Addendum to

Compilation of submissions received from Parties on

Information on adaptation approaches, strategies, practices and technologies at the regional, national and local levels in different sectors, as well as on experiences, needs and concerns

(Referred to in documents: FCCC/SBSTA/2007/MISC.10 and Add.1)

Nairobi Work Program on Impacts, Vulnerability and Adaptation to Climate Change (NWP)

Adaptation Approaches, Strategies, Practices and Technologies for Adaptation

Canada is pleased to offer this submission as a means of sharing information on, and improving understanding of, adaptation approaches strategies, practices and technologies for adaptation, as outlined in paragraph 56 of FCCC/SBSTA/2006/11.

The Annex to this submission utilizes the template provided by the secretariat to present some examples of adaptation actions being undertaken in Canada. The listing is far from comprehensive, and Canada would be willing to provide additional information in future if it is felt that this would be useful to other Parties. These could include examples related to transportation, health, energy and infrastructure.

Canada notes that since most of the examples included here are only recently established or remain under consideration, we are as yet unable to offer much information on lessons learned. Canada does feel that there are important lessons that can be learned from other initiatives that are either completed or have been active for many years. We also note that there is value in examining lesson learned from adaptation to non-climate stresses, as these provide insights into understanding adaptive capacity.

In reviewing the material presented in the annex, Canada makes the following general observations:

- All orders of government have an important role to play in providing an enabling environment for effective adaptation action to occur. Another important role for government is help avoid the adoption of maladaptive practices
- Adaptation actions can be effectively integrated into sectoral planning processes that address a wider range of development and sustainability issues.
- There are many example of autonomous / reactive adaptation at the local scale occurring in communities where the greatest changes in climate have occurred, such as in the Canadian Arctic.
- There is great value in sharing information on adaptation practices and technologies for adaptation within and among countries.
- Many current activities identify the need for new or revised decision support tools and methods to assist adaptation planning and the evaluation of potential adaptation options, as well as data and information required as input to these tools.

Finally, Canada emphasizes the strong linkages between the various focus areas of the Nairobi Work Program, such that discussion of adaptation planning and practices should be undertaken in the context of existing and needed planning methods and tools, relevant data and observations, socio-economic information, and technologies for adaptation.

Nairobi Work Program on Impacts, Vulnerability and Adaptation to Climate Change (NWP)

Adaptation Approaches, Strategies, Practices and Technologies for Adaptation
Submission by Canada – Annex B

Examples (not comprehensive) of some adaptation approaches, strategies, practices and technologies for adaptation within Canada at national, subnational, local and sectoral scales

Type of adaptation action[1]	Title of adaptation action, including projects	Status of adaptation action - ongoing - under implementation - under development - under consideration	Needs in order to successfully implement the adaptation action	Concerns/ Barriers	Experiences/ Lesson learned	References i.e. publications, websites etc.
Scope of adaptation action ***National level***						
Approaches/ strategies	Intergovernmental Working Group Climate Change Adaptation Framework (2005) Identifies potential areas of inter-jurisdictional collaboration to increase Canada's adaptive capacity	Under consideration			Recognizes: the importance of proactive adaptation; the roles for governments in adaptation (as adaptor and catalyst); the importance of collaboration between governments and with other stakeholders for effective planning; and, that action can be taken now based on available information.	Intergovernmental Working Group. 2005 *National Climate Change Adaptation Framework* . Available online at: http://adaptation.nrcan.gc.ca/pdf/e84cc04097004024847deda0f9cb72c6_e.pdf
Practices						
Technologies	Light Detection and Ranging (LiDAR) technology Provides highly accurate digital elevation models of the coastal zone	Ongoing			Used extensively in areas of sensitive coastlines in Canada to project impacts of sea level rise and storm surge flooding risk.	Example of application: http://adaptation.nrcan.gc.ca/projdb/pdf/20061113_full_report_e.pdf Background: http://www.csc.noaa.gov/crs/rs_apps/sensors/lidar.htm
Sub-National level						
Approaches/ strategies	Quebec Climate Change Action Plan (2006) Contains new actions in	Under implementation			The importance of assigning accountability for delivering, monitoring, and reporting on actions according to areas of expertise and responsibility.	Government of Quebec. 2006. *Québec and climate change: A challenge for the future*. Available online at: http://www.mddep.gouv.qc.ca/changements/pl

	climate change mitigation and adaptation to be implemented between 2006 and 2012, in the areas of health, environment, natural resources (forestry), and infrastructure in Northern Quebec.					an_action/2006-2012_en.pdf
	Yukon Climate Change Strategy (2006) and corresponding action plan The strategy identifies the need to initiate action on adaptation across a range of policy areas, including the environment, key economic sectors (natural resources, transportation, infrastructure and health). The government is developing an action plan, which approaches adaptation from a risk management perspective.	Under development (action plan is scheduled for release in spring 2008)	Appropriate scope and direction. Public consultation	Availability of adequate information regarding potential climate impacts in the Arctic in order to effectively manage risks		Government of Yukon. 2006. *Climate Change Strategy*. Available online at: http://www.environmentyukon.gov.yk.ca/epa/climate.html
	Newfoundland and Labrador Climate Change Action Plan (2005) Includes 40 climate change actions, 14 of which address adaptation. Sectors covered include fisheries and aquaculture, forestry, health, parks/ conservation, coastal zone management, in addition to education and outreach on climate change impacts and response options.	Ongoing	Public awareness and stakeholder engagement are important, as are partnerships with other orders of government, academia, and industry			Government of Newfoundland and Labrador. 2005. *Climate Change Action Plan*. Available online at: http://www.env.gov.nl.ca/env/Env/policy%20and%20planning/climatechangereport/default.htm
	British Columbia climate change plan, “Weather,	Ongoing	Collaboration with stakeholders at the		The necessity of timely and proactive adaptation, as demonstrated by the	Government of British Columbia. 2004. *Weather, Climate and the Future*. Available

	Climate and The Future" (December 2004) Lists 5 action areas (out of a total of 40) as foundation actions for adaptation: climate change and extreme weather in planning and operations; monitoring and reporting on climate change impacts; developing tools for adaptation; supporting applied climate change research; capacity building. The plan also includes sectoral actions that will help address climate-related risks (e.g., water supply, forest fires).		provincial and sectoral level.		Mountain Pine Beetle issues encountered by the BC forestry sector.	online at: http://www.env.gov.bc.ca/air/climate/cc_plan/pdfs/bc_climatechange_plan.pdf
	Development of a new climate change strategy for Alberta (previous strategy released in 2002) Public consultation process to identify priorities and actions ended in April 2007 - adaptation is one among 7 thrusts. Public consultation has identified availability of knowledge and tools to deal with the impacts of climate change as one priority for the strategy. Marked public support for ways to reduce water use in industrial and agricultural processes.	Under development	Available and easily accessible knowledge and tools with respect to climate change impacts.		Importance of public consultation in order to adequately and appropriately identify priorities.	The Alberta Government's climate change strategy consultation website can be accessed at:http://www3.gov.ab.ca/env/climate/index.htm
Practices	Northern Canada Development of	Ongoing		Access to technology for adaptation is limited by access to		Communities of Nunavik, Furgal, C., Nickels, S., Kativik Regional Government –

	agricultural practices, such as greenhouse gardens, and cultivation of alternative sources of food Installation of screens in the windows of homes in communities in the Inuvialuit Settlement region to help alleviate extreme indoor temperatures on hot days, while protecting residents from the increased presence of biting flies and other insects Sharing of knowledge to find new hunting locations and routes Improvement of survival skills to reduce travel risks in dangerous weather Increased operation and maintenance of community freezers through community freezer programs, to help ensure access to storage so that sufficient food is available throughout the year Use of Global Positioning Systems (GPS) for travel and hunting by younger hunters in some Nunavik and Nunavut communities is said to decrease the impacts of changing			economic resources. Limited and capital-intensive transportation and communication infrastructure affects prospects for implementing strategies. Magnitude and long-term implications of the impacts of climate change are still not clearly understood. Addressing the cultural implications of adapting to climate change (e.g., ability to successfully migrate, when faced with challenges; perception of adaptation as assimilation, especially as new climate conditions force the abandonment of important cultural practices).		Environment Department. 2005. Unikkaaqatigiit: Putting the Human Face on Climate Change: Perspectives from Nunavik. Ottawa: Joint publication of Inuit Tapiriit Kanatimi, Nasivvik Centre for Inuit Health and Changing Environments at Université Laval and the Ajunnginiq Centre at the National Aboriginal Health Organization. Communities of Nunavut, Nickels, S., Furgal, C., Akumilik, J., Barnes, BJ, Buell, M. 2005. Unikkaaqatigiit – Putting the Human Face on Climate Change – Perspectives from Communities of Nunavut. Ottawa: Joint publication of Inuit Tapiriit Kanatimi, Nasivvik Centre for Inuit Health and Changing Environments at Université Laval and the Ajunnginiq Centre at the National Aboriginal Health Organization. Communities of the Inuvialuit Settlement region (ISR), Nickels, et al., 2005. Unikkaaqatigiit – Putting the Human Face on Climate Change – Perspectives from the Inuvialuit Settlement Region. Ottawa: Joint publication of Inuit Tapiriit Kanatami, Nasivvik Centre for Inuit Health and Changing Environments at Université Laval and the Ajunnginiq Centre at the National Aboriginal Health Organization. Ford, J., Smit, B and Wandell, J. 2006. Vulnerability to climate change in the Arctic: A case study from Arctic Bay, Nunavut. Global Environmental Change, 16: 145-160.

	weather and ice conditions on the safety and ability to travel and hunt successfully in the Arctic environment.					
Technologies	ClimateBC software Program to generate climate normal data for the province, publicallypublicly available through the web. Developed through an academic/governmental partnership, the program provides regional stakeholders with a scientifically robust way to construct climate scenarios at required high resolution.	Ongoing	Education and training with regards to using the tool. Raising public awareness about the tool's existence, particularly among those that are in priority sectors			The University of British Columbia's ClimateBC program can be accessed online at: http://genetic.forestry.ubc.ca/cfgc/climate-models.html
Local (community) level						
Approaches/ strategies	City of Iqaluit (Nunavut) Climate Change Impacts, Infrastructure Risks & Adaptive Capacity Project (2007) Identifies risks to city infrastructure (including buildings, roads, and water supply, wastewater treatment and waste disposal systems); it also recommends and prioritizes adaptation options and ways to integrate climate change adaptation in municipal	Under consideration	Resources to develop and implement action plans for high-priority adaptation options; identification of external stakeholders to work on shared priorities; and, include climate-related policies in the City's General Plan when it is revised for 2008.			Nielson, D. (2007) City of Iqaluit Climate Change Impacts, Infrastructure Risks & Adaptive Capacity Project, March 2007

	policies.					
	ClimateSMART - Integrated Strategy for Climate Change Mitigation and Impact & Adaptation Preparedness and Planning for Halifax Regional Municipality (Nova Scotia) As a public-private initiative, it addresses mitigation and adaptation opportunities from a cost-benefit perspective, encompasses all of the municipalities corporate and community assets and activities, and includes a series of tools that are used to incorporate climate change information into its municipal decision-making processes.	Under implementation				The Regional Municipality of Halifax's Climate SMART strategy can be accessed online at: http://www.halifax.ca/climate/index.html.
Practices						
Technologies						
Sectoral level						
Agriculture						
Approaches/ strategies	National Water Supply Expansion Program Assists Canadian producers in developing and enhancing long-term agricultural water supplies. The program is available to Canadian producers, agri-businesses, rural communities, and governments.	Ongoing			Provision of technical expertise and strategic approach is well received by farmers. A recommendation for the design of a future program is to improve the integration between farm aspects and other beneficial practices.	Agriculture and Agri-food Canada's *National Water Supply Expansion Program* can be accessed online at: http://www.agr.gc.ca/env/index_e.php?section=h2o&page=h2o.
	Drought Watch	Ongoing	Information needs to be upgraded to integrate	Information tends to be used in a reactive	Density of climate stations insufficient in many regions. A network of observers is	Agriculture and Agri-food Canada's *Drought Watch* program can be accessed online at:

	Provides information on the impacts of climatic variability on water supply and agriculture.		socio-economic and environmental implications. Recent activity involves the development of risk maps	manner rather than proactively.	required in order to effectively ground truth the information.	http://www.agr.gc.ca/pfra/drought/index_e.htm.
Practices						
Technologies	National Agro-Climate Information Service The program includes the monitoring and reporting services, as well as climate change decision-support and provision of information for adaptation.	Ongoing	Working with the policy community to develop improved strategies and policies that reduce sectoral vulnerability, and increase productivity within existing and expected coping range. Geographic information systems maps, crop models, downscaling of climate scenarios to land suitability rating systems. Integrated methodology development to identify vulnerability of watersheds to economic, social, and environmental disruption due to extreme events and implications of alternative adaptation options.	Influence depends on ability to effectively identify and meet the needs of the sector. Uptake of information would greatly accelerate if linked to the next phase of Canada's agriculture policy framework. Lack of economic information on impacts and adaptation options is a real barrier for decision-makers to apply the program's information.	Building on expertise and experience in other countries is important. For example, the program draws on the results of the NOAA funded Climate Program Office in the United States and efforts by CSIRO and the Queensland Department of Primary Industries joint Agricultural Production Systems Research Unit (APSRU) in Australia.	
	National Land and Water Information Service (NLWIS) Provides on-line access to agri-environmental information, tools and applications to help Canadians make responsible land-use decisions. Supports monitoring of national programs and policies to achieve sustainable ecosystem management (e.g.,	Ongoing	Ongoing collaboration and coordination (standards and specifications, development, procurement, and maintenance) with other orders of government, producer and industry groups, non-governmental organizations, and academic institutions.	Continued alignment of information and tools to changing government requirements and policies. The information available for land use decision making varies from region to region and depends on regional priorities and capacity. Significant resources are required for		Agriculture and Agri-food Canada's *National Land and Water Information Service* can be accessed online at: http://www.agr.gc.ca/nlwis-snite/index_e.cfm?s1=expert&page=intro&type=4

	beneficial crop management practices and integrated water resource management). It is also useful for providing baseline information for forecasting and risk management.			maintenance of data derived from dispersed sources across the country.		
Water resources						
Approaches/ strategies	Saskatchewan Water Conservation Plan Developed through an extensive public consultation process, the goal is to increase the efficiency of water use and thereby reduce demand on water supplies, reduce energy costs and infrastructure needs. Among other things, the plan aims to address reduced availability of water due to climate change.	Under implementation				Saskatchewan Watershed Authority's Water Conservation Plan can be accessed online at: http://www.swa.ca/WaterConservation/Default.asp or http://www.swa.ca/WaterConservation/documents/WaterConservationPlan8x11.pdf
Practices						
Technologies						
Coastal zones (settlements)						
Approaches/ strategies	New Brunswick Coastal Areas Protection Policy (2002) Assists in reducing vulnerability of the coastal area to erosion, as well as events such as storm surges and flooding, by establishing minimum standards for the management and sustainable development of coastal lands in unincorporated areas of	Ongoing				The Government of New Brunswick's *Coastal Areas Protection Policy* can be accessed online at: http://www.gnb.ca/0009/0371/0002/Coastal-E.pdf.

	the province. It also aims to minimize damage to public property (e.g., roads, bridges, public buildings).					
Practices						
Technologies						
Forestry						
Approaches/ strategies	Adaptation and British Columbia's forest and range resources (2006) Recommendations on adaptation needs and strategies developed for the province's Chief Forester, including: improving knowledge on impacts and adaptation options; reviewing operational policies and practices of the Ministry of Forests and Range; and, building awareness and capacity within and outside the ministry.	Under consideration				British Columbia Ministry of Forests and Range. 2006. *Preparing for Climate Change: Adapting to Impacts on British Columbia's Forest and Range Resources*. Available online at: http://www.for.gov.bc.ca/mof/Climate_Change/Preparing_for_Climate_Change.pdf
Practices						
Technologies						
Parks and protected areas						
Approaches/ strategies	Parks Canada is developing a climate change adaptation strategy	Under development (draft due in December 2007)	External consultation with stakeholders such as environmental non-governmental organizations (ENGOs) linked to protected areas, tourism and recreation industry, and Aboriginal partners.	Expectations by non-custodial interest groups such as ENGOs and academia. Competing stakeholder demands.	Much background work is required before executive decisions to proceed in developing a strategy are made.	Welch, D., 2005, What should protected areas managers do in the face of climate change? George Wright Forum 22(1):75-93.
Practices						
Technologies						
Wildlife management						
Approaches/ strategies	Government of Northwest Territories - Caribou Management Strategy The Strategy addresses	Ongoing				Tesar, Clive. "What Price the Caribou", Northern Perspectives, CARC, vol 31, no 1, spring 2007, p.1. Northwest Territories. Environment and Natural

	decline in caribou abundance by placing lower limits on harvesting quotas for non-aboriginal and non-resident hunters, increasing wolf quotas, and controlling access to information regarding herd movements.					Resources. 2006. *Caribou Forever – Our Heritage, Our Responsibility* . Available online at: http://www.nwtwildlife.com/pdf/CaribouMgmtStrategyFINAL060130.pdf.
Practices						
Technologies						

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