curve for new users. Revisions of the ADAPTool and scoring system have been undertaken through these pilot experiences to try and simplify and clarify the scoring. These changes have been captured in the user guidebook produced as part of this project. While new users will inevitably require ADAPTool training in order to achieve the greatest benefit from adopting this new tool, they should only require the training once. Experience in the pilots suggests that in the B.C., Nova Scotia and Manitoba forestry cases, where provincial staff were heavily involved in undertaking the ADAPTool analysis, subsequent applications for additional policies will be much less time consuming and require only minimal, if any, external support.

Based on a comparison of experiences in different policy contexts and the feedback from participants, it seems that an explicit policy mandate for climate adaptation can advance the work considerably. Such a mandate, for example, could include a province-wide or departmental climate adaptation policy. In British Columbia, the province's explicit Climate Change Strategy created a clear demand for this kind of sectorial policy analysis. Indeed, the Ministry of Agriculture would have had to find some other way to conduct this analysis in the absence of this pilot. A provincial-level adaptation policy creates a much higher degree of executive level buy-in and engagement across the relevant departments to assess all relevant programs and feed the outcomes of the assessment into a broader framework.

Provincial partner expectations and objectives from the ADAPTool process were mixed and often unclear. In B.C. and Nova Scotia, where provincial adaptation policy analysts played a leadership role in the process, the objectives of the exercise were clearly to help mainstream adaptation in sectorial policies and to assess the adaptability of policies to climate change. The second objective was also evident in the Manitoba forestry case, where the focus of forest sector analysts was on policy responsiveness to climate change in a potentially climate-sensitive sector. But in the other cases, the match between the analytical capabilities of the ADAPTool and the objectives of the provincial policy analysts seems to be weaker. For example, in the case of Manitoba wetlands, provincial analysts expressed frustration that the

⁴ This may have been a contributing factor to the relatively limited benefits reported from applications in Saskatchewan and Manitoba wetlands cases, where technical staff were relatively less engaged in the process of analysis.

tool could not provide them with indicators for monitoring wetlands policy implementation, which is something it was never designed to do. These cases were the ones furthest from the original design application of the tool for assessing existing policies, and it may have been more difficult to align uncertain capabilities of the modified tool with the also indistinct requirements of provincial policy analysts who were not focused on climate adaptation mainstreaming.

In general, the experience of testing the ADAPTool in these different cases shows that the process is relatively time consuming, but that it builds shared learning and understanding about climate adaptation in a way that would not otherwise have occurred in most of the case situations. Several partners specifically mentioned the important role of IISD expertise in contributing to the analysis in cases that were led by provincial staff, and it is likely that any new application, even using the guidebook, would benefit from experienced advisors. In the cases where the ADAPTool analysis was modified to assess new policies, or application was attempted on relatively fuzzy policy goals, it proved more difficult to align analytical objectives to the capabilities of the tool. These experiences will be helpful in clarifying expectations for future applications.

The experience with using ADAPTool to help mainstream climate adaptation in various sectorial policies points to the value of the tool as a collaborative analytical platform for engaging experts from diverse policy, disciplinary and sectorial backgrounds in shared learning about climate adaptation. In this application, the tool works best if linked both to an overall adaptation policy framework and to previous or ongoing climate impact and adaptation analyses within each of the relevant sectors, such as policy reviews, risk assessments, economic impact assessments and emerging evidence of adaptation behaviours. The ADAPTool analysis may well reveal new insights about adaptation measures for program staff, but is much more likely to build common understanding around the relevance and prioritization of climate adaptation measures in relation to existing programming activities. In this way, it serves as a useful tool to support the ongoing cross-disciplinary and cross-sectorial discussions that will be essential to mainstreaming climate adaptation in government policies at multiple levels.

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5.0 Lessons from ADAPTool Pilot Cases

By selecting diverse and challenging pilot cases for the application of the ADAPTool, we have shown the relevance and limitations of the tool under a broad range of applications. In general, the tool has performed the analytical task expected from it, identifying the ways in which different policies are more or less adaptive to both anticipated and unanticipated stress. These analytical results have proven helpful to analysts in two ways: 1) they have shown provincial climate adaptation analysts strengths and weaknesses in existing policies in relation to supporting climate adaptation in a particular sector and 2) they have provided insights to sectorial policy analysts and program managers about how and why their programs can be made more adaptable. The experience also suggests that the ADAPTool works predictably when applied to one or more existing policies that have been implemented in practice, but requires more careful consideration if applied to other contexts. This section discusses lessons in more detail.

Limitations of the tool: The Saskatchewan case in this project attempted to assess multiple goals within the province's new water security strategy. In this case, the analysis was aimed at policy goals that had already been approved (i.e., they were no longer under debate) but had not yet been implemented in all cases (i.e., the specifics of program design and implementation were not yet in place). The attempt to assess the policy goals themselves, rather than the emerging programs related to these, proved relatively unsuccessful. Some of the goals, which were focused on specific sectorial issues, displayed limited engagement and support for adaptive capacities of target groups, while others were difficult to analyze because of poorly defined implementation mechanisms. In some respects, the new policy version of ADAPTool might have been more appropriate in this application. In addition, the adaptation issue, while highly relevant to the policy, was not the main focus of program analysts, who had their hands full with more immediate policy issues. This combination of factors resulted in an analysis that produced few useful insights for the policy team.

Similarly, in Manitoba, where the wetlands policy was in a near-final state and analysts were more concerned with drafting details than with considering climate adaptation on top of what had already been a long and complicated policy development process, the focus of the ADAPTool analysis may have been misplaced. These cases suggest that the tool is best applied either to cases of existing policies and programs that are already being implemented, or in the early stages of policy design when it can provide a different perspective and help streamline the policy development process.

Goals of analysis: A key consideration in future ADAPTool applications will be to gain clarity at the outset on the goal of the analysis. In this project, the motivating factor for funders and provincial lead agencies has been the desire to mainstream climate adaptation into provincial policies. So the goal of the analysis in these cases has been to determine how adaptable current policies are to climate change, and what gaps and weaknesses exist. This goal was addressed and conclusions discussed in each of the provincial reports. But program analysts and managers who are immersed in their own sectorial work and who have no mandate for climate adaptation have different objectives, and it may be difficult to either: a) convince them to buy in to the analytical objective of assessing adaptability of their program to climate or b) persuade them to commit staff resources to this analysis when it is not a priority. In these cases, program staff may have difficulty understanding the purpose of the ADAPTool analysis. In an atmosphere of widespread fiscal restraint and ongoing reviews of provincial programming with the objective of cutting staff and expenditures, program managers are understandably defensive and suspicious of any external "program assessment." In most of the cases, the project team found that they repeatedly had to explain the purpose of the analysis and the narrow limits of the ADAPTool in order to allay such suspicions.

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Policy rationale and champions for adaptability analysis: The ADAPTTool is designed to assess policy adaptability to a particular stressor. Results of this analysis are only likely to be used if there is a clear policy rationale for responding to the stressor or for building more adaptive policies. This policy rationale may come from a concern for the impacts of the stressor (as in this project, for climate change), or it may come from the experience of having crucial policies fail under changing conditions (e.g., mortgage policies as financial sector behaviour changes). However, if this policy rationale is not clear, then the analysis is unlikely to generate much attention and results are unlikely to be applied. In any case, the analysis cannot be undertaken solely by an external contractor. It requires champions within the policy and program domain who can organize the required interaction across agency and disciplinary boundaries, articulate the rationale and priorities for policy selection, connect analysts to requisite data, and ensure that results of the analysis are reviewed and interpreted coherently.

Capacity-building benefits: While the analysis can be successfully undertaken with varying levels of staff input, the greatest benefits to policy analysis and design will come from higher levels of staff engagement in the analysis itself. Beyond identifying candidate policies, data sources and reviewing results, engagement in the analysis is important to really become familiar with the tool, how it works, and how the results should be interpreted. With this kind of familiarity, further applications of the tool become much simpler, recognition of adaptive features comes more easily, and general conclusions for adaptive policy design can be formalized and integrated into standard operating procedures with accumulated experience.

Greater interaction between target audiences: The ADAPTTool has two main functions, each of which corresponds to a slightly different target group of policy decision-makers and analysts. The first function is to gauge the ability of existing policies or programs to support (in this case) climate adaptation actions and adaptive capacities of the actors who are primary targets of the policy in question. This part of the analysis is most relevant to those involved in planning and mainstreaming climate adaptation. The second function of the tool is to assess the general adaptability of the policies or programs themselves, particularly to unanticipated changes. This part of the analysis is probably most useful to policy designers and program managers attempting to build the most effective programs. Connecting these two audiences in deliberation and discussion is a central benefit from application of the tool.

Focus on policies, not stressors: The ADAPTTool analysis does not focus heavily on the nature of the stressor (i.e., climate change, in these cases). Responsiveness to specific adaptation actions only counts for one of eight separate scores in the tool. The design and implementation of the policies has a much larger effect on their overall scoring, as described in the conclusions (Section 4). This means that policies that scored well in terms of their adaptability to climate change are also likely to score well in terms of adaptability to other stressors such as changing market conditions. This is important to keep in mind if the ADAPTTool were to be used more extensively for assessing policy adaptability to a particular stressor. It could be possible to tweak the analytical structure of the ADAPTTool worksheet to weight the responsiveness to adaptation actions more heavily, if for example the tool was to be more widely applied specifically to climate adaptation analysis. Another option would be to focus more on the adaptation analysis component, assigning priorities to the adaptation actions to focus on those that are especially strategic for the sector and target group. However, this is not the way the tool was originally designed, and further testing would be needed to assess the implications of weighting in this fashion.

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6.0 Next Steps for Tool Development and Future Application

A number of the lessons and conclusions from these pilots have already been integrated into ADAPTool v. 2. These modifications include increased transparency in the analysis and changing the terminology to eliminate the use of the word “evaluation” in headings or explanations. The web form for data entry in the preliminary steps of analysis was simplified and the process for saving session work was made easier for users. A question on foresight applications was added to the tool, and formatting was modified to make it easier for users to view field contents. The programming of the tool was updated to resolve some calculation anomalies and improve readability of results, and a number of minor formatting and labelling enhancements were added. In addition to this new version of the online ADAPTool, a beta version of the tool intended for use with new policy development is also now available.

As part of this project, IISD has produced a guidebook that provides clear definitions of key terms and examples of scoring so that it is easier for users to build a common approach and interpretation of the analysis. The guidebook includes a roadmap of the entire process and simple guidelines to help users work their way through the linear analysis. The revised ADAPTool, with its online forms and more transparent instructions and worksheets, should also now be simpler to follow. As well, IISD has produced a brief outline and guidance for the ADAPTool for creating new policies to enable continued use and improvement. These products will be made widely available to encourage further application of the tool. IISD will encourage feedback from users to allow further improvements.

In addition to its application in the analysis of 27 policies in this four-province project, the ADAPTool is being used to assess 15 mining-sector-related policies in a related project in two provinces. As well, the ADAPTool has been used to assess transportation-related policies in Northern Canada and in previous pilot assessments in Manitoba and Saskatchewan. Based on this robust body of analytical work, IISD continues to improve the ADAPTool and its usability. The tool has been deemed useful for articulating sector-specific vulnerabilities and adaptations and understanding the role of existing policies in coping with future stresses. The tool also can be used as part of a policy review toolkit to determine whether policies are robust against foreseeable and unforeseeable stresses and to recommend ways in which to improve this performance. With increasing uncertainty related to not only climate change, but to demographic pressures such as population growth and shifts, as well as economic uncertainty, this tool is increasingly relevant for policy design and renewal.

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Appendix A: Detailed Overview of the Policies Analyzed

MANITOBA		
Timber Quota Allocation Policy	The quota provides timber producers with a five-year allocation authorized by a Timber Sale Agreement of Timber Permit. The latest Timber Quota Allocation is for the operating period starting April 1, 2010 to March 31, 2015. Under this policy, each timber producer is bound to an annual quota volume number under the policy's Annual Allowable Cuts, with a one-time harvest that is up to five times the annual volume within the five-year period	2010-2015 Timber Quota Policy http://www.gov.mb.ca/conservation/forestry/pdf/manage/timber_quota_policy_2010-15.pdf Manitoba Crown Timber Allocation Policy http://www.gov.mb.ca/conservation/forestry/pdf/manage/timber_allocation_policy.pdf
Forest Renewal Program	The program is designed to ensure the regeneration of forests within Manitoba in order to maintain the existing mosaic of forest ecosystem stand types. The program includes: (1) promotion of natural regeneration on Crown lands; (2) continued site preparation and tree planting on Crown lands; and (3) the implementation of stand tending, competitive vegetation management and intensive silviculture in renewed forests and plantations	Forest Renewal in Manitoba http://www.gov.mb.ca/conservation/forestry/renewal/index.html
Wood Supply Process	This is the Forestry Branch's inventory of wood supply in Manitoba and provides information on the best available information and current management and harvesting processes among the different forest management licence areas within the province.	Wood Supply Analysis Report for Forest Management Unit 13 And 14 http://www.gov.mb.ca/conservation/forestry/pdf/wood-supply/fmu13_14_wood_supply_analysis_report.pdf Wood Supply Analysis Report for Forest Management Unit 24 http://www.manitoba.ca/conservation/forestry/pdf/wood-supply/pineland_wood_supply_analysis_report_2013.pdf
SASKATCHEWAN		
Sustainable Supplies	This is one of the seven goals in Saskatchewan's 25 Year Water Security Plan aimed at long-term management of water resources. This goal focuses on "ensuring the sustainability of our surface and groundwater supplies." It includes actions areas for: efficient use of water, new water supply infrastructure, water allocation systems, irrigation, climate change adaptation and water availability study.	https://www.wsask.ca/Global/About%20WSA/25%20Year%20Water%20Security%20Plan/WSA_25YearReportweb.pdf
Safe Drinking Water	This is one of the seven goals in Saskatchewan's 25 Year Water Security Plan aimed at long-term management of water resources. This goal focuses on "ensuring our drinking water is safe by protecting supplies from the source to the tap." It includes actions areas for: municipal systems, semi-public systems and private systems.	https://www.wsask.ca/Global/About%20WSA/25%20Year%20Water%20Security%20Plan/WSA_25YearReportweb.pdf

Protection of Water Resources	This is one of the seven goals in Saskatchewan's 25 Year Water Security Plan aimed at long-term management of water resources. This goal focuses on "ensuring water quality and ecosystem functions are sustained." It includes action areas for: water quality, wetland conservation, ecosystem health and biodiversity protection and source water protection planning.	https://www.wsask.ca/Global/About%20WSA/25%20Year%20Water%20Security%20Plan/WSA_25YearReportweb.pdf
Safe Dams	This is one of the seven goals in Saskatchewan's 25 Year Water Security Plan aimed at long-term management of water resources. This goal focuses on "ensuring dams meet water supply and management needs." It includes action areas for: dam safety and maintenance, and dam benefits and sustainable operation.	https://www.wsask.ca/Global/About%20WSA/25%20Year%20Water%20Security%20Plan/WSA_25YearReportweb.pdf
Flood and Drought Damage Reduction	This is one of the seven goals in Saskatchewan's 25 Year Water Security Plan aimed at long-term management of water resources. This goal focuses on "ensuring measures are in place to effectively respond to floods and droughts." It includes action areas for: flood damage prevention and emergency response in developed areas, agricultural drainage, and flooding and drought response.	https://www.wsask.ca/Global/About%20WSA/25%20Year%20Water%20Security%20Plan/WSA_25YearReportweb.pdf
Adequate Data, Information and Knowledge	This is one of the seven goals in Saskatchewan's 25 Year Water Security Plan aimed at long-term management of water resources. This goal focuses on "ensuring adequate water data information and knowledge is available to support decision making." It includes action areas for: data collection and management, communication and information, and research partnerships.	https://www.wsask.ca/Global/About%20WSA/25%20Year%20Water%20Security%20Plan/WSA_25YearReportweb.pdf
Effective Governance and Engagement	This is one of the seven goals in Saskatchewan's 25 Year Water Security Plan aimed at long-term management of water resources. This goal focuses on "ensuring water management and decision making processes are coordinated, comprehensive and collaborative." It includes action areas for: modernizing legislation, engagement and consultation with First Nations and Métis communities, provincial water council, interjurisdictional water management and comprehensive planning to enhance decision making.	https://www.wsask.ca/Global/About%20WSA/25%20Year%20Water%20Security%20Plan/WSA_25YearReportweb.pdf
NOVA SCOTIA		
Guide to Surface Water Withdrawal Approvals	The purpose of this guide is to describe the recommended submission requirements, supporting documentation and the criteria to evaluate surface water withdrawal applications	http://www.novascotia.ca/nse/water/docs/guideToSurfaceWaterWithdrawalApprovals.pdf
Guide to Groundwater Withdrawal Approvals	The purpose of this guide is to describe the minimum submission requirements, supporting documentation and the criteria used by Nova Scotia Environment to evaluate groundwater withdrawal applications	http://www.gov.ns.ca/nse/water/docs/guideToGroundwaterWithdrawalApprovals.pdf

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<p>Our Parks and Protected Areas</p>	<p>This document is the province’s proposed plan to ensure that these areas continue to thrive. It delivers on two important government commitments including updating Nova Scotia’s park system to secure and strengthen its long-term success and increasing Nova Scotia’s legally protected landmass to at least 12 per cent by 2015. This plan proposes to protect more than 13 per cent of Nova Scotia’s outstanding lands</p>	<p>http://novascotia.ca/parksandprotectedareas/pdf/Parks-Protected-Areas-Proposed-Plan.pdf</p>
<p>BRITISH COLUMBIA</p>		
<p>Business Risk Management (Agristability)</p>	<p>AgriStability is part of the Business Risk Management programming under the Growing Forward agreements. The ministry’s Business Risk Management Branch took over administration and delivery of AgriStability in January 2010. Administration was previously provided for B.C. by Agriculture and Agri-Food Canada in Winnipeg. AgriStability is a margin-based income stabilization program that protects producers from large declines in their farming income caused by production loss, increased costs or market conditions. Income and expense data provided by each farmer through the Canada Revenue Agency is verified and used to calculate program support levels and benefits. Administration costs and producer benefits are cost shared 60 per cent by Canada and 40 per cent by B.C.</p>	<p>AgriStability program web page http://www.agf.gov.bc.ca/agristability/</p> <p>AgriStability Program Handbook http://www.agf.gov.bc.ca/agristability/documents/BC%20AgriStability%20Handbook.pdf</p>
<p>Business Risk Management (Production Insurance)</p>	<p>Production insurance is part of Business Risk Management programming. Production insurance helps producers manage risk of crop losses caused by hail, spring frost, excessive rain, flood, fire and drought. The program provides coverage against crop production losses due to specific weather and other natural events. A level of production is guaranteed in exchange for a premium. Production insurance provides a predictable, timely and budgeted mechanism for government to respond to crop loss. The program operates like commercial insurance with premiums adjusted in response to overall claims over time. Coverage and premium costs are set at the individual level, so lower-producing farms receive less protection than more productive farms. Premiums are cost-shared between producers, Canada and B.C., while administrative costs are covered by the governments of Canada (60 per cent and B.C. (40 per cent). Production insurance has been offered in B.C. since 1967.</p>	<p>Program web page http://www.agf.gov.bc.ca/production_insurance/</p> <p>Brochure http://www.agf.gov.bc.ca/production_insurance/plans/general/general_bro.pdf</p>

<p>Regional Agrologists Network</p>	<p>The Regional Agrologist Network (RAN) is often the first point of producer contact with the Ministry of Agriculture. The RAN encompasses all of British Columbia, and delivers through two diverse regions, the Interior and the Coast. The agrologists gather and provide local insights and intelligence to characterize regional agricultural opportunities and issues. They work with other program areas, local industry and producers, local governments and communities to encourage innovation, adaptation, and agricultural growth in balance with social and environmental interests. Through strategic extension efforts and long-term relationships in the local community, the RAN supports other ministry programs such as Strengthening Farming, emergency management/coordination, First Nations agriculture and environmental/water management</p>	<p>Program web page http://www.agf.gov.bc.ca/regional/</p>
<p>Strengthening Farming and Agricultural Area Plans</p>	<p>Strengthening Farming is an initiative that is jointly implemented by the B.C. Ministry of Agriculture and the Agricultural Land Commission. It promotes strong working relationships between local and provincial governments and the farming community. The program supports resolution of land-use conflicts and effective community planning for a sustainable agriculture industry in B.C. These programs are reflected in the two main components of the program: Farm Practices Protection and Planning for Agriculture. The Strengthening Farming Program maintains contacts with the agricultural industry and local governments through a variety of channels to identify emerging issues. These include supporting Agricultural Advisory Committees of local governments, providing ongoing workshops for local government planners, reviewing local government plans and bylaws, responding to farm practice complaints and coordinating our work with other provincial government agencies through the Strengthening Farming Directors Committee.</p>	<p>Strengthening Farming web page http://www.agf.gov.bc.ca/resmgmt/sf/</p>
<p>Agroforestry Program</p>	<p>Agroforestry is an intensive and extensive land management approach that purposefully integrates the growing of trees with crops or livestock. The integration may entail retaining or adding trees or shrubs into agriculture production systems, or adding or enhancing crops or livestock in forest production systems. The following agroforestry systems can be found in B.C.: silvopasture; alley cropping, forest farming, integrated riparian management and windbreaks/shelterbelts/timberbelts/buffers.</p>	<p>Program web page http://www.agf.gov.bc.ca/resmgmt/agroforestry/</p> <p>Agroforestry Industry Strategic Plan 2009 -2013 http://www.agf.gov.bc.ca/resmgmt/agroforestry/publications/BCAgroforestryStrategicPlan_2009-2013.pdf</p>

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<p>Range Management</p>	<p>The Range Management Program is delivered by the Ministry of Forests, Lands and Natural Resource Operations. Portions of the program were formerly under the Ministry of Agriculture, and related staff continue to work together closely. Of B.C.'s total land area, 94 per cent is provincial Crown land, 1 per cent is federal land and 5 per cent is private land. Approximately 1,000 livestock producers rely on Crown range to graze livestock from May until the end of October each year. The Range Management Program allocates and administers hay cutting and grazing agreements and grazing leases on Crown range across B.C. Program activities focus on ensuring healthy and sustainably managed rangelands capable of supporting the interests and activities of clients, stakeholders and partners. Parties with an interest in management of B.C. rangelands include the ranching industry, guide outfitters, First Nations, government and non-government agencies, wildlife, recreationalists and the general public.</p>	<p>Range Program web page http://www.for.gov.bc.ca/hra/</p>
<p>Invasive Species</p>	<p>The Invasive Plant Program in the Ministry of Forests, Lands and Natural Resource Operations is responsible for the detection, inventory and control of new and existing invasive plant populations, including noxious weeds on Crown land in B.C., and for the development of new biological control agents. Program staff also conduct risk assessments and risk analysis on emerging invasive plant threats, as well as logistics planning and client interactions related to preventing the introduction or spread of invasive plants. The team sets policy, makes recommendations regarding legislation and supports the Inter-Ministry Invasive Species Working Group in setting priorities for the province. Implemented control strategies are consistent with the principles of integrated pest management, and treatment methods include prevention, cultural, manual/mechanical, chemical and biological control. Monitoring is an essential follow-up to treatments in order to measure efficacy and make adjustments to future treatments. The Invasive Plant Program works in co-operation with local invasive plant/weed committees established across the province and with local government weed programs.</p>	<p>Invasive plant program web page http://www.for.gov.bc.ca/hra/Plants/index.htm</p>
<p>Pest Management</p>	<p>Pest management services are provided by the Plant Health Unit, which facilitates the development, implementation, maintenance and evaluation of integrated pest management practices and products to mitigate the impact of plant diseases and insect pests; diagnoses plant health problems; monitors for and addresses pest outbreaks, including established, non-native and invasive species; makes policy recommendations on plant health issues; administers the provincial Plant Protection Act; and provides guidance on the management of pesticides.</p>	<p>Pest Management/Plant Health http://www.agf.gov.bc.ca/cropprot/</p> <p>Plant Health Unit, Plant and Animal Health Branch http://www.agf.gov.bc.ca/cropprot/contacts.htm</p> <p>Plant Protection Act http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96365_01</p>

<p>Environmental Farm Plan Program (EFP)</p>	<p>Environmental farm planning is a no-charge, voluntary, self-directed process available to producers to identify both agri-environmental strengths and potential risks on their farms. As appropriate, it includes a prioritized action plan to reduce the risks. The process is normally completed with the assistance of a trained planning advisor. By conducting a risk assessment, producers establish the current level of environmental health-related risks to various activities on their farm or ranch. This is accomplished using a specifically designed planning workbook, which the planning advisor provides. The results of the assessment identify areas of concern on the farm or ranch that the producer may need to address to reduce environmental risks. The assessment also identifies where adoption of beneficial management practices may help to reduce the environmental risks. Producers who have a completed and current EFP are eligible to apply for cost-shared incentives through the Growing Forward Beneficial Management Practices Program.</p>	<p>ARDCorp Environmental Farm Plan Program web page http://www.bcac.bc.ca/ardcorp/program/environmental-farm-plan-program</p> <p>Environmental Farm Plan documents http://www.agf.gov.bc.ca/resmgmt/EnviroFarmPlanning/Documents_and_Reports.htm</p>
<p>Beneficial Management Practices Program (BMP)</p>	<p>The Beneficial Management Practices Program provides incentive-based funding for on-farm actions that have been identified by an agri-environmental risk assessment. As participants in the EFP program, producers are able to identify their farm's environmental strengths, prioritize any potential risks to the environment, and take advantage of tools and techniques available to manage those risks. Producers who have a completed an EFP are eligible to apply for cost-shared incentives through the "On-Farm Action" BMP Program to implement actions identified in their on-farm environmental action plans. Incentives are aimed at a host of environmental concerns across the province. Cost-sharing has ranged from 30 per cent to 100 per cent, with caps ranging from \$1,000 to \$70,000. In 2011, several BMPs related to climate change adaptation were added to the program (e.g., irrigation, shelterbelts/buffers).</p>	<p>See EFP Program, above.</p>
<p>Agricultural Emergency Preparedness</p>	<p>The program assists producers and regional governments to plan for and respond to catastrophic environment emergencies affecting agriculture. AgriRecovery is a disaster relief framework in which B.C. and the federal government work together on a case-by-case basis to assess disasters affecting B.C. farmers and respond with specific programming when assistance is needed beyond existing programs (AgriStability, AgriInvest, AgriInsurance). Disaster Financial Assistance is a funding program of Emergency Management B.C. that provides financial assistance to help individuals and communities to recover from catastrophic events resulting in uninsurable property and infrastructure damage.</p>	<p>Ministry of Agriculture Emergency Planning: http://www.agf.gov.bc.ca/emergency/</p> <p>Emergency Management B.C. http://embc.gov.bc.ca/em/index.html</p> <p>AgriRecovery http://www4.agr.gc.ca/AAFC-AAC/display-afficher.do?id=1200689505769&lang=eng</p>

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<p>Agriculture Water Management Program</p>	<p>About 97 per cent of water licensed in British Columbia is for hydroelectric power production and related water storage. The remaining 3 per cent of water licensed is for consumptive uses such as industrial, commercial, drinking water or agriculture. A number of agriculture water management strategies and projects are being undertaken in British Columbia: Agriculture Water Demand Model, Living Water Smart – B.C.’s Water Plan, British Columbia’s Water Act modernization and Okanagan Sustainable Water Strategy.</p> <p>This program addresses agriculture water-use efficiency and conservation, securing water for current and future needs, and planning for adaptation to climate change through the development of watershed plans. It delivers services through a variety of information channels including up to 20 public information and training sessions per year with producers and other local stakeholders.</p>	<p>Agriculture water management www.agf.gov.bc.ca/resmgmt/water/Ag_Water_Management.html</p>
<p>Water Act Modernization</p>	<p>Dating from 1909, B.C.’s Water Act is the province’s primary piece of water management legislation and provides the regulatory framework for the sustainability of B.C.’s water. The act has been under review for several years to address new pressures on water, related to growing populations; increased industrial, residential, and agricultural water use, and changes in climate. This review incorporates new initiatives directly relevant to agriculture such as promoting efficiency, reserving water for agriculture, groundwater licensing and water-use reporting. The new legislation will place greater emphasis on the value of water and on conservation measures. The 2010 policy paper on a new Water Sustainability Act proposes the enabling of agricultural water reserves, which expand powers to reserve water for irrigation. This is intended to improve the long-term security of water supply for Agricultural Land Reserve lands, and to support increased agricultural production and food security, and water use efficiency in the agriculture sector.</p>	<p>Water Act Modernization http://livingwatersmart.ca/water-act/</p> <p>Key Legislation:</p> <p><i>Water Act</i> http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/00_96483_01</p> <p>Policy proposal on BC’s new <i>Water Sustainability Act</i> http://www.livingwatersmart.ca/water-act/docs/wam_wsa-policy-proposal.pdf</p>
<p>Agri-food Business Development Program</p>	<p>Business Knowledge and Strategic Adaptation is a suite of initiatives based on a collaborative model between the ministry and industry stakeholders and strategic partners. The program goal is to strengthen the management capacity of agri-food sector businesses. The program builds on the foundation of farm business management programming developed during Growing Forward 1. The structure of the program is based on the ministry’s business development initiatives, including the Business Development Extension Unit, Farm Business Advisory Services, First Nations Agriculture Business Development, Farm Management Speaker program, Youth and Community Leadership development, and the SMARTFARMBC website and social media work. It is anticipated that the program will continue to evolve to better help the sector to manage challenges and opportunities through improved access to information, skills and knowledge resources.</p>	<p>Farm business management website http://www.al.gov.bc.ca/busmgmt/</p>

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Appendix B: Overview of the scoring for each analyzed policy

Adaptive Policy Questions	Guide to Surface Water Withdrawal Approvals (NS)	Guide to Groundwater Withdrawal Approvals (NS)	Parks and Protected Areas Plan (NS)	Business Risk Management (Agricultability) (BC)	Business Risk Management (Production Insurance) (BS)	Regional Agrologists Network (BC)	Strengthening Farming and Agricultural Area Plans (BC)	Agroforestry Program (BC)	Range Management (BC)	Invasive Species (BC)	Pest Management (BC)	Environmental Farm Plan Program (EFP) (BC)	Beneficial Management Practices Program (BMP) (BC)	Agricultural Emergency Preparedness (BC)	Agriculture Water Management Program (BC)	Water Act Modernization (BC)	Agri-food Business Development Program (BC)	Sustainable Supplies (SK)	Safe Drinking Water (SK)	Protection of Water Resources (SK)	Safe Dams (SK)	Flood and Drought Damage Reduction (SK)	Adequate Data, Information and Knowledge (SK)	Effective Governance and Engagement (SK)	Timber Quota Allocation Policy (MB)	Forest Renewal Program (MB)	Wood supply process (MB)
Ability to Support Anticipated Adaptation (max 10)	3	5	6	7	7	4	6	6	7	4	6	8	9	4	6	8	7	4	3	4	4	3	5	5	7	5	6
Support for the anticipated adaptation actions	1	1	1	1	1	1	1	1	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	13	0.8	1.3
Vulnerability of the policy itself to the stressor	1	1	1	1	1	1	2	1	1	0	1	2	2	0	2	2	1	0	0	0	0	0	2	2	2	0	1
Contributing to actor's adaptive capacities	1	1	2	1	1	1	0	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	1	1	1	2	1
Use of foresight and multistakeholder deliberation used in the design of the policies	0	2	2	2	2	0	2	2	2	1	2	2	2	0	1	2	2	1	0	1	1	1	0	1	1	1	1
Ability to Respond to Unanticipated Events (max. 10)	3	5	8	6	8	5	8	8	9	8	5	8	6	6	5	9	9	4	4	5	4	4	5	4	9	8	9
Use of foresight and multistakeholder deliberation in the implementation of the policy*	0	2	2	1	2	0	2	2	1	2	1	1	1	1	1	2	1	1	1	1	1	1	1	1	2	2	2
Level of self-organization, social networking supported by the policy	1	2	2	1	1	2	2	2	2	2	1	1	1	2	1	2	2	0	0	1	0	1	1	1	1	1	1
Decentralization of the policy-making for policy implementation	1	0	1	1	1	1	1	1	2	1	1	2	1	1	1	1	2	1	1	1	1	1	1	1	2	2	2
Use of regular formal policy review	0	0	2	2	2	1	1	1	2	1	1	2	2	1	1	2	2	1	1	1	1	0	1	0	2	2	2
Overall Adaptive Policy	1	1	2	1	1	1	1	1	2	1	1	2	2	1	1	2	2	1	1	1	1	1	1	1	2	2	2

*Please note that the 14 B.C. policies were assessed earlier, using a version of ADAPTTool that did not include the use of foresight in policy implementation.

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Appendix C: Overview of the Interview Questions

A. General Intro (this should be kept brief)

1. What is the name of your department/organization and job title?
2. Would you characterize your job responsibilities as mainly involving:
 - CC) climate change and adaptation policies or programming; or
 - SS) sectoral policies or programming?
3. How were you involved in the ADAPTTool pilot project in your province? Please be specific (e.g. analyst, reviewer, workshop participant etc.).
4. What specific policies/programs (if any) have you evaluated using the ADAPT tool?

B. Working on adaptation to climate change

5. Were there any new insights that the use of the ADAPTTool provided you about climate adaptation in the pilot sector? (This question focusses on lessons around CC adaptation.)
6. From your application of the ADAPTTool, what insights did you gain on current, sectoral provincial policies as they relate to (this questions focusses on lessons around policies):
 - a) Climate adaptation (i.e., How do provincial policies relate to CC adaptation?)
 - b) Adaptive policy-making (i.e., How flexible are existing policies to uncertainty and change?)
7. Did using the ADAPTTool enable you to share your knowledge within and between government priorities? If yes, in what ways? Please specify (for e.g., lessons about a different sector and its use of policy to address adaptation needs, lessons about how your sector-specific policies are contributing to provincial CC adaptation priorities, etc.)?

C. Working with the ADAPT tool

8. Was the experience of working with the ADAPTTool helpful to your work? Please provide examples of how the experience of working with the ADAPTTool will be helpful.
9. Were there any interesting/surprising results of the ADAPTTool analysis that you observed? Please provide examples of how the results of the ADAPTTool analysis were surprising.
10. Did you find the use of the ADAPTTool in this pilot challenging? Please provide examples of challenges that you had to overcome in using the ADAPTTool.
11. Would you use the ADAPTTool again:
 - To assess how new and existing policies contribute to climate adaptation needs?
 - To assess the adaptability of your program or policy to other stressors (not climate change)? (e.g., In our assessment of a new wetland policy in Manitoba, we used economic stressors such as competitive land uses, commodity prices etc. as a second stressor.)
 - To assess new policies or programs for their ability to deal with uncertainty and change?
12. If you were to use the ADAPTTool again, what measures would you recommend to improve the process? (Prompt if necessary: more technical information about climate impacts? More consultations? More external support? Other?)
13. Based on your experiences working on adaptation including the ADAPT tool, what advice would you give to other jurisdictions that are considering using this tool?

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