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Farmer knowledge as formal knowledge: A case study of farmer-led research in Ontario, Canada

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Abstract

Farmer-led research (FLR) is a process of inquiry wherein farmers use scientific methods to address their own on-farm curiosities and challenges in ways that are compatible with the scale and management style of their operations. With its flexible, adaptable, participatory, grassroots-oriented nature, FLR has typically been employed by farmers inter-

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Declaration of Interest

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ested in ecological farming techniques and technologies, and evidence shows that it contributes to the adoption and improvement of ecological management practices across a range of contexts. Engagement in FLR initiatives has also been linked to positive social outcomes, including community-building, farmer empowerment, and enhanced capacity for leadership and collective action. In this paper, we present a case study of the Ecological Farmers Association of Ontario's (EFAO) Farmer-Led Research Program (FLRP), which is currently one of relatively few FLR initiatives in North America. We draw on data from a participatory, mixed-methods research project. Our results highlight how the FLRP is enabling farmers to feel more knowledgeable, confident, motivated, and inspired to adopt and/or improve ecological practices on their farms, in part by supporting them in building robust social networks that align with their farming values and priorities.

Keywords
Farmer-led Research, Ecological Agriculture, Farmer-to-Farmer Networks, Knowledge-Sharing, Social Learning, Evidence-Informed Practice, Ontario

Introduction

For as long as people have been farming, farmers have engaged in experimentation as a means of refining the productivity, sustainability, and quality of their farming systems. As they work through growing seasons and cycles, they test techniques and technologies, seeds and soil amendments, new innovations and traditional practices. In spite of this, conventional agricultural research and development generally positions farmers as subjects of research and/or consumers of research results, with the role of researcher reserved for those with more formal scientific credentials (Farrington, 1989; Konde, 1998).

In resistance to the dominance of expert scientific agricultural knowledge, the concept of farmers engaging in—and leading—more formalized research efforts began gaining traction in the 1990s (Waters-Bayer, 2015). Originally targeted at small-scale, resource-poor farmers in the Global South, farmer-led research (FLR) was developed as a method whereby "farmers organized in research teams were given the tools to plan and carry out randomized block design trials and replications, and to evaluate and analyze the results in a manner that was statistically verifiable…" (Humphries et al., 2015, p. 3). The knowledge generated from FLR is a public good (Braun et al., 2000) and widespread dissemination and practical application of research results is essential (Ashby et al., 2000). With its adaptable, participatory, grassroots-oriented nature, FLR has typically been employed by small- and medium-scale farmers interested in ecological techniques and technologies, and research has found that it supports the adoption and improvement of ecological management practices across a range of contexts (Humphries et al., 2015; Wettasinha et al., 2014). Engagement in FLR initiatives is also linked to positive social outcomes that include community-building, farmer empowerment, and enhanced capacity for leadership and collective action (Ashby et al., 2000; Classen et al., 2008; Waters-Bayer et al., 2015). As will be elaborated upon in this paper, the methodology has close ties to agroecology, and can serve as a strategy for supporting transitions toward more agroecological food and farming systems.

Although FLR was initially most widely practiced in Latin America, Africa, and Asia, more recently the methodology has gained traction in the Global North. Notable examples include initiatives to reduce antibiotic and pesticide use in Scottish dairy operations (Macmillan, 2017), increase cover cropping in the United States (Lenssen, 2015; Wood & Bowman, 2021), and address soil health in Canada (Hargreaves et al., 2019). Because of the relative novelty of FLR in the Global North, there is little available evidence regarding program processes, impacts, challenges, and opportunities in that context. Our research addressed this gap through in-depth analysis of the Ecological Farmers Association of Ontario's (EFAO) Farmer-Led Research Program (FLRP).

The primary transdisciplinary research network involved in this work is the EFAO itself. Founded in 1979, EFAO represents almost 1,000 members, and supports farmers in building resilient, ecological farms and growing a strong knowledge-sharing community. The organization views resilience

broadly in economic, ecological, and social terms. It envisions a future in which "thriving ecological farms are the foundation of our food system" and agriculture "protects our resources, increases biodiversity, mitigates climate change, and cultivates resilient, diverse, equitable communities" (EFAO, 2020). To achieve that vision, programming focuses on farmer-led education, research, and community-building, all aimed at enhancing farmers' ability to learn from each other in order to improve the health of their soils, crops, livestock, and environment, while running profitable farm businesses. EFAO is also involved in larger networks—for example, it was a founding member of the Farmers for Climate Solutions coalition—that advocate for policy solutions to build social and ecological resilience. Indeed, the organization strongly supports the development of a network of networks to enhance its efforts, along with those of like-minded organizations.

To conduct the research shared in this paper, the EFAO collaborated with a team of faculty and graduate student researchers from the University of Guelph. This relationship was grounded in the principles of participatory action research (PAR) and community-engaged scholarship (CES). These principles require researchers to address community-identified issues and work with local stakeholders in a spirit of reciprocal exchange, ensuring that the research endeavor is mutually beneficial for all parties and that results can be meaningfully applied (see Brydon-Miller et al., 2003; Hall, 2009). This methodological approach challenges traditional notions regarding who is perceived as a "researcher" (Reason & Bradbury, 2008) and, as such, aligns closely with the philosophy of FLR.

In the spirit of PAR and CES, the EFAO and the university-based research team co-designed the project and communicated closely throughout its development and execution. The overall project goal was to assess FLRP impacts, constraints, and opportunities. Based on our results, we argue that FLR is deeply impactful, as it enables farmers to produce knowledge grounded in both their lived experiences and traditions of more formalized scientific discovery, and to share that knowledge so that it can be applied. In so doing, the methodology supports the uptake and improvement of ecological farming practices and can support transitions to more sustainable and resilient food and farming systems.

Literature Review

The 2022 report from the Intergovernmental Panel on Climate Change notes that "land-based mitigation measures represent some of the most important options currently available" to address the urgent climate crisis (IPCC, 2022, p. 185). However, while the potential for agriculture to mitigate climate change is high, interconnected political, economic, and socio-cultural barriers act as "lock-ins" (International Panel of Experts on Sustainable Food Systems [IPES-Food], 2016), constraining a widespread transition toward ecologically sustainable food production methods (Food and Agriculture Organization of the United Nations [FAO], 2019; Gliessman, 2014; International Assessment of Agricultural Knowledge, Science and Technology for Development & United Nations Environment Programme, 2009). In this context, it is important to understand mechanisms that can encourage farmers to adopt practices such as cover cropping, minimizing soil tillage, reducing agrochemical application, integrating livestock, and conserving biodiversity.

Agroecology offers a useful framework for understanding how an ecological transition can be facilitated as, at its core, agroecology aims to transform the dominant food system away from industrial practices and toward those that foster ecological soundness, as well as economic viability and social justice (Altieri & Toledo, 2011; Gliessman, 2014; Pimbert, 2018). Defined simultaneously as a scientific discipline, a set of on-farm practices, and a social movement (Méndez, Bacon, & Cohen, 2013), one of the central components of agroecological transitions is knowledge (Altieri & Toledo, 2011; Anderson et al., 2019; Pimbert, 2018; Warner, 2006); however, Gliessman (2014) notes that "Although we have accumulated a great deal of knowledge about the ecological relationships underlying sustainable food production, that knowledge has seen relatively little application, and industrial agriculture has meanwhile strengthened its dominance of the world food system" (p. 14) This raises questions regarding what kinds of

knowledge, knowledge-generation, and sharing processes are most likely to translate into the pursuit of agricultural transition.

Knowledge (Co-)Production and Social Learning Networks

In the conventional agricultural paradigm[1] knowledge produced by professionally trained experts drawing on western scientific traditions plays a dominant role (Carolan, 2006; Sumane et al., 2018). Such knowledge focuses heavily on increasing agricultural productivity to the exclusion of other (socio-cultural, ecological) concerns (Ingram, 2008). By contrast, agroecology is associated with more holistic, locally grounded, experiential, and traditional knowledge held by farmers (Altieri & Toledo, 2011; Anderson et al., 2019; Rosset et al., 2011). While these two types of knowledge are often conceptualized as being in opposition to each other, Sumane et al. (2018) note there is "an increasing body of research that tells another story, that of the complementarity of informal farmer and formal scientific knowledge, and points to the necessity of combining them to achieve the best results and meet sustainability goals" (p. 235). In challenging this formal/informal dichotomy, and its implied hierarchy, farmer knowledge can be viewed without the "informal" label that has been, and continues to be, used by some to devalue it. This perspective aligns with other research that suggests agroecology is best supported by knowledge that is co-produced through collaboration, negotiation, and exchange among diverse actors, including farmers and scientists (Carolan, 2006; Humphries et al., 2015; Pimbert, 2018).

If knowledge co-production is an essential component of supporting agricultural transformation, so too are knowledge-sharing processes grounded in social networks and social learning principles (Kroma, 2006; Sumane et al., 2018; Sutherland et al., 2017). As Schneider et al. (2009) explain, "The social learning approach represents a philosophy focusing on participatory processes of social change" (p. 496). Such participatory approaches are actualized by networks wherein farmers are "active partners and knowledge co-producers rather than passive receivers" (Sumane et al., 2018, p. 235). Arguably, "agroecology can be effectively put into action only when networks of farmers and scientists learn together [emphasis added] about the local ecological conditions. Agroecology cannot be 'transferred' in the way that a chemical or a mechanical technology can; it must be facilitated by social learning…" (Warner, 2006, p. 3). Such networks stand in contrast to mainstream agricultural extension processes that, to the extent they still exist, are typically characterized by top-down, unidirectional knowledge flows and inattention to power dynamics, local conditions, political economic context, and farmers' lived experience (Cook et al., 2021; Ingram, 2008).

Farmer-Led Research

Farmer-led research represents one mechanism through which agricultural knowledge co-creation and network-based social learning can be operationalized. The core of the methodology is to encourage active collaboration between farmers and scientists to enable the co-production of knowledge. While farmers drive the agenda, "scientists can play an important role by sharing their knowledge and skills, building farmers' capacity in certain aspects of experimentation, helping farmers understand why something works or not, documenting and sharing what farmers are doing and validating innovations in scientific terms to increase credibility in the formal [agricultural research and development] sector" (Waters-Bayer et al., 2015, p. 5) and enhancing the potential for results to influence policy. The collaboration among farmers and, in many cases, between farmers and other researchers that is facilitated through FLR is often supported by nongovernmental organizations (NGOs) and other civil society organizations and has been shown to enhance social cohesion and enable collective action (Classen et al., 2008; Wettasinha et al., 2014).

[1] By this, we refer to agriculture grounded in industrial principles and practices, including industrial-scale production, monocrop systems, heavy reliance on chemical fertilizers and pesticides, and a general tendency toward external inputs rather than on-farm production and recycling (see IPES-Food, 2016).

The increased capacity for collective action fostered through FLR can be used to many ends; however, a central goal is to drive the adoption of ecological farming practices, in part by increasing farmers' capacity to make evidence-informed decisions regarding sustainable farm management (Braun et al., 2000). As Humphries et al. (2015) explain, "Involving farmers as protagonists of their own agricultural research agendas is one means of permitting continual innovation, allowing the moving target of sustainability to be kept continually in the 'crosshairs' of local people" (p. 2). This is borne out by research on FLR initiatives. For example, a Honduras-based study found that a majority of participants in an FLR program improved the ecological integrity of their agroecosystems, for example by increasing on-farm biodiversity (Classen et al., 2008). In Cuba, FLR was found to contribute to crop diversification, economic improvements, increased adoption of locally adapted seed varieties, and increased use of integrated pest management (IPM) to reduce agrochemical application (Ortiz Pérez, 2013), and Wettasinha et al. (2014) found that farmer-researchers' farms were more resilient to the impacts of Hurricane Mitch in 1998. Similarly, in Scotland, FLR efforts have reduced antibiotic use in dairy production as well as pesticide applications (Macmillan, 2017), while in Iowa they contributed to significant increases in cover cropping (Lenssen, 2015).

Farmer-Led Research in Ontario, Canada

As in other jurisdictions, adoption rates of ecological farming practices (e.g., cover cropping, compost application, biodiversity conservation, reduced tillage, livestock integration, minimizing agrochemical application) in Ontario, Canada, remain relatively low (Ontario Ministry of Agriculture, Food and Rural Affairs [OMAFRA], 2018; Rotz et al., 2019). While the province's Ministry of Agriculture acknowledges the importance of encouraging a greater uptake of ecological practices, extension services that could support that work have been almost non-existent since the 1990s, leaving most agricultural advising to industry-embedded crop advisors (Milburn et al., 2010). Even when extension services were more readily available, they were generally not well-aligned with the needs of ecological farming (Milburn et al., 2010), and support for ecological agriculture has typically been left to NGOs and farmer networks (Isaac et al., 2018).

In 2016, one such network (EFAO) received funding from the Ontario Trillium Foundation to begin its Farmer-Led Research Program (FLRP) with 11 participating farmer-researchers. The program was the first—and at the time of writing, still the only—one of its kind in Ontario. By 2022, it had supported more than 80 farmers in conducting more than 125 scientific trials on their farms. These farmer-researchers received a CA$250-$500 stipend, depending on project scope, and the program also provided them with up to CA$1,500 for research expenses. The FLRP emphasizes the cultivation of a "culture of curiosity" among farmers, for example, by framing its yearly call for proposals as a "call for curiosity" that centers the idea of helping farmers find answers to their "burning on-farm questions and challenges." A research advisory committee selects projects to support, and EFAO staff work with farmer-researchers to develop and implement their research and share the results (see Figure 1).

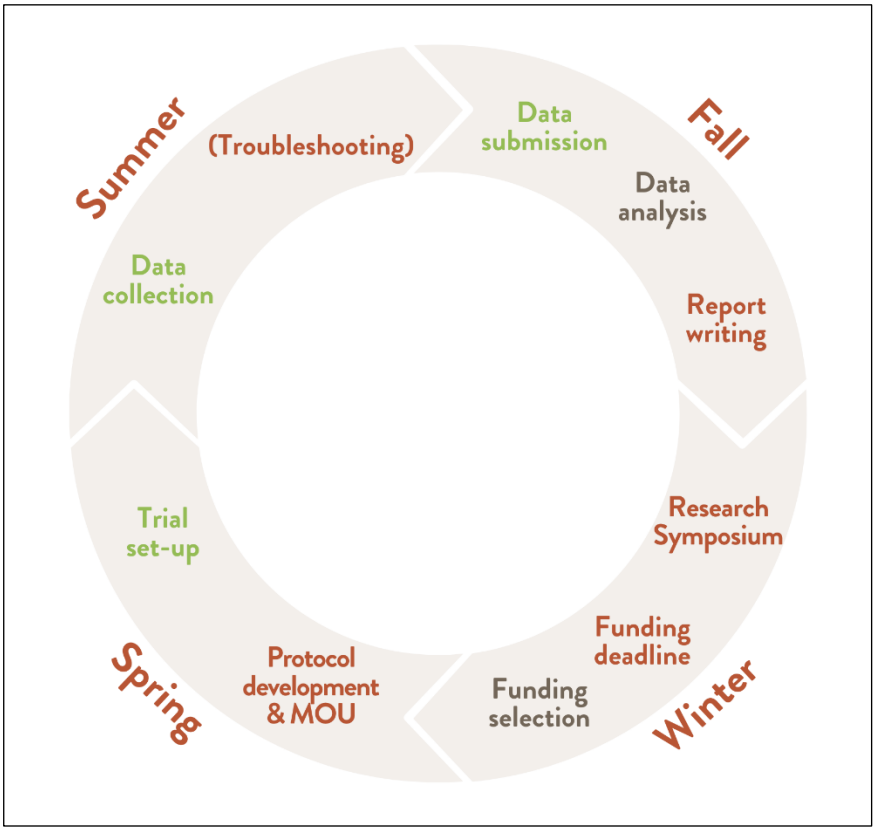
Projects fall into the following categories: alternative livestock feed; cover crops; disease and pest control; livestock breeding; nutritional quality; pasture regeneration; pollinator services; seed selection, production, and breeding; soil health; and weed control. One notable project was the Southern Ontario Pepper Breeding Project, which involved a collective of five farmers who, informed by consumer demand, bred an open-pollinated, early, blocky, sweet red pepper with good flavor that was adapted to ecological growing systems. After five years of research trials, the group commercially released the "Renegade Red" pepper under the Open-Source Seed Initiative. In another example, a farmer-researcher conducted randomized complete block design with five replicates to compare the planting of no-till spring cereal grain into four winter-killed cover crops with a fall tillage control. In that case, findings demonstrated that no-till planting into daikon radish was best for grain yields, soil health, and net return on investment.

Methods

In alignment with the action-oriented, community-engaged methodology outlined in the introduction, the starting point for our research was a series of informal conversations between the lead researcher and EFAO's executive and research directors, both of whom were interested in formally investigating their FLRP to better understand its impacts, limitations, and opportunities. As it took shape, the project maintained a participatory approach, with the research team collaborating closely with EFAO during research design, data collection, and analysis. The first step in the research process was a series of workshops held between September and December 2019. Through these workshops, EFAO representatives and the research team collaboratively clarified connections among FLRP activities, goals, and expected short-, medium-, and long-term impacts, developing a program logic model that was then vetted by the EFAO board of directors. In addition to the logic model, several priority research themes were identified during the workshops: farmers' social networks; existing farm practices; stories of changing farm practices; knowledge, motivation, and confidence regarding ecological practices; risk perception and tolerance; and personal experiences with the FLRP and its project results.

The research team used the logic model and priority research themes to develop a 34-question online survey (see Appendix A), which included questions regarding current, past, and future use of ecological management practices; knowledge, motivation, and confidence in ecological practices; barriers to ecological practices; social networks; and how each of these areas was influenced by various types of involvement with the EFAO. The EFAO distributed the survey via its listserv[2] on multiple occasions. Between February and September 2020, 139 responses from across Ontario were recorded. Survey respondents were invited to volunteer for a follow-up semi-structured interview designed to gather more in-depth information about engagement with and opinions regarding the FLRP. Volunteers were randomly selected and a total of 17 were interviewed between November 2020 and April

Figure 1. Cycle of Ecological Farmers Association of Ontario's (EFAO) Farmer-Led Research Program Outlining Responsibilities for Farmers (Green), EFAO Staff (Brown), and Farmer-Researchers Together with EFAO Staff (Red)



Source: EFAO

[2] At the time of survey distribution, the listserv included 2,877 individual contacts, of whom approximately 1,000 were EFAO members eligible to complete the survey.

2021. The interviews took place via Zoom or telephone and had a duration of approximately one hour. They included questions about the participants' farming practices, their engagement with the FLRP, the impacts of and limitations to that engagement, and any recommendations for improvement (see Appendix B for the interview guide). Data from the interviews will be cited in this paper using participant identification numbers (e.g., EFAO01). Data from interviews and the preceding survey were supplemented by an online focus group discussion held with six FLRP participants in March 2021 (see Appendix C for the focus group discussion guide). Those participants were people who had expressed interest in an interview—separately from volunteering via the survey—as well as FLRP leaders identified by the EFAO.

Participant Profile

Of the 139 EFAO members who completed the survey, most (58%) had been farming for 10 or more years, while 20% had less than five years of experience. A majority (73%) reported growing fruits or vegetables, less than half (44%) raising livestock, and one-third (33%) growing field crops. A small number (11%) produced seeds, while even smaller numbers reported producing eggs, milk, herbs, trees, flowers, oilseed, honey, wheat, maple syrup, and nursery plants. Approximately one-quarter of respondents (26%) were long-time EFAO members (10 or more years), while 41% had joined the organization in the preceding one to five years. Respondents reported engaging with the EFAO in a variety of ways, including via its print and electronic newsletters, annual conference and research symposium, and web-based resources (including research reports from the FLRP). Thirty respondents (21%) identified themselves as farmer-researchers in the FLRP.

Of the 17 survey respondents who participated in an in-depth, semi-structured interview, six had engaged with the FLRP as farmer-researchers conducting at least one on-farm research project. Of the remaining nine participants, seven indicated that they engaged with FLRP projects through the EFAO website, conversations with peers, by participating in farm tours and, in almost all cases, by attending sessions at the organization's annual conference and research symposium. With the exception of website use, these activities enabled members to not only receive knowledge regarding FLRP project results, but to actively engage in conversations about how results were generated, and how they might be able to adapt and apply them on their own farms. Interviewees' years of farming experience ranged from two to 50, and the scale of operations ranged from one to 350 acres. Their farming systems included market gardens, flowers, cash crops, vegetables, oilseed, dairy, and livestock. In the case of the focus group discussion, all six participants had been actively involved in the FLRP as farmer-researchers conducting at least one on-farm trial.

In addition to their ecological orientation, there are some notable differences between the EFAO member population and the general Ontario farming population. There is a tendency toward smaller farm sizes, with EFAO members farming a median of 12 acres (EFAO, 2021), compared to the 243-acre provincial average (OMAFRA, 2021). In addition, while provincewide 31% of farm operators identify as female (Chen, 2022), 56% of EFAO members are women (EFAO, 2021). The EFAO population also skews somewhat younger, with 65% of members under the age of 55 (EFAO, 2021). By contrast, just 38% of all Ontario farmers are under 55 (Chen, 2022).

Results and Discussion

Increasing and Improving the Use of Ecological Farming Practices

Survey results demonstrated a distinct connection between engagement with EFAO and its FLRP and farmers' confidence, motivation, interest, and ability to adopt and improve upon ecological practices (Table 1). Approximately three-quarters of respondents indicated that the EFAO helped them improve their knowledge regarding ecological soil health practices (77%) and increased their motivation (74%) and confidence (74%) to employ such practices on their farms. A majority also reported that the EFAO introduced them to ecological innovations (72%) and helped them improve upon ecological practices they already employed (68%).

Table 1. Impact of Ecological Farmers Association of Ontario (EFAO) on Farmer Relationships with Ecological Soil Health Practices (*n*=139)

Impact	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Improved knowledge	2%	5%	9%	37%	40%
Increased motivation	2%	4%	14%	32%	42%
Increased confidence	3%	3%	14%	37%	37%
Introduced to new innovations	2%	6%	13%	31%	41%
Helped improve existing practice	4%	4%	17%	36%	32%
Helped adopt new practice	2%	7%	25%	35%	24%
Helped support other farmers adopting ecological soil health practices	5%	8%	32%	32%	17%
Helped access resources to adopt ecological soil health practices	8%	12%	42%	21%	10%

Although the survey looked at the whole EFAO, rather than specifically the FLRP, some conclusions can still be drawn regarding FLRP influence. Firstly, all of the ways in which survey respondents reported engaging with the organization have some connection to the FLRP. While only 21% of respondents participated directly in the FLRP as farmer-researchers, 78% attended the annual conference and research symposium where FLRP results are shared, and 74% participated in farm tours or workshops, which highlight FLRP projects. In addition, in response to an open-ended question asking participants to specify how EFAO activities impacted them, the most referenced activity was the annual conference and research symposium, followed closely by the FLRP. While receiving knowledge gleaned through the FLRP is different from engaging directly in its production, it is clear that the program permeates the organization and impacts even those members who may only peripherally engage with it. One member acknowledged that, while they themselves did not have the capacity to serve as a farmer-researcher, they still felt included in the broader culture created through the program: "that [FLR] culture, it's just so approachable, and honestly I so look forward every year to the conference that the EFAO holds; it's a highlight of my year" (EFAO05). They went on to explain: "I get inspiration from the fact that there's farmers who are taking their own time and applying themselves in that way for the collective betterment of our community, our movement. … I really admire those people who are able to and excited to do that."

Farmer-researcher survey respondents were more likely to "strongly agree" with statements about EFAO impact than those who engaged with the organization in other ways (Table 2).

This difference was especially notable when it came to increasing motivation and confidence to use ecological practices, improving upon and adopting ecological practices, and supporting others in adopting ecological practices. For example, 14 of the 30 farmer-researcher respondents strongly agreed that the EFAO helped them adopt new ecological practices, compared to one-fifth of other respondents, and 24 of the 30 farmer-researcher respondents strongly agreed that the EFAO had increased their motivation to use ecological practices, compared to 35% of other respondents. While the sample size is too small to make causal conclusions, the extent to which farmer-researcher responses consistently differed from the rest is noteworthy, warranting further research to understand the complex relationship between the FLRP, the ways in which different farmers engage with and are impacted by it, and factors that influence such differentiation.

Data Quality and Reliability

Research showed that the FLRP significantly enhanced perceptions regarding the quality and reliability of on-farm data collection. Interview and focus group participants (farmer-researchers and

Table 2. Farmer-Researcher (*n*=30) and Other Respondent (*n*=109) Assessment of Ecological Farmers Association of Ontario (EFAO) Impacts on Ecological Farm Practice

Impact	Farmer-Researchers who "Strongly Agree"	Others who "Strongly Agree"
Improved knowledge of ecological practices	69%	35%
Increased motivation to use ecological practices	83%	33%
Increased confidence in use of ecological practices	72%	30%
Introduced to new innovations in ecological practice	69%	37%
Helped improve upon ecological practices already in use	61%	27%
Helped adopt ecological practices	48%	20%
Supported other farmers in adopting ecological practices	41%	11%
Helped access resources to use ecological practices	21%	8%

other EFAO members alike) drew a clear distinction between informal on-farm experiments and FLRP research projects. While the former is certainly valuable, participants associated the latter with higher levels of rigor in research design and execution. Thus, they perceived results as much more reliable than the "lousy quality, un-replicated data" that one focus group participant described themselves collecting outside the FLRP structure. Another farmer-researcher clarified the distinction:

> [The FLRP] was really important for us because I think we're experimenting all the time on the farm, but we're often not very rigorous. … I think sometimes you don't really go through meticulously to ensure that the results you're getting are significant and good enough that you want to actually change your practice. (EFAO13)

The increased rigor and reliability associated with FLRP data was in part connected to the program's focus on training farmers in scientific research methods (e.g., randomized control trials) and providing ongoing mentorship and support. In the words of one focus group participant, the program "[makes] the whole process of asking and trying to answer questions on the farm something more solidified and more formal." Several farmer-researchers referenced the "discipline" inherent in FLR, expressing appreciation that the program kept them accountable to the data collection and recording process, ensuring they maintained consistency even as other on-farm priorities competed for their time, resources, and attention. For example:

> It was just having that forced discipline to do all those [data collection and record-keeping] steps. Whereas when it gets really busy on the farm it's easy to cut corners and let things like that slide, because we had [the FLRP Director] sending us emails saying, "I need your data! I need your data!," you stay on top of it. (EFAO13)

A focus group participant further explained:

> Part of [what makes the FLRP successful] is just the discipline of, well we said we were going to do this, we have funding for doing this, and now we actually gotta collect the data every week. … It's just that consistently keeping that amount of data, it takes a chunk out of your week … [and] actually follow[ing] through for the entire season. … I know that it's good to keep that sort of data for myself, but … whether I actually would do it [without the FLRP] … the answer is usually no.

The distinction participants made between the rigorous, replicable, "disciplined" knowledge produced via the FLRP and their more intuitive, experiential knowledge mirrors agroecology discourses regarding how different knowledges are valued (Gliessman, 2014; Sumane et al., 2018). The value

that participants ascribed to the "meticulous" application of scientific methods echoes findings from Honduras, where the success of a farmer-led plant-breeding initiative was closely tied to developing farmers' scientific research skills (Humphries et al., 2015; Wettasinha et al., 2014). However, a review of 11 FLR projects in Africa, Asia, and Latin America found that, in most cases, "more emphasis was given … to generating a strong and broad spirit of experimentation and adaptation to explore new possibilities than to perfecting farmers' research skills" (Wettasinha et al., 2014, p. 37). This echoes the EFAO's emphasis on building a culture of curiosity that extends beyond farmers directly engaged in FLRP trials. It suggests the context within which the FLR is being conducted, along with the focus of the research and the intended audiences, are important factors in determining the extent of scientific rigor required to lend credibility to project results.

Evidence-Based Decision-Making

Many of the interview and focus group participants drew a connection between the high-quality data produced through the FLRP and their ability to feel confident making evidence-based decisions on their farms. This was particularly true with respect to adjusting existing practices or adopting new ones. The willingness to actively apply FLRP results is consistent with research on FLR in other contexts, where the methodology has been shown to increase farmers' capacity to make effective, evidence-informed decisions regarding sustainable farm management (Braun et al., 2000; Humphries et al., 2015; Waters-Bayer et al., 2015).

In discussing a research project that assessed yields for different varieties of tomatoes, including grafted plants with different root and top stocks, a focus group participant explained how the FLRP enhanced decision-making about on-farm practice: "Spending a couple of years of collecting solid data … it's taken a lot of guessing out of stuff." Another farmer shared how involvement in the FLRP enabled them to confidently invest the required resources to shift to a no-till operation:

> We had read a lot and talked to other farmers about using tarps to kill weeds and stubble and to replace tillage, and in order to convert our whole farm to no-till we're talking about probably a [CA]$20,000 investment in material. And we needed a process to figure out what was the best material to use, how we're going to do it…before we made that investment. So, the farmer-led research project helped us get the rigor to actually see… to go through the process for two complete seasons to figure out exactly what worked best for our operation and then, when we made that investment, we were totally confident that we had exactly the right stuff. (EFAO13)

As this example demonstrates, farmers must always weigh the potential benefits of a new or adapted practice against the resources (e.g., time, capital, materials) they would need to invest and the potential risks (e.g., yield losses) involved in adoption. Because perceived risks can deter action, simply possessing knowledge about ecological farming practices does not necessarily translate into their adoption (Kroma, 2006). One research participant highlighted how the FLRP helps farmers better make these complex calculations, mitigating the risk that is often cited as a barrier against adoption of ecological practices:

> I would say [the FLRP] has made me feel less worried [about the potential risks of changing practices] in the sense that when you see people doing it and you see the result. … Most of the risk in wanting to switch to a different [best management practice] or a [best management practice] that you're not currently using, usually it's financial, you don't want your yields to plummet, you want your farm to succeed and continue to thrive. … I would say that [seeing FLRP results] has given me confidence that as we [adopt a new practice] we can transition, and things will be just fine coming out the other side. (EFAO7)

This aligns with work by Waters-Bayer et al. (2015), which found that engagement with FLR was connected to, among other things, "the capacity of individuals and communities to continuously identify and prioritize problems and opportunities

in a dynamic environment; the capacity to take risks, experiment with social and technical options, and assess the trade-offs that arise from them…" (p. 3).

The kind of evidence generated by FLR is particularly crucial for enabling effective decision-making, because much of the widely available data designed to help farmers make management decisions is not geared toward ecological or smaller-scale operations (Carolan, 2006; Sumane et al., 2018). Many participants discussed the difficulties they had finding data that was relevant to, for example, their varieties or breeds, the inputs they wanted to use, or the overall approach they wanted to take with their farming. A focus group participant described this challenge:

> You can talk to a hundred experts, and nobody has a darn clue what you're talking about because nobody's actually done this research. … If I want to know in conventional production how much it costs to raise a kilo of chicken, there's so much benchmarking information out there. But for ecological, pasture-raised chicken, nobody knows. … We all have a general sense of what it might cost on our farms but, even there, the effort that I've put into writing my own spreadsheet versus the effort I think it deserves and would get if I had to do it, and had that sort of organizational support behind me, would be just two entirely different things.

Similarly, participants stressed that the location-specific nature of FLRP data, when compared against the more standardized, generalized, "reductionist" (EFAO01) information typically available through extension sources, rendered it especially trustworthy and relevant to them.

One response to a dearth of ecologically focused, context-specific agricultural data has been a strong reliance in agroecological circles on local or farmer knowledge (Carolan, 2006; Gliessman, 2014; Pimbert, 2018). However, many smaller-scale or ecologically oriented farmers—including participants in this study—still express a desire to access complementary scientific evidence to bolster confidence in their decisions (Carolan, 2006; Waters-Bayer et al., 2015). To some extent, they are looking for a kind of extension service (many participants expressed dismay about the loss of public extension services in Ontario), but the dominant model —with its emphasis on decontextualized, one-size-fits-all information focused on maximizing productivity through industrial methods and inputs—does not meet their needs. Rather, they would be better served by something akin to Cook et al.'s (2021) notion of a "humanized extension," with its attentiveness to power, place, and people, and emphasis on farmers' socio-spatial contexts and lived realities.

In the case of the FLRP, such farmer-centeredness was key to farmers' willingness to use project results to inform practice. While, as discussed above, the application of formal scientific methods was perceived as enhancing the reliability of the data, the farmer-led nature of the program meant that results were perceived as more relevant, accessible, and trustworthy than information from more conventional sources. This is consistent with findings regarding FLR in locations such as Honduras (Humphries et al., 2015), where collaborative interaction between farmer-researchers and formal research experts was central to program success. As one participant, who was not themselves a farmer-researcher, explained,

> [Other sources are] very formal, very top-down, no nuance necessarily. I find that much harder to interact with, where someone doesn't actually know my farm, doesn't know the intricacies of what I do, it's just a blanket approach... I find that I don't connect to that style of information as much. (EFAO5)

Another participant highlighted the conflict of interest associated with industry-led or funded science as a way to explain why they had more trust in FLRP data: "[The FLRP] works with the interests of the farmers. It's not something [the researchers] are trying to sell to the farmers or promoting to the farmers; this is a program that comes from farmers' interests." These farmers underscore some of the shortcomings of mainstream extension models as described by Cook et al. (2021). At the same time, their interest in scientifically grounded knowledge

developed through farmer-led processes aligns with arguments regarding the centrality of knowledge co-production as a means of achieving agricultural sustainability (Carolan, 2006; Pimbert, 2018; Sumane et al., 2018).

Strengthening Networks and Fostering Community

As noted, it is not just the quality of available knowledge that is important for supporting transitions toward agroecology, but also the processes used to share that knowledge (Gliessman, 2014; Sumane et al., 2018; Sutherland et al., 2017). Research participants were keenly aware of this, frequently highlighting how, as in other contexts (see Waters-Bayer et al., 2015), network-based, farmer-led knowledge-sharing embedded in relationships of trust was central to FLRP success: "Having your friend tell you, 'This is what we did, and this is the origin, and this didn't work. ...' This is the best way to learn. The important thing about that, I think, it's trust" (EFAO17). Another participant noted the importance of trust in describing their attendance at the annual research symposium where FLRP results are shared: "The culture of coming together, sharing, exchanging, building this face-to-face interaction, it builds a really strong level of trust and cohesion" (EFAO05). That trust and sense of belonging to a supportive, cohesive community play a key role in helping farmers work through the risks associated with increasing and improving their use of ecological practices, particularly in a context that requires continuous adaptation (Gliessman, 2014; Kroma, 2006).

In addition to drawing upon networks and relationships of trust for its success, the FLRP helped foster such connections, as farmer-researchers were considerably more likely than their fellow EFAO members to feel that the organization improved their connectivity with other farmers, farmer mentors, the broader farm sector, and even their consumers (Table 3). These connections could be defined as social capital—that is, the relationships of trust that facilitate feelings of shared identity and capacity for collective action (Ostrom & Ahn, 2009)—which has been identified as important for FLR success (Wettasinha et al., 2014) and, more generally, for the effective spread of ecological farming practices (Isaac, 2012; Kroma, 2006; Prokopy et al., 2019). Participants drew direct comparisons between the network-based, peer-to-peer social learning approach of the FLRP and more conventional mechanisms for agricultural information-sharing. For example:

> The FLRP is farmers] learning from each other. Not just some expert at the front of the room or leading the parade with a microphone through the fields.… People are sharing from their own experience, which is useful for the person who it's being shared with and also validating for the person sharing it.… It encourages people to be open to trying out new things. And it also, I think, creates a situation where [people] see themselves as being part of something. (EFAO14)

Similarly, a focus group participant explained that FLRP evidence felt more readily accessible, and thus usable, than data from conventional sources because of its relational nature: "There's a database that people can look towards that doesn't

Table 3. Farmer-Researchers' (*n*=30) and Other Respondents' (*n*=109) Assessment of Ecological Farmers Association of Ontario's (EFAO) Impact on Social Networks

Impact	Farmer-Researchers that "Strongly Agree"	Others that "Strongly Agree"
Improved connection to other farmers in area	59%	24%
Improved connection to other farmers across Ontario	86%	32%
Improved connection to farmer mentors and advisors	69%	17%
Improved connection to broader farming sector	52%	22%
Improved connection with customers	21%	6%

feel too institutional. Like you can probably reach out with an email to the person that did that research."

Importantly, the FLRP did not just support connectivity among like farmers (i.e., those in the same region), but also across various groups. One focus group participant offered a practical illustration of the importance of these boundary-crossing ties:

> We've started using deep wood chip mulch on a few different things and I wouldn't have had the nerve to do that if I hadn't have read somebody's research project out of California where they were tilling large quantities of wood chips into their soil and still finding that they could get good yields. So, I like to think that whatever I do might have that sort of impact for somebody else, whether it's in Ontario or far beyond; it's the collective sharing of knowledge that's important.

Such connectivity across space and place is arguably of special importance for fostering uptake of ecological farming innovations (Isaac, 2012).

The relationships drawn upon, built, and strengthened through the FLRP motivated and inspired farmers to strive for on-farm improvement and mitigated the associated risks. This was effective with respect to ecological practice adoption and also was perceived as deeply meaningful on a personal level. In the words of one focus group member:

> The idea of maybe being something a little bit bigger, just part of the collective whole of information that's going to be available that is useful beyond just ourselves. … It gives us … a dab of validation; like our questions are not stupid questions; there's other people that would love to hear the answers. So that kind of bolsters us up a little bit, makes us say "let's try to make our answers as useful to others as we can."

Such feelings extended to members of the FLRP audience as well, with a research participant who did not themselves conduct FLR describing their reaction to learning about program results via a farmer-led workshop: "It was … really important to have this connection to the community through these citizen scientists … and to find out what they're doing. It is incredibly powerful and inspiring to see and hear their stories" (EFAO11). These perspectives echo findings on the powerful nature of peer-to-peer social learning, particularly in the context of ecological farming systems (Kroma, 2006; Pimbert, 2018; Sutherland et al., 2017; Wettasinha et al., 2014).

Facilitating Communication About Ecological Agriculture

Farmer-researchers almost unanimously described a sense of pride in their role as formal knowledge producers and expressed a desire to communicate research results to the widest possible audience. One focus group participant explained:

> I would also like to be able to share what we do on that kind of broader scale … whether it's farmers' markets or whatever platform that I get to see other growers face to face. … We love doing this and so we love talking about it, the same as researchers in other fields. … As soon as we learn something, the next thing we want to do is tell someone.

Another added: "I'm just really happy to talk to anybody, whatever kind of farmer or person they are, about [the FLRP]. … It's a fun conversation and I think it is a less fraught and more constructive conversation to get into with a conventional operator than [some other topics]." Yet another described how the FLRP connected farmers with varied ideological positions: "I think there seems to be some success in bringing together farmers with different viewpoints, which is good" (EFAO4).

Beyond facilitating conversations with neighbors and peers, the FLRP created a platform for communicating about the benefits of ecological farming methods with a variety of audiences, including conventional farmers, consumers, and the broader public. One focus group participant discussed how they use FLR as a conversation-starter: "It's a more constructive conversation,

instead of just going directly into ecological agriculture, you talk about the role of the farmer as a researcher and start from there. Being the farmer is the key element in this, more than the ecological part of it, so it's a great tool." Another explained how the high-quality data produced by FLRP projects contributes to those productive bridge-building conversations:

> [The FLRP] allows you to cross boundaries, because once you know the numbers behind your soil organic matter and things like that you can start having conversations. … It [gives] you a good grounding to have conversations that aren't divisive, because we may be the ecological farmers, but the environment is a big and growing concern for everybody in agriculture even if they're following a conventional method. So, with that grounding behind you, you can have those conversations that just don't have the same division.

Partly in response to this finding, the public-facing report (Nelson, 2022) presenting the research results included, among other things, a call to Ontario's Ministry of Agriculture, Food and Rural Affairs to support pilot FLR projects in farm organizations beyond the EFAO, including those with more conventional orientations.

FLR's potential as a platform for discussing ecological agriculture outside self-identified ecological farming circles has not been significantly featured in research to date, which has instead more strongly emphasized impacts related to farmer livelihoods (e.g., food security, poverty reduction), along with equity considerations (e.g., gender inclusivity, farmer empowerment) (Classen et al., 2008; Humphries et al., 2015; Waters-Bayer et al., 2015; Wettasinha et al., 2014). The issue has also not been prominent in discussions about knowledge co-creation, social learning, and ecological farming practices, which have tended to focus on networks of farmers already interested in pursuing agricultural transitions focused on sustainability (Carolan, 2006; Kroma, 2006; Sumane et al., 2018). That said, Classen et al. (2008) found that farmers not directly participating in an FLR initiative still showed evidence of adopting new ecological techniques when a program was operating in their region. Combined with the findings from our study, this suggests it would be worthwhile for future research to consider how FLR could mobilize knowledge and catalyze the adoption of ecological farming practices among a broader cross-section of farmers.

Challenges and Limitations

As is the case with FLR in other geographic, socio-economic, ecological, and cultural contexts, the FLRP faces challenges. The program is constrained by available funding and other resources, including farmer time and labor, land, and other materials required to conduct research. In addition, because of the location-specific nature of many FLRP projects, generalizing results across diverse farming contexts is difficult. Multi-farm trials are being used to address this issue; however, the extent to which they can be conducted is limited by resource availability. Such issues are consistent with FLR initiatives in other contexts, where programs often depend on support from donors and civil society organizations (Waters-Bayer et al., 2015) and the scaling up and out of specific innovations developed through FLR often prove challenging (Wettasinha et al., 2014).

Some of these challenges represent trade-offs. For example, the time-intense nature of FLRP projects was a barrier to participation for some farmers—underscoring concerns raised by Wettasinha et al. (2014) about equity issues in FLR—but also contributed to the high quality of the data produced. Similarly, the specificity of the research did not lend itself well to generalization but did mean results were more highly relevant to some audiences. Research participants were keen to build new partnerships—for example, through collaborations with formal research institutions and other farm organizations—as a means of addressing program limitations and expanding the reach of their work. This is consistent with discussions regarding how to scale FLR up and out, such as through pursuing opportunities to institutionalize the methodology via policy, civil society organizations, and farmer networks (Waters-Bayer et al., 2015; Wettasinha et al., 2014). The notion of embedding FLR within institutions as a means of scaling impacts up and

out is an important consideration for future research, as is analysis of equity issues, more explicit comparison of FLR programs in the Global South and North, and further exploration of how FLR might foster connections among different types of farmers.

Conclusions

> [FLRP] research is representing a sector of the food economy that is not represented by research done in other places. … I think it becomes even more important that this [ecological farming] sector becomes represented when we're talking about what could [our future] food system look like, because if more local food or smaller farms or more ecological farms need to be part of that future picture, then we have to know what that looks like, how we get there, and we have to have the numbers to back that up as to why it's beneficial. So, we potentially have a major role to play going forward. (Focus Group Participant)

The words of this farmer-researcher circle back to this paper's opening, which highlights the urgency of transforming food and farming systems to enhance their resilience in the face of climate-related (and other) crises. While no single strategy, on its own, will achieve transformation, the results shared here demonstrate that farmer-led research can and does catalyze adoption of and improvements to the kind of ecological farming practices that are associated with agroecosystem resilience. Ontario farmers who engaged both directly (as farmer-researchers) and indirectly (as audience for farmer-researcher results) with the EFAO's FLRP increased and improved their use of ecological farming practices. This occurred as they were able to access high quality data that were relevant to their farming systems and use the data to make evidence-informed decisions about on-farm change. The risks typically associated with such change were mitigated by the data themselves and by the strong social networks through which that data were shared. Belonging to these networks, which were also strengthened by the FLRP, was a source of motivation, confidence, inspiration, and pride for many farmers, as they worked individually and collectively to create improved farming systems.

In a 2006 paper discussing co-production of knowledge for sustainable farming, Carolan asks, "How can we retain the concept of 'expertise' while allowing greater epistemic diversity to enter into the decision-making process?" (p. 422). This question is echoed in agroecological debates over the role that can and should be played by knowledge produced through formalized scientific methods and that which is produced through more localized, experiential processes. A growing consensus suggests that the most effective way to facilitate agricultural transition is through the co-production and relationship-based exchange of knowledge that simultaneously draws on the strengths of scientific methods and on farmer expertise and networks (Gliessman, 2014; Pimbert, 2018; Sumane et al., 2018), while acknowledging that balance will look different in different contexts (Isaac et al., 2018). The research presented in this paper underscores how farmer-led research can serve as a mechanism to enable such co-production and participatory exchange. For research participants, the knowledge produced through the FLRP was simultaneously farmer knowledge and formal knowledge, and thus imbued with the benefits of each. The knowledge-sharing and application process strengthened the bonds of trust across significant distances and enabled farmers to feel part of "something bigger" than themselves. FLR, then, could be considered an effective strategy to enact agroecology as, at once, a scientific discipline, a set of farming practices, and a social movement.

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Appendix A. Online Survey Questions

Thank you very much for agreeing to participate in this survey! It should take 20-30 minutes to complete. If there are any questions that you feel uncomfortable answering, or do not feel apply to you, feel free to skip them.

It is our hope that the information we collect will help improve the quality of future programming designed to support adoption of soil health best management practices.

What do you produce? Please select all that apply.

- Field crops
- Fruits and/or vegetables
- Livestock
- Seed
- Other (please specify)

How many acres do you have in production?

- Total
- Owned
- Rented

How long have you been farming?

- Less than 5 years
- 5-9 years
- 10-19 years
- 20+ years

For each of the following management practices, please select the description that best fits for you:

- Cover crops
- No-till
- Minimum tillage/conservation tillage
- Compost use
- Livestock integration
- Managed rotational grazing
- The 4Rs of fertilizer use
- Crop rotations (3+ crops)
- Keeping soil covered over winter
- Other _____

Options for each practice

- Have practiced for more than two years
- Started practicing in the past two years
- Planning to practice in next year
- Considering practicing in the future
- No plans to practice
- Practiced previously and stopped
- Other _____

Are you a member of the Ecological Farmers Association of Ontario (EFAO)?
How long have you been a member of the EFAO?

Less than 1 year
1-5 years
5-10 years
10+ years
Not sure

What is your relationship to EFAO? Please select all that apply.

I have attended a farm tour or workshop
I have used the Advisory Service
I have attended the EFAO Conference and/or Research Symposium
I have conducted farmer-led research
I have used online resources on the EFAO website
I have read the printed EFAO newsletter and/or the e-news
Other (please specify) _____

How has your involvement with EFAO changed your personal network?

Being a member has improved my connection to other farmers in my area
Being a member has improved my connection to other farmers across Ontario
Being a member has improved my connection to farmer mentors/advisors
Being a member has improved my connections in the broader farming sector
Being a member has improved my connections with my customers

Rate agreement (strongly disagree - strongly agree)

How has your involvement with EFAO impacted your relationship to soil health best management practices?

Being a member has improved my knowledge of soil health best management practices
Being a member has introduced me to new innovations in soil health best management practices
Being a member has increased my motivation to use soil health best management practices
Being a member has increased my confidence to use soil health best management practices
Being a member has helped me access the resources (e.g., financing, equipment, seed) to use soil health best management practices
Being a member has helped me adopt soil health best management practices
Being a member has helped me improve upon soil health best management practices I was already using.
Through being a member, I have supported other farmers in adopting soil health best management practices.

Rate agreement (strongly disagree - strongly agree)

Please describe any specific ways that EFAO has helped you adopt or improve soil health best management practices. If possible, give a specific example.

_____

_____

To what extent to the following barriers limit your ability to adopt soil health best management practices?

Risk of yield loss
Too costly
Lack of knowledge
Lack of confidence
Lack of materials (e.g., equipment, seed)
Risk to insurance coverage
Concern about what neighbours would think
Other _____

Rate (does not limit me at all to is a severe limitation)

What would be required for you to overcome the barriers you identified?

_____

_____

Please share any additional comments you have regarding your involvement with EFAO in relation to soil health best management practices.

_____

_____

Thank you very much for participating in this survey!

If you would like to be considered for participation in a follow-up interview about these issues, please click on the following link.

Appendix B. Interview Guide

Introductory Details

- Personal:
  - Gender, age, family status
  - Length of time farming
  - Educational background (including farm training)
  - Career background (e.g., prior to farming; off-farm work)
- Farm:
  - Location
  - Scale (e.g., acreage, number of employees)
  - Main crops/products

EFAO Membership

- Length of membership(s)
- Motivation for membership(s)
- Role(s) played within organization(s)
- Please describe briefly your involvement with any other organizations that you feel is relevant for a discussion of your soil health attitudes and practices (e.g., farmer associations, environmental groups, community networks).

Use of ecological management practices

- Practices currently used on farm
- How long have you been using each?
- Motivations for adoption
- What factors have helped you implement these practices on your farm?
- What have been the main challenges in implementing these practices?
- Practices you would like to adopt but have not yet and reasons for non-adoption
- What do you perceive as the main reasons for relatively low rates of ecological management practice adoption in Ontario?

Involvement in Farmer-Led Research Program

- Role(s) played in the Farmer-Led Research Program
  - E.g., program leader/organizer, farmer-researcher, attending/hosting meetings, attending/hosting farm visits, learning about program results via website, newsletter, word-of-mouth, etc.
- Motivations to become engaged in the program(s)
- Time spent on program activities
- Please briefly describe your involvement, if any, in other farmer peer learning programs.

FLRP Impacts

- What do you feel have been the most important impacts of your involvement with the FLRP?
- Can you describe any specific examples of new knowledge you have gained through the program and how you have applied this knowledge? Shared this knowledge with others?

- Can you describe any specific examples of new relationships you have built through the program, and how those relationships have impacted your knowledge and/or practice of ecological farming practices?
- Can you describe how your involvement in the program has changed your attitudes about ecological management practices, if at all? Has your thinking shifted as a result of program involvement?
- Can you describe how your involvement in the program has changed your perception of the potential risks involved in ecological practice adoption, if at all? Risks to consider could include:
    - Negative perceptions of family, friends, neighbours, community members
    - Cost/investment required for adoption
    - Potential for yield loss
    - Weed and/or pest issues
- Can you describe how your involvement in the program has impacted your soil health, if at all?
    - Have there been any related impacts? E.g., changes in yield, pest resistance, input costs, etc.
- Any unanticipated/surprising impacts of your involvement in the program
- How would you compare peer learning programs like the FLRP to other efforts at supporting ecological management practice adoption? What are the main advantages/disadvantages of the peer learning model?

Barriers to Program Success

- What do you feel are the most important shortcomings of the FLRP?
- What, if anything, has limited your ability to personally engage with the program and/or to apply program learning or experiences to your own soil health management? (e.g., time constraints, resource constraints including funds or equipment, social barriers including opinions of friends, family, neighbours)
- What do you think the most important barriers are for other farmers becoming involved in this kind of program?

Recommendations

- Do you have any specific recommendations for improving the quality of the FLRP?
- Do you have any recommendations for how organizations like EFAO could *better* support *more* farmers in adopting ecological farming practices?
- Beyond EFAO, what are the main supports you feel are needed to encourage better rates of ecological farming in Ontario?
    - e.g., policies, funding, knowledge (try to be specific), equipment

Other Comments

_____

_____

Appendix C. Focus Group Discussion Guide

Overview & Goals

The main goal of the workshop will be to collect information about the ways in which EFAO's Farmer-Led Research Program influences adoption of ecological farming practices.

We will use an Appreciative Inquiry approach (https://www.centerforappreciativeinquiry.net/). Rather than focusing on challenges or problems, Appreciative Inquiry seeks to examine and better understand solutions. In this workshop, we will identify aspects of the FLRP that are working best and explore the underlying conditions for those successes. We will also envision how EFAO can build upon FLRP strengths to increase impact in the future.

Participants will be encouraged to share specific stories that demonstrate how FLRP is supporting farmers in moving toward greater adoption of ecological practices. They can create titles and/or visuals for the stories that capture key themes, as well as taking conventional notes.

Discussion Guide

1. Goals for Discussion
    a. Identify what's working best with the FLRP.
    b. Try to understand the conditions for success.
    c. Envision how successes can be built upon in the future.
    d. Document FLRP stories to share with others.

2. Introductions

3. Can you share a specific story about how the FLRP contributed to you and/or other farmers adopting or improving an ecological farm practice?
    a. What factors made the success possible?

4. Thinking about the FLRP, what has been the most "eye-popping" result or impact of your participation? What impact or accomplishment have you been most proud of?

5. Thinking about the FLRP, what are the most important changes have you seen?
    a. For your farm
    b. For you as a person
    c. For your larger community

6. Thinking about the FLRP, what opportunities are there to increase impact? What conditions would allow us to get there?
    a. Resources
    b. Partnerships
    c. Policies
    d. Other

7. What has been the most meaningful part of participating in the FLRP for you?

8. Final comments