

## AGRICULTURAL WATER FUTURES IN CANADA: STRESSORS AND SOLUTIONS

# How will climate change affect agriculture in Canada?

The earth's temperature is set to rise by 1.5°C by as early as 2030. This will have an enormous impact on the earth's climate system, affecting everything from increased temperatures to extreme precipitation to drought. How will Canada's agricultural systems cope with these changes? What will these changes mean for food production systems and waterways in Canada?

**Agricultural Water Futures is working with end users to find ways to safeguard Canada's agricultural systems in the face of risks from climate change.**

### How much water will there be to grow our crops? What kind of crops will we be able to grow successfully?

#### DEVELOPING MODELS WILL HELP US TO PREDICT:

- › how changing weather patterns and water cycling will affect crop-climate-water interactions by season and by region (e.g. droughts, hail, snow, freezing rain; e.g. Great Lakes region, Prairies region)
- › a better understanding of how crops can be stressed by too little or too much water under varying regional Canadian agricultural climates
- › how changes in farming practices can affect water availability and crop yields (e.g. evapotranspiration, net primary productivity)



### How does weather impact water quality over an annual cycle and how will a changing climate affect this? What will be the ideal land management practices to offset these challenges?

#### UNDERSTANDING CLIMATE DRIVERS MEANS:

- › examining processes driving soil health and water quality (e.g. runoff patterns, nutrient fluxes, etc.) during winter conditions and in response to changing management practices
- › optimizing land management practices for current and future climates (e.g. tillage, cover crops, tile drainage, manure application, etc.)
- › simulating water quality changes (precipitation patterns, nutrient loads) year-round, including during winter conditions

### How do we help farmers adapt their agricultural systems and practices to changes in climate? What kinds of government programs and policies are needed to support adaptation and minimize risk?

#### WORKING WITH END USERS AND STAKEHOLDERS TO:

- › develop an agent-based model to predict how farmer decision-making of BMPs overlaps with hydrological systems and policy scenarios in order to improve resiliency
- › determine economic and policy instrument incentives (e.g. P trading, offset schemes, etc.) that will encourage farmers to adopt and invest in BMPs
- › analyze existing institutions and drivers that affect decision-making of agricultural management practices in the Ontario grain sector

