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Food Systems and Climate Change in the Canadian Maritimes

Climate Resilience on Maritime Farms Project

Climate change is a concern for the food system in the Canadian Maritimes. Coastal sea level rise, changing temperatures, and increasingly erratic weather impact the way food is produced, stored, distributed, and consumed. Current production techniques are responsible for a significant part of greenhouse gas emissions[i]. In this way, agriculture is both a cause of and at risk from climate change.

We asked 40 farmers, retailers, and other food system actors about the vulnerability of the food system in the Maritimes. Our research identifies key areas of intervention for governments and other institutions on the federal and provincial levels. Integrating local knowledge about small-scale producers' experiences will help inform meaningful action on climate change adaptation. **Current practices must change towards more sustainable and resilient production in order to safeguard the Maritime food system.**

Farmer Bryan Dyck checks on hoophouse anchors in the field. Hoophouses are flexible and mobile ways of extending the season, but they are vulnerable to high wind events and heavy snow load.

Photo: River Hébert, Nova Scotia, May 2016. Bernard Soubry.

Key messages

- **The Maritimes' food system is vulnerable to climate change.** Across provincial infrastructure and on farms, the food system is vulnerable to rapid as well as long-term changes in climate and economic forces. These vulnerabilities can impact food production, transport, storage, and consumption.
- **Farmers' observations match climate change projections for the region.** The literature on climate change in the region was corroborated by the farmers we interviewed. Farmers noted that, in the past years, precipitation events have become increasingly erratic; windiness has increased; and the growing season has slowly shifted later into the autumn.
- **Climate resilience is financial resilience.** Farmers are able to adapt their practices when they have the financial capacity to do so. This means supporting markets, business training, and practices that minimize risk and help build financial resilience.
- **Building adaptive capacity for the food system means recognizing small-scale farmers as actors in their own right.** Possible avenues for policymakers include creating spaces where food system actors can dialogue and exchange knowledge; making sure that legislation differentiates between the needs of small-scale farms and large-scale farms; and promoting marketing avenues which distribute risk and open new markets, through institutions like co-operatives.

Climate change and food in the maritimes: projections and observations

Local knowledge and observation corroborates with international and national projections.

IPCC SAYS	FARMERS SAY
Seasonal shifts towards longer autumns: models for the region forecast a shift in temperatures over the coming years which would potentially increase the growing season[ii].	Farmers observed that late frosts are getting later, shifting the growing season towards the fall. Cold and precipitation are causing issues with accessing land early in the season; maintaining farm infrastructure; and planning for market.
More erratic weather and precipitation: Climate modelling for the region suggests increased variability in precipitation over time. More erratic precipitation can lead to drought, waterlogging, and erosion, all of which may have negative consequences for crops[iii].	Farmers have observed significant changes in weather patterns in past years, including • *more wind events*, potentially causing damage to crops and to farm infrastructure. • *intense and erratic precipitation*.
Impacts on distribution channels and infrastructure may become common in the future, according to climate adaptation focused on the Maritimes[iv]. Significant pockets of the Maritime region run the risk of being cut off, or otherwise significantly impacted, by the effects of sea level rise and coastal erosion on roads and other protective infrastructure[iv].	Small-scale producers and larger distributors rely on a small number of main highways to distribute and sell their produce. Participants interviewed worried that if roads became inaccessible, food distribution would be severely impeded.

Table 1: Local knowledge matches some of the projections made by global modelling.

Farmer Shannon Jones waters early squash in the greenhouse. The use of greenhouses and hoophouses to extend the growing season allows farmers to start crops much earlier than they would in outdoor growing conditions.

Photo: River Hébert, Nova Scotia, May 2016. Bernard Soubry.

How are farmers reacting to and planning for climate change in the maritimes?

Small-scale farmers in the Maritimes are...

Resilient

On the farm, climate resilience techniques include an increased **diversification of crops** to distribute the risk of a crop failure. In interviews, farmers discussed the advantages of growing multiple varieties of one crop and selecting carefully for those varieties which produced best in their microclimate.

Farmers also spoke of **soil management** as one of the strongest ways of building on-farm resilience. By managing soil to promote water retention or drainage based on the needs of the farm, farmers lessen their dependence on organic or conventional fertilizers, mitigate the effects of heavy precipitation, and retain moisture during periods of drought.

Farmers discussed the idea of **financial resilience** in the face of climate change, by making their businesses less susceptible to changes in the market or in consumer preferences. Examples of financial resilience include **marketing co-operatives**, which are prominent in New Brunswick, and **community supported agriculture (CSA)** schemes. Marketing co-operatives are key to maintaining a share of the market for small farmers, as well as distributing financial risk between farms. CSAs stabilize cash flow by asking customers to pay for a season's worth of produce in advance and give farmers a better idea of demand, thereby lowering the risk of overproduction, and form strong social bonds with customers.

What do we mean by resilience?

Resilience refers to "the capacity of a system to tolerate disturbance without collapsing[v]", while still maintaining options to develop. Resilience theory understands that social and ecological systems cannot be understood in absence of each other[vi]".

Adaptive

Interviews revealed that small-scale farms fulfil several indicators of high adaptive capacity. Some examples include:

Production methods that are varied and experimental: Small-scale agriculture is adaptive and flexible by nature. Farmers in the Canadian Maritimes have been experimenting with season extension infrastructure, crop varieties, and market gardening techniques. They can exchange information and experiment results at gatherings.

A strong social network of formal and informal adaptive institutions: Farmers spoke to the closeness of the farming community in the Maritimes. Given that there are relatively few small farms in each region, it is possible for information to move very quickly between farms, and for advice and help to come quickly when it is needed.

Acceptance that the future will be volatile: Dealing with uncertainty is a basic reality of farming in the Maritimes. Maritime farmers spoke about ensuring that any investment they make will be able to adapt to changes, and to be resilient to shocks and surprises.

What do we mean by adaptive capacity?

Adaptive capacity is the capacity to make changes in behaviour which support adaptation objectives (like a healthy food system). This capacity is driven in part by socioeconomic status; effectiveness of governance institutions; and capacity to self-organize within the system[vii].

Vulnerable

In interviews, farmers identified several vulnerabilities to their businesses as food producers, as well as to the food system in general.

Farmers were concerned with **lack of adequate infrastructure** for transportation, storage, and distribution of food across the Maritimes. Key transportation routes are at risk of being affected by sea level rise and storms, which would in turn affect farmers' ability to go to market, or for distributors to bring produce to stores. They also mentioned a lack of distribution, processing, and storage infrastructure across regions, which leaves individual farms vulnerable to storms and makes processing meat a difficult and costly process.

Many small farmers **lack trust in governance institutions**. This lack of trust was traced back to a feeling that such institutions primarily existed to represent the interests of large-scale agriculture. Support which would otherwise be available to small farms is often rejected due to a dislike of bureaucracy or a lack of understanding with regards to opportunities.

What do we mean by vulnerability?

The Intergovernmental Panel on Climate Change defines vulnerability as "the degree to which geophysical, biological and socio-economic systems are susceptible to, and unable to cope with, adverse impacts of climate change"[viii]. It includes factors which may enhance or deter adaptive capacity.

Barriers to adaptation

Lack of provincial adaptation planning for the food system. There is currently no explicit, public provincial strategy for food systems adaptation to climate change in New Brunswick, Nova Scotia, or Prince Edward Island. Without proper consideration from government, food systems adaptation will be difficult to develop quickly and effectively. Lack of unified planning on the federal and provincial levels negatively impacts the adaptive capacity of actors across the food system by impeding financial support and knowledge exchange.

Weak support networks between farmers and governance institutions. Many small farmers across the Maritimes suggested that they had a difficult with funding and support organizations, especially provincial and federal departments. Farmers pointed out that they found it difficult to trust government officials due to a perceived skew of interest towards large-scale farms and markets.

Lack of communication across food system institutions. Market cooperatives, governments, non-governmental organizations, and individual farmers identified major problems with knowledge exchange and communication across provinces. The language differences between French- and English-speaking organizations were identified as one reason why information wasn't communicated effectively. Departments also lack the institutional capacity to exchange information with their analogues in other provinces. NGOs find it difficult to communicate across the multiple departments concerned with food systems—health, environment, and agriculture.

Farmer David Blanchard removes protective row cover from his sweetcorn. Photo: Pleasant River, Nova Scotia, July 2016: Bernard Soubry.

Recommendations for policy

Mainstream food systems adaptation in governance across the Maritime provinces. All three Maritime provinces need a coordinated task force to simplify communication between groups and across industries. Government departments and NGOs should must commit to cross-departmental, interdisciplinary commitment to food systems adaptation research.

A national food policy should recognize climate change as a threat to the food system, and include adaptation planning in its long-term goals. It should commit to working at all levels to facilitate knowledge exchange between food system actors.

Recognize small-scale farmers' financial needs as food system actors. Small farmers have different requirements than larger industrial farms. Changing financial support structures to differentiate between scales and bringing small farms into discussions with larger industry representatives and distributors is essential.

Provincial support for season extension is project-specific, and is due at a time when infrastructure is already being upgraded on farms. A number of farmers suggested changing the funding cycle so that funding applications are due in winter rather than springtime: this would allow farmers to plan ahead and start building projects before the production season took over work hours.

Promote and build on programmes which already bolster adaptive capacity. Many farmers pointed out that certain programmes work, but don't receive enough support. Marketing cooperatives build both climate resilience and financial resilience by distributing market risk across farms; the practice, however, is relatively unknown in Nova Scotia and Prince Edward Island.

Extension agents are useful links between farmers and government by providing financial advice, agronomic expertise, and horticultural research. Increasing funding for extension agencies would allow for a higher number of workers on the ground, facilitating knowledge exchange across the food system.

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