Global Water Futures: Solutions to water threats in an era of global change

"Global Water Futures: Solutions to Water Threats in an Era of Global Change" is a University of Saskatchewan-led research program that is funded in part by a \$77.8-million grant from the Canada First Excellence Research Fund. The aim is to transform the way communities, governments and industries in Canada and other cold regions of the world prepare for and manage these increasing water-related threats.

Our water is at risk.

In Canada and globally, we are facing unprecedented water-related challenges. Canada has some of the world's highest rates of warming, which impacts infrastructure, institutions, ecosystems and human health.

How can we best forecast, prepare for and manage water futures in the face of dramatically increasing risks?



GLOBAL WATER FUTURES SOLUTIONS TO WATER THREATS IN AN ERA OF GLOBAL CHANGE Global Water Futures will provide global leadership in cold regions water science, delivering monitoring, diagnosis and prediction of change, and the tools needed for adaptation and risk management.

Cold regions such as Canada, where snow, ice, and frozen soils control the storage and release of water, deliver water resources to half the world. GWF's overarching goal is to deliver risk management solutions—informed by leading-edge water science and supported by innovative decision-making tools—to manage water futures in Canada and other cold regions where global warming is changing landscapes, ecosystems, and the water environment.

GWF aims to position Canada as a global leader in water science for cold regions and will address the strategic needs of the Canadian economy in adapting to change and managing the risks of uncertain water futures and extreme events. End-user needs will be our beacon and will drive strategy and shape our science.



GWF will focus on three main goals:

1. **Deliver new capability for providing disaster warning to governments,** communities and the public, including Canada's first national flood forecasting and seasonal flow forecasting systems, new drought warning capability, and water quality models and monitoring that warn of hazards to health and drinking water supply;

2. **Diagnose and predict water futures** to deliver improved scenario forecasting of changing climate, landscape and water for the future, with information outputs tailored to the needs of users. This will enable us, for example, to assess risks to human health from changing flood, drought and water quality; and

3. Develop new models, tools and approaches to manage water-related risks to multiple sectors, integrating natural sciences, engineering, social and health sciences to deliver transformative decision-making tools for evidence-based responses to the world's changing cold regions. New models will define changing risk from floods and drought, and allow end-users to plan sustainable infrastructure investment to manage future risk.

Big data for water

A new era for users and public access to water information



User Engagement & Information Sharing



Data Sensing

Diagnosing

and Predicting Change

> Preparing for Water Future in an Era of

Global Chang

GWF will be the provider for Canada and the world of strategic tools to manage water futures.

GWF will achieve this through three interrelated pillars of activity.

Pillar 1: Diagnosing and Predicting Change in Cold Regions will deliver transformative, transdisciplinary science on an unparalleled global scale across water, land and air and at the human-water interface. Informed by user needs, this comprehensive scientific approach will lead to a more complete understanding of our ecosystems and provide the necessary data that underpin cutting-edge technologies and forecasting models.

Pillar 2: Decision Support Systems will create new water, snow and land sensing and modelling systems and deploy them across living laboratories in nature. These systems will feed in to our science, dramatically raise our observational power to unmatched levels and lead to the generation of the 'Big Data' required to uncover key insights and support user needs.

Pillar 3: Designing User Solutions will work with our communities of users to translate decision support systems into user-friendly solutions providing stakeholders with warning systems for impeding climate disasters, predictable water futures for planning and evidence-based decision support for optimal economic and health choices for populations.

More than 140 National and International partners

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KEY GLOBAL

PROGRAM

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Canada First Research Excellence Fund (CFREF) is a federal program which aims to place Canada at the forefront of global research that is of economic benefit to Canada. In September 2016, the University of Saskatchewan was awarded \$77.84 million over seven years from CFREF to establish the CFREF project "Global Water Futures: Solutions to Water Threats in an Era of Global Change".







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SOLUTIONS TO WATER THREATS