

BACKGROUND



Climate Change Action Fund Science, Impacts and Adaptation Projects

Total Climate Change Action Fund Contribution	\$1,818,000
Total Value of Funded Projects	\$5,504,600

The Government of Canada established the \$150-million Climate Change Action Fund (CCAF) in the 1998-1999 federal budget. The Fund is designed to encourage projects that build public awareness and understanding of the climate change issue, conduct research on climate change and promote early actions by Canadians to reduce greenhouse gas emissions.

Further research is required to advance our knowledge of the magnitude, rate and regional distribution of climate change and its impacts on Canada to better estimate the risks of climate change. To that end, Science, Impacts and Adaptation (SIA), a \$15 million component of the CCAF, will focus on:

- systematic climate monitoring to detect climate change, and to improve and validate our climate models;
- the study of key climate processes, including those related to greenhouse gas sources and sinks;
- regional scale climate modeling for impact and adaptation needs;
- the study of the impacts of climate change on Canada; and
- the identification of possible adaptation responses.

PROJECTS ANNOUNCED NOVEMBER 16, 1999

Science Projects

Improving the Approximation of Ice Cloud Radiation Processes in Canadian Climate Centre Global Climate Models

Project objective: To develop regional and global climate models that represent ice clouds more accurately. The ice crystals making up the ice clouds come in a variety of sizes and shapes. This feature makes them more difficult to represent in a climate model. In this project, researchers will ensure that the different sizes and shapes of ice crystals are more accurately represented. They will also determine the processes that these crystals influence inside the clouds. This information will be included in the Canadian Climate Centre Global Climate Model (CCC-GCM), and researchers will investigate its impact on climate simulations.

Proponent: Dalhousie University, Halifax, Nova Scotia
Total budget: \$92,000
CCAF contribution: \$42,000
Key partner: Environment Canada

Sulphate Aerosol Forcing in Global Climate Models

Project objective: To improve the way in which climate models represent the processes involving sulphate aerosols. **Sulphate aerosols are important as they may cool the atmosphere, thus countering the warming effect of greenhouse gases.** By understanding the effects of greenhouse gases and sulphate aerosols, we will be better able to predict the future climate.

Proponent: Dalhousie University
Total budget: \$340,000
CCAF contribution: \$170,000
Key partner: Environment Canada

Climate Scenarios for the Canadian Impacts Community: Identifying the Needs

Project objective: To identify the climate scenarios that would meet the needs of the climate impacts research community. This would help provide all regions of Canada with more accurate information from climate models. This work is best done through a partnership between researchers working on climate models and those working on the impacts of climate change. There is also a need for a national capacity that would make climate scenarios available for all regions of Canada. This initiative would have links to similar activities internationally.

Proponent: Environment Canada
Total budget: \$65,000
CCAF contribution: \$45,000

Improving the Representation of the Interaction between Clouds and Radiation in Canadian Climate Models

Project objective: To ensure that the Canadian Climate Centre Global Climate Model (CCC-GCM) accounts for the interaction of solar and terrestrial energy as well as cloud fluctuations that occur on a smaller scale than the model grid. Researchers will conduct further testing to improve model representations of small-scale cloud fluctuations. These more realistic models will help scientists to evaluate climate change caused by increased greenhouse gas concentrations and the presence of aerosols in the atmosphere.

Proponent: Environment Canada
Total budget: \$108,000
CCAF contribution: \$54,000

Scaling of Cold Season Land Surface Processes and its Application to Improving Land Surface Parameterizations in Canadian Climate Models

Project objective: To improve the way Canadian snow-covered land surfaces are represented in climate models. Researchers will conduct a modeling study involving tests of different regions and seasons. As a result, Canadian climate models will be able to better predict cold season conditions across Canada.

Proponent: Environment Canada
Total budget: \$202,000
CCAF contribution: \$42,000

Improving Approximations of Land Surface Snow Processes for Canadian Climate Models

Project objective: Researchers will test approximations for snow cover against observational data from various Canadian sites. The project will also incorporate the phenomenon of blowing snow, which is not currently considered in models. As a result, the climate model will represent snow cover more accurately. It will also lead to more precise predictions of snow cover and other climate variables.

Proponent: Environment Canada

Total budget: \$312,000

CCAF contribution: \$128,000

Partners: Trent University, Peterborough, Ontario, the University of Waterloo, Waterloo, Ontario and York University, Toronto, Ontario

Northern Oceans Dimethylsulfide Emission Models (NODEM)

Project objective: To improve our understanding of how naturally occurring sulfur sources (e.g. microalgae) from northern oceans affect climate change. It will also help us predict the effect of climate change on oceanic dimethylsulfide production. **It has been hypothesized that a rise in global temperature could foster DMS production, which would partially counter the greenhouse effect.**

Proponents: Fisheries and Oceans Canada

Total budget: \$850,000

CCAF contribution: \$150,000

Partners: Environment Canada, Memorial University, St. John's, Newfoundland and the Université du Québec à Rimouski, Rimouski, Quebec

Modeling Regional Climate Changes in the Canadian Inland Seas: The Gulf of St. Lawrence and Hudson Bay

Project objective: to accelerate the development of a regional ice-ocean climate model component for the Eastern Canada Regional Climate Model. The model will be used to produce regional ice-ocean climate scenarios for Canadian inland seas. These scenarios will show what conditions could be like in the future if carbon dioxide levels continue to increase.

Proponent: Fisheries and Oceans Canada

Total budget: \$685,000

CCAF contribution: \$180,000

Partners: Environment Canada, the Université du Québec à Montréal, Montréal, Quebec and McGill University, Montréal, Quebec as well as Mississippi State University and the University of Alaska

Establishing Approximations for Sloping Bottom Boundary Layers to be Incorporated into Ocean General Circulation Models

Project objective: Researchers will use modeling studies to understand and quantify the important mixing processes of water in the oceans. Once they understand the main processes that occur on a small scale, they can calculate the mixing processes for major continental shelves and deep-ocean ridges.

Proponent: Fisheries and Oceans Canada

Total budget: \$494,000

CCAF funding: \$144,000

Partner: University of Victoria, Victoria, British Columbia

Impacts and Adaptation Projects

Climate Change and Geomorphological Hazards in the Canadian Cordillera: The Anatomy of Impacts and Some Tools for Adaptation

Project objective: To provide information to reduce the negative impacts of climate-driven catastrophes on the people, economy and resources of the mountainous Canadian Cordillera.

The potential changes in landslides, river floods and glacier-related floods will be studied

Proponent: Natural Resources Canada - Geological Survey of Canada

Total budget: \$325,000

CCAF contribution: \$120,000

Key partners: Simon Fraser University, University of British Columbia, British Columbia Ministry of Forests, Septer Consulting based in Whaletown, British Columbia

Impact of Climate Change on the Frequency of Slope Instability in the Georgia Basin

Project objective: To assess how climate change could affect the intensity of short duration rainfalls and soil conditions, and to evaluate how these changes might affect the frequency of shallow landslides and the flow of debris. These events can result in direct economic loss by destroying roads, bridges, housing; by degrading forest productivity; and by adversely affecting this region's fishing habitat.

Proponent: M. Miles and Associates, Victoria, British Columbia

Total budget: \$48,000

CCAF contribution: \$24,000

Key partner: Environment Canada

Assessment of the Impact of Climate Variability and Change on the Reliability, Resilience and Vulnerability of Complex Flood Protection Systems

Project objective: To develop a dynamic hydro-climatologic assessment model and suggest possible adaptation strategies to maintain efficient flood protection over a broad geographic region. Large-scale flood protection systems like the Red River Valley are vulnerable to the impacts of predicted climate variability and change. Failure of the Red River Floodway would result in safety hazards to Manitobans, as well as economic losses.

Proponent: University of Manitoba - Natural Resources Institute and Department of Civil Engineering

Total budget: \$109,400

CCAF contribution: \$50,000

Impact of Climate Change in the Okanagan Valley – Agriculture (irrigated crops) Component

Project objective: To identify anticipated changes in crop distribution in the British Columbia, assess future crop water requirements and water supply, and suggest strategies to improve the efficiency of crop water use. In these semi-arid regions, sustainable agricultural production requires an adequate supply of water. Global warming is expected to increase temperatures and change precipitation patterns, which will have an impact on water supply and demand.

Proponent: Agriculture and Agri-Food Canada --- Pacific Agri-Food Research Centre

Total budget: \$91,000

CCAF contribution: \$22,000

Key partner: Parchomchuk Research and Engineering, Summerland, B.C.

Crop Yield Variability under Climate Change and Adaptive Crop Management Scenarios

Project objective: To evaluate crop yields and crop yield variability under both historic conditions and future climate change scenarios; to assess different soil, crop, climatic combinations in major agricultural eco-regions across Canada; to identify the impacts of innovative soil and crop management practices on crop yields under different climate change scenarios.

Proponent: Agriculture and Agri-Food Canada – Eastern Cereal and Oilseed Research Centre

Total budget: \$257,000

CCAF contribution: \$77,000

Impact of Climate Change on the Risk of Winter Damage to Forage Crops

Project objective: To examine the potential impact of climate change on damage risks caused by the intensity and duration of cold temperatures, the absence of protective snow cover, inadequate winter hardening and ice encasement. Climate models project warmer winters. More frequent freeze and thaw cycles represent a significant threat to winter forage crops, which comprise more than 40 percent of cultivated land in Canada.

Proponents: Agriculture and Agri-Food Canada- Soils and Crops Research and Development Centre and Eastern Cereal and Oilseed Research Centre

Total budget: \$170,000

CCAF contribution: \$70,000

Assessment of Climate Change and Impacts on Soil Moisture and Drought on the Prairies

Project objective: To determine the impact of possible climate change scenarios on soil moisture, soil temperature and drought in the Prairies and to identify possible adaptation strategies. Climate is a key determining factor in the type of agricultural production possible in a region. To develop appropriate agricultural adaptation strategies, scientists need to better understand the possible impacts of climate change on agricultural production and to identify vulnerable agricultural activities.

Proponent: Agriculture and Agri-Food Canada – Lethbridge Research Centre

Total budget: \$115,000

CCAF contribution: \$77,000

The Potential Impact of Climate Change on the Development and Growth of Commercial and Horticultural Crops and on Pests Associated with these Crops

This project aims to develop and verify some bioclimatic models adapted to several areas of agricultural territory in Québec. These models will be invaluable tools to evaluate the impact of climatic changes on crop growth and to quantify the pressure that pests exert on crops, making it easier for farmers to manage climatic information in their routine operations.

Proponent: Agriculture and Agri-food Canada- Horticulture Research and Development

Centre Total Budget: \$ 340,000

CCAF contribution: \$ 140,000

Key Partner: Environment Canada, BSME de Québec

Climatic Change and Fragmented Prairie Biodiversity: Prediction and Adaptation

Project objective: To predict the impacts of climate change on prairie diversity and to evaluate adaptation strategies to offset these impacts. This project will evaluate the ability of species to migrate given the fragmented nature of prairie ecosystems.

Proponent: Saskatchewan Environment and Resource Management – Fish & Wildlife Branch

Total Budget: \$ 73,200

CCAF contribution: \$ 33,000

Key Partner : University of Regina – Canadian Plains Research Centre

Enhanced Indicators of Climate Change Impacts on Forest Hydrology

Project objective: Forests occupy nearly half of Canada's land area and play a major role in both hosting and regulating the mass and energy exchanges that make up the hydrological cycle. This study will develop indicators to demonstrate the sensitivity of the forest water balance to climate variability.

Proponent: Environment Canada – National Water Research Institute, and Atmospheric Environment Service

Total Budget: \$ 280,000

CCAF contribution: \$140,000

Key Partners: University of Saskatchewan, Natural Resources Canada – Canadian Forest Service, United Kingdom Meteorological Office – Hadley Centre for Climate Change and Prediction Indian and Northern Affairs Canada – Northern Affairs Programme

Climate Change Impacts on Northern River Ecosystems and Adaptation Strategies via the Hydroelectric Industry

Project objective: The Peace-Athabasca Delta, one of the world's largest inland freshwater deltas has been adversely affected by the effects of regulating the flow of the Peace River and by shifts in climate. Based on future climatic predictions and a modelled hydro-ecological response, researchers will design an adaptation strategy that can be used by the hydro-electric industry in their flow operations to mitigate the negative effects of climate change on the ecosystem health of the delta.

Proponent: Environment Canada - National Water Research Institute,

Key Partners: University of Saskatchewan, École de technologie supérieure, Trent University, University of Winnipeg

Total Budget: \$ 548,000

CCAF contribution: \$ 110,000