

# Networks, Methods and Quality of Soil and Crop Advisory Services in Ontario



## Research Brief

*August, 2021*

**Ataharul Chowdhury**

**Ezekiel Martin**

**André Melrose**

UNIVERSITY  
of GUELPH

SCHOOL OF  
ENVIRONMENTAL DESIGN  
AND RURAL DEVELOPMENT

*With Support from*



Knowledge Translation and Transfer (KTT) Funding  
Program, Ontario Agri-Food Innovation Alliance

*In Collaboration with*



## Abstract

In the last decade, agricultural extension and advisory services in Ontario have gone through tremendous transformations, including declining public funding, the emergence of new stakeholders in the delivery and funding, increasing use of group methods, and introduction of new terms, such as Knowledge Translation and Transfer (KTT). The reconfigurations of the systems in which public and private organizations play roles in financing and delivering extension services are known as pluralistic advisory services. There has not been any systematic assessment of the contemporary pluralistic agricultural extension and advisory services in Ontario. Therefore, the current study intends to examine the characteristics and quality of the crop, soil and livestock advisory services. This research brief reports the findings of the literature reviews and key informant interviews with the purposively selected crop and soil advisors. The findings show that the role of public sectors in extension delivery has changed from face-to-face delivery towards facilitating partnerships and supporting initiatives led by non-profits and producer organizations. The pluralistic advisory service offer opportunities for various stakeholders to contribute to service delivery. But it has been confronting challenges of coordination and collaboration among various distinct actors, marred by different definitions, goals, and methods. Although various advisory methods are being used, there are increasing trends of using digital and online media, private sector certified crop advisors and product-tied services for providing crop and soil advisory services. The findings highlighted that the most effective methods are the ones (e.g., face-to-face meetings) that allow one on one communication with farmer clients. In addition, there is a concern about the consistency and authenticity of service delivered to farmers. It might be due to contrasting degrees of trust levied by product-tied advice provided by private sectors, lack of practical on-farm experiences of new generations of advisors. As per advisors, non-agriculture stakeholders, such as environmental activists, sometimes influence policy which might be detrimental for farmers. Advisors indicated various strategies that they follow to influence behaviours of various types of farmer clients. However, advocating for change and innovation was seen as most difficult when advising traditionalist or laggard farmers. The topic of individual advisor capacities is of some concern. As public funding has waned and experienced advisors have left, more research needs to be done with regard to the new generation of advisors. The public sector advisory service needs to play a stronger role in supporting the governance of the systems by reconciling the differences, brokering relationships, listening to farmers and other stakeholders, and facilitating a better understanding of their needs and knowledge levels.

## Table of Contents

Abstract.....	1
1. Introduction .....	4
1.1 Changing Roles of Public Sector in Agricultural Extension and Advisory Systems in Ontario .....	4
1.2 Assessing the Gaps and Addressing the Extension and Advisory Needs of Smallholders .....	7
1.3 Quality of Services Provided and Capacity of Extension Workers .....	8
2. Methodology.....	9
3. Results .....	10
3.1 Types of Services Provided and Delivery Methods.....	11
3.2 Networks and Funding.....	13
3.3 Challenges .....	15
3.3.1 Strategies to Influence Behaviour.....	15
3.3.2 Private and Public Sector Distrust.....	16
3.4 Quality of Services and Satisfaction.....	16
4. Conclusion.....	17
Works Cited.....	18
Appendix .....	22

DRAFT FOR DISCUSSION

## 1. Introduction

Agricultural advisory services are essential to facilitating joint learning and the co-production of knowledge (Faure et al., 2017), both of which accelerate the adoption of sustainable agricultural technologies by farmers (Long et al., 2016; Labarathe & Laurent, 2013; Cerf et al., 2011). Traditionally, advisory services have depended on technically capable extension staff to work closely with communities and research bodies and produce knowledge for the advancement of agricultural techniques (Blackburn 1994). Extension or advisory services are tasked with identifying issues and solutions, introducing new technologies and transferring knowledge to the public (Milburn, Mulley & Kline, 2010). Effective service provision can increase the resiliency, efficiency, and productivity of agricultural sectors with targeted information that is delivered in an appropriate manner, preferably through joint experiential learning and practice (Klarkx & Jansen, 2010). The research currently being undertaken seeks to understand the nature and relationships within Ontario's agricultural advisory system. This research brief reports the preliminary findings of a study focused on advisory networks, practices, and capacities within the soil and crop agricultural sector of Ontario. The findings of the Livestock advisory service will be discussed in another research brief. This report will begin with a literature review of advisory services in Ontario, including the concept of a pluralistic system. Included is a delve into the decline of the public advisory system within the province and seek to understand the challenges, opportunities, and relationships developed from the private sector filling these gaps. The theoretical and practical methodology employed will be discussed, followed by the findings of the literature reviews and key informant interviews with purposively selected crop and soil advisors.

### 1.1 Changing Roles of Public Sector in Agricultural Extension and Advisory Systems in Ontario

The public sector extension in Canada has been facing numerous challenges, including a reduction of staff numbers, and budget cuts. Consequently, there is a rise in private actors producing and disseminating knowledge to clients (Hambly 2020). The history of agricultural extension services in Canada is long and had remained in the public sector until only recently. Blackburn (1994), discusses accounts of extension in Canada back to as early as 1606. He traced the hiring of the first extension staff to 1906 in Ontario and discussed that the Cooperative Extension System in the USA heavily influenced the Canadian system. By 1985, there were over 1000 professional staff and nearly 4000 support staff in federal research and demonstration farms across Canada (Hambly 2020).

Milburn et al. (2010) argue that government services to farmers expanded until the 1990s. Agricultural extension advisory services in Canada have been developed less consistently and pervasively than in the USA (See Annex Table 1 and 2), which has led several authors, such as Milburn et al. (2010), to describe this phenomenon as the disappearance of public extension services in Canada. On the other hand, public agricultural extension and advisory systems in the USA have managed to continue face-to-face delivery, various forums and associations, higher

education opportunities, and service coordination and collaboration mechanisms despite a decrease in public funding (See Annex Table 1 and 2). Public supports for agricultural extension, including both funding and services, were drastically cut at the beginning of 21st century, in Ontario and other provinces of Canada (Maynard & Nault, 2005). Indeed, the withdrawal occurred with little documentation or press and was deemed to have “disappeared with a ‘whimper’, rather than a ‘bang’” (Milburn et al., 2010). In the American context, policy makers encountered similar challenges related to the proper reallocation of human and financial resources (See Annex Table 1). In response to Milburn’s observations that extension services were seen as outdated and commodity-oriented, leading to the lack of funding and support in Canada (p.2), Hambly (2020) further detailed the key shifts in the extension service in Ontario since the 1980s. Notably, these have included the lack of political and financial support, related to the reasons mentioned above. Rising costs associated with public extension programmes also resulted in a lack of return on investment or economic benefit for Canadian provincial and federal governments. In turn, the role of the agricultural extension advisor experienced a shift towards agri-business advisory and training services, operated by the private sector. This coincided with the not-for-profit sector providing more holistic, community-based projects. As digital technologies and communications methods have evolved, so have the needs of farmers for higher levels of education and access to information. The technological evolution can be seen either as a “pull” or demand-driven shift, or as a “push” towards the private sector. Lastly, the changes in agricultural research and design institutions were met with cuts to both federal experimental farms, as well as university and college extension services and agricultural faculty (pp.3-4).

Extension audiences in Canada were primarily producers, future producers, including students, and commodity groups (Blackburn 1994). As mentioned, the decline in support and funding for public advisory services within Canada has allowed for various actors, such as producer organizations, private consultants, input dealers, to intervene and fill the gaps in Ontario (Hambly, 2020). Indeed, this has led to the transformation of the system into what is best defined as pluralistic systems of extension services. Pluralistic agricultural advisory services are characterized as an extension system in which multiple public and private providers with diverse funding streams are providing services to farmers and agricultural communities (World Bank, 2012). While pluralistic services have been shown to allow for more multifunctional advice and promote the empowerment of civil society actors, there are many challenges with this approach (Birner, et al., 2009). The Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) has traditionally been one of the most important actors for agricultural extension in the province. However, their funding and capacity have been reduced, as is apparent in the drastic reduction of extension staff (Milburn et al., 2010; Hambly, 2020). OMAFRA still maintains regional offices in the province with technical staff to provide advice but has eliminated the position of agricultural representative (Stark, 2017). Research and knowledge translation partnerships, such as the one with the University of Guelph, are examples that

highlight the province still plays an active role, but it is now only one of many actors (See Annex Table 2).

Canada's agricultural system is referred to as the Agriculture and Agri-food system (AAFS). The Canadian Agricultural Partnership (CAP) was launched to respond to the myriad challenges and changes the primary agriculture industry faces. Referred to as "the partnership", this is a five-year program that involves the collaboration of federal, provincial, and territorial governments to support AAFS (OMAFRA, 2021). Within this arrangement, agricultural advisory services continue to evolve to meet the needs of various individual clients and organizations. Hambly (2020) envisions a duality in the roles of both the private and public sectors in offering services. It is characterized by public sector resources being focused on the regulatory standards while the private sector, through its agriculture R&D efforts, evolves its R&D extension services.

As the nature of advisory services has changed through the technology "pull" and "push" mentioned above, waning public support has reduced public sector extension and advisory staffs. In addition, as many experienced civil servants retired or left for employment elsewhere, few, if any, were replaced (Hambly, 2020). Also experienced in Ontario is the increased utilization of communications and information technology and more participatory teaching methods. In the early 2000's, the concept of extension and advisory was to be replaced by the label of knowledge translation and transfer (KTT). OMAFRA states that this is a more advanced approach, promoting a two-way dialogue between researchers and research users. Through the use of KTT, which originates from the field of public health, or Knowledge Mobilization (KM), the field of agricultural extension becomes ever more complicated and obscure (Hambly, 2020). This model embeds KTT processes into the research programs and seek to incorporate extension services, despite some notable differences (Bergen et al., 2018). There is variation in KTT delivery compared to traditional extension services, which were present in Ontario. The goal of the KTT approach is to broker knowledge and ensure that research findings are accessible to the end-users. Proponents of KTT claim that the discontinuation of the term 'extension' does not mean services or targets have changed. Instead, it can now be seen as practiced and continued under different guises. There are some concerns and uncertainties about whether this remains the case (Allen, 2021; Hambly, 2020). A recent study by Allen (2021) indicates that direct needs of cover crop farmers are not necessarily additional information but a rather direct system of knowledge brokering which allows for one-to-one interactions and supports knowledge utilization. The current approach needs to consider aligning KTT initiatives with farmers' social networks and integrating a more personalized approach to reaching out to smallholders and reluctant adopters.

An example of the extension-related KTT activities funded through the federal Growing Forward program is the Canada-Ontario Farm Stewardship Program and Environmental Farm Plan (EFP). This is a voluntary program consisting of workshops, face-to-face advisory services and a cost-sharing element (Prairie Research Associates, 2011). Farmers participating in the

program are empowered to self-identify environmental issues experienced on their farms, including nutrient management in soils, energy conservation, and improved water quality (Woyzbun, 2010). The program involves staff from OMAFRA, the Ontario Farm Environmental Coalition (OFEC), the Ontario Federation of Agriculture (OFA), and the Ontario Soil and Crop Improvement Association (OSCIA). Throughout the program, producers are connected to technical staff for specialized information. The program is also connected with a range of conservation Authorities (CAs), local Soil and Crop Improvement Associations, stewardship councils and watershed groups, agri-businesses certified crop advisors, and nutrient management consultants (Woyzbun, 2010). This initiative does indeed represent many practices consistent with traditional agricultural advisory services, yet the terminology shift remains clear. Similarly, in a domain previously dominated by OMAFRA and the public sector, this larger collaborative effort demonstrates how the organisation has now become one of many actors within the system.

### 1.2 Assessing the Gaps and Addressing the Extension and Advisory Needs of Smallholders

No comprehensive assessment of the current pluralistic agricultural advisory service system in Ontario has yet been conducted. As per the available research reports (Warsame, 2015; Roche, 2015) and policy documents (AIC, 2018; AAFC, 2016; Maynard & Nault, 2005; Agricultural Odyssey Group, 2002), many of the diverse characteristics, as well as comparative issues, currently exist with the Ontario context. Given the limited literature on the current advisory system within Canada, it is challenging to discuss specific examples of issues faced within the system today. There is an increasing trend that federal and provincial government investments in extension services have been allocated to grants and to facilitate contributions and collaborations to support initiatives led by industry stakeholders (AIC, 2018). Private sectors and producer organizations have taken a proactive roles to fulfill the extension and advisory needs of farmers. The extent to which these needs, and new gaps brought on by the sector's evolution, are properly addressed through the pluralistic system needs to be examined.

At the local level, agricultural advisory committees formed by some municipal councils provide a platform for various stakeholders to raise their voices and influence local agricultural policy, plans and programs (Epp, 2018). An important goal of these committees is to address the challenges associated with a lack of coordination between research and knowledge and to mediate and educate around topics of nutrient management (Carlow, 2009). Committees identify gaps in understanding the storage and application of nutrients and provide training to the community. Committee members receive training through the OMAFRA and receive support from the Ministry of Environment for technical guidance. A nutrient management line is also available for the community to contact for questions and referrals to specialists (Carlow 2009). Research farms are another approach that can involve community members in knowledge production. One such farm is the Elora Research Farm, through the University of Guelph for soil and cropping practices. The initiative brings together stakeholders from the community, OSCIA, OMAFRA, and scientists to design and interpret results. The research results

are displayed in an interpretive center where the public and interested parties are able to visit (Lammers-Helps, 2016).

Despite these initiatives, challenges remain, especially with regards to small and medium-sized farms. The utilization of extension services has been found to be much lower in smaller farms (revenue of \$25,000 to \$99,000), with only 24% of farms reporting the service of third parties to be an important factor when preparing to adopt innovation. This is in contrast to 61% of larger farms (\$1,000,000+) in Canada (Agriculture and Agri-Food Canada, 2016). Canada, much like other developed nations, has experienced a decline in small-scale farming operations. Since 1961, the total number of agricultural operations has dropped from 480 000 to 193 500, or a 60% decrease, in 2016. Meanwhile, the total acreage of farm area has only dropped by 8.8% in the same time period, indicating that farm operations are only getting larger (Statistics Canada 2016). Economic viability continues to be a challenge for smaller farms, and the reduction in public extension services means that unconditional services (e.g. services at free of cost, contracts or obligations) are less accessible (Maynard & Nault, 2005). The weak coordination among extension providers, authorities and farmers has made small and medium-sized farms less visible target clients (Faure, et al., 2017).

Furthermore, small and medium-sized farms do not rely on, nor can they afford, highly standard information about sustainable agricultural technologies, which need to be continuously updated (Benson & Jafry, 2013). As a result, these farms find it difficult to make informed decisions since information sources have been diversified from public services to various sources, such as private extension agents, web-based portals, help-lines and call centers. For example, the experience of privatization of agricultural advisory services in the European Union has raised the question of whether the private sector's introduction has truly addressed these gaps, especially fulfilling the needs of smallholders (see Labarthe & Laurent, 2013). The concept of capacity development, linking the individuals to networks for social change, is the preferred approach to facilitate learning and leadership across the system (Hambly 2020, 9). As small and medium-sized farms are excluded from these benefits, not only are the gaps maintained, but the difference becomes further entrenched. Technologies and concepts continue to evolve, raising concerns that those unable to access new information may be left behind. In order to address these concerns, there is a greater need for a higher quality of extension and advisory services and initiatives.

### 1.3 Quality of Services Provided and Capacity of Extension Workers

The quality of advisory services can be understood as the combination of program quality developed, quality of services provided and quality of the advisor providing services. Generally, the quality of advisory service is measured through the satisfaction of clients or results of the service provided, but as is discussed by Landini (2020), the quality of service can be further broken down into enabling factors that all contribute to the level of service. Enabling factors can be considered staff educational level, research-extension linkages, institutional communication and the planning and evaluation process. The qualifications and capacity of



advisory staff is one large area of focus for agricultural extension service providers. AIC (2018) assessed that skilled labour shortages, particularly in the agricultural extension and advisory services, have a negative impact on the farm level adoption of technologies. The lack of succession and replacement of retired civil servants working in the agricultural advisory sectors might distort coordination and KTT efforts in Ontario (Hambly, 2020). As per Birner et al. (2009), the quality of pluralistic service depends on various criteria, such as (i) content, i.e. information and advice provided are according to the needs and opportunities of the clients, (ii) accuracy of the information and knowledge provided; (iii) timely provision of the services; (iv) effectiveness, i.e. the advice provided by the organization is useful in bringing changes of livelihoods of the clients; (v) efficiency, the expertise of field advisors regarding service provision using optimum resources and efforts; and (vi) and the existence of a feedback or evaluation system of the service.

## 2. Methodology

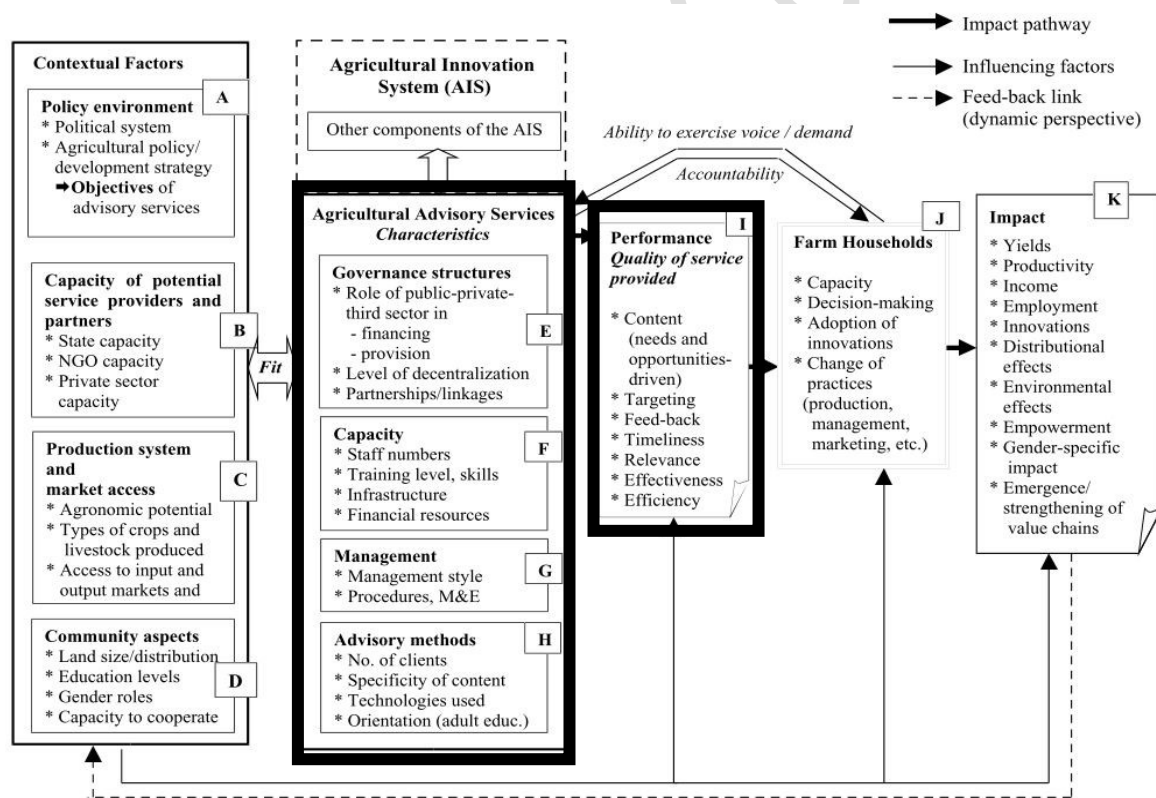


Figure 1: A conceptual framework for the analysis of pluralistic advisory services (Birner et al., 2009: 344).

In this study, we employed a mixed-method design and the framework proposed by Birner et al. (2009), illustrated in Figure 1, to understand the contemporary practices of livestock, crop and soil advisory services in Ontario. Also known as a ‘best-fit’ approach, it

covers a range of issues for analysis and understanding of the conditions that best suit different organizations and their advisory services to meet their clients' diverse needs and expectations (See Briner et al., 2019 for details). According to the framework (Figure 1), the pluralistic advisory services can be analyzed by considering the local context within which the advisory services are delivered, the characteristics of the advisory service system, and the quality of the service provided.

In this report, we focus on preliminary research on crop and soil advisory services. The initial research phase focused primarily on reviews of existing literature and initiatives within Ontario and elsewhere. Themes and trends have been identified related to advisory services that support farmers' decision-making processes. This has culminated in the literature review presented above. Finally, key Informant Interviews were conducted with nine purposively selected soil and crop advisors, including agricultural advisory service agents, representatives, and managers. Two of these individuals being the director or president of their respective organisations.

### 3. Results

The nine crop and soil advisors come from varied backgrounds and levels of education. Notably, 89% have a post-secondary level education, with half of those having attained a master's degree. This demonstrates a reasonably high level of education among the advisors, which perhaps suggests that perhaps some rural studies graduates are finding employment in Ontario's advisory sector, however, some of the education and qualifications received by the respondents may have been acquired while working for their respective employers. As previously detailed in Hambly (2020), no extensive study has been done to examine which statement is true. Nonetheless, there appears to be a sensible preference for graduates of the post-secondary level at a minimum. Further research on that topic may be advantageous. Of the nine respondents interviewed, six identified as working for a non-profit organisation, with the remainder in the public sector. In general, the amount of formal degrees indicates a strong level of education within the profession. Notably, one-third of respondents have had 20 years or more experience working in advisory services, with half devoting 60% or more of their time to advisory services and related activities (see Appendix tables 3 and 4). In that sense, a high level of competency can be expected of agricultural advisors in Ontario. Individual capacities of advisors can potentially be seen as fairly strong due to a combination of experience, education, and capacity building activities. However, the on-farm experience remains an issue, especially for public sector advisors. There is some disagreement from non-profit sector respondents about the capacities of the public sector. This may be due to the fact that public sector advisors rely more heavily on a one-to-many approach and an online approach, rather than a one-on-one advisory program.

### 3.1 Types of Services Provided and Delivery Methods

Advisory services provided by the respondents were offered mainly to primary producers, covering the range of commodities produced within the province of Ontario. This included services to small, medium, and large-scale farmers. One respondent stated that they provided advisory services to farmers with an average acreage of 244 and to approximately 25 to 30 clients. The forms of advisory services provided were equally diverse, including soil health and fertility, crop production and protection, climate change and technological innovation, as well as best management practices. A few advisors from non-profit organisations indicated going beyond traditional advisory roles and indicated initiatives to provide advice on broader topics to their clients. This included advice on executive leadership development, trade policies, team building, as well as lobbying to affect policy change. Indeed, this presents a noteworthy addition from the private sector that was potentially lacking with traditional OMAFRA-led services. Specifically, the advisor stated that:

We do not provide a program that is going to tell people how to be farmers or agronomists. That's not the point; it is for people that may already be in agriculture at some level [...] This is a program where, they are going to learn about trade policies, some elements that are agronomy, climate change things that affect agriculture and effect issues of importance in agriculture.

Through a more pluralistic advisory system, a clear benefit is the greater variety of information that can be provided, such as described above. While variety will not singularly translate to improved quality of services, a collaborative effort with farmers on these different topics can improve the enabling environment, allowing for greater adoption of different practices and lessons. As there are fewer limitations to what can be provided by eschewing traditional ideas of agricultural extension, there is the opportunity to better respond to the individual needs of each farmer. Since we know smaller farms to be underserved, more specific information could aim to target the specific demographic, potentially providing the greatest return. However, providing a greater variety of services also creates new challenges that need to be addressed. In the forefront is that of coordination and collaboration that can only be exacerbated as different actors begin offering different, non-traditional, extension services. Analogous to the terminological difference between extension services and KTT, as different actors define their extension or knowledge transfer in a different manner, proper coordination becomes more difficult. These challenges could result in a net-loss for the effectiveness of service delivery as some aspects of extension services may be overlooked. As individual actors work within their own parameters, the system's lack of a universal definition and overall facilitator can complicate these collaborations. The outcome is a varied network of collaboration and coordination between different actors. This will be further discussed in the network analysis.

Here, it is important to note the impact that the COVID-19 pandemic has had on delivery methods. Adapting to a new online format created some setbacks for advisors and farmers alike, however, remote engagement also provided new opportunities for advisory services.

Advisors reported greater collaboration with partner agencies through online platforms, while simultaneously improving their own online and electronic capacities to find the most effective means of communication. Many also found a benefit to reducing or eliminating printed newsletters in favour of an online format. Similarly, the use of virtual meeting spaces, allowed some advisors to participate in more conferences than was possible prior to the pandemic. All respondents indicated, pandemic notwithstanding, that they participated in a variety of capacity building activities in the last 24 months. However, some did express feelings of 'Zoom fatigue' from having spent far too long in front of a computer, rather than having in-person engagements. In general, the challenges posed by the pandemic appear to have been considered a more temporary setback for the advisors, while their primary focus remained on the overarching challenges facing advisory systems in Ontario.

Respondents indicated that only 40% of the advisors employed by their organization interact directly with the farmers. For private sector non-profit organisations, the paid field level staff are known as member service representatives, focusing on facilitating program access instead of specific agronomic issues. Examples given include helping with grant or program applications for County Federations and individual farmers respectively. Within the public advisory organisation, the advisors were referred to as subject specialists and not extension officers. Their method of interaction was more one-to-many, rather than a one-to-one mode of extension as was done traditionally. Interactions were also specific to particular commodities and the specific subject areas for which each specialist was responsible. Direct interactions with the farmers were more often done for research projects rather than regular advisory services. These special initiatives, including research and development projects, are fairly negligible in terms of the total advisory services being provided. As such, one-to-one interactions are increasingly less common in favour of the one-to-many approach:

Yes, so our branch specifically has the extension specialist so everyone will kind of have specific commodities that they deal with. There's less sort of one-on-one advisory services that we provide [...] if there's like a specific issue that a certain farmer dealing with sometimes our specialists will go actually like visit the farm. But and then it was often they actually are working specifically with specific growers like on research projects and stuff like that.

Research projects under this framework are a highly collaborative effort between specialists and farmers. They are seen as a "very special relationship" in which the land is volunteered for applied research efforts. These present the opportunity for direct exchanges with the farmer, discussions of issues, and sharing research results. For non-profit organisations, there is a reliance on different organisations and industry players to bring information to members and the general farm community.

Respondents indicated that there are very few voluntary or unpaid advisors in the system. Voluntary activities occurred mainly as part of applied research projects in partnership with OMAFRA, University of Guelph and other partners. One respondent stated that due to the

vast geographic area to be covered, and limited human resources, informal networks, including certified crop advisors, were utilized to assist in completing some tasks.

Advisory methods, such as workshops, conferences, farm visits, newsletters, and online/social media, were deemed necessary by respondents to satisfy clients' advisory needs. However, it was maintained that the essential and most effective methods were the ones that allowed one on one communication with farmer clients. All respondents concurred that a one-size-fits-all approach is improper for advisory methods. Instead, it should be curated to the specific type of farmer with which they are interacting. An emphasis was placed on active listening to understand the specific needs and knowledge levels of farmers better. In turn, the advice being given needs to be tailored to both these needs and capacities. In addition to needs, different individuals have different motivations that will influence the advisory services that are best suited. Lastly, there was a distinction made between four different farmer types, including pro-activists, who actively seek advice from advisors, do-it-yourself-ers, who develop their own way, for example, by experimenting or seeking alternative sources of information, Wait-and-see-ers, who seek advice but implement this to a lesser degree or at a slower pace, Traditional/Laggard, who do what they have always done or think they know best. In response to these differences, alternative strategies have been proposed in order to reach each of these types of farmers identified. A more detailed examination will be discussed under section 3.3.1, strategies to influence behaviour.

### 3.2 Networks and Funding

The findings indicate myriad service providers, including public and private producers, all providing services to local farmers. All respondents were very familiar with many different organisations and producers that operate within Ontario, with many involved in partnerships. Some of the examples given include the Grain Farmers of Ontario, Ontario Soil Network, Cargill, Beritas, Dairy Farmers of Ontario, OMAFRA etc. The result is a diverse network of collaboration and even competition. Further complicating these networks is the question of funding. As the majority of respondents (7), stated that their organization did not charge a fee for providing advisory services to farmers, while the two who did, described it as a fee for service. What is less clear is the exact mechanism used to collect money from the client. Respondents also preferred to remain abstract with regards to the exact dollar amounts for services. When no fees were collected, operational costs were funded through a variety of mechanisms, with some organizations utilizing two or more to fund their operations. These mechanisms included direct funding from federal or provincial governments, membership fees, partnerships, indirect funding through community organisations or services tied to sales and promotions (see table 5/ Appendix).

The motivations for these partnerships often rested on a shared vision and common goals. Despite differences, all respondents do appear to want the best outcome for Ontario farmers. To a lesser extent, they noted that benefits including greater efficiency and cost saving also played a role in the development of partnerships and networks. This network plays a key

role in the producer non-profit organization and their collaboration with provincial and federal governments. Many respondents indicated a strong relationship with either or both the provincial and federal government, this included collaboration with OMAFRA. The exceptions to these networks are the for-profit input dealers that generally operate independently from others but are also acknowledged as an important component of pluralistic advisory services in Ontario. These for-profit organisations are seen as separate from both the public sector and producer organisations as advisory services are often tied to a specific product. In that sense, the knowledge can certainly be valuable, however they would not be considered as an integrated part of the network. The relationships can be depicted as a web with the non-profit organisations at the center (see Figure 2 below).

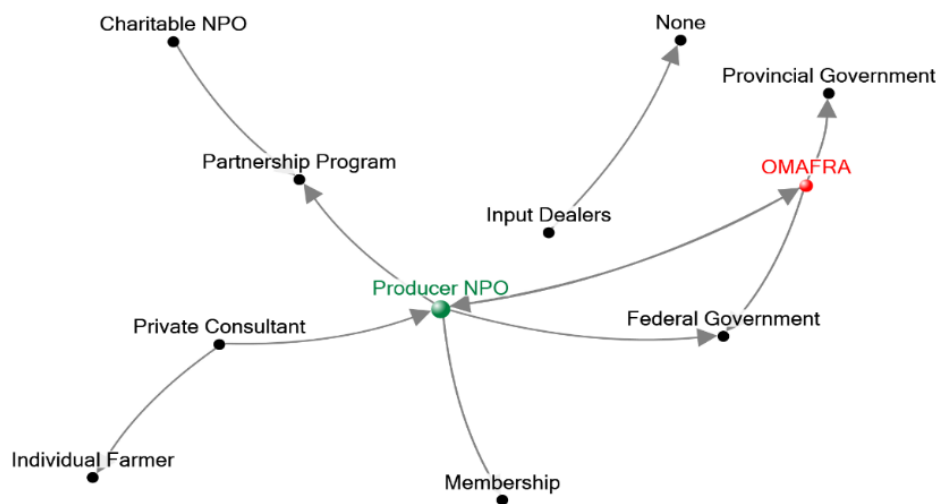


Figure 2: Advisory service Network (Source: Key informant interview)

Besides the service provider networks shown above, the respondents also discussed networks used for individual capacity building. Notably, all advisors answered having attended different capacity building training events throughout the year. These include training events such as industry and on-farm conferences, Certified Crop Advisor Training, KTT days, and many more (see table 6/ Appendix). These events are offered throughout the community for other advisors and interested parties within these networks. This helps demonstrate that the pluralistic network can be extended beyond simply providing advisory services. It can also be leveraged to improve the capacities of individual advisors. While there is generally a cost associated, this does represent a factor of cooperation and knowledge sharing between the different parties. Attending these events was often supported by allowing employees time off and financial support in some instances. However, budgetary constraints are also a limiting factor in the number of events in which advisors are able to participate. In addition to these exterior opportunities, six out of nine respondents stated that their organisation provided in-service training in the form of conferences, workshops, and online training programs.

### 3.3 Challenges

When asked about other challenges faced within Ontario's advisory network, respondents had little problem providing lists. There is an impression, whether rightly or not, that rural communities are severely under-represented and supported. This includes a lack of adequate financial resources in public advisory service partners, which results in inadequate advisory coverage in rural, remote areas. Rural areas are plagued with inadequate or unreliable internet services, which have become more pertinent during the pandemic. Respondents also noted that new technologies are often seen as intimidating by older farmers. Farmers have also expressed concern about being treated as a homogenous group. Even within one commodity producer group, there are always variations in size and agronomic practices. Similarly, the idea of separating farmers into the four types mentioned above may be considered pigeon-holing and reductive. Overall, there is concern regarding the different communication styles presented by different farmers, noting that with the shorter knowledge cycle, there are times that when the results of trials are disseminated to farmers, the innovation is already obsolete. Respondents indicated that a knowledge-gap is created when older advisory staff retire and are replaced by inexperienced, newer advisors. Similarly, there is a sense that OMAFRA has moved away from traditional advisory service delivery, distorting the expectations held by older farmers as they are no longer being provided with the services that they had previously received. OMAFRA has been forced to make these decisions given the constraints and challenges mentioned above. Therefore, the current transformations are probably the consequences of those changes that occurred during the last decade.

#### 3.3.1 Strategies to Influence Behaviour

As mentioned, the different farmer types present different challenges for advisors. Respondents indicated that it was important to understand the personality of the client with which that the advisor is interacting. This includes the initial task of determining which advisory approach is best suited for the individual farmer. Responses were aggregated and combined into table 7 in Appendix. Advocating for change and innovation was seen as most difficult when advising traditionalist or laggard farmers. Two broad approaches were mentioned when dealing with this group. Respondents stressed the need to remain patient, keep channels of communication and have information readily available. Utilizing peer-to-peer influence and access to cost share programs was also seen as strongly beneficial. However, there was still a sense of frustration expressed by the advisors, with one stating almost a sense of hopelessness:

That is I don't even know if we reach those guys, quite honestly. Like the peer to peer network might [work] [...] I find it's regional if they've got a neighbour and they do a couple of tailgate meetings or coffee and donut meetings, they're just shooting the crap about this new practice. And then the next year, "Oh well that guys corn looks pretty darn good", it's working it's all very visual and tacit [they – laggards] [...] might get on board but it's not coming from me

The second approach advocated was to regulate them heavily and wait for generational transitions to occur. There is a sense that some may be set in their ways and unwilling to change. Faced with that opposition, it becomes easy to sympathise with the frustration expressed. Although it was expressed as simply waiting for the older generation to die, there is a sense of optimism that the newer or younger generation may be more agreeable to change. Nonetheless, not all advisors expressed a sense of hopelessness. As stated by one respondent, with enough time and patience, even laggards will get on board. The view was also expressed that that knowledge brokers have a critical role to play. There is also a sense that OMAFRA and the government can play a crucial part as “there’s a lot of private services that provide the same kind of thing right, but they still look to the OMAFRA for an objective opinion”.

### 3.3.2 Private and Public Sector Distrust

Another source of distrust is that the government policies are sometimes influenced by non-farming sources and special interest groups resulting in policy outcomes that may be detrimental to farmers. An example given was the carbon tax levy. In Ontario, this is a federally mandated fuel charge (Government of Canada 2021). As crop farming involves a number of heavy machines and rural communities often necessitate longer drives for supplies, the government initiative can be seen as unfairly targeting farmers. In addition, farmers feel that this policy was enacted with little consultation, relying primarily on the advice from environmental group lobbyists. Conversely, there is also distrust of many private actors as they often advocate certain products and provide agricultural advice linked to their own products. Although private sector advisors might not intentionally influence farmers, advisors acknowledge a bias with product-linked advisory services. Consequently, one respondent stated that OMAFRA is seen as an objective voice to counter-balance private sector advice that may be biased. Reconciling these contradictory statements is a challenge for advisors in both the private and public sectors. Respondents highlighted a need to listen to farmers and better understand their needs and knowledge levels. In addition, similar to the differing motivations from organisations, it is important to acknowledge the farmer’s own motivations. Some are driven by profits, with a long or short-term outlook. In some instances, the farmers' accountant may even be more influential compared to advisors while making farm-level decisions. Overall, respondents stated that honesty and integrity were foremost important when offering advice. When the advice is tied with the need to sell a product, it becomes easily dismissed. Other considerations and challenges for advisors included the need for Certified Crop Advisors to be knowledgeable on a broad scope of agronomic issues, including prompt response to queries and timely explanation. Respondents also saw strong value in publishing success stories or farmers who have adopted innovations, especially for laggards or wait-and-see-ers.

### 3.4 Quality of Services and Satisfaction

Overall, 90% of respondents expressed a moderate satisfaction level (3.5/5), with one being least satisfied and five being highly satisfied with the quality of services delivered and the connected uptake of advice. These results echo both the level of frustration and success that



the individual advisors have expressed. In general, the ratings were given based on the growth of their respective clientele bases. For some, the rate remained relatively static, while others expressed an improvement in the usage of advisory services. The overall levels of satisfaction reflected both their own capabilities and the effectiveness of the services provided in reaching out to their audience. It is necessary to have effective farmer lobbying to influence policy makers, often supported by different advisors, to implement farmer-friendly policies and to support messaging that positively impacts agriculture in Ontario. While there are concerns regarding broadband issues in rural Ontario, internet infrastructure is continually improving and reaching acceptable and usable levels. Lastly, the train-the-trainer approach has been reasonably effective with advisory services. Collaborative efforts at maintaining and improving the knowledge of the advisory network have been beneficial for individuals and clients.

#### 4. Conclusion

The preliminary results indicate that contemporary crop and soil advisory services can be defined as a pluralistic system with various actors marred by different definitions, goals, and methods. There are contrasting degrees of trust levied by product-tied advice, lack of practical on-farm experiences, or any alternative goals that may not align with the best interests of farmers. The topic related to the capacities of individual advisors is of some concern. As public funding has waned and experienced advisors have left, more research needs to be done concerning the new generation of advisors. We currently have little information about recent graduates who seek employment in Ontario. This research can be said to contribute to a small but growing understanding of the evolution of advisory services within the province. The evolving advisory delivery methods, especially online and remote delivery and product-tied services, need to be aligned with the needs of different clients, especially smallholders and reluctant adopters. Meeting the needs of various target clients has increasingly become a challenging task. The transformations of the systems with the rapid decline of the number of public sector advisors, followed by a shift away from traditional public extension services to allow various stakeholders to provide services, needed a system that addresses greater coordination and collaboration. The transition needs to adopt a model that can encapsulate various practices and beliefs held by various organizations.

## Works Cited

- Allen, N.G. P. 2021. "Social Side of Soils: A Farmer Centred Analysis on the Adoption of Cover Crops". Unpublished MSc. Thesis, School of Environmental Design and Rural Development, University of Guelph.
- Al-Kaisi, M. M., Elmore, R. W., Miller, G. A., & Kwaw-Mensah, D. 2015. "Extension Agriculture and Natural Resources in the U.S. Midwest: A Review and Analysis of Challenges and Future Opportunities". *Natural Sciences Education*, 44(1): 26-33. doi:10.4195/nse2014.10.0022
- Agricultural Institute of Canada (AIC). 2018. "An Overview of the Canadian Agricultural Innovation System". Ottawa: AIC.
- Agriculture and Agri-Food Canada (AAFC). 2016. "An Overview of the Canadian Agriculture and Agri-Food System." [http://publications.gc.ca/collections/collection\\_2016/aac-aafc/A38-1-1-2016-eng.pdf](http://publications.gc.ca/collections/collection_2016/aac-aafc/A38-1-1-2016-eng.pdf).
- Agricultural Odyssey Group. (2002). "The Odyssey Report: An Industry Quest for Solutions". Agricultural Adaptation Council, Ontario
- Benson, Amanda, and Tahseen Jafry. 2013. "The State of Agricultural Extension: An Overview and New Caveats for the Future." *The Journal of Agricultural Education and Extension* 19 (4): 381-393.
- Bergen, A., Pletsch, C., Pratley, E., Simms, G., Moore, R., Zachariah, O., . . . Brown, S. (2018). "Growing Knowledge Translation and Transfer (KTT) in Ontario: A Manual of Best Practices From Agriculture, Agri-food and Rural KTT Researchers and Practitioners (2010-2018)". Retrieved from [https://www.uoguelph.ca/alliance/system/files/Growing\\_KTT\\_in\\_Ontario\\_Manual\\_of\\_Best\\_Practices.pdf](https://www.uoguelph.ca/alliance/system/files/Growing_KTT_in_Ontario_Manual_of_Best_Practices.pdf)
- Birner, Regina, Kristin Davis, John Pender, Ephraim Nkonya, Anandajayasekaram Ponniah, Javier Ekboir, Adiel Mbabu, et al. 2009. "From Best Practice to Best Fit: A Framework for Designing and Analyzing Pluralistic Agricultural Advisory Services Worldwide." *The Journal of Agricultural Education and Extension*, 15(4): 341-355.
- Blackburn, Donald J. 1994. "Extension handbook: processes and practices". 2nd Edition. Toronto: Thompson Educational Publishing.
- Carlow, Dan. 2009. "Local Advisory Committees Factsheet". Factsheet, Guelph: Ontario Ministry of Agriculture, Food, and Rural Affairs.
- Cerf, M., M.N. Guillot, and P. Olry. 2011. "Acting as a Change Agent in Supporting Sustainable Agriculture: How to Cope with New Professional Situations?" *The Journal of Agricultural Education and Extension* 17 (1): 7-19. doi:10.1080/1389224X.2011.536340.

- Epp, S. (2018). "Agricultural Advisory Committees: Recognizing the value of Agriculture in the Golden Horseshoe". Toronto: Friends of the Greenbelt Foundation.
- Faure, G., M. K. Huamanyauri, I. Salazar, C. Gomez, E. de Nys, and M. Mulcire. 2017. "Privatisation of agricultural advisory services and consequences for the dairy farmers in the Mantaro Valley, Peru." *The Journal of Agricultural Education and Extension*, 23 (3): 197-211.
- Government of Canada. 2021. *Canada.ca*. Accessed 07 10, 2021. <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work.html>.
- Harder, A., Landel, N., Bengel, M., Denny, M., & Farmer, K. 2021. "Exploring Early Career Extension Agents' Perceptions of Their Mentors, Best Liked Coworkers, and Organizational Commitment". *Journal of Human Sciences and Extension*, 9(2), 80-95. Retrieved from <https://www.jhseonline.com/article/view/1162/909>
- Hambly Odame, H. (2020). "Agricultural and agri-food extension in Canada". In D. O. Torimiro (Ed.), *Global Agricultural Extension Practices: Country by Country Approaches*: Nova Publishers.
- Hunt, W., Birch, C., Coutts, J., & Vanclay, F. 2012. "The Many Turnings of Agricultural Extension in Australia". *The Journal of Agricultural Education and Extension*, 18(1), 9-26. doi:10.1080/1389224x.2012.638780
- Juhasz, M. 2014. "Agri-Environmental Management in Southern Ontario: Enhanced Program Participation through Better Understanding of Dairy Farmers' Social Dynamics". Unpublished Ph.D. Thesis. University of Guelph.
- Klerkx, Laurens, and Jolanda Jansen. 2010. "Building knowledge systems for sustainable agriculture: Supporting private advisors to adequately address sustainable farm management in regular service contacts." *International Journal of Agricultural Sustainability*, 8 (3): 148-163. doi:10.3763/ijas.2009.0457.
- Labarthe, Pierre, and Catherine Laurent. 2013. "Privatization of agricultural extension services in the EU: Towards a lack of adequate knowledge for small-scale farms?" *Food Policy* 240-252. doi:10.1016/j.foodpol.2012.10.005.
- Lammers-Helps, Helen. 2016. "Measuring the effects of cover crops on soil health; Elora Research Station Environmental Monitoring Project is the first of its kind in North America". News, London: Postmedia Network Inc.
- Landini, Fernando. 2020. "What does 'quality' mean in the context of rural extension and advisory services?" *Agronomía Colombiana* 38 (1): 133-147. doi:10.15446/agron.colomb.v38n1.81738.

- Maynard, Hugh, and Jacques Nault. 2005. "*Big Farms, Small Farms*". Ottawa: Agricultural Institute of Canada.
- Milburn, Lee-Anne S., Susan J. Mulley, and Carol Kline. 2010. "The End of the Beginning and the Beginning of the End: The Decline of Public Agricultural Extension in Ontario." *Journal of Extension* 48 (6).
- Marsh, S. P., & Pannel, D. J. 1999. "Agricultural extension policy and practice in Australia: An overview". *The Journal of Agricultural Education and Extension*, 6(2), 83-91. doi:10.1080/13892249985300201
- OMAFRA. 2021. "*Canadian Agricultural Partnership (the Partnership)*". August 5. Accessed August 09, 2021. <http://www.omafra.gov.on.ca/english/cap/index.htm>.
- Paschen, J.-A., Reichelt, N., King, B., Ayre, M., & Nettle, R. (2017). "Enrolling advisers in governing privatised agricultural extension in Australia: challenges and opportunities for the research, development and extension system". *The journal of agricultural education and extension*, 23(3), 265-282. doi:10.1080/1389224x.2017.1320642
- Prairie Research Associates. 2011. "*Environmental Farm Plans: Measuring Performance, Improving Effectiveness, and Increasing Participation*". Ontario Federation of Agriculture.
- Roche, S. M., A. Jones-Bitton, M. Meehan, M. Von Massow, and D. F. Kelton. 2015. "Evaluating the effect of Focus Farms on Ontario dairy producers' knowledge, attitudes, and behavior toward control of Johne's disease." *Journal of Dairy Science* 98 (8). doi:10.3168/jds.2014-8765.
- Roche, S. 2014. "Investigating the Role of Agricultural Extension in Influencing Ontario Dairy Producer Behaviour for Johne's Disease Control". Unpublished Ph.D. Thesis (Population Medicine). The University of Guelph.
- Rajić, A., Young, I., & McEwen, S. A. (2013). "Improving the Utilization of Research Knowledge in Agri-food Public Health: A Mixed-Method Review of Knowledge Translation and Transfer". *Foodborne Pathogens and Disease*, 10(5), 397-412. doi:10.1089/fpd.2012.1349
- Stark, Deb. 2017. "A selected (and slightly biased) history of OMAFRA." *Ontario Farmer*, June 27.
- Swanson, L et al. 2021. "Overview of the US's University-based Cooperative Extension Services (Discussion Draft)". North American Agricultural Advisory Network, Colorado State University System Office.
- Statistics Canada. 2016. "2016 Census of Agriculture." Census Report. <https://www.statcan.gc.ca/eng/ca2016>.

- Turner, J. A., Landini, F., Percy, H., & Gregolin, M. (2021). Advisor understanding of their roles in the advisory system: a comparison of governance structures in Argentina, Australia, Brazil, and New Zealand. *The Journal of Agricultural Education and Extension*, 1-26. doi:10.1080/1389224x.2021.1944233
- The World Bank. (2012). "Agricultural Innovation Systems". Washington, DC: The World Bank. Retrieved from <http://siteresources.worldbank.org/INTARD/Resources/335807-1330620492317/9780821386842.pdf>
- Watters, M., Godkin, M., Leger, D., Coe, J., Lissemore, K., & Kelton, D. (2019). "Experiences, attitudes and perceptions of accredited advisors towards a voluntary producer training program for Canadian Quality Milk". *The Canadian Veterinary Journal*, 60(9), 955-963.
- Warsame, Warsame Jirde. 2015. "*Comparative Analysis of Agricultural Extension in Ontario, Yaroslavl Oblast and Crimea*". Unpublished MSc Thesis, School of Environmental Design and Rural Development, The University of Guelph.
- Woyzbun, Elisabeth. 2010. "*Spatial Analysis of the Adoption of Nutrient Management Related Best Management Practices in Ontario*". Ottawa: Agriculture and Agri-Food Canada .

## Appendix

*Table 1: Key Characteristics of Contemporary Agricultural Extension and Advisory Services in the United States of America and Australia*

<b>Characteristics</b>	<b>USA</b>	<b>Australia</b>
Public funding for extension	Public funding for agricultural extension and advisory services have declined over the years, although multiple nationally funded programs and partnerships geared towards <a href="#">US agriculture extension</a> . \$315 million was funded by federal governments in 2020, which accounts for 10-50% funding at state level extension and advisory services.	Public funding for agricultural extension and advisory services has declined over the years, although there are public funding specifically for agricultural extension still exists. Over \$21.3 million was invested between <a href="#">2013-2017</a> . Co-investment of fundings through the <a href="#">National Primary Industries Research, Development and Extension (RD&amp;E) framework</a>
Role of public organisations for extension delivery	Public extension provider (national and state) is one of many service providers under pluralistic systems. Provides direct education to farmers through the Cooperative Education System, employing extension agents in approximately 3000 counties. Ensures a federal, state, and <a href="#">local cooperation for reach</a> .	Public extension provider (national and state) is one of many service providers under pluralistic systems. Extension and outreach efforts organised by the <a href="#">Australian Government</a> . Support given to universities and individual farmers (see below).
Coordination mechanisms / accountability	While public agriculture extension in the US. is state-owned, collaboration between the state systems, and support from the United States Department of Agriculture (USDA), have led the collection of state-owned extension programs to be seen as a national <a href="#">US Cooperative Extension System</a> .	The evolution of the agricultural extension sector in Australia has involved an emphasis on government coordination and leadership in bringing-in private organisations. Rather than a decrease, allowing for private organisations to fill gaps, they were invited to join and collaborate ( <a href="#">Marsh and Pannel, 1999</a> ). Collaboration and coordination exist among national, state, territory governments, research institutes, universities through <a href="#">National Primary Industries Research, Development and Extension (RD&amp;E) framework</a> (see Hunt et al, 2012).

University level education for extension	The US has a number of agricultural extension specific degrees available at a variety of universities, including a strong agricultural focus through Land Grant University (LGU) Extension Service Systems. Funding for LGU extension services is primarily dependent upon their State and Counties. In comparison, only UoG has an extension-specific program (albeit not exclusively agriculturally focused). Recent university graduates hired as extension agents are provided with mentors ( <a href="#">Harder et al. 2021</a> ).	While there does not appear to be extension-specific degrees, the courses are taught in the form of graduate course, undergraduate course, and micro-credit. There are <a href="#">clear pathways towards a career in extension</a> for students in various Universities. For example, see <a href="#">Rural Innovation Research Group</a> , University of Melbourne <a href="#">School of Environment and Rural Science</a> , University of New England, The University of Queensland, <a href="#">Master and Certificate in Rural Development</a>
Association / forums for scholarly and practitioner communities	Multiple forums and associations are available for extension scholars and practitioners, including: <a href="#">National Extension Association of Family and Consumer Sciences</a> , <a href="#">The American Association for Agricultural Education</a> , <a href="#">Associations for International Agricultural Education and Extension</a> , <a href="#">National Institute of Food and Agriculture Cooperative Extension Systems</a> (Partnerships between government and universities).	<a href="#">Australasia Pacific Extension Network</a> provides a forum for cooperation between government and universities for extension research ( <a href="#">Example</a> ), <a href="#">Agrifutures website</a> ,
Methods of delivery	Although there have been many transformations of extension delivery methods, including reliance on digital delivery, publicly funded extension (national, and state level) continue to involve in face-to-face service and farmers training.	Although there have been many transformations of extension delivery methods, including reliance on digital methods, publicly funded extension (national, and state level) continue to involve in face-to-face service and farmers training.
Replacement of extension / advisory term	The term agricultural extension is used at times, however, extension remains predominant.	Nearly exclusively uses the term ' <a href="#">extension</a> ' rather than advisory or Knowledge Translation and Transfer (KTT).

Source: Based on Swanson et al. (2021); Turner et al. (2021); Harder et al. (2021); Al-Kaisi et al (2015); Paschen et al (2017); Hunt et al (2012); Marsh & Pannel (1999)

*Table 2: Key Transformations of Agricultural Extension and Advisory Services in Ontario*

<b>Major Issues</b>	<b>Key findings</b>	<b>Sources</b>
Decline in public Extension in the 1990s	<ul style="list-style-type: none"> <li>• Reduction in funding and political support for public extension.</li> <li>• Large reduction in public sector advisors employed by OMAFRA, the position of agriculture representative was eliminated.</li> <li>• Shift towards a “return on investment” approach to providing public extension services.</li> </ul>	Hambly (2019); Stark (2017); Roche (2014); Milburn et al. (2010); Maynard & Nault (2005)
The changing role of public agricultural advisory services and the emergence of private extension actors to fill the gaps of public services	<ul style="list-style-type: none"> <li>• Shift towards agri-business advisory services and networked information and non-formal education.</li> <li>• Public extension workers shift to community development, facilitative learning and individual empowerment roles.</li> <li>• Movement towards specialization in agriculture in conflict with the “generalist” nature of extension educators.</li> <li>• OMAFRA shifts from providing face-to-face extension to methods and approaches, such as fact sheets, digital information sources, media, and partnerships with other organizations.</li> <li>• OMAFRA staff interact at the organizational and policy level in a “train the trainer” approach to influence the uptake of new technologies at a more macro-level scale.</li> </ul>	Hambly (2020); Stark (2017); Juhasz (2014); Milburn et al. (2010)
Greater coordination required amongst extension actors	<ul style="list-style-type: none"> <li>• Farmers feel improvements could be made in extension by increasing cooperation between stakeholders of extension and advisory services for soil conservation practices.</li> <li>• Cross-sectoral approaches linking agriculture, human health, environment are now a focus and challenge for the extension.</li> </ul>	Allen (2021); Hambly (2020); Warsame (2015); Roche (2014); Juhasz (2014)
Unequal distribution of extension services, and shortage of	<ul style="list-style-type: none"> <li>• Small and medium farms are affected by the decline in public extension to a greater extent than large farms.</li> </ul>	AIC (2018); Roche (2014); Rajic et al (2013); Maynard & Nault (2005)



highly skilled workers	<ul style="list-style-type: none"> <li>• Market-driven research has led to more restricted information flows.</li> <li>• Shortages of skilled labours, especially for extension services, to facilitate the adoption of research outputs at the farm level.</li> <li>• Current KTT initiatives are not effectively reaching all members of the target audiences in Johnes Disease initiatives.</li> <li>• Direct interactions between users of extension services and researchers are one of the most important factors in ensuring uptake of research results to allow a contextual understanding to develop. Research is presented in a format that does not meet the needs of end-users.</li> </ul>	
Combination of Top-down, supply-chain, and participatory nature of agricultural extension in Ontario	<ul style="list-style-type: none"> <li>• Most Johnes disease programs employ top-down, linear forms of education</li> <li>• Bottom-up approaches have been shown to improve adoption and are recommended in the dairy industry.</li> <li>• Veterinarian advisors could be more effective by participating in bottom-up, producer-led groups.</li> <li>• Canadian Quality Milk Program employing veterinarians to provide training and extension to ensure farmers are meeting standards.</li> <li>• Environmental Farm Plans giving farmers the opportunity to identify issues and providing funding and extension support for innovation.</li> <li>• Local advisory committees established amongst community members to provide extension support and in nutrient management issues.</li> <li>• Local advisory committees formed by some municipal councils serve as the forum for agricultural stakeholders to influence agricultural plans, programs and policies at local level.</li> </ul>	Watters et al. (2019); Epp (2018); Roche (2015); Roche (2014); Woyzbun (2010), Carlow (2009)
Replacing extension with labels such as Knowledge	<ul style="list-style-type: none"> <li>• Shift away from “extension” to using the term “KTT”.</li> <li>• Emphasis on two-way dialogue in KTT.</li> </ul>	Hambly (2020); Bergen et al. (2018);

---

Translation and Transfer (KTT)	<ul style="list-style-type: none"> <li>• KTT practices are embedded into research funding by federal and provincial programs.</li> <li>• Federal funding provided to the province for KTT approaches in research.</li> </ul>
--------------------------------	--

---

*Table 3 Experience of Advisors*

<b>Years of experience/service</b>	<b>No. of Respondents</b>
1 to 5 years	2
6 to 10 years	1
11 to 15 Years	2
16 to 20 Years	
20+ Years	3

One (1) respondent no response

*Table 4 Time Devoted to Services*

<b>Percentage of time devoted to service-related activities</b>	<b>No. of Respondents</b>
< 10 %	
10 – 25 %	2
26 – 40 %	2
41 – 55 %	
51 – 65 %	
66 – 80 %	2
81 – 95 %	1
>95%	1

One (1) respondent no response

*Table 5 Sources of Funding*

<b>Type of funding</b>	<b>Response</b>
Direct federal government funding	1
Direct provincial government funding	4
Service covered through membership fee	3
Service tied to a product sales/promotion	1
Other - Federal/Provincial Partnerships	5
Other – Indirect through commodity organizations	1
MUNICIPAL Support Grants	1

Table 6 List of Training Events

Training Events	
1.	International Association of Programs for Ag Leaders Conference
2.	Certified Crop Advisor Training
3.	Nature Based Solutions Conference
4.	OMAFRA Conferences
5.	Ontario Non-profit Network Training
6.	Precision Ag Conference
7.	Industry Conferences
8.	On-Farm Conference
9.	Latornell Conservation Symposium
10.	Southwest Ag Conference
11.	FarmSmart
12.	KTT Days
13.	Regional Diagnostic Days
14.	Other program that contributes towards continuing education credits

Table 7 “Types” of Farmers

Types of Farmers	Techniques followed
<b>Pro-activists</b> , who actively seek advice from advisors	Conferences, workshops, on-farm trials, knowledge brokers etc. Advisors need to be ready for those who are actively looking to learn. Information needs to be readily available. Peer groups can demonstrate the benefits of change (once may be enough for the pro-activists). Encourage farmers to join their specific commodity board, collaborate with this group on research projects/initiatives. Temper expectations.
<b>Do-it-yourselfers</b> , who develop their farming in their own way, for example, by experimenting or seeking alternative sources of information	As above Social media is key. Information needs to be readily available in variety of formats. Training sessions are encouraged. Provide support for evaluation of field trials.
<b>Wait-and-see-ers</b> , who seek advice but implement this to a lesser degree or at a slower pace	Use a variety of media, Peer to peer groups, industry led initiatives, grassroots level initiatives etc. Patience and constant repetition are necessary.
<b>Traditional/Laggard</b> , who do what they have always done or think they know best.	Place value on peer to peer learning, demonstrate the profitability of initiatives, continued engagement and encouragement is necessary. Colloquially, ‘keep the door open’, give them access to cost-share programs, and have information available. Pessimistically wait for them to die, or regulate them