

Ken Laing (on tractor) of Orchard Hill Farm in Ontario has worked with the Living Labs project since 2020. It has significantly informed his efforts with cover crops.



Q INVESTIGATION

LIVING LABS PROJECT QUANTIFYING SUSTAINABLE PRACTICES

by MATT JONES | Photos supplied by EFAO.CA

Several years ago Agriculture and Agri-Food Canada (AAFC) launched the Living Laboratories Initiative (LLI), an effort to bring researchers directly to farms to develop, test and adopt new practices and technologies to address environmental issues. The end goal of the project is to help Canadian farmers adapt to and mitigate climate change impacts, reduce water contamination, improve soil and water conservation and maximize habitat capacity and biodiversity.

Living Labs started in 2018, with projects in Manitoba and PEI. Last year AAFC launched their 10-year Agricultural Climate Solution Program. This project is meant to deploy the Living Labs concept across the country, with at least one Living Lab per province. Living Labs projects are underway in Alberta, Quebec, Manitoba and PEI with proposals for 2022 in the remaining six provinces currently under review but not yet approved as of press time.

"It's deploying scientific research on real farms with real producers to cope with the reality that producer faces," says LLI Director Francois Chretien. "Not working in a research farm where we control most of the things that are happening, but really working at the farm with the producer. That obvi-

ously comes with challenges in terms of scientific research, but it is also beneficial in coming up with solutions at the end that fit with real life."

Chretien says that the first four projects all shared the same broad objectives regarding water quality, soil health and biodiversity, but were targeted to local priorities.

"The project in Quebec is in the surrounding area of the Lac St. Pierre," says Chretien. "In Ontario, it's in the surrounding area of Lake Erie, so there was quite a bit of work on the water quality team. In PEI, there was quite a bit of work related to soil health and water quality, but also biodiversity. And in Manitoba, there's quite a bit of integration across those four key themes. But with the new Agricultural Climate Solution Program, the number one driver is climate change. How can we actually increase the amount of carbon being treated in the agricultural soil and mitigate greenhouse gas emissions?"

DESIGNED FOR RAPID ADOPTION

Living Labs are collaborative efforts as well, often partnering with local organizations. Chretien says that there are as many as 15 organizations working in



The development of a potato seed piece at time of mowing.



Digging potatoes from early planted plot at the end of August.

concert with up to 30 scientists per site. It is obviously a very labour-intensive effort, but the benefit is that the producer is involved in the core development of best management practices with the scientists and other partners.

“Typically in scientific research, there’s a hypothesis at the beginning and then you experiment for three, four or five years and then analyze the result and come up with a scientific paper on that result,” says Chretien. “Living Labs does an iterative process where you actually try to co-design the management practice that you’re going to be implementing and experimenting on.”

For example, in PEI, the producer, scientists and a local expert sat down and developed a crop rotation scheme that made sense both from a scientific perspective and for the realities of the farm itself. All the partners looked at seeding rates, types of crops that could be rotated, and instead of experimenting for several years, they looked at the results at the end of each year and adapted their efforts accordingly.

“In that sense, there has been some early results, but in terms of more formal publication we’re still in the project phase,” says Chretien. “What we’re really after with this approach is an accelerated rate of adoption of the codeveloped best management practices. No-till, for example, took about 20 years for the practice to be broadly adopted. We’re looking at information sharing across the network of Living Labs and with the Agricultural Climate Solution Program, the key focus will be those practices that can store more carbon to the soil and mitigate greenhouse gas emissions.”

ORCHARD HILL FARM, ONTARIO

Ontario’s Orchard Hill Farm, a 93-acre organic farm that produces vegetables, grain and hay, was the site

of a Living Labs effort. Co-owner Ken Liang says that with many smaller scale vegetable farmers being hesitant about hosting trials on site in case something went wrong, his farm was a perfect site – he’s semi-retired and has been growing organically on his farm for decades. The Living Labs project on his farm began in 2020.

“I had some cover crops already planted,” says Liang. “They weren’t purposefully planted for the trials, but we were able to use those for the trials in 2020. I learned a lot, which I then applied last year for another range of trials. The first couple of years were more like a rapid survey. Once you get into trials, you start replicating plots three or four times and randomize them, then you have some numbers to statistically analyze at the end of it to give you more confidence that the results we’re seeing are true and typical of what you might see if somebody else uses that technique.”

The effort at Orchard Hill Farm focused significantly on evaluating the effectiveness of different cover crops used for weed control. It found that deep compost mulch was the most effective of those tested, but could lead to problems if weed seeds were scooped up with the compost when stockpiled. Dairikon radish provided the least effective weed control. Other observations include that cover crop strategies for successful no-till usually must start at least one year before planting the cash crop and research trials must account for this. In 2022, Liang is focusing on no-till garlic and potato systems.

A full report on the trials conducted to date at Orchard Hill Farm can be read on the Ecological Farmers Association of Ontario website at <https://efao.ca/living-lab-ontario-ken-laing-interim-summary-2020-2021>. **SF+**