



Canadian Foundation for Climate and Atmospheric Sciences Brief to the House of Commons Standing Committee on Finance

Executive Summary

Canada needs much better information on climate factors, weather and its impacts, in order to predict future climate, improve forecasts, meet obligations under the Kyoto protocol, develop sound public policy, and adapt to the inexorable warming of our planet. The impacts of climate change are already being felt throughout the country. Canada is an industrialized nation committed to sustained economic growth; it must, therefore, invest in new climate knowledge as well as in environmental technologies and controls of greenhouse gases. Recent investments by the federal Government (Project Green - *Moving Forward on Climate Change: A Plan for Honouring Our Kyoto Commitment, 2005*) go only half way.

This Brief proposes measures to strengthen research on climate issues, generate the knowledge and train the people we need now and for the future. It recommends action in five areas:

1. Reinforcement of support for climate research in universities and federal laboratories;
2. Allocation of federal monies to the Canadian Foundation for Climate and Atmospheric Sciences, to administer grants for targeted university-based research;
3. Establishment of a mechanism for adequate and coordinated logistical support for research in northern and remote locations; more consistent policies for support of northern work across all research performing sectors;
4. Compensation for the indirect costs of university research for grant funds originating with the federal government and administered by Foundations;
5. Increased support for Canadian participation in major international climate initiatives such as those of the World Climate Research Program, as well as for a limited number of International Project Offices based in Canada.

The Brief proposes that \$100 million in new funds be allocated for university-based climate research administered by the Canadian Foundation for Climate and Atmospheric Sciences. It further recommends that the Foundation's mandate be expanded to incorporate studies on the economic impacts of climate.



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Brief to the House of Commons Standing Committee on Finance

September 6, 2005

Introduction

Canada is a lead player in international climate discussions. It recently ratified the Kyoto Protocol, strengthened domestic measures for energy efficiency and reductions of greenhouse gas emissions, and increased its investment in environmental technologies. It has also invited government leaders from around the world to Montreal, for the 2005 Conference of the Parties to the United Nations Convention on Climate Change and the first review of actions under the Kyoto Protocol (November 29-December 9, 2005). Canada's actions show that it understands the seriousness of global climate change; however, investments in understanding the climatic factors involved have lagged or been postponed. This is compromising Canada's ability to generate necessary climate information and to meet its international environmental commitments.

Canada needs better climate knowledge to improve forecasts, to underpin sound public policy, to mitigate the effects of extreme weather events, to effectively measure sources and sinks of greenhouse gases, to assess future climate impacts and to adapt to the changes increasingly affecting us. A new generation of meteorologists, climate scientists, oceanographers and others must be trained to meet the needs of the future.

Climate context

Around the world, roughly 80% of natural disasters are related to climate and weather; the number and costs of these events are increasing dramatically. At home, weather-related events - floods, droughts, hailstorms, smog etc. - are costing Canada billions of dollars annually and directly affecting peoples' safety and livelihoods. Notable events over the past few years include the 1996 Saguenay River flood, the 1997 Red River flood and the 1998 Eastern Canada ice storm, which cumulatively caused \$5.5 billion in damages, as well as Hurricane Juan in 2003, which led to \$113 million in payouts and the Edmonton flood and hailstorm of July 2004 which caused \$74 million in damage.

We recognize that:

- the Kyoto Protocol, while an important first step in addressing climate change, will by itself have very limited impact on future climate;
- Canadians will have to adapt to a changing climate for the rest of this century: knowledge of regional conditions and climatic factors is needed for this. Canada must develop an adaptation strategy;

- Further scientific research is required to understand the natural processes that produce climate hazards and to provide the basis for critical policy decisions. The Kyoto Protocol has demonstrated the need for much better knowledge of greenhouse gas sources and sinks.

Phase I of the Federal Government's 'Project Green'¹ allocates no funding to climate science, to adaptation, or to understanding natural greenhouse gas cycles. Federal support under the earlier Climate Change Action Plan has expired and no equivalent program or plan is yet in place. Without new resources, research-based departments and agencies, Environment Canada, Fisheries and Oceans Canada and others, are unable to support climate research, monitoring and databases adequately. Federal departments are also struggling with deteriorating infrastructure.

Recommendation 1:

That the federal Government reinforce support for climate research in universities and federal laboratories as part of its climate planning process and the next phase of 'Project Green'.

The Canadian Foundation for Climate and Atmospheric Sciences

CFCAS is the main funding body for university-based research on climate and atmospheric sciences in Canada. Since 2000 it has invested over \$76 million in cross-Canada research networks and projects in areas such as air quality, extreme weather, climate system science, greenhouse gases, ocean conditions and Arctic climate. These grants have garnered an additional \$96 million through partnerships with federal granting councils, departments, industry and other players, more than doubling the impact of the funds.

CFCAS-funded researchers are training the scientific leaders of tomorrow – the people who will replace senior scientists as they retire and will address Canada's future climate problems. Five years of CFCAS-funded science have shown concrete results and helped increase Canada's international scientific recognition and profile, ensuring a respected place in major world climate initiatives and access to data and facilities Canada could not generate or afford itself. For example, with CFCAS funding:

- Three groups are examining data from Argo ocean floats in Canadian and international waters. The floats constitute the greatest source of subsurface temperature and salinity data available anywhere. Data from the international Argo program is used to improve and extend weather forecasts and analyses, which are important for offshore exploration, fishing, marine safety, tourism and weather prediction. Another group has developed a technique for combining models of ocean conditions, resulting in improved prediction of extreme weather on the Scotian Shelf, an area of offshore industrial activity.
- A major national network studying the generation and absorption of carbon in Canada's boreal forests has shown how drought, forest fires and land use affect these, and has proven that forests of medium age (35-60 years) have the strongest ability to absorb and retain carbon. This is helping Natural Resources Canada develop policies on forest management and is providing data for carbon accounting to meet Canada's Kyoto commitments. Another group is showing how agricultural practices affect soil and plant emissions and links to climate change.

¹ Project Green - *Moving Forward on Climate Change: A Plan For Honouring Our Kyoto Commitment, 2005*

- Findings on regional air quality have shown how proposed emission controls will affect air quality. New knowledge on the behaviour of different particles in the air is helping Environment Canada improve its predictions on urban air quality. CFCAS-funded work is also helping trace airborne pollutants to their sources.
- Data from an ocean observatory in Lunenburg Bay is being used to forecast severe storms and enabling authorities to issue earlier warnings to people living in coastal communities. It is also providing information on ocean conditions for recreational and commercial fishing, boaters and for sailing competitions.
- Alberta researchers have developed a mathematical model to improve prediction of severe hailstorms in the prairies. This is helping the Meteorological Service of Canada to issue weather warnings for large hail. A group in Quebec has developed technology to predict imminent rainstorms, supercooled water and snow patterns and to pinpoint where they will hit the ground. Collaboration with the Meteorological Service of Canada and sharing of data is enabling airports to optimize de-icing operations. Agreements are in place to commercialize these Canadian forecasting systems in the U.S., Switzerland and other countries.

At the request of the Prime Minister, the Foundation is preparing a report outlining what we know about climate change. CFCAS will present the report in November 2005.

CFCAS research investments average \$12 million annually. By the end of 2005-06 its grants budget will be fully committed; however support is still needed for university research, for weather security and the well-being of Canadians and their economy. Demand is heavy: CFCAS has an increasing number of requests, all of which indicate how they address priorities and are relevant to federal policy needs. Already excellent initiatives are being denied funds: in June 2005 the Foundation had to defer support for an important initiative on Arctic storms and their impact in a key northern community; a unique prairie drought program was approved for funding at only half the amount required.

Recommendation 2:

That the Government continue to use CFCAS to target support for climate research to the academic community and expand the Foundation's mandate to climate impacts. We respectfully suggest an additional \$100 million in new funds be allocated to the Foundation, with extension of the Foundation's mandate to at least 2015.

Coordination of funding

CFCAS investments are affected by pressures on partner agencies. NSERC² and CFCAS have co-funded 3 research networks, all of which are due to end in 2006. An ongoing NSERC moratorium on new network requests, and the termination of programs under the federal Climate Change Action Plan have severely restricted partner funding. This has doubled the urgency and size of requests to CFCAS and increased pressure on its resources.

CFCAS is not mandated to support major research facilities, yet the research costs of the scientists using them must come from somewhere. This has increased pressure on CFCAS and other funders, and on the research leaders who must approach multiple funding sources.

² Natural Sciences and Engineering Research Council of Canada

The impacts of climate change are most evident in the North. International Polar Year (2007-08) provides a superb opportunity to learn more about this vast but vital region; however support for northern research remains fragmented and inconsistent. CFCAS provides an excellent vehicle for supporting targeted research linked to International Polar Year and could partner with federal bodies distributing targeted IPY support. Long term monitoring of climate trends is essential for predicting future conditions in this sensitive but remote region. Data on the North requires observations and fieldwork: this is costly, and the playing field is not level. CFCAS-funded academics are excluded from getting in-kind support for northern research from the Polar Continental Shelf Project; the same academics when funded by granting councils do have access to such support. The requirement that CFCAS-funded researchers pay the full cost of northern work has caused some to withdraw from Arctic research due to heavy logistical costs.

The current CFCAS funding Agreement does not allow it to cover indirect research costs. This imposes a financial burden on universities and is a source of inequity with federal granting councils, who distribute a federal allocation for indirect costs.

Recommendation 3:

That the Government establish a mechanism for adequate and coordinated logistical support for research in northern and remote locations;

and

That the Government task an appropriate body with the coordination of federal support for climate research and technology across research and development sectors (including universities, foundations, federal and non-governmental sectors).

Recommendation 4: That the indirect costs of research in universities be recognized in federal funding agreements with Foundations, and other relevant allocations.

International Co-ordination and Profile

Participation in international research programs enables Canada to influence major programs, showcase Canada's intellectual and technological strengths, and reinforce Canada's importance as a partner nation. CFCAS funds are enabling Canada (University of Toronto) to host the International Project Office for SPARC (Stratospheric Processes and their Role in Climate), a component of the World Climate Research Program. The Secretariat for this international program moved to Canada from France in 2004. CFCAS has also helped establish an international SOLAS (Surface Ocean-Lower Atmosphere Study) office in Halifax (Dalhousie University). Given the importance of Canada's north and its circumpolar role, the Foundation is contributing to the National Secretariat for International Polar Year (University of Alberta). Canada needs stronger participation in international initiatives.

Recommendation 5:

That the Government reinforce its support for Canadian participation in international research programs such as those of the World Climate Research Program, as well as for a limited number of International Project Offices located in Canada; that it allocate funds to international coordination and the participation of Canadian scientists in these programs.

Conclusion

Canada is hosting the 11th Conference of the Parties under the U.N. Framework Convention on Climate Change in November-December 2005. This provides a unique opportunity to

highlight Canada's research accomplishments. CFCAS-funded research will help showcase Canadian excellence in climate science.

CFCAS has fostered an impressive record of world class research accomplishments in areas of policy relevance or importance to Canadian society. Its Secretariat has demonstrated accountability, efficiency and commitment to Canada's climate needs and objectives. Without new funding support in the current fiscal year, CFCAS will have committed all its funds and will no longer be able to support new activities.

Project Green recognized the importance of Canada's forests and agricultural lands in sequestering greenhouse gas emissions from the atmosphere; it also stated that "the Government will introduce additional measures as part of this climate planning process..." We welcome this and propose the existing mechanism – CFCAS - to manage new research funds, to generate knowledge and create human resources in these areas of federal priority and Canadian need.

A financial supplement of \$100 million is suggested with early release of funds, and extension of CFCAS's mandate to at least 2015.