Bridging the Water Adaptation Gap (BWAG) - Pathways to Adaptation for Vulnerable Regions

Results from Canada's Objective Three Primary Economic Activities (PEA) Interviews

Gabriela Beltran, Margot Hurlbert, Harry Diaz, Oscar Zapata

April 14, 2025

EXECUTIVE SUMMARY

Saskatchewan has a diversity of experience with **climate impacts** within the study region. The west side of the province is dry and experiences aridity and drought while the east side has more experience with flooding. Because of this, there is disagreement within Saskatchewan by agricultural producers as to which climate impact, drought or flood, is more challenging. Producers described their experiences with increasing variability and having drought and flood very quickly, season after season, or even within seasons, from one area or region within Saskatchewan to another (within the same year or growing season). Further complicating the situation is that "no year in agriculture is ever the same" (PEA Interview 5).

Many spoke eloquently about their dependence and relationship with Mother Nature. Droughts, floods, increasing storms, hailstorms, wildfires, and killing frosts were also described as salient climate hazards. Most often **climate hazards** were described in combinations: issues of heat, drought, and wind; fire risks from heat, drought, and continuous seeding; high heat, hail, and insects; markets, policies, drought (PEA Interview 7); climate and lack of cattle marketing opportunities due to oligopoly (PEA Interview 6); more pests, more heat, less water held in soil, drought (PEA Interview 2); and commodity prices and drought (PEA Interviewee 14). Another interviewee identified how flooding and excess moisture can contribute to soil salinity, increased costs for having to farm around wetlands, wasted inputs on the marginal surrounding lands, and needless overlap with inputs and expense.

Non-climatic hazards include the markets, obtaining labour for farm production, rising costs of farm inputs, increasing consolidation of corporations (especially in the cattle industry), and policy including food policy and carbon tax. Non-climatic hazards also included increasing costs (some due to COVID, the Ukraine war, geopolitical issues, and supply chain issues). Trade policies were a source of hazard in relation to marketing produce and obtaining supplies or inputs. Inflation was considered the private sector setting prices. Increasing electricity costs were also a concern. The high cost of crop insurance due to numerous claims and the frustration over carbon pricing were often mentioned as increasing farm risk.

Young farmers and small rural communities were described as particularly **vulnerable** given trends of increasing farm consolidation, increasing farm debt, and farm corporatization. Individual backgrounds, farm location, and amount off debt of capitalization were also factors. Delivery contracts for agricultural production have reduced adaptation with delivery schedules and quotas. In times of drought and water shortages, communities downstream of the Diefenbaker dam were particularly vulnerable. Differential gender vulnerability was identified as one spouse worked in high tech agricultural equipment with air conditioning and another in non-air-conditioned farmhouses.

While all farmers recognized they are dependent on world markets and vulnerable to them, there was a healthy debate amongst interviewees as to whether large or small farms were more adaptive. Large farms have a diversity of geography to mitigate impacts of drought and flood, can invest in drainage or dams/berms, and can experiment with innovations and then upscale them. Small farms are more focused on using all their resources to support their family. However, several interviewees mentioned that it is really about cashflow to maintain the health of the land and modern equipment. Several noted that large producers had "huge debt loads."

The agency, ingenuity, and innovativeness of agricultural producers in **adapting to climate** impacts and hazards was noted by many. Many discussed how much farming had changed in relation to seeds, tillage, herbicides, soil management, rotations, equipment, and infrastructure. Proper soil management in relation to drought and flood was a predominant theme of interviews. Technology of farming has progressed by leaps and bounds over the decades. However, one interviewee pointed out that agricultural ecosystems have limitations to adaptation.

Cattle farming adaptive practices in relation to drought, such as pasture management and reducing herds when feed was not available, were a common theme. One producer mentioned moving his herd as a drought adaptation instead of buying higher priced feed. The challenges of rebuilding and the barrier of only two feedlots to sell to were noted.

Producers pointed out both the value of wetlands (carbon sequestration, flood control, nutrient filtration, and recreational value) and the importance of drainage (saline issues, soil management, field/crop/farming efficiency, reducing crop loss, reducing risk of fill and spill flooding, reducing flooding, and weed resistance). One interviewee noted the futility of regulating reduction in fertilizer because farmers are already highly attuned to reducing fertilizer as much as possible due to high input costs (PEA Interview 9). The calculations of fertilizer, crop yield and price are therefore essential for profitability. One adaptation mentioned was seeding perennial forages in areas with high water and high salinity, since these crops do well in these conditions and would require less application of fertilizer, herbicides and pesticides (PEA Interview 14).

Irrigation was identified as an important adaptation and a requisite in some places for farming. Innovative farms utilizing irrigation for excess drainage were described.

Social adaptations were important. Pulling landowners together for education, drainage, irrigation, water co-ops, responding to fire/flood, and researching crop practices/drainage and good water management were key. Also key was learning from neighbours, talking to neighbours, and talking to politicians and governments. Even talking early to bankers was noted. While the loss of PFRA (Prairie Farm Rehabilitation Administration) was noted, much knowledge and assistance is now obtained from farm consultants, farm equipment manufacturers and dealers, and professionals. Younger people had a better grasp on new technology. Policies to assist producers adapt included crop insurance, water programs for livestock, and drainage regulations (with new ones being drafted). More adherence to the Canadian Energy Code for Buildings was identified as needed.

Most interviewees noted that farming is no longer a lifestyle, it is a business. Farmers are now truck drivers, hired labour, consultants, etc. Decisions surrounding adaptation and managing the farm are always underscored by profitability. If an action isn't going to advance profitability it will not be pursued. One producer stated, "**The word sustainability as a producer I don't necessarily love**. Because to me, if you're sustaining, you're staying the same, what I wanna do is regenerate and improve. I want to leave this land in better shape when I found it for the next generation, for the 6th generation that wants to farm this farm." The whole picture of agriculture production had to be known to determine sustainability. But disputes on the landscape surrounding adaptive practices often involve university researchers. Universities are often seen as 'monouniversities' representing industry and the private sector and giving results that these funders desire to hear.

Primary Economic Activity interviews were replete with examples of decisions and drivers that underpin a market value system. Farms are getting bigger to compete on margins and this is having a detrimental effect on small rural communities.

KEY INSIGHTS

- Underscoring the conflict between drainage and wetlands is a host of agricultural adaptations to increasing drought and flood. Protecting soil health, preventing salinity, farm efficiency, reduction of greenhouse gases in having to pass over farmland multiple times, and weed control are some of the examples given.
- Drought was cited by some as the worst climate impact as it results in loss of all inputs and zero returns on agriculture, while flood doesn't impact all land and agricultural producers don't lose all their inputs.

- Large farms allow diversity of geography (distributing drought and flood hazards across a large geographical area), allow increased funds to innovate, invest in drainage, experiment, build infrastructure, and buy modern implements whereas small farms allow for household self sufficiency.
- Ultimately, cashflow is the determining driver of producers being able to adapt, ensure modern technology, and soil health.
- Drainage regulations have changed several times in the past decades and new regulations are still being formulated (again). One interviewee stated that "producers do what they want with drainage."
- Agriculture is no longer a livelihood; it's a business. Rewards for retaining wetlands pale in comparison to arguments for drainage. Payments for Best Management Practices are a 'rounding error' for large agricultural producers.
- Capital investments must have a payback of a very short term; one person stated a term of one year.