

**France's 'Double Performance' Agricultural Policy: Insights for Ontario?
Or 'Don't mention *agroecology* or *France*'**

by

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Glossary

AAFC – Agriculture and Agri-food Canada

ACTA – Association des Instituts Techniques Agricoles

CAP – Common Agricultural Policy

CETA – Canada-European Union Comprehensive Economic and Trade Agreement

ECCC – Environment and Climate Change Canada

EEIG – Economic and Ecological Interest Groups

EFP – Environmental Farm Plan

EU – European Union

GDP – Gross Domestic Product

GF2 – Growing Forward 2

GLASI – Great Lakes Agricultural Stewardship Initiative

INRA – Institut National de la Recherche Agronomique

MAAF – French Ministry of Agriculture, Agri-food, and Forestry

MLP – multi-level perspective

MNR – Ministry of Natural Resources

MOECC – Ministry of the Environment and Climate Change

OECD – Organization for Economic Co-operation and Development

OMAFRA – Ontario Ministry of Agriculture, Food, and Rural Affairs

OSCIA – Ontario Soil and Crop Improvement Association

TM- transition management

Foreword

While researching for an independent study with the World Wildlife Fund Canada, I came across the idea of an ‘agroecology plan’. My assignment was to examine field crop practices for large and medium scale farms in Canada, and policy approaches to drive large-scale shifts in farm management practices towards more diverse crop rotations. Lengthening crop rotations – diversifying the number of crops and the number of years between crops planted in a field – is a key practice for improving soil health and biodiversity, and reducing costly inputs. This aim of the research was to support the World Wildlife Fund, and other groups, in determining where to focus future work on agriculture and climate change.

During the research my advisor Rod MacRae suggested contacting a colleague in the UK who directs an organic agricultural research centre, for insights into work happening in that part of the world. I did, and luckily this person passed on some great resources. One of them was a recent report by the environmental protection departments in the UK examining if and how agriculture focused on ‘sustainable intensification’ could be use useful for farmers and the public good. The authors included France’s national efforts to apply a ‘double performance’ initiative to agriculture, to support higher environmental performance complementing economic performance. It focused on ‘agro-ecological’ farm management, emphasizing biodiversity and enhancing natural processes on the farm to achieve this. The French plan had developed a political process, laws, and a suite of tools to apply it. I was intrigued, as it provided a ‘container’ for environmental work being done related to agriculture. In Canada, and Ontario, there are pieces of agri-environmental work being done, but they are often not connected, lack long-term planning and commitment, and in need of better monitoring and evaluation (MacRae, 2011). Could these overseas efforts be improving protection of water, air, and biodiversity?

How did the French project come to be implemented? What are the processes and tools being used, and how are they being perceived? And could they be compared with work happening in Ontario in a way that offers insights for local challenges?

I chose to delve into these questions for my major research. I have focused on presenting information in a format that can be useful for policy-makers and advocates, while deepening my own understanding of the issues at hand. This report is a comparative policy study of agri-environmental policy and programs in France and Ontario. It supports the ‘agroecology’ theme of my Plan of Study, speaking most directly to the components of agricultural policy, and the science and practices of agroecology; it also supports the popular-education component in the examination of how a culture of environmental stewardship can be fostered by farmer-to-farmer networks, and my interest in mediating and negotiating agreements between groups. This MES submissions will be revised later to create a strategic, summarized policy memo, and submitted to decision-makers.

Introduction

After a few decades of environmental policies and programs for Ontario’s agricultural sector, one main voluntary program dominates, with a host of different partnerships, funding, and research initiatives. Environmental problems resulting from agricultural practices remain however, and some are worsening. The most recent Agriculture and Agri-Food Canada report on environmental indicators for agriculture in Ontario shows that soil organic carbon is declining, greenhouse gas emissions are high, wildlife habitat is decreasing, and a high percentage of farmland at risk for pesticide run-off (Clearwater et al, 2016). This indicates negative impacts on the health of farm agroecosystems, as well as communities and resources they affect. The challenges are complex, involving multiple actors and processes, and require significant changes

to address. Ontario agricultural producers face a variety of challenges that impact their farm management choices in relation to ecosystems on and off-farm. These include low incomes, lack of in-depth information on soil biology and application of best practices, and lack of support networks when trying new practices.

This is a particularly interesting moment to examine agricultural goals and policy. There are many overlaps between farmer interest in managing their operations in economically and ecologically sustainable ways, and the public interest in seeing farmers run successful businesses while stewarding our precious natural resources and the ecosystems that sustain us. The Ontario Ministry of Agriculture and Rural Affairs (OMAFRA) is in the process of developing a soil health strategy to support both farm operations and public goals to mitigate climate change. The development of a national food policy is also being led by the federal department of agriculture, and more citizens have rated “conservation/protection of resources” as a high priority (93%) than any other issue in a public survey (Meredith, 2016, p. 9). The time is ripe to explore work being done in other jurisdictions that offers insights into the challenges at hand, and ground-breaking work in France to support farm practices with ecological benefits offers one such example.

In 2013, France’s Ministry of Agriculture launched a national project targeting “double performance” for the sector: higher environmental performance for enhanced economic outcomes. The project is called ‘Produisons Autrement’ (producing differently), and the first 5-year phase has just been completed. The government uses agroecology as the framework to view the challenges at hand. They do not prescribe practices for producers, but focus on the ecosystem services and economic efficiencies that can be provided by understanding and enhancing natural processes. This project is led by a multi-stakeholder group, is focused on

short and long-term goals, and includes a variety of programs and supports. In this report, I have examined the approach in France to compare it with efforts in the province of Ontario.

As some of my research has reminded me, it is worth examining which scenarios will help us reach our goals. Are we working towards a healthy ag sector that also has the capacity and support to steward our ecosystems? Are we on track to reduce the degradation being caused by some agricultural practices, in some areas? Do we even have the information needed to answer this? This report is an effort to uncover perspectives and relevant research for Ontario. Below my methods are described, followed by an introduction to challenges and approaches in Ontario, and then the approaches taken by the French government. Some context for the policies in each area are highlighted in Table 1. I then compare policies and programs in France and Ontario using three types of analytical frames and discuss the results. This is followed by a conclusion and bibliography, and appendices complete the report.

Methods

Policy comparison has been considered “A fundamental tool of analysis”, bringing similarities and differences into focus (Collier, 1993, p. 015). My research methods to execute this comparison include document analysis and interviews to generate information and feedback.

The document analysis included academic articles, media, and reports by government and other organizations. Eight semi-structured interviews were completed with experts in the field. Please see Appendix 2 for a list of interviewees. These interviews helped to guide my research and to gather data on the experiences and opinions of those working in the field. Participants were chosen based on my previous research related to the topic, as well as from snowball sampling. The semi – structured interviews followed roughly the same questions (see Appendix 3). I adjusted the questions based on who I was interviewing for strategic reasons, and to follow

interesting side conversations. From the interviews, I identified main themes for application to the policy comparison.

To gain perspective on the context for agri-environmental efforts in both regions, I have begun with an introduction to recent agri-environmental efforts in France and Ontario. To deepen the context, I applied a modified Institutional-Ideological analysis used by Mark Winfield in his 2012 book on the history of environmental policy in Ontario (Green-Blue Province), in the format of a chart (Table 1). This was helpful to understand the past and present political, economic, and social factors that lead to France's application of their innovative policy; however, to comment on the policies in a way that considers current impacts as well as their capacity for system change, I have used three additional perspectives, or frames, to structure my comparison of agri-environmental policy in Ontario and France. Each of these frames shed light on the pros and cons of each type of policy in a unique way, improving the comparison. I even started to recognize the language used in the literature from some of the frames in the descriptions of the French policy efforts.

To begin, I used research on what motivates farmers in the Ontario region to adopt management practices leading to improved ecological performance. This research was highlighted by an interviewee as being key for Ontario policy-makers to understand, to craft an effective soil health strategy. As I did not have the time to perform many interviews with farmers, I mainly relied on research involving hundreds of farmers in Ontario. Important sources were surveys and interviews with almost 500 farmers in 5 Southern Ontario watersheds described in Lamba (2007), Lamba et al (2009), and Filson et al (2009). I chose the factors with the most impact from the literature that also coincided with major themes in my interviews, to structure policy comparisons.

I also used a multi-level perspective, which highlights where system change is often blocked, and suggests how to free up barriers for sectors like agriculture (Geels, 2004, 2011). This lens offered insights into the efficacy of policy tools in France and Ontario, which I include in my analysis of the policy comparisons.

Finally, I applied a transition management approach to public policy advocated by Voss et al (2009). Transition management is used to “influence the direction and speed of transitions by coordinating and enabling the processes that occur at different levels in a more systematic and evolutionary way” (Kemp and Loorbach, 2006, p 109). This frame has been used where transitions to more sustainable systems (such as agriculture) are desired. It offers key insights into the long-term, collaborative process undertaken by the French Project.

Agri-environmental policy in Ontario and France

There are many ways that ecosystems on farms (which include the organisms that live in the soil, plant populations, birds, spiders, insects and cycles of water and nutrients) are linked to the larger ecosystems that surround them. As Filson et al point out, “If the elements of the structure of the resilience of [a producer’s] agro-ecosystem are lost during their farming cycles, the resilience of farmers’ agro-ecosystem can be destroyed increasing the vulnerability of the environment” (2009, p. 231). There is a growing soil health movement in Ontario that recognizes this, and producers are keen to better understand the processes at work in their fields to benefit these ecosystems and reduce input costs (Ruth Knight, personal communication, July 5, 2017, Glen Monroe, personal communication, July 10, 2017, Interviewee 7, personal communication, July 20, 2017). For example, fertile soil holds carbon, which provides food and habitat for diverse soil organisms that supply plants with nutrients and water; this can reduce the amount of costly fertilizers and pesticides that need to be applied. Fields with good levels of soil

carbon (contained in organic matter) are helping to keep carbon out of the atmosphere while holding more water in the soil, protecting crops from the increasing effects of extreme weather due to climate disruption. Pesticides, fertilizers, and eroded soil, also find their ways into surface and groundwater.

Unfortunately, high soil carbon levels and the diverse crop rotations that sustain them are not business as usual on Ontario farms; Filson et al describe that “excessive dependence on inputs of energy... characterizes Ontario’s intensive agriculture” (2009, p. 231). French agriculture has also been responsible for water pollution, large amounts of greenhouse gas emissions, while farms are struggling to make ends meet. There are a variety of barriers to shifting practices which increase synergies between farm operations and natural processes, which public policies and programs can affect.

There are similarities and differences in the context that supports ecosystem-enhancing agricultural management practices in both Ontario and France. The first difference is that the French plan is national, while Ontario is a province of Canada. However, the national French approach applies to each region in France, just as most Ontario’s agricultural policy is determined by federal-provincial agricultural policy frameworks; there are opportunities to adapt policy goals and programs regionally in both cases. France and Canada are similar in that they are in the northern hemisphere, and blessed with large regions with fertile soil and favourable conditions for crops and animals. Both Canada and France are economically advantaged states, and join ranks in several international fora including: the Organization for Economic Cooperation and Development; G20 group of nations; the World Trade Organization; the Paris Agreement of the United Nations Framework Convention on Climate Change; and most recently the Canadian-European Union Comprehensive Economic and Trade Agreement. Both states also

have a similar level of people living in urban areas, approximately 80% (United Nations Statistics Division, 2017).

Other differences include the average size of farms: in France the average is smaller, at 145 acres, while in Ontario the average is 249 acres (European Commission, June 2017, OMAFRA, 2017). France has a larger population than Canada as well, almost double (United Nations Statistics Division, 2017). France's inclusion in the European Union also means that the French Ministry of Agriculture, Agrifood and Forestry is not just negotiating policies and programs with producer unions, government departments, agri-business and civil society organizations within France; the last round of negotiations included 28 nations, and funds for agriculture are largely determined by their Common Agricultural Policy. Public opinion in France also expects an important level of environmental stewardship by producers: in a 2013 poll, most citizens agreed that protecting the environment is the main responsibility attributed to farmers (46%) (European Commission, 2013, p 40). Although I could not find a similar poll in Ontario, my impression is that this is a much higher expectation than that on Ontario farmers.

Below, I have included a brief introduction to current agri-environmental policy in both regions. Table 1 gives some policy context using Winfield's approach to examine the context for environmental policy, applying the following 5 categories: Interests and Societal Factors; Institutional factors; material, physical, and economic factors; and normative factors (ideas about how things work).

Ontario

The Canadian and provincial governments work together on agricultural policy, through the current agreement: 'Growing Forward 2' (GF2) 2013-2018. Funding for programs in GF2 is shared, with roughly 60% supplied from federal sources, and 40% from the province. The

provinces have some flexibility for how funds and programs are applied in their regions; the national budget is roughly \$3 billion. Total GF2 investment by the provincial and federal governments in Ontario is approximately \$1.5 billion (Premier of Ontario, 2016). Most funds are spent on a suite of ‘business risk management’ insurance programs; these include a limited matching savings fund (AgriInvest), payments for difficult years (AgriStability), and production insurance (Eagle et al, 2016, Agriculture and Agri-food Canada, 2017). GF2 includes the environment as one of 6 priorities. Funds spent to date in Ontario on environmental priorities in this period of the program are approaching \$10 million), a reduction from the previous budget (interviewee 6, personal communication, July 19, 2017).

The Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) has used a variety of programs since the 1990’s, in combination with regulation, to encourage environmental stewardship by farmers. The Environmental Farm Plan (EFP) is the main tool of GF2 to encourage ecological stewardship. Officially implemented in Ontario in 1995, the EFP was led by a coalition of farm groups working with OMAFRA staff. The farm groups were motivated at the time by the threat that government would bring in more regulation to protect the environment (Morrison and FitzGibbon, 2014). This voluntary plan has had success in engaging many farm operators in educational workshops, farm-plan reviews, and adoption of best management practices. Morrison and FitzGibbon found that the EFP has engaged approximately 70% of farmers in the educational workshops (2014), although Lamba et al (2009) found that less than half of those have followed through to the peer-review process. This highlights a challenge with voluntary programs, where “the burden of the program falls on those who feel a greater sense of moral responsibility and not necessarily on those contributing to the environmental problems” (Weersink et al, 1998, p. 321). A 2003 study also found that EFP

participation in Ontario was lowest in areas where agricultural operations had the highest income and there was most ecological risk, although there has been speculation that these are areas where strong organizations exist (McCallum, 2003, World Wildlife Fund – Canada, 2004).

The Environmental Farm Plan also serves as a prerequisite for other government and non-governmental programs with specific environmental outcomes that offer funding. There is a patchwork of other provincial and regional programs, many administered by the Ontario Soil and Crop Improvement Association (OSCIA). The OSCIA administers cost-shared and educational programs by the Ontario Ministry of the Environment and Climate Change and Ministry of Natural Resources and Forestry that benefit wildlife, as well as water-protection programs for Lake Simcoe (LH-SHIP), and the Great Lakes Agricultural Stewardship Initiative (GLASI). Some Conservation Authorities and not-for-profit organizations also offer advice, funds, networking, and research.

Despite these efforts, indicators and anecdotal evidence show that serious environmental challenges related to agriculture remain for soil health, biodiversity, climate change, and water quality, and unfortunately some are increasing. One alarming indicator is that soil organic carbon in 82% of Ontario cropland is estimated to be decreasing; soil fertility is declining, and more greenhouse gases are being emitted (OMAFRA, 2016b). This is related to Ontario having the highest proportion of land in the ‘very low’ soil cover class (fewer than 250 days per year), even though the practice of summer fallow – historically the worst practice for bare soil - is decreasing (Clearwater et al, 2016). Water pollution came up in interviews and documents as well; despite long-time knowledge of problems due to erosion, run-off of nitrogen and phosphorus, and pesticides, there are many indications that application rates of inputs are rising and there are still many water quality challenges (B. Van Dieten, personal communication, July

5, 2017, Clearwater et al, 2016). The agri-environmental indicator report by the federal government also found a decline in wildlife habitat capacity on a substantial proportion of land due in large part to a shift from pasture and hayland to annual crops (a response to market prices) (AAFC, 2016, p. 72). These results all suggest that the environmental programs being offered are insufficient to generate significant environmental improvements.

Unfortunately, there are no public indications that OMAFRA has a list of goals related to the environment. In a conversation with a senior staff member at OMAFRA I was given a list of environmental programs, but my mention of the word ‘agroecology’ elicited skepticism and a comment that the Ministry does not ‘give preference’ to certain production styles. The Ministry does not even provide support for organic production, which is legally regulated, so my mention of an approach like agroecology was dismissed because it did not have clear definition that could be marketed. What was implicit was that business as usual is sustaining current conventional practices.

A key driver of agri-environmental policy and programs is currently the Premier of Ontario. The Premier’s mandate letter to the Minister of Agriculture, Food, and Rural Affairs includes greenhouse gas reduction goals as well as other environmental efforts: developing the Agricultural Soil Health and Conservation Strategy (a piece of Ontario’s Climate Change Action Plan efforts); finalizing the Pollinator Health Action Plan; and supporting Ministry of Environment and Climate Change on Great Lakes water quality work (Premier of Ontario, 2016).

France

As part of the European Union, France’s agricultural policy is largely funded by the priorities of the Common Agricultural Policy (CAP). The early aims of the CAP, after WWII,

were to ensure a steady supply of affordable food to the population while providing support to producers. In the 1990's, support moved "from products support (through prices) to producer support (through income support, direct payments)" (European Commission, 2017c). In 2003 support became fully detached from production, where producers received a single payment in return for compliance with food safety, environmental, and animal health and welfare standards. France was a main player in the 2013 reforms, for the 2014-2020 cycle of funding; these included 'greening' requirements for direct payments, more equality in payments received across states and reductions for the biggest farms, and targeting of supports towards young farmers, those in low income sectors, and those in areas with natural challenges (European Council, 2017). Most funds are now spent on direct payments to farmers (70%), followed by rural development programs (23.5%), and then market measures (5.9%) (European Commission, 2017). Since almost 40% of the European Union's funds go towards the CAP, it makes sense to most French citizens that the objectives are broad (European Commission, 2017d). A 'multifunctional' view of agriculture is held by France, and a majority of the French public, that asks agriculture to provide a variety of services including environmental stewardship and rural livelihoods (European Commission, 2016)

France's regions also have their environmental challenges. The most recent State of the Environment Report for France found that from 1990 to 2012 water pollution from agriculture had not fallen (European Environment Agency, 2016); in 2013 just half of the surface water and 67% of the groundwater met the quality standards set for major pollutants (French Government, July 2016). Nitrate levels in rivers had remained stable and were increasing in groundwater. Soil erosion was also affecting water quality and degrading soils. France has also highlighted that agriculture needs to play a role in meeting their GHG emission reduction targets and

mitigating climate change (MAAF, 2017). The international 4 per 1000 campaign initiated by France points out that an annual increase in soil carbon stocks of 0.4% globally would stop the current increase in atmospheric carbon. France invited regional and global stakeholders at the Paris Conference of the Parties 21 meetings in 2015, to consider this and join in committing to supporting agricultural practices that build soil carbon (MAAF, 2017).

In 2013, the French Ministry of Agriculture, Agrifood and Forestry (MAAF) launched ‘Produisons Autrement’ (producing differently), a wide-ranging plan with a focus on supporting a majority of farmers (200,000) to engage in ‘double performance’ by 2025 (Crosskey, 2016). The stated goal is to achieve high ecological performance to support and complement strong economic outcomes. Produisons Autrement, which I will call ‘the Project’ in this report, has been a large undertaking. It has been described as a “meta-instrument” which offers incentives and regulatory tools to empower farmers (Jolly, 2016, p. 87). The MAAF is the coordinator, mobilizing the partners and ensuring execution. Stephane Le Foll, the Minister from 2013-2017 championed new regulation called ‘The Law of the Future for Agriculture, Agrifood, and Forestry’ to promote and sustain production systems combining economic, environmental, and social performance for better environmental, social, and public health protection (MAAF, 2017).

The definition of ‘double performance’ on the Ministry’s website is: "designing production systems that rely on the functionality offered by ecosystems. It favours the autonomy of farms and improves competitiveness while reducing environmental pressures and conserving natural resources. Input needs are reduced including consumption of energy, water, fertilizers, plant protection products, and veterinary drugs, especially antibiotics. The aim is to make maximum use of nature for production by maintaining its resilience. It also contributes to mitigation and adaptation to climate change” (MAAF, 2015, p 6, translation by author). In June

2014, an official plan of action developed by a diverse steering committee was endorsed. The plan was structured around 10 themes and 10 specific action plans. Annual reports since 2014 have tracked the goals, processes, and indicators of the Project and these plans. Please see Appendix 1 for an outline of the project's structure.

The 10 **themes** that guide the project and organize the annual reports:

- A. Mobilizing the actors
- B. Communicating and raising awareness about the project
- C. Teaching to produce differently
- D. Accompanying the producers
- E. Supporting agroecological goals
- F. Supporting research and innovation
- G. Engaging the sectors
- H. Considering the realities of overseas territories
- I. Promoting agroecology internationally
- J. Monitoring and evaluating the project

10 specific **action plans** have their own goals, governance groups, funding, and indicators. They are:

1. *Organic Ambition*: 20% share of public procurement market, 10% of land in organic production by 2021
2. *Ecoantibiotics*: reducing livestock antibiotic use by 25% over 5 years and other measures to fight antibiotic resistance
3. *Ecophyto II*: halving pesticide use by 2025, engaging 30,000 operations in reduction plans
4. *Methane for Energy and Nitrogen Self-reliance*: using methane for energy, supporting better nitrogen management and reducing need for it
5. *Vegetable Protein*: producing more vegetable proteins domestically
6. *Sustainable Seeds*: breeding seeds for better environmental and economic performance
7. *Agroforestry*: supporting more research, policy, business planning, training and funds
8. *Development of Sustainable Beekeeping*: research, hygiene, training, organization of producers
9. *Teaching to Produce Differently*: updating diplomas/curriculum, training ministry staff, supporting regional governance, mobilizing farm operators and workshops (added in 2014)
10. *Animal Wellbeing*: includes 20 priority actions for better animal and operation health

France is applying funds for the current Common Agricultural Policy cycle to their Project goals. CAP is divided into 2 'pillars', and supports are co-funded with the host country.

Pillar 1 encompasses market and farmer income support and pillar 2 is broader ‘Rural Development’ funding that can be modified per state needs. The newer CAP legislation, also helps EU states comply with World Trade Organization limits for direct supports to producers by moving some of them into the ‘green box’ for environmentally-related agriculture projects. The EU-wide ‘Greening’ of the basic payment pillar 1 funds for each state towards efforts benefitting the environment and climate. Farmers receiving area-based payments have to follow “straightforward, non-contractual practices” including diversifying crops, maintaining permanent grassland, and setting aside up to 5% of lands in locally-determined ‘ecological focus areas’ for “ecologically beneficial elements” (European Commission, 2017a).

Policy context in France and Ontario

Table 1 examines the context for agri-environmental policy in each region, assessing a variety of factors. This exercise allowed me to further identify differences and similarities between France and Canada and Ontario, which I applied to the three additional frames used in this report. For example, the statistics illuminated the amounts of financial resources available for supporting producers, and the players at the table in determining agri-environmental policy. As observed by Eric Monpetit (2000), a key factor in French policy is that the government can use European Union negotiations as excuses for policy decisions that might be opposed by major farmer organizations. EU standards for environmental protection then become the starting point for stewardship in member countries. The importance of using a multi-level perspective was also highlighted, for example in the role of public opinion in France in supporting higher amounts of aid and higher environmental expectations for producers.

This information was also crucial for preparing to compose a strategic policy memo for a decision-maker audience. This allowed me to guess at the resources available in Ontario,

political will, and historically loaded topics. For example, multi-functionality is widely accepted in France, and even included in law; Canada (and the United States) rejected making agriculture a ‘multifunctional’ sector during World Trade Organization negotiations, and it is not a commonly held view (Skogstad 2012). Appendix 4 summarizes further preparation for developing the memo, using a negotiation preparation template.

Table 1. Modified Institutional-Ideological Analysis

	France	Ontario
Interests and societal factors	<ol style="list-style-type: none"> 1. Traditional, high-quality food an important part of French culture. 2. Majority of French citizens in 2013 poll see protecting the environment as main responsibility of farmers aside from providing high quality food; majority of French citizens would like to see an increase in financial aid to farmers to stabilize income and strengthen their role in the food chain (European Commission, 2014) 3. Public concerns about BSE (food safety), pesticides in water 4. Powerful farming lobby, farmers and their friends and families come out to vote 	<ol style="list-style-type: none"> 1. Farm landscapes and produce contribute to southern Ontario identity 2. “Environment always seems to make the short-list of citizen interests” (Interviewee 6). ‘Promoting conservation/protection of resources’ has highest public approval ratings (93%) of all elements for Canada’s National Food Policy (Meredith, 2016). Public more interested today in how farm operations are caring for land and animals than 10 years ago (Interviewee 7). 3. Organizations/citizens working to protect Great Lakes from agricultural phosphorous runoff (causes algae). Walkerton tragedy affected water-related policy. 4. Farm groups have power in rural voting areas
Institutional factors (policy, political parties and their level of power etc.)	<ol style="list-style-type: none"> 1. French Ministry of Environment and environmental groups involved in steering committee and evaluation of Produisons Autrement 2. Hosts of COP 21’s Paris Agreement, commitment to reducing greenhouse gas emissions by 40% below 1990 levels by 2030 (EU-wide target). Agriculture a focus. 3. Common Agricultural Policy: France (and French farmers) need to negotiate subsidy rates and requirements with EU members 	<ol style="list-style-type: none"> 1. Ontario's Environmental Protection Act does not include "normal" farming practices. OMAFRA works with MOECC on some environmental data measuring work 2. Paris Agreement commitments include reducing greenhouse gas emission by 30% below 2005 levels by 2030. OMAFRA implicated in Ontario’s Climate Change Action Plan 3. OMAFRA negotiates policy with producers and federal government. Farm groups worked

	<p>4. France’s ‘Grenelle’ policies and the National Ecological Transition Strategy for Sustainable Development commit to reducing pesticide use, protecting water, boosting organic practices. Minister Stephane Le Foll’s personal leadership of the Project and new laws</p> <p>5. More state control, hierarchical. History of activist policies, projects (Monpetit, 2000)</p> <p>6. EU has more prescriptive legislation with performance requirements. Socialist Party held majority government 2012-2017.</p>	<p>together, with government, to create EFP to avoid more regulation</p> <p>4. Agriculture included in Environmental Registry. Environmental Commissioner of Ontario recently examined soil health strategy discussion paper</p> <p>5. Policy choices in Ontario tend to be more self-regulatory (Winfield, 2012)</p> <p>6. Legislature and cabinet provide broad oversight, civil servants often fill in details. Provincial and federal majority Liberal governments currently.</p>
Material, physical, economic factors	<p>1. Agriculture as % of GDP: 1.7% (United Nations Statistics Division, 2017)</p> <p>2. Agriculture represents 2.8% of national jobs. Forty % of agricultural workforce set to retire by 2020 (European Commission, June 2017, Crosskey 2016); however most young farmers in EU</p> <p>3. Policy network: Part of EU, OECD, G20, WTO, CETA, Paris Agreement (UNFCCC)</p> <p>4. Average farm size: 145 acres (Agreste 2017)</p> <p>5. Average farm income (gross receipts) from state supports in the EU: 21% (OECD, 2016)</p> <p>6. Climate change affects agriculture – more extreme weather, precipitation events</p>	<p>1. Agriculture as % of GDP: 1.7% Canada, 0.8%ON (United Nations Statistics Division, 2017a)</p> <p>2. Agriculture represents 2.1% of jobs in Canada, 1.4% in Ontario. Average age of Ontario farmers: 55, rising (Statistics Canada, 2017, 2017a)</p> <p>3. Policy network: Part of NAFTA, OECD, G20, WTO, CETA, Paris Agreement (UNFCCC)</p> <p>4. Average farm size: 249 acres (OMAFRA, 2017)</p> <p>5. Average farm income (gross receipts) from state supports in Canada: 10.7% (OECD, 2016)</p> <p>6. Climate change affects agriculture – more extreme weather, precipitation events</p>
Ideas about how things work	<p>1. Interventionist state. More integration of systems and departments, hierarchical (Monpetit, 2000).</p> <p>2. Multifunctional agriculture widely accepted</p>	<p>1. Ontario government being managerial/facilitative, pursuing neo-liberal policies (Monpetit, 1999).</p> <p>2. Dominant ideas about agriculture: Productivist (maximum yield) and pollution control</p>

Comparing policies and programs

To examine the work being done in France and Ontario, I have used the three frames introduced in the Methods section: motivations for stewardship behaviour, multi-level perspective, and transition management.

The first lens applied to the policies and programs is factors that may motivate farmers to increase management practices that enhance ecosystems on the farm and surrounding area. Each of the key factors I have focused on are used to organize a table comparing French and Ontario policies that are related. A discussion follows each section.

The second and third perspectives are from research on creating pathways for system change. They have both been applied to agri-food systems, and are highlighted by MacRae and Winfield (2016) in an article on frames for food system change. **Multi-level perspective theory (MLP)** points out that complex environmental challenges like those related to climate change, loss of biodiversity, and water quality require systemic change. Creating change in the agricultural system is then a “complex and long-term processes, comprising multiple actors” (Geels, 2011). Introduced in 2004 by Frank Geels, a professor at the University of Manchester who focuses on innovation and sustainability, MLP highlights the social and technological systems that influence the way things are (and the ways they could be). These include technology, policy, markets, consumer practices, infrastructure, cultural meaning and scientific knowledge. The systems are either upheld or challenged by actors such as businesses, industry, policy-makers, consumers, civil society organizations, researchers etc. (Geels, 2011, p.24).

There are three levels that the systems operate on. The first level includes ‘Socio-technical niches’, innovators that form networks at a local scale; this relates to producers, researchers, and networks supporting innovative management practices. Level two includes

‘socio-technological regimes’, networks of social infrastructures, regulations, markets, and established technical knowledge; this relates to agri-businesses, policy, and government culture. The third is the ‘socio-technical landscape’ including resource prices, lifestyles, and political, cultural and economic structures (MacRae and Winfield, 2016). This relates to relationships with consumers and public opinion. Are the agriculture programs and policies acknowledging and affecting these three levels? I briefly discuss this.

The third frame looks at recommendations for **Transition Management** for policy-makers. The French government is explicitly working towards a transition: engaging the majority of French farmers in the Project, improving environmental performance alongside economic performance. OMAFRA and their partners speak of working on improving water quality, reducing greenhouse gas emissions, reversing the decline of agricultural soils, and reducing negative impacts on biodiversity. These are multi-dimensional challenges requiring more than a few best management practices. As the Environmental Commissioner of Ontario stated, “The climate change potential in healthy soils is enormous, but if the soil health movement is to fully take hold in a timely manner in Ontario, government must play a substantive and proactive role” (2016, p 38). For the government to have an effective role, transition management states that having a ‘reflexive’ governance approach is essential. ‘Reflexive’-ness in this context means continually experimenting and applying learning to planning and evaluation processes. Over time, the process and policies can be tweaked and improved, based on what is working or not working. Jan-Peter Voss, who works on innovation for governance and is based at the Technische Universität Berlin, identified 4 key components of policy design for reflexive governance. I compare these with French approach for further insight into the development and execution of their Project.

Behaviour change and multi-level perspective

There are many pressures producers face when deciding how to manage their farms. Many studies have examined how producers make operational decisions, and how they consider the environment when doing so. Examining research on this topic – with a focus on Ontario farmers - gave me insight in to the barriers preventing uptake of practices that would enhance ecosystem services in farm fields and have beneficial impacts for local ecosystems. From the fundamental issues highlighted in the literature and interviews, I have chosen six key factors that support behaviour change: creating a culture of stewardship; financial support; improved knowledge; research policy; and monitoring and evaluation. I have used these factors as headings, and listed the related policies and programs applied in France and Ontario in a summarized chart. Each chart is preceded by a very brief summary of the research on that factor, and followed by a discussion of the work being done in each region to animate the comparison. Comments according to the multi-level perspective frame as also included.

Creating a Culture of Stewardship

Creating a culture that values stewardship of the environment was highlighted in some interviews and literature as the most important motivator for stewardship behaviour. One interviewee stated that farmer-to-farmer networks and workshops are crucial to supporting more farmers in Ontario to access the knowledge and peer support needed to shift practices. Pressure from neighbouring farmers, community members, and friends can also be a barrier to moving away from what has ‘always’ been done. Interviewee Glenn Monroe pointed out: “It can be hard to sit around with a group of friends or neighbours and be different – shared values, outlooks, etc. are big factors [in openness to new practices]” (personal communication, July 10, 2017). The most recent annual census also found that producers rely on their own experience and advice

from peers (68%) over other sources when decided whether to adopt or innovate (AAFC, 2016); this is also related to the decreasing number of other sources of trusted information.

Culture and values can directly influence practices more than economic concerns. A 2012 study with farmers in Indiana found, “The difference in attitude toward the environment seems to be a key distinction between farmers who implement a few practices when they are financially beneficial and those who are willing to take the extra step (and cost) to implement practices to protect environmental quality” (Reimer et al, p 34). The study found that attitudes can motivate a producer to overcome barriers along the path such as seeking out supports (Reimer et al, 2012).

Table A. Policy supporting a culture of stewardship

France	Ontario
<p>Rural Development (pillar 2) funds focused on farmer network and knowledge-sharing projects. These include Economic and Environmental Interest Groups (EEIG’s), where producers work together and in combination with other professionals. These are given public recognition and preference for EU/state/regional aid</p> <p>Events focusing on farmer innovations: ‘Night of Agriculture’ awards and celebration, highlighting ‘pioneers’</p> <p>Educating consumers about production methods and the efforts of farmers</p> <p>Training for agricultural ministry staff on the definition of agroecology and the French project</p>	<p>Some grant funds received by regional projects to bring farmers together to discuss and research innovative practices (i.e. Innovative Farmers Association of Ontario, Ontario Soil Network leadership course)</p> <p>GF2 includes Environmental Farm Plan. High level of participation (in early stages)</p> <p>Projects like the Great Lakes Stewardship Initiative, Lake Simcoe Soil Health Improvement Project and wildlife-enhancing programs in partnership with other departments promote stewardship in specific regions for specific practices</p>

Creating networks where farmers can meet others who are like-minded, or at least open to new practices, creates spaces for innovation. These are the ‘level 1’ niches that Geels states lead eventually to more widely-accepted practices. It was pointed out in an interview that

farmer-to-farmer networks need organizational support (administration, support staff, reliable funds) to be sustained. Studies on innovation have shown that it is often linked to collective action and sharing of knowledge, especially where these are supported by incentives and resources, and enabling environments are created (Angeon and Chave, 2014). Multiple studies have also shown that facilitated networks help farmers to increase their commitment to adopting and maintaining new practices over the long-term (Dobbs & Petty, 2001, Just & Heinz, 2000, Wynn & Skerratt, 2000). A recent study in Belgium showed the same results, for both farmers with low and high concern for biodiversity depletion; they emphasized the importance of the role of network bridging organizations that support cooperation and social learning (co-creation of knowledge) (Dedeurwaerdere et al, 2015). OMAFRA is supporting some of this work through funds granted to efforts listed in the chart above, which is largely being done by groups outside of government. Organizing and supporting networks of producers requires funds and human resources, and Ontario could be doing more to support network-bridging organization in these efforts.

Agricultural advisor Ruth Knight pointed out that the piecemeal best-management practice approach of the Environmental Farm Plan does assist farmers who will not likely be interested in doing whole-farm planning. For these producers, the Environmental Farm Plan process helps evaluate risk factors in a way that can lead to improving the farm ecosystem. This works well for some farmers, and helps with eligibility for funding. The origins of the EFP, as a

farm groups initiative, and its widespread use have also helped to ‘normalize’ the practices and information it includes (Interviewee 6, personal communication, July 19, 2017). However, it is a voluntary program, and there is evidence that the largest polluters are not participating (McCallum, 2003).

The main thrust of France’s Project *is* to change the culture. A senior director at the French MAAF has stated that what is being sought is “a changing social gaze, and for that you have to use all the tools at once” (Jolly, 2016, p. 86). The Project’s main collaborative tool is ‘Economic and Environmental Interest Groups’ (EEIG’s), groups of farmers working together and with complimentary professionals to experiment with innovating practices or fine-tune them for their operations. As of December 2016, there were 334 groups recognized (MAAF, 2016, p. 14). Efforts to build a culture of stewardship have also included training for Ministry staff and staff of local public teaching establishments (p 10, MAAF, 2016), effecting what Geels would call ‘the regime’ (level 2). The study in Belgium that examined the effects of network-bridging organizations on farmer’s commitment to agri-environmental practices was motivated by the authors concern about the ability of the CAP payments to affect long-term changes. The authors noted that current CAP funding includes support for these organizations through various reforms and changes to the Rural Development pillar, which they see providing opportunities to enhance the effectiveness of payments (Dedeurwaerdere et al, 2015). France’s GIEE’s are taking advantage of these funds.

France's project also includes the third 'landscape' level in efforts to accelerate a culture that embraces the efforts that farmers are making through raising public awareness of their work and the positive effects of different practices. There have been suggestions that France could improve on public support for the Project by increasing communications, and making more explicit links to public health and nutrition (Claveirole, 2016).

Financial Support

The financial challenges of running a farm business in southern Ontario came up often in the literature and interviews. The research interviews with farmers in the 5 Ontario watersheds found that off-farm work was a significant source of income for *over half* (55%) of landowners (Filson et al, 2009). Lamba found that 27% of farmers stated their *gross farm sales* were less than \$10,000 (2008, p. 69). In addition to the stress that this situation must cause producers, their families, and communities, it also affects farm management decisions. A quote from Ahnstrom et al captures this situation: "Being a farmer is not simply a profession but a way of life and thus money is not all that matters: quality of life and independence are important. However, the fact that a larger and larger proportion of farm families earn their main income outside the farm might be the beginning of a disconnection of the tight bonds between the farmer and the land. An example is that working off the farm and doing farming in spare time will lead to a great need to be fast, and a higher risk of doing the management actions when there is time, rather than doing specific operations when it is optimal to perform the actions." (2009, p 42).

Filson et al found an association between landowners in Southern Ontario watersheds practicing good environmental management (high rate of adoption of best management practices) with larger farm size (2009). There was additionally a trend for farm operations with higher incomes to be practicing more best management practices. This is likely due to the risk

inherent in trying a new practice, which includes resources such as time and funds for investment and trial and error. Building up soil health (organic matter, carbon) also takes years, resulting in delayed benefits. Subsidies, cost-share programs, payments for ecosystem services, and rewards from differentiating products in the market can support producers in adopting more environmentally efficient practices. McCallum also points out that incentives are useful when the off-site benefits of farm practices are equal to or outweigh on-site benefits (2003).

Table B. Financial support policy

France	Ontario
<p>EU CAP Policy (2014-2020):</p> <ul style="list-style-type: none"> ➤ Pillar 1: 30% of direct payments go to producers using practices defined as beneficial for climate and environment -approximately 7 billion euros per year (European Commission, June 2017). France will subsidize practices per hectare according to the practice and area ➤ Pillar 2: Rural Development funds include higher payments for larger, voluntary environmental practices. Budget of approximately 2.4 billion euros (European Commission, June 2017) <p>Funding included with each of the 10 action plans (i.e. \$13M euros for Sustainable Beekeeping)</p>	<p>GF2 includes EFP and funding for BMP's (cost-share, 35% paid by government for physical improvements, 50% for plans/assessments/training).</p> <p>Programs below also require an EFP completed within in the past 5 years:</p> <ul style="list-style-type: none"> ➤ Great Lakes Agricultural Stewardship Initiative (\$14 million): Farmland Health Checkups, cost-sharing to modify manure and biosolids application equipment, dust deflectors ➤ Lake Simcoe Soil Health Improvement Project, funded by OMAFRA ➤ Species at Risk Programs on Agricultural Lands funded by ECCC ➤ Species at Risk Farm Incentive Program, funded by MNRF and ECCC. Cost-share 50-65% for projects, up to \$20,000 per farm in 2016
Organic	
<p>Prioritizing CAP funding for organic growers:</p> <ul style="list-style-type: none"> ➤ Pillar 1: organic farms eligible for green direct payment without fulfilling obligations non-organic farms must engage in ➤ Pillar 2: Support for organic conversion and maintenance of organic production through the Agri-Environment-Climate Measures. France matching funds to contribute €180 million/year– available for period of conversion or up to 7 years 	<p>Crop insurance: Agricorp offers insurance plans for crops such as soybeans, corn, winter spelt, winter wheat, fresh market carrots and fresh market cabbage (not all categories visible on website or advertised widely)</p> <p>An OMAFRA branch offers export strategies for general 'natural food products' file</p> <p>Foodland Ontario (OMAFRA's buy local program) has marketing strategy for organic products</p>

<p>Support for conversion of conventional aquaculture production methods into organic aquaculture through the European Maritime and Fisheries Fund (EMFF)</p> <p>Commitment of €4m for Organic market development</p>	<p>including voluntary use of the Foodland Ontario Organic logo (branding not regulated).</p> <p>Some online fact sheets and links on organic production</p>
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In 2011 Canada and European Union countries provided similar financial supports for their farmers, which differed by just 3 percentage points; however, that has changed. In 2016, EU producers received on average 21% of their gross farm receipts from government policies supporting agriculture (OECD, 2016). Canadian producers received 10.7%, substantially lower than the OECD average of 18.8%. The French Project applies these funds in more ways that recognize environmental performance. Thirty percent of CAP direct payment funds go to farmers enacting certain practices that benefit the environment and climate change, equalling roughly 7 billion euros (European Commission, June 2017). For young farmers, an aid supplement of 25% of the national average direct payment is paid per hectare for the first 5 years (for the first 34 hectares). This relates to putting hope in new farmers to help reach their targets by 2025. Filson et al also found that younger farmers are more likely to apply more best management practices (2009). Like Ontario, over half of French farmers are likely to retire by 2025, making way for a new generation; journalist Peter Crosskey suggests that if curriculum, subsidies, and culture are aligned with higher environmental performance, new farmers will be more likely to take up this cultural shift and contribute to the Project (2016).

In a 2016 article, Eagle et al noted that “Canadian government expenditures on environmental initiatives in agriculture, as a share of farm income, are more than 10 times smaller than those in the United States and the EU” (p. 13). They suggest these amounts could be boosted *without increased spending* if funds for stabilizing farm income were linked to

environmental performance. Since 2012, 75% of the \$3 billion spent through Growing Forward 2 has gone towards “business risk management” (Eagle et al). Approximately \$10 million has been spent to date on GF2’s environmental priorities in Ontario; this is much less than 30% of Ontario’s share of risk management funds, if compared with France’s budget for environmental direct payments (Interviewee 6, personal communication, July 19, 2017). European Commission surveys show that there is widespread support from the French public for funds to support farmers to be stewards of the environment (2013); however, Eagle et al (2016) also cite research that shows there is popular support for more environmental programming and initiatives connecting support payments to environmental goals.

French and Ontario actors have pointed out the importance of finding the right amounts of funding to provide for practices, tools that work in combination with funds, and the benefits of cost-sharing with producers (Jolly 2015, p. 86). The staff from the Maitland Valley Conservation Area that I interviewed emphasized that producers need “to have some skin in the game” for payments for practices (Ben van Dieten, personal communication, July 6, 2017). They recently reduced payments in one of their programs subsidizing planting of new and larger areas of cover crops, so that they offered some risk management, but did not provide revenue; they found that if funds are too high, they can encourage a temporary switch until funds end.

France is also emphasizing the role of organic production in reaching the Project’s environmental objectives. Certified organic production offers a set of regulated practices with explicit environmental considerations; it also contributes to France’s pesticide reduction goals. Organic farming can also be considered an innovative niche according to the multi-level perspective, pioneering practices that reduce inputs. The 2012-2017 program set ambitious targets and developed a multi-dimensional plan to move towards them. In that time, there has

been a 30% increase in organic operations (up to 32,000 from 24,500) and a 50% increase in land in organic production (1 million to 1.5 million hectares). A recent article stated that there was also a 7% growth in the organic market (worth \$7 billion euros) in 2016 over the previous year (Barbieri, 2017). The French MAAF just announced that in 2018 it will be focusing funds on supporting conversion, rather than the current practice of also subsidizing practices. The EU also publishes a guide for organic producers, highlighting all the ways that they can take advantage of funding and develop programs for support (European Union, 2014). Current Minister Stephane Travert stated that rising consumer support for organic is now bolstering the market for organic products, reducing the need for the state to support farmers who have already transitioned (Barbieri, 2017).

Ontario has the largest market for organic foods in Canada (Katawazi, 2017). The 2011 Census of Agriculture found that there were 774 farms with certified organic and/or transitional production in Ontario, representing 1.5% of all farms (Statistics Canada, 2016). Growing Forward 2 offers no dedicated funding for organic conversion in Ontario, but organic producers can still apply for funding along with all other Ontario producers. This is surprising, especially given the research on the benefits of organic practices for climate change and soil health. Research in 2017 in the United States on the soils of almost 1500 conventional and organic farms showed that organically-managed soil held the highest amounts of soil organic matter, and the most stable forms of carbon (Ghabbour et al., 2017). Like the approach in France, Ontario's neighbour Quebec recently applied GF2 funding to support farmers transitioning to organic. Quebec is seeing a response: in the first year of their program approximately 100 people signed on, and over 300 signed on in the second year (Interviewee 8, personal communication, July 2017).

Improved Knowledge: Training and Advisory Services

Advisors can help build the business case for best management practices, and assist producers in charting pathways to improved environmental performance. As noted above, producers are very busy and need reliable information and advice supported by research that is applicable to their regions and operations. A 2003 report for the Christian Farmers Federation of Ontario found that limited access to advisors was a barrier for participation in agri-environmental programs in Ontario (McCallum). OMAFRA’s recent discussion paper for a soil health strategy noted that over the past couple of decades the number of public sector specialists in soil science, as well as soil management advisors has decreased, and that anecdotal evidence also suggests a decline in the capacity of agribusiness and the consulting sector (2016, p. 32-33). As for training related to soil health, the foundation of a healthy farm business, the paper noted that “in Ontario over the past 25 years, a gradual diminishing has occurred in our soils education and training capacity as well as public sector expertise in soil science.” (2016b, p. 34).

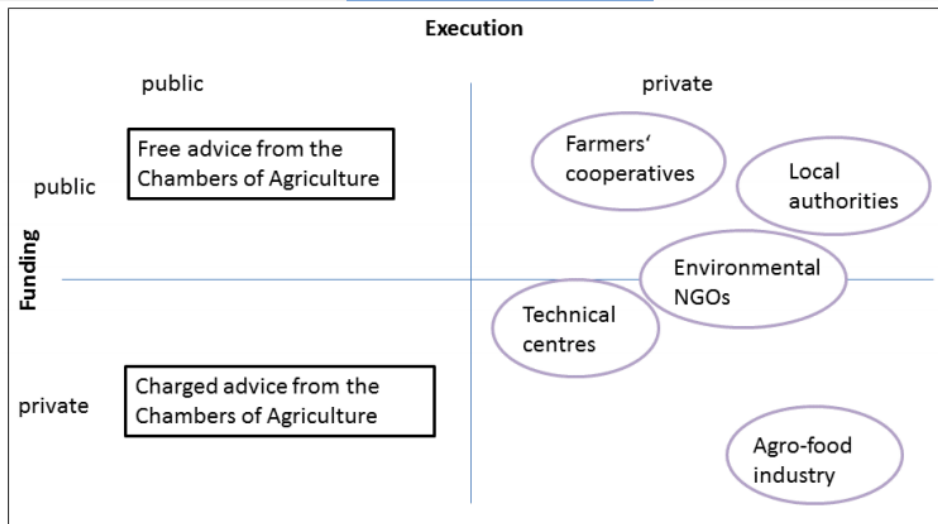
Table C. Knowledge improvement policy

France	Ontario
Training	
<p>Review of institutional curricula</p> <p>200 new researchers and tutors to teach practices that align with Project goals</p> <p>Teaching institutes (Lycees) officially support transition through events, trainings, official plans. Agro-ecology in agricultural diploma and certificate programs offered by the Ministry of Agriculture</p> <p>Conferences, internal government training events, online introductory training, website materials</p>	<p>EFP 2-day training and workbook</p> <p>Online BMP resources</p> <p>Updated 4H (youth) soil education program ‘Loyal to the Soil’ – funded through GLASI program</p> <p>FarmSmart Agricultural Conference (1 day) at University of Guelph (OMAFRA is a partner): some workshops address soil biology</p>

Advisory Services (support for voluntary programs geared to different farm sizes and types)	
<p>Online diagnostic tool for use at farm level to support advisors</p> <p>Extension programs vary by region; some free services, some for fee (see diagram below)</p> <p>Advisors can be part of EEIG groups</p>	<p>Limited direct extension support for environmental improvement, more reliance on independent crop advisors. OMAFRA website lists 43 extension specialists across all sectors.</p> <p>Less services via personal contact, more through information online, workshops and training agri-business personnel (OMAFRA, 2016b).</p> <p>Three hours of support for farmers in regions supported by GLASI project. GF2 cost-sharing funds for planning, audits and assessments, training</p>

The Project in France has committed to reviewing and adjusting curricula and diplomas, as well as employing more researchers and tutors specifically towards Project goals. They have also signed contracts with teaching institutions to use their resources to support the Project. An independent review of the Project was conducted in 2016 by France’s economic, social, and environmental Council (CESE), a constitutional body that the government consults with. The CESE report suggested that even more training modes and tools need to be adapted to meet Project goals (Claveirole, 2016). When the ‘green’ direct payments under the CAP were introduced, states were obliged to ensure that each farmer can seek and receive advice on at least the basic cross-compliance requirements in the field of the environment, public health, animal and plant health, animal welfare and good agricultural and environmental conditions (European Commission, 2017b). This was put in place by 2007, with funds coming from Rural Development (pillar 2). Figure 1 is a diagram of the French advisory system:

Figure 1



From "Main aspects of the French Advisory Services for Rural Businesses", by the Scottish government, 2012, p. 27, (<http://www.scotland.gov.uk/Topics/farmingrural/SRDP/SRDP20142012/AdvisoryService/frenchadvisoryservice>)

Some interviewees suggested that in Ontario education and mentoring (including farmer-to-farmer work) are both needed for innovation in the direction of practices with better ecological performance. One interviewee suggested that agricultural training program curriculum review would be helpful. OMAFRA's technical advisory staff numbers have dropped along with the budget for provincial advisory support, and the business of farm advice now falls more to independent crop advisors and companies selling seeds and inputs to producers (Glen Monroe, personal communication, July 10, 2017). The original plan by the farmer coalition behind the Environmental Farm Plan highlighted that education would be central to the Plan, but so would advisory support (Our Farm Environmental Agenda, 1992). The Great Lakes Annual Stewardship Initiative (GLASI) is offering 3 paid hours of advisory support related to evaluating and supporting environmental management practices; some Conservation Authorities also employ agronomists and agricultural technicians to support producers in similar efforts.

Broader access to expert advisory support and education will be key for meeting the objectives in Ontario’s Soil Health Strategy.

Research policy

Research has a significant role to play in establishing the knowledge needed to manage and adapt farm management systems. The literature and my interviews point to a need for reliable information that is specific to the local region, soil types, climate, and types of operation. This information can help develop solid business cases to ease the risks inherent to changing practices. Currently, it is relatively easy to find industry information on step-by-step instructions and application rates for fertilizers and pesticides, however it is much more difficult to find out exactly how much a certain cover crop (or cover crop mix) might help a farmer decrease fertilizer rates, at what time of the year, and for which crops. Since the provision of ecosystems services benefits the farmer and the public, there is less motivation for industry to invest in this research (Lampkin et al, 2015). For example, good farm management can reduce the need for expensive inputs. This research needs champions, and the government can play a key role.

Table D. Research policy

France	Ontario
<p>Research partners (INRA, IRSTEA) signed framework agreements supporting project</p> <p>Regional academic teaching organizations have agreement with government including objectives, actions, monitoring. All public institutions have at least one innovative ‘double performance’ project running</p> <p>Research included in key action plans: Agroforestry, Sustainable beekeeping, Antibiotic resistance, Seed breeding plan, Methane energy</p>	<p>OMAFRA-University of Guelph Partnership research program: 8 themes, one is ‘Environmental Sustainability’. ‘Plant Production Systems’ also includes ‘Environmental/ecosystems Impact’ (1 of 7 ‘Key Research Areas’)</p> <p>Great Lakes Agricultural Stewardship Initiative project</p>

The French Government worked together with agronomists and researchers to develop their Project and targets. It is also investing in research by farmers and other professionals to provide the information needed to support producers to reach the targets. The government has also had to work with the country's largest farmer's union (FNSEA) to address one of their main concerns: that the Project would support and sustain research and innovation (Jolly, p. 110). France's economic, social, and environmental Council evaluation of the Project has suggested that the work to date has not gone far enough in making the changes required to meet objectives, and that further changes are needed. They also suggest that more of the research needs to be in collaboration with producers, supporting their interests and confirming their observations (Claveirole, 2016). The CAP includes local development methods that have been used for two decades to engage local actors in the design and delivery of strategies, decisions, and resource allocation in their areas, in the Rural Develop pillar. This 'Community-led Local Development' method is implemented by Local Action Groups, of which there were over 200 in France during the last funding cycle (European Network for Rural Development, 2017).

In Ontario, official support for research related to environmental best management practices is in the form of a partnership with the University of Guelph, where 'Environment' is one of 8 research priorities. Other projects in academia, or by advisory staff, must be contributing to the body of knowledge related to farm management that reduces inputs and enhances biological processes; however, the targets and supports are not explicit or monitored according to public documents. One project that is working to establish more detailed information on the effects of environmental best management practices on local waterways is the Great Lakes Agricultural Stewardship Initiative; work is currently underway specifically with farm operations impacting Lake Erie and Lake Huron.

Regulation

Ministries in Ontario and France have considerably developed their regulatory tools for environmental protection over the past 25 years. Plummer et al point out that regulation has a necessary role in providing “a base minimum standard of practice and a system of enforcement to address issues of intentional contravention”; they also note that stewardship programs and supports related to the themes in this section enable producers to go beyond compliance to best management practices (2008, p. 81). Regulation can also enable innovations to become mainstream, moving ideas and practices from the first level of MLP, to the regime (level 2).

Table E. Regulation

France	Ontario
<p>Introduction of “Law of the Future for agriculture...” -land policy: protecting farmland from competing uses and to making it easier for young farmers to get started in agriculture. Regional farmland management bodies (SAFERs) were reorganized to intervene in land sales to purchase farmland that might otherwise be built over -Update of curriculum of agricultural colleges across the country -Encourages farmers and other stakeholders to participate in EEIG’s</p>	<p>Clean Water Act (MOECC) Conservation Authorities Act Canada-Ontario Agreement on Great Lakes Water Quality (2014) Ontario’s Great Lakes Strategy (includes MOECC, OMAFRA, MNR) Ontario Climate Change Action Plan: Driving Ontario Soil Strategy</p>
<p>EU Sustainable Use of Pesticides Directive</p>	<p>Nutrient Management Act (managed by MOECC) and Nutrient Management Program administered by OMAFRA</p>
<p>EU Nitrate Directive</p>	
<p>Water policy started including pollution fines for agriculture in the 90’s, as well as regulation for larger livestock operations to reduce excess N</p>	<p>OMAFRA supported MOECC in 2015 changes to O. Reg. 63/09 under Pesticides Act to address sale, purchase, use of grain corn and soybean seed treated with neonicotinoid insecticides. Supports province’s target to reduce number of acres planted with treated seed by 80% by 2017, for pollinator health</p>
<p>EU limits the use of neonicotinoids, France planning to ban their use as of Sept. 1, 2018</p>	
<p>Agricultural Framework Law stating the multifunctional nature of agriculture and application of this to policy</p>	<p>Ministry has Memorandum of Cooperation with Fertilizer Canada, Ontario Agri Business Association to develop a 4R Nutrient Stewardship program to reduce fertilizer use</p>
<p>The 10 action plans and project</p>	

Ontario has implemented a series of regulations to protect public resources and ecosystems since the '90s. Regulation is resisted by producers as it can add more paperwork to their already large suite of administrative tasks, however it is ensuring minimum standards for key public health concerns. One successful correlation between regulation and farm management practices in Ontario is a 'significantly positive relationship' between producers with a Nutrient Management Plan and the number of best management practices implemented (Filson et al, 2009, p. 247). Nutrient Management Plans are only required for operations where livestock numbers are large enough to trigger the Nutrient Management Act, or a farm unit is located within 100m of a municipal well – otherwise they are voluntary (OMAFRA, 2016c). France's new 'Law of the Future of Agriculture' regulation is a tool to help mobilize more actors in and outside of government, and provide stable support for project objectives. Both the French and Ontario governments have acknowledged that they would prefer to avoid the costs and conflict associated with regulation when possible; innovation, education, research, data, and a culture of stewardship support prevention, reducing the need for more regulation.

Monitoring and Evaluation

As quoted in OMAFRA's soil discussion paper, "you can't manage what you can't measure" (2016b, p. 32). Monitoring and evaluation provides information on the impacts of policies and practices, generating baseline information. Producers looking for reliable practices, and public institutions looking for positive environmental results all need this information, and can use future data trends to provide feedback on what is and is not working.

Table F. Monitoring and Evaluation

France	Ontario
Haute Valeur Environmental certification - highest of three levels of environmentally-conscious practices certified by the Ministry. Has a logo that can be displayed to consumers	EFP: track # of farmers who attend workshop, # who receive funds for BMP's. Farmers can rate themselves on their practices on a scale of 1-4. New plan every 5 years to be eligible for funding
Online diagnostic tool for farmers to log and compare practices	GLASI includes measuring and developing more metrics for the effects of farm practices on soil health and local water quality
Evaluation committee analyzes and monitors PA project, make suggestions to pilot committee.	RUSLE2 computer program estimates soil erosion levels based on practices and geography
Annual reports published, including evaluation methods and metrics	Pollinator Health Strategy, regulated reduction of neonicotinoid pesticides. Developing soil health strategy, which will likely include measurements
10 Action Plans and Programs include metrics	

GLASI has contributed an additional \$16 million to support excess nutrient reduction and improve pollinator health (OSCIA, 2016, Mandate letter). Ministry staff and certified crop advisors developed the initiative as a complement to the Environmental Farm Plan, and it is being used to develop models and measurements for regional farming practices and their effects on water quality. All interviewees that I spoke with were enthusiastic about the support for farmers, and anticipate that it will yield important advances for future information, programming, monitoring, and evaluation. EPA results are not shared publicly, to protect farmer privacy. There are discussions about how this data could better contribute to environmental projects, while keeping farm data anonymous (Interviewee 7, personal communication, July 20, 2017).

OMAFRA states in the 2016 soil health strategy discussion paper that staff are currently working to develop an on-farm method for measuring soil health, as part of the soil health strategy in development. This can be used to provide information on specific soil health

indicators to producers as well as feed into an Ontario database for monitoring, which will be more specific than Agriculture and Agri-Food Canada's national report. This is good news for addressing the decreasing health of soils in Ontario, as OMAFRA points out that there is insufficient information to answer questions being asked about soils in Ontario today (p. 32).

Monitoring and evaluation are one of the 10 themes of France's Project, which includes a variety of short and long-term targets. Institutionalization has led to benefits such as the resources to set evaluation measures and adjust them over time, and to have dedicated reviews by internal and external sources such as the French legislature's CESE. The project formed an evaluation committee in 2015, made up of members from MAAF, public institutions, experts and researchers from public policy and agro-ecology, trade unions and professional agricultural organizations, development organizations, regional and environmental actors. This committee has completed annual evaluation reports of the Project as well as a report on the work of the evaluation committee. The project's 'scoreboard' include three types of indicators: achievements (actions undertaken, budgets dedicated, administrative achievements etc), results (41 indicators that range from very precise to aggregated), and impacts (31 indicators on environmental, social, economic performance) (MAFF, 2016, p. 32).

The French government has used a loose definition of agro-ecology, perhaps to give them flexibility to engage a variety of actors and adapt it to different regions and operations; however, the CESE has asked for a clearer definition of 'agro-ecology' to better measure and track progress. Some of the goals are broad, such as aiming to have the 'majority of French farmers engaged in agroecology by 2025'. Measures included in the annual evaluations are from an annual survey: in 2016, 79% of producers were familiar with the concept of agro-ecology, and 73% stated that they were engaged in at least three agro-ecological approaches that included the

reduction of inputs, improving soil quality, and protecting water quality (Clareivole, 2016, p. 28). Although this level of engagement seems not far from business as usual, a Conference Board of Canada report in 2013 found that only 43% of Canada's producers had implemented some form of environmentally beneficial management practice (2017). The number of producers familiar with agroecology has increased from only 50% IN 2014, and many producers stated an interest in increasing their 'agro-ecological' practices (34% of those engaged in at least three practices). Another interesting trend revealed by survey is the higher participation of producers under the age of 35, re-enforcing faith in the younger generation to advance Project goals; 85% are engaged in at least three practices, and 22% (over the national average of 11%) are engaged in a joint project related to agro-ecology (Clareivole, 2016, p. 28).

There are many other evaluation measures being tracked in the annual reports (see Appendix 1). One example of an 'indicator of the results' of efforts to increase biodiversity on operations is a tracking the number that have crop rotations that include a legume crop at least every 5 years (to increase nitrogen), as well as crop rotations that include at least 3 different crops every 5 years (MAAF 2017, p. 20). The 10 priority action plans also include specific goals and plans, and enable them to benefit from specific evaluations. Other evidence of increases in agro-ecological approaches by producers had been tracked by MAAF's statistics, and published in the 'Agreste' database (Clareivole, 2016, p. 29). I could not find evidence of indicators monitoring the impacts of the practices on the local environment, which would be a useful addition for measuring change.

Transition Management approach

One further lens that I found helpful for understanding the approach of the French Project comes from the public policy realm: transition management. As a concept, transition management (TM) is an approach to “influence the direction and speed of transitions by coordinating and enabling the processes that occur at different levels in a more systematic and evolutionary way” (Kemp and Loorbach, 2006, p 109). In this field, transitions are understood to evolve from niche innovations that shift the current social and technological regimes and then the broader landscape (Voss and Bornemann, 2011). Government and regulations are part of the ‘regime’ referenced in the multi-level perspective levels above. At first, government often hinders change, being a promoter of ‘business as usual’; however, once they agree on the need for change, they greatly increase the speed by which it happens (Geels, 2009). To foster innovation, and move more quickly towards goals (such as improved soil health), research suggests government departments and project teams practice a ‘reflexive’ approach (Voss and Bornemann, 2011). This means setting goals and working towards them in a process that allows for reflection and adjustment along the way, as opposed to controlling for rigid outcomes. TM suggests principles and instruments for defining the challenges and designing processes. Voss and Bornemann (2011) lay out four suggested steps to structure a reflexive process. I will outline these steps and note similarities or difference with the French Project.

The first step is creating a ‘transition arena’, which will be the core actors for a new project. This group is made up of individuals from diverse backgrounds with skills to help develop the vision and set an agenda. At the national level, strategies are set by the National Committee for Evaluation and Orientation (CNOS). This committee is chaired by the Minister of Agriculture and meets twice per year. It produces the annual reports and adjusts or adds to the

strategies as needed. There is also a steering committee (COPIL) of approximately 20 members associated with the key partners of the project. This group meets 3-6 times per year, and is chaired by the director general of economic and environmental performance under the Minister of Agriculture. They ensure that the plans of action are being operationalized, and suggest improvements. The steering committee is made up of:

- representatives from multiple government departments (food sector; teaching and research sectors; regional representatives from food, agriculture and forestry; water and biodiversity representatives from the Ministry of Environment, Energy, and Oceans)
- other national and regional groups including:
 - the association of French regions
 - assembly of chambers of agriculture
 - association of coordinators of agricultural teaching (ACTA)
 - France's largest agronomic research institute (INRA)
 - France Nature Environment (federation of associations for nature protection)
 - Institute for Sustainable Development
 - Federation of institutes for the development of agricultural and rural employment
 - Professional agricultural organizations
 - National association of food industries

Having a strong advocate in Minister Le Foll had its benefits and drawbacks. Le Foll has a background in family farming, and a previously a lecturer at an agricultural college before joining politics (Crosskey, 2016). He was Agriculture Minister under both Hollande governments, had a hand in reforming the CAP for the most recent cycle, and was also government spokesperson from 2014-2017. His leadership advanced the Project and supporting legislation; however, it also reduced the focus on the need for a strong social base of support (Arrignon and Bosc 2016, Jolly 2016). One of the biggest challenges this presents is vulnerability to any change in government. The current government lead by Emmanuel Macron

has a new Minister of Agriculture, Stephane Travert. Travert was a previous member of Hollande's party, but switched alliances to Macron in the spring. It is not yet clear how this will affect the Project, although the materials are still live on the MAAF website. Le Foll also remains in government, being one of the few from Hollande's Socialist Party to be re-elected to the National Assembly in France in 2017.

The second suggestion is to develop the vision and agenda in the arena. The different perspectives on the problem at hand are discussed with the goal of collectively defining the challenge in an informed way. This is obviously a challenge, especially for producer groups. Jolly found that the French approach to the 'Institutionalization' of agroecology is considered appropriation by some farm groups. They think it does not recognize the multi-dimensional definition that groups like Via Campesina and academics associate with agroecology, which includes an emphasis on social movements and participatory democracy (2016). The concerns of the biggest French farmer's union, that the Project must focus on investments in research and innovation in accordance with their expectations, are also on the table.

The process then suggests developing goals on two levels: the long-term vision and more specific targets related to key themes that evolve over time. "Pathways" for these transitions are developed, to operationalize the goals, anticipating challenges along the way. It is helpful if some of the pathways have been tested on a smaller scale, to inform the plan. The MAAF engaged the core network in developing a vision, allowing the MAAF to facilitate and lead but also engage in collaborative governance. Targets specific to key themes were established. The 10 action plans and programs lay out goals, actions to achieve them, and are reported on annually. There are also the 10 categories of actions that guide the Project and organize the

annual reports. CESE report suggests that even more detail for the vision, as the Project evolves, will be helpful (Claveirole, 2016).

The third step involves “mobilizing actors and executing projects and experiments” (Kemp and Loorbach, 2006, p 115). Engaging with the public and developing support is key to preventing negative reactions along the way. To achieve this, the authors suggest expanding the ‘transition arena’ (or the network) to wider circles of strategic actors as well as the public. The Project mobilized actors on many levels, working towards the targets. Regional governments were engaged to adapt targets and partnerships locally, agreements were made with farmer organizations, institutions and related organizations. The CAP subsidies and programs were adapted to Project goals. After a few years of the Project, Arrignon and Bosc (2015) suggest that the Ministry has had to compromise on the design of the Project to appease different actors to the effect that there is not yet widespread engagement but only production niches; they warn that there is a danger that the government is just creating another ‘alternative production label’ and not system change. One of the criticisms by the CESE is that *better* communication with the public is needed regarding what is being done, and specific benefits of project for nutrition etc. (Claveirole, 2016).

The fourth step is to continually monitor and evaluate the entire project. The authors recommend monitoring in rounds, which evaluate interim objectives and the quality of the transition process. These actions are supposed to help the network learn about the nature of the social and technical systems at work and help adjust the goals and pathways (p. 9). The French project built in concrete goals as well as an annual evaluation framework. Annual reports have attempted to measure progress on results and impacts, with adjustments made over the years to reflect necessary changes in metrics, and addition and adjustment of goals. The scale of the

Project has also enabled it to be externally reviewed by a government body in 2016, the French legislature's CESE, as mentioned above.

The agricultural sector in Ontario has most often created policy and programs in response to outside pressures and disastrous events. As Winfield pointed out, there is a pollution control approach (2012), as opposed to a preventative approach. A transition management approach would allow the government to set a course, and anticipate problems. Even with number of actors and interests at play in Ontario, and the non-intrusive, 'facilitator' role of government, there are ways to plan for this. Voss and Bornemann suggest that progress could be made with a transition management approach. They note that political realities are not usually stable, predictable or immune to "nasty politics" however (2011). To anticipate these challenges, they identify a few suggestions. One is mapping out the process and actors to identify where conflicts are likely to exist and planning for them. They also suggest strategies according to the level of conflict and power struggles likely to be encountered in the political arena. Even if the 'arena' is not a cooperative space, political interests and strategies as a resource for exploring pathways of sustainable development. They note that social learning "can be a result of strategic mutual adaptation within a field of discursive forces. Actors may, perhaps slowly and often secretly, pick up certain elements of each other's perspectives if it helps them to defend a position and maintain public credibility" (2011, no page number).

Conclusion

France and Ontario have both come a long way since the early 90's, to implement regulation and programs to enable producers to better steward the environment and enhance biodiversity. In Ontario there have been some successes; however formidable environmental

problems created by agriculture still exist. The three frames applied to research on agri-environmental efforts in France and Ontario illuminate timely insights for the next steps forward.

Ontario's main agri-environmental program, the EFP is engaging a sizeable proportion of farm managers and normalizing environmental concern; however, it is voluntary, and although some data is tracked internally measurable goals and more data are needed. Funds available are unable to keep up with demand, which relates to how little the Canadian agriculture sector spends on environmental initiatives than the United States or European Union. The focus of the EFP on individual practices does not highlight the benefits of a whole-farm approach to maximizing biodiversity and reducing inputs. And despite the EFP, and the collection of other programs in Ontario, there is still a perception that the public does not trust that that most producers are being good environmental stewards. Ontario could benefit from creatively improving sources of funding to support adoption of best management practices, for example linking risk management payments with environmental performance. Support for research that explains region-specific effects of best management practices on farm and local ecosystem health is needed, along with more robust business cases for these practices and overall ecological farm management. And building up values supporting stewardship behaviour (and the networks that enable this) will pay dividends in innovation and motivation.

One of the authors of a report exploring the future of 'sustainable intensification' of agriculture in the United Kingdom, suggested that three factors are needed to drive change in this direction: political backing at the level of the Ministry of Agriculture, public concern about environmental and health issues, and the active engagement of producers and industry partners. Although the Project has much work to do to meet their targets, France has clearly engaged all three drivers with *Produisons Autrement*. A strength of the Project has been the transition

management approach, which has generated long-term goals, short-term targets, and action plans. Some targets and methods need to be improved, but the comprehensive process that guides them allows the opportunity to evaluate and adjust them. More strengths of the Project that stand out from the comparison include investing in training a new generation of farmers who better understand the natural forces at work on their land and can increase efficiency by working with them; prioritizing funding for farmer-led projects; and enabling regional application of Project programming. And although CAP funding has been slowly declining since the early 2000's, the foundation and culture developed by the Project could compensate.

If Ontario hopes to see positive change in future annual reports on indicators for agricultural impacts on the environment, a similarly comprehensive approach could be a way forward. To shape our future, it is imperative to develop a vision to work towards and establish pathways to achieve it. The provincial government does not need to do this work alone, but could play a key role outlined in transition management, to influence the direction and speed of change as a facilitator. A broad effort, like France's project, can be a holding container for many efforts, enabling many groups to work on the challenges at hand. As Voss et al note: "without a plan, there is no coherent direction and transition is about direction A robust transition plan must ultimately frame and structure what actors involved in policy change do" (2009, p. 37). In 2013, the Conference Board of Canada suggested a similarly collaborative approach in the form of an 'agri-food environmental governance system'. The Conference Board describes this as "A coordinated and overarching farm-to-fork approach to risk governance", that would "improve on the current plethora of systems organized around sector, environmental cause, geographical region, and political jurisdiction" (2017). This could be supported federally by the National Food Policy, as well as climate change mitigation commitments.

As the authors of the UK report on sustainable intensification state, a mosaic of approaches addressing specific needs will be needed to reach environmental and economic goals for more ‘sustainable’ agriculture; this will also insure against the failure of any one approach. A recent report by the Nature Conservancy also emphasizes a multi-level, multi-pronged approach to achieving better soil health in the United States (2017). Although France had the leadership of Stephane Le Foll, Ontario has Ministry support for a soil strategy, and public concern about health and environment related to agriculture. Staff of the Ministry of Agriculture will also have an influential role to play, filling in policy and process details in a more powerful way than in France. They can choose to establish a process that fosters transition, and involves more than the usual players in tackling the challenges at hand. Similar principles could apply for planning to one agri-environmental goal (such as increasing healthy, carbon-rich soil with Ontario’s soil health strategy), as for a setting culture-shifting environmental targets for the agricultural sector. A process informed by the realities of producers, that works on all multi-level perspective levels, and uses a transition management approach could support the province in generating a successful soil strategy now, and a broader environmental vision soon.

Appendix 1: Outline of the French Project

See following page.

Fig 2. Outline of the French action plan. Website of MAAF. Accessed on August 25, 2017:
<http://agriculture.gouv.fr/le-plan-daction-global-pour-lagro-ecologie>

Appendix 2: List of Interviewees

1. Glenn Monroe, Manager of Special Projects at the Compost Council of Ontario
2. Ruth Knight, agricultural consultant
3. Ayla Fenton, Youth President of the National Farmer's Union
4. Ben Van Dieten, Agricultural Stewardship Technician, Maitland Valley Conservation Authority
5. Stephane Bellon, Research Engineer at French National Institute for Agricultural Research (INRA)
6. Interviewee 6 (anonymous)
7. Interviewee 7 (anonymous)
8. Interviewee 8 (anonymous)

Appendix 3: Interview questions guide

Below is the rough guide that I used to structure the questions in my interviews:

1. Confirm preferences for recording, anonymity
2. Confirm professional role
3. How long have you been working on issues related to agriculture and the environment?
4. What do you think are the biggest challenges are?
5. What do you think that barriers to change are?
6. Did you have a chance to read the summary of the French Agroecology project? What were your thoughts?
7. Do you think that an agroecology plan is a useful structure for addressing current challenges?
Are there particular pieces of policy that you think would be helpful? Which parts and why?
8. Who do you think is be best positioned to do this work in Ontario?
9. Is there anyone else I should speak with, or resources I should look for?

Appendix 4: Policy memo negotiation considerations

Preparation for developing a policy memo, based on a negotiation preparation template.

The template was created by Viaconflict (2012), based on the book ‘*Getting to Yes*’, by Roger Fischer, William L. Ury and Bruce Patton.

1. The Players

Individuals or groups who can influence an agreement or implementation of an agreement.

➤ **Side 1:** *Argument for learning from France’s agroecology plan and applying elements in Ontario*

Likely supporters: Ecological Farmers Association of Ontario, Compost Council of Canada, Innovative Farmers Association of Ontario, Soil Health Network, Farms at Work, Food Secure Canada, National Farmer’s Union, organic soil consultant Ruth Knight, Organic Council of Ontario, World Wildlife Fund Canada

Possible supporters: Freshwater Alliance, Freshwater Future Canada, consumer groups, some Conservation Authorities, Environmental Commissioner of Ontario

➤ **Side 2:** Groups affected not likely to be supportive

OMAFRA staff generally, OMAFRA soil health strategy policy team, Ontario Federation of Agriculture, agricultural commodity groups, Ministry of Natural Resources and Ontario Ministry of Environment and Climate Change (agricultural species at risk programs)

Unsure: agricultural colleges (some academics might support, but not necessarily leadership), Certified Crop Advisors

2. The Opportunity or Problem

There is an opportunity to address degradation of ecosystems and resources on and off-farm, while improving farm bottom lines and system management capacity of producers. Key environmental problems include greenhouse gas mitigation, reducing nutrient loading in waterways, habitat for wildlife, falling soil health. Opportunities include: keen interest in learning more about soil ecosystems and health among producers; need to improve bottom line and resilience for farm operations; the Ontario Climate Change Action Plan and resulting provincial Soil Health Strategy discussion paper (a member of the strategy development team indicated interest in reading my research); public opinion related to environmental protection and support for agri-environmental stewardship. As pointed out by the Environmental Commissioner in a recent report “if the soil health movement is to fully take hold in a timely manner in Ontario, government must play a substantive and proactive role” (2016, p 38). France’s Project, and their approach, should be considered to glean lessons and inform policy and program development in Ontario.

➤ **Side 1: Supporter Interests**

(Needs, wants, and motivations. Why and for what purpose negotiating position is founded on)

- Problems related to on-farm soil health, surface and groundwater, climate, wildlife
- Currently a variety of programs and supports to improve farmer ecosystem stewardship, but there is no central plan. A comprehensive, long-term plan with a vision for large-scale transition to farming systems that are designed along agroecological principles could help set targets, monitor, work across government departments and with Civil Society Organizations (CSO's), and create a long-term plan.
- National Food Policy being developed, agroecology and/or improved agri-environmental efforts could be included
- Winning priorities seem to be optimizing soil health and reducing inputs (costs). OMAFRA's soil health strategy could serve a foundation, but there is skepticism that their commitment will be substantial enough; will it be well-resourced, work in collaboration with other departments and CSO's, and ambitious enough to help reach substantial targets?
- There could be more voluntary work done, if it is approached skillfully (support for innovative groups of farmers, incentivized practices to help manage risk, advisory support, adjustments improved education curriculum)
- Most farmers are in debt – problems with business as usual. Increasing soil health is central to productivity and reduces external inputs, but takes years to develop (also requires new practices and adjusted business plans). Government could offer more supports decoupled from production and associated with soil health, or other environmental improvement rewards as public goods. Would make trying new practices more possible.
- Farmers interested in increasing soil health but need more support (from other farmers, need information from other producers, professionals, and from agricultural curriculum, need advice from Conservation Authority staff, extension workers or crop advisors etc.). A cultural shift is also needed in many farming communities to try new things, value an agroecosystem approach

✧ **Key needs to be met:**

- Consider France's approach (pros and cons)
- Consider how collaborative governance approaches have been helpful in development and implementation
- Consider their efforts in the areas of education and training (for ministry staff as well as colleges and advisors)
- Consider their action plans based on key areas of work (including funding, targets, partners)
- Consider their use of internal and external monitoring and evolving target-setting
- Consider how financial support tied to environmental performance
- Increase public awareness of state of impacts on environment, how agricultural sector is performing, and the issues at play

➤ **Side 2: Non-supporter Interests**

(Needs, wants, and motivations. Why and for what purpose their negotiating position founded on)

- Interested in securing consumer trust that producers are being environmental stewards
- Not getting any new funds - constrained resources
- Just finished negotiating the next APF, not sure of capacity for change this round
- Government mandates are only 4 years (currently Liberal majority at federal and provincial levels, current terms ending soon)
- More work to make change
- At least some OMAFRA staff think that enough is already being done 'for the environment'

- OMAFRA considers agroecology to be like 'organic' - don't want to support it to appear 'biased' to different modes of production. Agroecology is not a specific definition, would have to have a more specific understanding and be convinced that consumers and constituents want this
- OMAFRA not interested in hearing about France (Glenn Monroe, personal communication, July 10, 2017); perhaps because EU situation is thought to be too different than Ontario?
- CAP includes large producer supports which WTO is trying to reduce - Canada not interested in 'multifunctionality' officially. Canada and Ontario focused on yields and boosting exports as measures of success, 'extensification' supported in EU but not popular here
- Not sure plans and practices from other places will work here (i.e. tried agronomy 'clubs' approach like Quebec in the Lake Simcoe watershed and that was not taken up well)
- Interest in working with Conservation Authorities and 'friends of'-type groups, have had 'great success' in past
- Having farmers producing measurable environmental goods and services in return for incentives ("using taxpayer money well" according to Interviewee 6, personal communication July 19, 2017)
- Interest in more "second layer" education initiatives above EFP – OSICA and OMAFRA staff enthusiastic about GLASI's farmland health checkup program (paid advising, BMPs)
- EFP challenges - loss of farmer-led nature, smaller role for agroecosystems education and more emphasis on farm profitability (Morrison and Fitzgibbon, 2015)

✧ **Key needs to be met:**

- Improve soil health – agreed on across the board as part of all challenges.
- A way to track and measure soil health (already many tools...)
- Reduce amount of nutrient and pesticide run-off into waterways, especially lakes Erie and Huron
- Reduce GHGs and sequester carbon
- Support farmers to stay in business – meet minimum regulation, use EFP, be a competitive enterprise
- How to measure and track impacts of EFPs over time big obstacle, as we've discussed
- More research on best practices for specific local regions and field types: best practices for outcomes like increasing SOC (i.e. how cover crops and longer rotations contribute, exactly how to reduce inputs in coordination with this)
- Better information tailored to farmer's needs – want to know what best practices are for their operations and there is often conflicting research, need reliable sources of info
- ways to communicate with consumers, who want to know more now about farm practices than in past (possibly using EFP as a building block)
- Lots of evidence for any new practices, 'reasonable' approaches - focus on good case studies
- Could be supportive of more funds/supports for farmer to farmer events and networks: "Literature points to that that kind of interaction is very helpful in breaking down barriers" (Interviewee 7)
- Make choices that build trust with, and protect, producers
- It is well documented that there is distrust of government by farmers, resentment about regulation and paperwork

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