

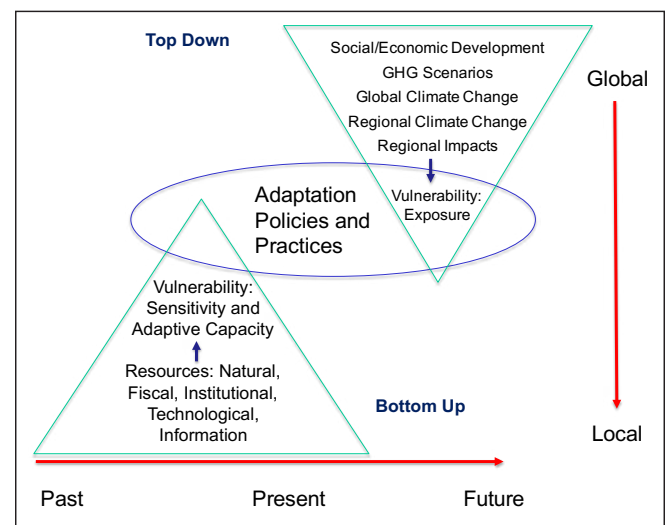
# Approaching climate change and adaptation from the farmers' perspective

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Dr. Sauchyn is the Senior Research Scientist at the Prairie Adaptation Research Collaborative (PARC). His main research interest is in the climate of the past millennium in Canada's western interior and what past climate can tell us about the climate to expect in the near future.



Did you ever have difficulty recognizing a familiar place because you approached it from a different direction? A few years ago, before a meeting in Sherwood Park, I had a chance to visit nearby Cooking Lake for the first time in many years. I had trouble locating our favourite duck hunting spot, because I'd taken a different approach to the lake than our dad did those many years ago. In a similar way, how we view climate change, and its consequences, can depend on how we approach the subject. Basically, there are two different approaches. They are labeled top down and bottom up in this diagram.



One of the major concerns about climate change is what it means for global food production and security. This concern has resulted in a large number of studies, reports and scientific assessments. They've typically taken a top down approach, using models to simulate global and regional climate changes and the impacts on food production. To incorporate the influence of human activity, the models are run using data and assumptions

about social and economic development and emissions of greenhouse gases (GHG scenarios). Every climate model predicts a longer growing season for Canada. The obvious conclusion is that there is significant potential for increased production and crop diversity, and for the expansion of agricultural land to higher latitudes, where today you'll find mostly bush, muskeg and rocky soil, and no grid roads or railroads.

In a typical 'top down' climate and crop modeling study, the UN's Food Agriculture Organization (FAO) concluded that by 2050 "in the case of wheat, Canada is projected by most models to replace the former Soviet

6 Union to become one of the top three exporters in the world". First of all, as far as I know, Canada is already amongst the largest exporters of wheat, and secondly, this prognosis assumes that Canadian grain farmers would choose to seed more wheat in a warming climate, rather than grow higher value crops. This view of Canada from a distance, as a cold but warming country, prompted a Yale University economist and a UK anthropologist to conclude that global warming is good for Canada and the more the better. What they don't seem to realize is that taking advantage of a warming climate will require adaptation to exploit the extra growing degree days, while minimizing the adverse effects of weather extremes, and amplified climatic variability, and the impacts of more and different pests, pathogens and invasive species, who also like shorter, warmer winters.

The top down approach is a legacy of seeing climate change as a scientific problem. When public concerns about the warming of the earth were first raised in the 1980s, scientists were consulted; they'd known for almost 100 years that the burning of fossil fuels would cause global warming.

The United Nations created the Intergovernmental Panel on Climate Change (IPCC) and asked it to produce a series of assessment reports (ARs), each one a synthesis of a large amount of science published since the previous report. Climate modeling centers around the world ran the latest versions of their

models so that the IPCC would have the best climate change projections for each AR. While each report, from AR1 (1990) to AR5 (2013), has included more information about the social dimensions of climate change, the IPCC has been led and dominated by climate science. This top down process has been a template for national and regional scientific assessments and for major studies of climate change impacts and adaptation. This approach makes some sense when you're dealing with the entire world; the strongest indications of climate change come from the largest sample, but while climate change is global, the impacts and adaptations are local. People are exposed and respond to conditions where they live. Top

down research makes assumptions about how people are affected by weather and how they deal with it. This research either assumes no adaptations, which simplifies the analysis but is unrealistic, or certain adaptations are assumed or anticipated. Why anticipate? Just ask! Farmers are experts on adaptation.

All climate change impact assessments have the same ultimate objective: to inform planned adaptation to climate change by identifying the risks, vulnerabilities and opportunities. The top down approach produces information on exposure to climate change – what is changing and where. But risk and vulnerability exist only if and where exposure has consequences, which depend on an array of social factors that determine sensitivity to weather and climate, and on access to various types of resources that enable a community or business to adapt to climate change and manage the risks. These social factors can be measured and evaluated using secondary data from a census or survey, although this information is aggregated by geographic units, like census districts, and only for certain

variables. Aggregate data don't capture the diversity of experience and perspective that characterizes Canadian agriculture, a unique sector because it consists of hundreds of thousands of independent and adaptable businesses. Therefore, any study of climate change in a rural area has to start on the ground speaking with the

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farm and ranch families about how they are affected by extreme weather and the best practices for dealing with it.

A strong personal bias for the bottom up approach reflects my experience with a series of studies of prairie agricultural communities. We consulted a sample of producers who live within a certain distance of a town where they get most of their goods and services. My colleagues in the social sciences interviewed hundreds of producers in their homes and at meetings in town. This bottom up interdisciplinary research has produced insights that would escape a top down approach. Here are a just two examples:

- From irrigators we expected to hear mostly about drought, but they told us about how recent floods had damaged infrastructure designed to deliver water not get rid of it. They are concerned about the potential for more intense rain and flooding in a warming climate.
- Prairie agriculture is arguably Canada's most adaptive industry; increasingly adopting advanced technology

and innovative farming practices. Thus we expected producers to tell us that further technological innovation will sustain, and even raise, production through a changing climate. We heard some of this, but we were also frequently told about the high cost of these technologies and also that there is only so much extreme weather that a single farm business can withstand. Thus many producers talked about the importance of community and acting collectively, whether through a local watershed stewardship group or calling on government to support rural development and sustainable farming practices, which they seem to have backed away from, for example, with the demise of PFRA.

These and other insights, gained by seeing climate change from the producers' perspective, are important outcomes of our climate change research. They also provide context for the direction and interpretation of the climate science, allowing us to convert measurements and data into knowledge and understanding. **FFR**

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