



Agriclimat

Farms adapted
for the future



Pilot Farm Project



AGRICLIMATE: A STEP TOWARDS FIGHTING CLIMATE CHANGE

Launched in 2017 by the Conseil pour le développement de l'agriculture du Québec (CDAQ), the Agriclimat project has been deployed in each of Quebec's agricultural regions. With financial support from the governments of Quebec and Canada, the project's aim is to share knowledge that will help agricultural producers and advisors meet the challenges of climate change head-on.

Agriclimat is made up of a small, dedicated team from CDAQ and a large network of collaborators, including the Union des producteurs agricoles (UPA), its regional and specialized federations, as well as agri-environment club members from the VIA Pôle d'expertise en services-conseils agricoles.

Fifty researchers and experts from Ouranos, MAPAQ, Agriculture and Agri-Food Canada, as well as several universities and research and training centres, contribute to updating and sharing knowledge and expertise.

The diagnostic: What's it all about?

Agriclimat has developed an on-farm diagnostic tool to help farmers mitigate the effects of climate change. This diagnostic tool has two components: adapting to climate change and improving carbon balance on farms.

The first stream analyzes climate projections (supplied by Ouranos) specific to the agricultural ope-

ration's geographical location. Potential impacts of climate change on the operation's activities are assessed with the goal of protecting it from the detrimental effects of climate change and taking advantage of opportunities.

The second stream estimates the amount of greenhouse gas (GHG) produced by the farm and the potential for on-farm carbon sequestration. These results determine which actions the operation can take to reduce its impacts on the climate. It was in this context that a GHG calculator tool was developed to estimate carbon balances on Quebec farms. This tool is in line with established international standards regarding agricultural GHG estimates. Furthermore, it integrates current scientific results applicable to the Quebec context.

With the support of the Agriclimat team, a comprehensive diagnostic is conducted by the farm's advisor. Based on the results, the producer and advisor can decide on an individualized action plan to mitigate the effects of climate change.

Between 2021 and 2022, thirty-eight pilot farms participated in a trial run of the Agriclimat diagnostic. Twelve of those farms have shared what they learned in this report. Furthermore, thanks to a partnership between Agriclimat and the UPA's Agrisolutions climat project, 100+ new diagnostics are being completed in 2023 and 2024 by Agriclimat trained advisors.

Agriclimat: More Than a Diagnostic

Agriclimat's goal is to mobilize the entire agricultural community, individually and collectively, to fight against climate change. The objective is to ensure broad access to current climate change information and to share this knowledge as widely as possible through conferences, training sessions, "Carbon Café" webinars, and field days. Additionally, in each agricultural region of Quebec, Agriclimat and the regional UPA federations have instituted working groups that will play a key role in strategic thinking and coordinate various climate mitigation actions in collaboration with agri-environmental clubs. ■



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Éric Lapierre, owner of Ferme Duhamel-Lapierre and member of the Agriclimat pilot farms network, and agronomist Mélanie Hardy from Agri Conseils Maska, assess which actions will improve the carbon balance and resilience of Lapierre's operation.

Fifty researchers and experts from Ouranos, MAPAQ, Agriculture and Agri-Food Canada, as well as several universities and research and training centres, contribute to updating and sharing knowledge and expertise.



Robert Rossier, owner of Ferme Rodovanel and member of the Agriclimat pilot farms network, discuss pasture sustainability with Marie-Noëlle Thivierge, agr., Ph. D., Agriculture and Agri-Food Canada.

WHAT ABOUT MY WOODLOTS? DO THEY SEQUESTER CARBON?

Currently, the Agriclimat GHG calculator tool only analyzes the main agricultural activities on farms. On-farm forests and woodlots can be assessed by forestry experts. In collaboration with the forestry sector, the Agriclimat team hopes to find a way to have the carbon impact of a farm's forests reflected in the operation's carbon balance. ■



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THE AGRICLIMATE TEAM

Sarah Delisle, agr., coordinator
Sylvestre Delmotte, Ph. D., agr.

Charlotte Codron, agr.
Jennifer Pillion, M. Sc., agr.



Agrisolutions climat

Agrisolutions climat was developed by the UPA and is made possible through a partnership with the Producteurs de grains du Québec and with CDAQ within the framework of Agriculture and Agri-Food Canada's Agricultural Climate Solutions program. This project aims to support agricultural producers in reducing greenhouse gas emissions on their operations through the adoption of beneficial management practices. ■

For more information, please visit the following websites at upa.qc.ca/agrisolutions-climat and pgq.ca

FERME PLAMONDON & FILS

ENVIRONMENTALLY FRIENDLY PRACTICES BASED ON EFFICIENCY

At Ferme Plamondon et Fils, a passion for agriculture is being cultivated in keeping with a long tradition of prudent management. In this family-owned cow-calf and field crop business, adapting to climate change requires adjusting to new standards.

“The big variation on our farm is in the extremes. When it rains, it rains too much. When it’s hot, it’s too dry. It’s also windier than it used to be; the wind is almost constant now. We are seeing large temperature differences,” observes Félix Desaulniers, co-owner and proud next-generation farmer, who cares for a herd of over 450 head.

Fescue to the rescue

The young farmer says one of the business’s greatest assets is its land area, which currently exceeds the farm’s needs. “We always have a rescue plan to accomplish our goals, but it means we have to juggle things around,” he says. To keep these vast crops in production, the farmer is gradually transitioning his cultivars towards perennial species, an effort that includes enhancing

fescue pastures previously planted by his father. “It’s my go-to rescue plant. The amount of variation in performance is small relative to other kinds of grasses. We also want to include new plants in our management systems to protect our cattle’s feed source,” the farmer points out. Agrologist Gauthier Debuyscher, who provides coaching for the farm, describes the process the producer has embarked on. “He has begun adapting his grasslands and pastures to withstand climate stress. Félix had already started planting tall fescue, which is more tolerant to excess heat; if a drought occurs, the fescue takes over from other forage species. It’s a long-term transition, one that will take place bit by bit over the course of the seasons,” the agrologist says.

Water access: a logistical concern that needs rethinking

While many of the waterers in the farm’s pastures are fed by the municipal water supply, certain water shortages have occurred that the producer finds worrisome. “For one section of our herd on pasture, we have to draw water from a creek. I’ve had a situation where that creek that we pumped water from for decades went dry, which has never happened before,” says the young farmer, whose logistics have become considerably more complicated as a result of this new situation. “We had to source water from off-site



New knowledge gained through the Agriclimat project has enabled Félix to reduce his carbon footprint.



According to Félix Desaulniers, one of the business’s greatest assets is its land area, which currently exceeds the farm’s needs.

© Photos: Courtesy of la Ferme Plamondon et Fils

and bring it in with tanker trucks. We wasted a lot of time on water management,” says Mr. Desaulniers, who plans to install a permanent water supply system for this section of his pasture.

Acquiring and learning good practices

The farmer says he has learned some surprising things about his carbon footprint, especially when it comes to his farming practices. “I didn’t realize that a cow produced that much CO₂!” he laughs. “I was really nervous about my fuel consumption and looking for strategies to reduce it. But actually, it doesn’t even account for a quarter of my emissions,” the producer says. “Energy manufacturing and consumption account for 6 percent of the total GHG emissions from the farm, in fact,” Mr. Debuyscher points out, adding that 50 percent of total emissions from the business come from enteric fermentation, and 32 percent come from manure management. In the case of manure management, the farmer says he benefits from good logistical management and the harsh winters in his region. “We have wintering pens, so our bedding accumulates outdoors, where it stays frozen from December

to May. As soon as the manure thaws, we transport it directly to the field,” explains Mr. Desaulniers. “Not only is this method simple for us, but it’s also an effective way to reduce GHG emissions from manure, because we know that they are higher when the manure accumulates in hot conditions.”

The new knowledge he has gained through the Agriclimat project has also encouraged the producer to continue certain farming practices. “With over three hectares per cow, our pasture land is big enough, and our cattle graze from May to November, which is a plus for us,” says the farmer, who plans to optimize his strengths by developing other solutions as well. “Reducing tillage, direct seeding, and planting more intercropped cover crops to keep the soil covered in winter are some of the things Félix hopes to do,” Mr. Debuyscher says. “These practices will help reduce emissions from soil, which account for 8 percent of total emissions from the business,” he says, noting that these solutions are just some of many scalable options adapted to the business’s context and future plans. ■

PLAMONDON & FILS

Represented by: Félix Desaulniers
Production type: Beef (cow-calf and feeder cattle)
Advisor: Gauthier Debuyscher
(Groupe Conseil Agricole de l’Abitibi)

Regional Agriclimat Partner: Anne-Marie Trudel
UPA Abitibi-Témiscamingue Federation

WHAT DOES THE SCIENCE TELL US?

Intensive pasturing is one way to provide animals early-stage grass that is rich in energy, especially during heatwaves, when animals’ energy requirements are high. Furthermore, soil temperature is lower in the pasture as compared to a dirt pen, where bare soil absorbs more heat.

FERME L'ABITIBIENNE

MAN ON A MISSION

Alexandre Anctil doesn't need any convincing that climate change is real. The co-owner of Ferme L'Abitibienne, which specializes in sheep production, sees its effects in all aspects of the operation.

"Last year, I seeded barley on June 25, which is dangerously late for that crop," Mr. Anctil says. "But I had a bumper crop! The warm season is getting longer; it's not uncommon to take a nice hay cut in late October." Periods of extended heat are having other consequences for the sheep sector. "I have one building that's naturally ventilated—a super-functional dome in normal weather. But at the peak of summer, with the heat waves we are seeing now, that building, where the breeding happens, is getting less comfortable. The intense heat makes the rams less active, and the ewes can have problems with estrus. If we get three very hot weeks, it becomes a problem for the reproductive process," says the business owner, who is considering investing about \$20,000 in a cutting-edge ventilation system.

Troubling results

Mr. Anctil, who works as an agricultural technician, is sensitive to environmental issues. For him, it was the GHG balance that caused the biggest stir. "I honestly thought I was a good boy on this front. My business produces 75 to 85 percent of its feed from land that I farm with an environmentally friendly rotation: four or five years in grassland, two years in cereals, reduced tillage... I was expecting my carbon footprint to be neutral or low. But what I saw knocked me off my seat!" Mr. Anctil says, whose greenhouse gas balance is 480 tons of CO₂-equivalent. About a third of this comes from animal enteric fermentation, followed

by soil emissions at 27 percent and manure management at 14 percent of total farm emissions, and contrary to popular belief, only 13 percent comes from energy consumption.

Because his farm is relatively "young," exact data regarding carbon sequestration is hard to pin down. "I took over land that had been abandoned, some of it in the last year. We need more perspective on the samples we took in order to determine what's happening in the soil," explains Mr. Anctil.

Rethinking logistics

Having absorbed the initial shock, the business owner was quick to shift into solution mode. The first adaptation he made was using the climate to his advantage. "We're getting summers with more intense periods of heat and drought in July and August. We want our plants to be fully emerged by the start of June. You have to seed early and take advantage of snowmelt and the leftover moisture in the soil, which lasts until June on our farm," he ob-



According to analyses conducted by Agriclimat, heat waves are expected to become more common. The farmer is preparing to invest in forced-air ventilation to maintain the welfare of his animals.



Contrary to popular belief, energy consumption at Ferme L'Abitibienne only accounts for a little over 10 percent of the farm's GHG emissions, coming in fourth place behind enteric fermentation (36 percent), emissions from soil (27 percent) and manure management (14 percent).

serves, noting that a plant that has a well-developed root system by early July will fare better in times of drought. Apart from early seeding, the farmer does direct seeding in order to reduce organic matter losses, as well as minimum tillage. "I also asked myself 'Can I grow more of my own feed?' Increasing the

amount of protein in my silage and grains will cut down on my need for supplements, which are something I bring in from off the farm that puts pressure on my GHG balance," the farmer says, who is running trials in which peas are mixed into his traditional barley crop to increase protein levels.

Clearing farmers' reputation

But for this father of four, who is highly involved in his community, the issue of climate change has sparked broader reflection. "I produce 70,000 kilograms of meat per year, and the soil I farm on is healthier, more productive, and more fertile than it was 23 years ago when I started," says the farmer. "I'm glad to be participating in this project, and I'm going to do everything I can. But can't we question other sectors of human activity?" asks Mr. Anctil, calling for a more balanced perspective on how we value agriculture. "We need to avoid putting more of a burden on farmers' shoulders. We grow food, which seems like an essential human activity to me. We will always emit some GHGs. We need to do our best and work both collectively and individually to reduce our carbon footprint in all areas of society. ■

"I was expecting a neutral or low carbon footprint. But what I saw knocked me off my seat!"

— Alexandre Anctil, Ferme L'Abitibienne

FERME L'ABITIBIENNE

Represented by: Alexandre Anctil
Production type: Sheep
Advisor: Caroline Dionne (Groupe Pousse-Vert)

Regional Agriclimat Partner: Mylène Gagnon
UPA Bas-Saint-Laurent Federation

WHAT DOES THE SCIENCE TELL US?

Some Quebec soil has only recently been put to agricultural use. As previous ancient forests, these soils contain high levels of organic matter. In this situation, the amount of carbon returned to the soil is less than that which is mineralized each year, resulting in a carbon deficit.

FERME PÉROU

MULTIFACETED RESILIENCE

At Ferme Pérou, six generations of Bouchards have witnessed the seasons go by on the banks of Baie-Saint-Paul. For this farm, which specializes in dairy and cereal production, the fight against climate change is already well under way on multiple fronts.

“The Agriclimat climate projections for our region indicate wider temperature differences and shorter shoulder seasons, which we are already seeing,” confirms states Julie Bouchard, who represents the next generation of this dairy farm, which today holds 90 kg butterfat/day worth of quota.

Fine-tuning cropping and husbandry practices

The farmer oversees a herd of 105 head, including 65 cows (57 in constant production) and 40 replacer animals. Her carbon footprint gave her plenty to think about. “We were surprised to find out that most of the emissions came from the animals,” says Ms. Bouchard, who admits she is still reflecting on her farm management practices. “One option would be to have more productive cows so I can reduce the size of my herd. For example, if I can produce the same amount of milk with five fewer cows, I think that would have a direct impact,” she reasons. “The ability to obtain methane production indices from insemination centres is also an appealing option for future generations,” the young farmer adds.

An alteration has been planned for the farm’s cereal production component, which includes 250 hectares of hay as well as cereals and soybeans grown at different altitudes. “Having the different altitudes is beneficial, since the fields aren’t all ready at the same time. The harvest dates can be

as much as ten days apart,” says the farmer, who notes a larger difference in yield between the clayey soil at the bottom level and the higher fields, especially during droughts. “The soil texture and thermal units differ between the two altitudes. Most of our soil is sandy loam, which doesn’t have the same water retention. This higher portion of the land is more affected by drought,” observes Ms. Bouchard, who says she plans to select the most resistant cultivars to grow in this soil.

Heat stress: a major issue

Of all parts of the business, the barn is where higher temperatures pose the most threat. “The climate is a major issue for my barn,” the producer says, recalling emergency situations where she had to act quickly to ensure her animals’ comfort. “Our building was renovated in 2003 to have natural ventilation via thermal buoyancy. It had sidewalls that functioned like curtains, which were lowered to moderate the temperature during summer and raised in winter when it was time to close up the barn,” explains Ms. Bouchard, noting that the system was now no longer sufficient to cope with the climate, despite having done the trick until a few years ago. “The animals started suffering from the heat. They started producing and eating a lot less,” says the farmer, who observed a drop in performance in several different areas. “The drop in feed consumption caused dietary imbalances, and therefore energy deficiencies, which



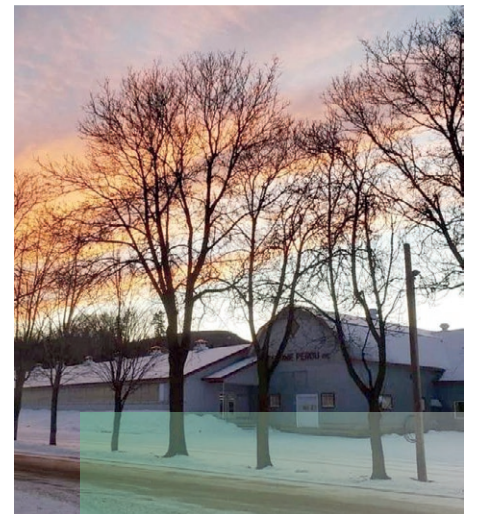
Julie Bouchard, a next-generation family farmer, in a barn equipped with a mechanical blower ventilation system. Courtesy of Ferme Pérou.

© Photos: Courtesy of la Ferme Pérou

also affected fertility.” In response, the business invested in a mechanical blower ventilation system for the whole building. “We immediately saw a change in the cows’ behaviour,” reports Ms. Bouchard, who now sees supplementary ventilation as non-negotiable for all barns.

An awakening

For Julie Bouchard, the Agriclimat project was a chance to alter her trajectory, but also to dispel unnecessary worry. “In the beginning, all this talk of going carbon neutral made us a little nervous: producers have enough on their plates as it is. But in the end, the project introduced us to a number of farming principles that we were already aware of and that we can now put into practice more easily,” the farmer admits. She says she would like to implement the use of cover crops and green manures, in addition to reducing fertilizer use. “We had already used these me-



Ferme Pérou has specialized in dairy and cereal production for six generations.

thods in the past, but not systematically because we were always wondering ‘Is this really necessary?’ Now we see that it is. It’s been an awakening that makes certain concepts a little more concrete.” ■

FERME PÉROU

Represented by: Julie Bouchard
 Production type: Dairy and cereals

Regional Agriclimat Partner: Annie-Pier Paradis
 UPA Capitale-Nationale-Côte-Nord Federation

WHAT DOES THE SCIENCE TELL US?

Dairy cows are affected by heat and humidity and will experience thermal stress if they cannot release enough heat. Daily production can decrease by 0.2 to 2.2 kg of milk, 20 grams of fat, and 20 to 30 grams of protein due to decreased feed intake and slower metabolism.

JARDINS VMO

PRECIOUS H₂O

For cranberry growers, having access to water is an absolute priority. Just ask Jean Olsthoorn, co-owner of Les Jardins VMO in Drummondville, where the sour fruit is collected through both dry and wet harvesting methods.

Les Jardins VMO operates in a closed loop, an approach that calls for meticulous water management. “We use an irrigation system with tensiometers; we control it by taking readings from instruments that tell us how moist the soil is,” explains Mr. Olsthoorn, who optimizes this system by making strategic use of it. “In summer, I do a lot of watering at night or early in the morning. I start the system around 4:00 or 5:00 a.m. and run it till 7:00 a.m. This ensures there’s enough water in the soil to meet the plants’ needs throughout the day,” he explains.

Plants in the open

For this thirty-acre operation, the issue of climate is primarily a logistical concern. The warm temperatures that come on in early spring and last into the fall have caused the farmer to have to make adjustments. “In 2021, we had a warm spring followed by a freezing period, which greatly affected our yield. Because of extremes like these, we need to be much more alert,” the producer says. The later arrival of frost in winter also makes protecting the plants a more complicated process. “This year, the fields didn’t freeze until about January 3, whereas the first frosts typically come around

Christmastime. This increases the risk of the plants being exposed to cold during the fall,” he explains. The risk is the same with the early melting of snow cover in spring. “In the past, the snow would melt completely by about the end of April; now it’s about the end of March. It means we have to give our plants more protection from frost early in the season, which means getting the irrigation system installed earlier.”

Encouraging results

Thanks to the crop he produces and his attentive management of resources, the business stacks up favourably against other farms when it comes to greenhouse gas (GHG) emissions. “My production type doesn’t require tillage, so we don’t generate emissions from that activity,” says Mr. Olsthoorn. “Our fertilizers produce some GHGs, but we use much smaller amounts of them than commercial grain growers do,” notes the farmer, whose primary source of emissions is energy consumption. “We power the pumps in our irrigation system with diesel engines. A quick calculation showed us that converting to electric motors would make us carbon neutral,” observes Mr. Olsthoorn.



The family farm’s cranberry crop extends over 30 acres.



Lucienne Van Mil and Jean Olsthoorn, co-owners of the farm, with their son Yan.

© Photos: Ghyslain Bergeron

“In the past, the snow would melt completely by about the end of April; now it’s about the end of March. It means we have to give our plants more protection from frost early in the season, which means getting the irrigation system installed earlier.”

– Jean Olsthoorn, Jardins VMO

Anticipating the risks

His crop may put him at an advantage in terms of GHG emissions, but what are the potential risk factors when it comes to adapting to climate change? “By 2050, we can expect milder temperatures in winter and hotter ones in summer. These conditions will likely allow certain pests to survive over the winter and accelerate the development and reproductive cycles of other pests,” explains Joseph Bertrand Desrouillères of the Club Environnemental et Technique Atocas Québec. “This means crops will be subject to increased pressure from pests, although that pressure is still low on Mr. Olsthoorn’s farm for the time being,” observes the agrologist, who has been coaching the business as part of the Agriclimat project. “The farm doesn’t apply many treatments to its fields at present, so unless pest pressure inten-

sifies, Mr. Olsthoorn should continue with his integrated pest management approach, which is already well established on the farm. This will ensure that he is ready to act as soon as infestation levels exceed the intervention thresholds,” the agrologist explains. “The summer heat also brings about increased water stress, especially when there isn’t enough rainfall. Currently, water resources are sufficient to meet the crop’s needs. But if we see snow cover go down in the coming years, along with greater evaporation from higher summer temperatures, then current resource levels may no longer be enough,” predicts Mr. Desrouillères.

While he remains aware of the issues at play, Mr. Olsthoorn feels he is well equipped to handle changes in the future. “Our systems are prepared to respond quickly,” the farmer says. ■

JARDINS VMO

Represented by: Jean Olsthoorn
 Production type: Cranberries
 Advisor: Joseph Bertrand Desrouillères
 (Le Club Environnemental et Technique Atocas Québec)

Regional Agriclimat Partner: Yann Bourassa
 UPA Centre-du-Québec Federation

WHAT DOES THE SCIENCE TELL US?

Climate projections indicate that Centre-du-Québec’s summer temperatures will average 2.3°C higher by 2050 when compared to the period between 1991 and 2020. Heatwaves will become more frequent, with 26 days a year above 30°C. With rainfall expected to be similar to current levels, plants will require even more moisture.

FERME BOVICOLE

IMPROVING YIELD WITH PASTURE!

Jean Lambert is a man of convictions and never does things halfway. The owner of Ferme Bovicole, who has been using “green” farming approaches for several years, is exploring new solutions through the Agriclimat project.

Based in Saint-Nicolas, the business owner has been an enthusiastic participant from the very beginning. He describes his Agriclimat experience as follows: “When we got started with the project in 2017, we were presented with climate models showing what our area will look like in 2050. We worked on the threats and opportunities for each of the main agricultural production types and looked at different scenarios. We answered questions like ‘Will longer and hotter growing seasons mean new pests?’ In 2021, Agriclimat continued fighting climate change, which involved creating a network of pilot farms. Naturally, I put my name forward to be a pilot farm in the Chaudière-Appalaches region,” he says.

Surprises in store

Based on the knowledge he gained through the project, Mr. Lambert’s expectations for his greenhouse gas (GHG) balance were modest. “Based on the data I saw from the beginning, I expected that going carbon-neutral would be hard.” His carbon footprint showed the beneficial impact of some of the practices he adopted on the farm. “Mr. Lambert was off to a good start, as seen from his carbon footprint, which was lower than that of the other participating farms,” says Dominique Fiset, an agrologist with Fertior, who provided coaching to Ferme Bovicole. “Intensive grazing is an important aspect. It consists of moving the cattle several times per day, which ensures the animals have a continuous supply of quality forage. Direct seeding and maintaining soil cover at all times also put him ahead of the game,” she adds.

Unlike the general trend across the province, organic matter levels in the fields of Ferme Bovicole have been stable since the early 2000s—but Mr. Lambert has a certain humility about this, pointing out that organic matter is only one part of the equation. “Plants absorb carbon as they grow. Could increasing the amount of carbon sequestration in my soil help balance out some of the GHGs generated by my other farming activities?” the farmer wonders. The Agriclimat project is a way to raise these ideas and develop farm-specific solutions in collaboration with agri-environmental advisors and other experts who give advice.

Farm-specific targets

Herd and manure management offer new possibilities in terms of measures the farm can take. “The feedlot where I overwinter my livestock is an old building with a liquid manure pit directly under the building. In summer, the manure heats up and emits more GHGs, especially methane,” Mr. Lambert explains. GHG emissions from solid manure are generally lower than from liquid manure. Mr. Lambert would need to undertake a major structural reorganization to change his approach to handling animal waste; he is still weighing the pros and cons.

In terms of herd management, two of the solutions being considered are improving feed conversion and reducing enteric fermentation. “We can increase the number of kilograms produced per cow by back-grounding our calves. This is already



Jean Lambert believes that improving his calves’ diet can promote feed conversion.

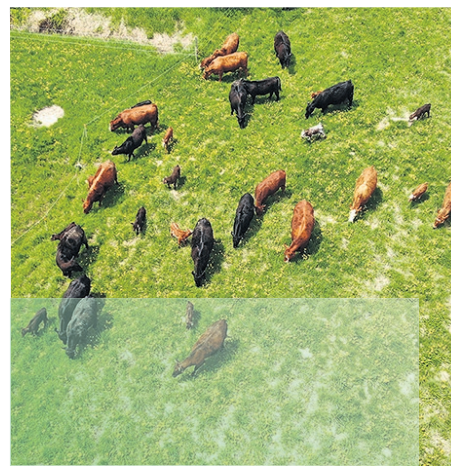
“For a long time, people have been saying that grassland stops growing at a certain point, which isn’t true. I have some grasslands that are over 20 years old!”

– Jean Lambert, Ferme Bovicole

under way,” the producer says. Mr. Lambert is also looking at reducing enteric fermentation by adding certain fats from by-products to the cattle’s feed.

GHGs and finances

Considering all the different facets of his operation, Jean Lambert is



Intensive grazing, which consists of moving the cattle several times per day, ensures the animals have a continuous supply of quality forage.

categorical in stating that economic interests can be compatible with reducing GHGs. “My intensive grazing is economically profitable, and it improves my carbon footprint,” he says. “Maintaining permanent grassland not only saves me from having to turn the ground over all the time, but also improves my carbon footprint,” he says, debunking the conventional wisdom. “For a long time, people have been saying that grassland stops growing at a certain point, which isn’t true. I have some grasslands that are over 20 years old!” Mr. Lambert argues, attributing the longevity of his fields to a method he already uses in his pastures. “If there are no more legumes left or not enough grasses have grown in a certain area, I just do a little overseeding with a small seeder.”

At the end of the day, various soil conservation practices, together with overseeding on the grassland, minimize the need for tillage. It’s a winning formula on all fronts. ■

FERME BOVICOLE

Represented by: Jean Lambert
Production type: Cow-calf
Advisor: Dominique Fiset (Fertior)

Regional Agriclimat Partner: Isabelle Lessard
UPA Chaudière-Appalaches Federation

WHAT DOES THE SCIENCE TELL US?

Quebec studies have shown that well-managed pastures (e.g., reseeded and enriched as required) will remain productive longer (beyond four or five years). During this phase, the annual renewal of roots and production of root exudates provide the soil with carbon. Root carbon is also more likely to remain stable in the form of organic matter.

RANCH CLIFTON

CHANGING PERCEPTIONS OF THE BEEF INDUSTRY

A proud sustainable beef and maple producer, Étienne Brodeur Bond is candid about the fact that he's not a fan of the bad press the beef industry gets. It's a perception the young owner of Ranch Clifton, located in the Estrie region, hopes to change.

Small details, big impact

The young farmer sees his participation in the Agriclimat project as a great opportunity to learn, but also to understand certain facets of his own operation better. "I was impressed by all the items listed in my carbon balance," the producer says. That said, he does regret that the calculations currently don't account for forested land, as it represents a significant proportion of his property. "Once we're able to account for it, some producers could see their carbon footprint improve," he states. The process did, however, allow him to plan certain projects with newfound enthusiasm. "After the carbon footprint was compiled, we implemented solutions that had an immediate impact on our GHG emissions, and I found that so cool!" Of all the measures proposed for his farm, better manure management appeared to be the low-hanging fruit. "In beef production, you've got cattle on dry straw, and I was accumulating a lot of manure," the producer recounts. "I learned that this kind of accumulation creates a lack of oxygen. That's not a problem in

the winter, but in the hotter weather the lack of oxygen releases more GHGs. But by cleaning the building out more quickly, we avoid creating these anaerobic conditions. That lowers our emissions without us having to make any more investments," he summarizes.

Another area for improvement was managing how he spreads manure. This led the young business owner to make other interesting discoveries. "We're realizing that the things we used to do in the past might have been easier for the farmers, but we didn't necessarily understand how they affect the environment. I had been wondering about that a lot," the producer says. "In addition to changing how we manage manure in the building, we were able to modify our spreading times and have an impact on the amount of gas emitted," he recalls.

Changes can also be made to the animals' diet, to a certain extent. "My cattle's diet is over 80 percent grass, which works in my favour. Forage that is higher in quality and lower in

Étienne Brodeur Bond advocates for beef production that is "sustainable," meaning practiced with care for animal welfare and the environment.



© Photos: Courtesy of Ranch Clifton

"In addition to changing how we manage manure in the building, it is possible to intervene on the spreading period to have an impact on the gases that will be emitted."

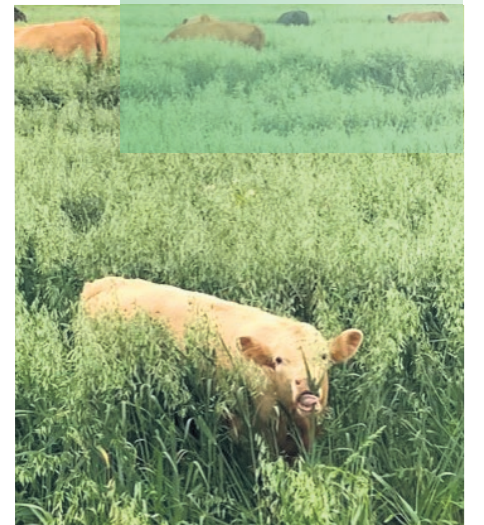
- Étienne Brodeur Bond, Ranch Clifton

fibre is easier for cattle to digest. These are some of the finer details that you can tweak," he mentions, adding that animal welfare affects the amount of methane produced. "If we consider all the factors encompassing our businesses, we can surely improve our carbon footprint," he says.

An educational mission

Are young farmers more open to changing their ways than their elders? For Étienne Brodeur Bond, first and foremost it's about making the information available—both to farmers and to the public. "For example, I joined the VBP+ [Verified Beef Production] program because I feel it's important to produce sustainable, environmentally friendly beef, but also to promote it to consumers, who often don't even know it exists," the farmer says. He views Agriclimat as an opportunity not just to gain new knowledge but also to share information between generations. "I think it's the financial aspect that scares producers off, and that's the part that needs to be demystified. As you get going in the project, you

Grass makes up 80 percent of the feed animals receive at Ranch Clifton.



start to realize that the changes don't always equate to huge costs or lower performance," observes Mr. Brodeur Bond, adding that more information and publications will eventually win out over stubborn preconceptions. "I believe we'll get farmers on board by showing them that caring for the environment is a good thing for their bottom line too." ■



RANCH CLIFTON

Représenté par : Étienne Brodeur Bond
Production type: Beef (cow-calf and feeder cattle)
Advisor: Geneviève Pilon
(Club Agroenvironnemental de l'Estrie)

Regional Agriclimat Partner: Julie Duquette
UPA Estrie Federation

WHAT DOES THE SCIENCE TELL US?

Waste management—especially the frequency at which a manure pit is emptied, the time of year in which it's done, and discharge techniques—has a major effect on GHG emissions. In systems where manure is stored in a building, more frequent removal of manure reduces emissions, most notably methane gas.

FERME BOVITOM

PERENNIAL CROPS

STILL A SAFE BET

“Under climate change, heat waves are going to be a problem, but temperature variations will be just as serious,” says Tommy Cyr, a beef and field crop producer at Ferme Bovitom, located in the Gaspésie region. “We have had to adapt to ensure our grasslands survive. Many farmers in our area have replaced their forage mixes with more heat-tolerant grasses and legumes, such as fescue, brome, alfalfa, and bird’s-foot trefoil,” says the fourth-generation producer, whose farm has 310 acres of forage, 120 acres of pasture, and 110 acres of cereals.

But the intense heat doesn’t just affect plants... “In Mr. Cyr’s case, we looked for solutions to make the animals more comfortable, such as setting up and conserving trees at the edge of pastures, as well as alleys that make it easier to herd the animals into the barn in extreme conditions,” explains agrologist Brigitte Gravel of the Club agroenvironnemental de la Gaspésie-Les Îles, who has been helping Mr. Cyr in his Agriclimat activities. “Hydration is another thing to keep in mind. The pasture system needs to have multiple waterers close by to provide hydration in sufficient quality and quantity. These are some of the ideas that were considered as part of the diagnosis,” says Ms. Gravel.

Another logistical challenge for the farmer is managing wintering pens for his 90-head herd. “In the past, the first frosts would come early in November, which resulted in weight-bearing ground that helped us manage the manure. But when it doesn’t freeze, the quality of the ground is poor. By the afternoon, the snow turns to rain, and next thing you know you’re surrounded by mud. We have to clear out the manure multiple times and spread a lot of bedding to try to keep the animals clean,” states the farmer, reporting that he spreads 600 bales of straw per year.

Lessons from the carbon footprint

Apart from the adjustments already undertaken by Mr. Cyr, the process also included calculating the carbon footprint, which was as educational as it was surprising. “I thought our soil, our hay fields, and our pastures were capturing plenty of CO₂,” the farmer says. “I expected my biggest emissions sources to be my fuel,

Apart from its forage and cereal crops, the farm has 120 acres dedicated to pasture.



Tommy’s wife Edith Bujold, pictured with her husband and the next generation, their children Marianne and Michaël.

“Now, we are almost reaching a plateau where, if you alter your growing practices, improve your soil structure, and maintain your perennial crops for longer, you’ll tend toward a balance. But you won’t necessarily capture carbon.”

- Tommy Cyr, Ferme Bovitom

my machinery, and input purchases such as plastic for my bale wrap. But that’s only a tiny fraction of it,” says Mr. Cyr with amazement. On his farm, enteric fermentation accounts for about 55 percent of GHG emissions, with manure management being the second largest source. “Manure that is left to accumulate for a long time produces more methane and N₂O than when it is cleared out frequently. So, the fact that I clean frequently has a positive effect on my GHG emissions,” explains Mr. Cyr, who stacks up favourably relative to other farms, where cleaning is less frequent.

Soil carbon loss, a critical factor in his region, is another concern for the farmer. “In the Gaspésie region, our land is relatively young. Before it became fields, it was forest. When you turn forests into fields, you stimulate the release of carbon: it’s a

decades-long process, and our soil is still releasing carbon,” the farmer explains. “Now, we are almost reaching a plateau where, if you alter your growing practices, improve your soil structure, and maintain your perennial crops for longer, you’ll tend toward a balance. But you won’t necessarily capture carbon,” he states, supporting his argument with an eloquent equation. “My farm produces 665 tons of CO₂-equivalent and sequesters 56 tons. That means it nets 609 tons of CO₂-equivalent in emissions. So, we’re far from being carbon neutral.”

In Mr. Cyr’s view, part of the solution is to optimize the cropping system that meets the needs of his farm. “Cattle producers need high-quality, productive forages and pastures. They are already doing good things to reach this objective, and they could still improve,” he concludes. ■

FERME BOVITOM

Represented by: Tommy Cyr
Production type: Beef (cow-calf and feeder cattle) and field crops
Advisor: Brigitte Gravel (Club agroenvironnemental de la Gaspésie-Les Îles)

Regional Agriclimat Partner: Germain Babin
UPA Gaspésie-Les Îles Federation

WHAT DOES THE SCIENCE TELL US?

By 2050, winters in the Gaspésie will be shorter and there will be more frequent episodes of alternating rain and snow. Snow will melt sooner and accumulate less, creating conditions that will make it a challenge to manage herds outdoors. In some areas, overwinter plant survival will also be affected.

FERMES LORTIE

WHEN GOOD PRACTICES BECOME THE GUIDING PRINCIPLE

If you ask Émilien Lortie, a farmer specializing in field crops, what his takeaway from participating in the Agriclimat project is, his answer is as simple as it is telling: “Based on my farm’s carbon footprint and the changes in climate we expect in the future, it wasn’t long before we realized our farming methods would have to change.”

Mr. Lortie, who is based in Saint-Lin-Laurentides, is already seeing the effects on his farm. “With the drier springs, hotter summers, rainier falls, and less snowy winters we’ve been seeing, it’s a completely new system, in terms of which cultivars we select and also in terms of how we grow them. Cultivars and even whole species of cereals that used to yield well just aren’t cutting it anymore. It’s as if these species are no longer adapted to our changing climate,” he observes.

Adapting the system

In response to this troubling outlook, the farmer decided to optimize some changes he had already started making. Imed Hasni, Ph.D., field crop coordinator and advisor with Services AgriXpert, has been coaching Fermes Lortie as part of the project. “Mr. Lortie worked closely with us to develop this new approach in order to determine the most appropriate measures for his business. I met a young farmer with a ‘spark’ and a clear vision, which has allowed him to implement a strategy centred on good agri-environmental practices,” Mr. Hasni says. “The carbon footprint analysis for his business shows that its GHG emissions are below what would be expected for the average field crop farm in Quebec,” the advisor added.

One of the measures the business has its sights set on is reducing tillage. “In the last few years, our approach to soil management has mostly been moving towards minimum tillage and direct seeding in some of our fields with lighter soil,” explains Mr. Lortie, who is conscious about conserving soil moisture from season to season. “Every time you till, you’re losing soil moisture and other important elements. Every pass, every operation, every field treatment also has a tangible cost.” Another major feature of the business’s practices, which is also one of the farm’s guiding principles, is optimizing soil health and reserves. “Adding manure, seeding green manure after harvest, intercropping, and having effective drainage, both at the surface and beneath it, are some of the other methods we use.”

Rotation is a must

The other centrepiece of this all-important guideline is strategic rotation with wheat, ryegrass, barley, corn, and soybeans. “After the small-grain crops are harvested, we systematically plant green manure. This allows us to add manure amendments, do some levelling, correct the drainage, and make sure the soil isn’t bare afterward. When tilling isn’t needed, we seed clover early in the season between the rows of cereals,” the farmer explains. “When it comes to soybeans, our ap-



“We make our living from the land. Land values being what they are these days, we need to keep them healthy to get the most out of them.”

– Émilien Lortie,
Fermes Lortie

Émilien Lortie at corn harvest time.

proach is to direct-seed ryegrass or winter wheat immediately after the harvest,” he explains, noting that soybeans are generally harvested in conditions that are ideal for planting winter wheat. This year, it will be the corn’s turn to share the furrows with intercropped ryegrass, tillage radish, and clover.

“Fermes Lortie’s commitment to implementing other actions and conti-

nuing them into the future makes it one of the region’s key players in the fight against climate change,” says Hasni. For Émilien Lortie, managing the business in a way that is clearly oriented towards sustainable agriculture is also a matter of respect. “We make our living from the land. Land values being what they are these days, we need to keep them healthy to get the most out of them.” ■



Machinery used to improve soil health and install tile drainage.

An example of reduced tillage: stubble breaking in spring with a buckwheat green manure seeded after soybeans in preparation for corn planting.



FERMES LORTIE

Représentées par : Émilien Lortie
Production type: Field crops
Advisor: Imed Hasni (AgriXpert)

Regional Agriclimat Partner: Dominic Brochu
UPA Lanaudière Federation

WHAT DOES THE SCIENCE TELL US?

Quebec based studies show that, on average, soils that are tilled less have a higher rate of organic matter compared to those that are worked intensively. However, the geographic location, the history of soil use, its texture and its original level of organic matter can all limit the beneficial effects of less tillage on the presence of organic matter.

FERME JODANI

ACCESSIBLE SOLUTIONS

Are productivity, efficiency, and environmental concern compatible with each other? Martin Lamy, co-owner of Ferme Jodani in Mauricie, intends to prove the answer is yes. Through the help of the Agriclimat project, he is well on his way to doing so.

Lukewarm on climate

When it comes to the climate variations projected for his region, the farmer says he has mixed feelings. "In winter, less snowfall and fewer cold snaps will be better for the buildings and outdoor equipment. Very cold weather makes it harder to operate the farm, and more likely that equipment will break. Less snowfall also means less accumulation on the roofs of buildings, and less snow removal to do," the business owner states. "On the other hand, less snow cover on the ground could damage crops that we want to continue growing after winter, especially hay," he says. Hotter and more humid summers are, however, an even greater concern to the producer, who expects he will need to alter his buildings and farming practices. "We will have to adapt buildings to make our dairy cattle and workers as comfor-

table as possible. Optimizing ventilation in the buildings will be critical," he stresses. "For the fields, we absolutely want to maintain plant cover to preserve soil moisture for as long as possible in the event of drought and reduce soil erosion during heavy winds or rainfall."

"Together with Cloé and our resource at Agriclimat, we are working to develop methods that will be profitable for our business while still improving our carbon footprint."

- Martin Lamy, Ferme Jodani

Targeted measures

Martin Lamy readily admits he is "very surprised" about his carbon footprint. "Our farm is in the average range for the dairy businesses included in the analysis, but we are still very far from being carbon neutral," he observes. Agrologist Cloé Deschesnes, who has been coaching Mr. Lamy as part of the project, elaborates: "The leading emissions sources on Ferme Jodani are enteric fermentation, emissions from soil, and manure management." She has a few possible solutions to suggest. "Emissions from enteric fermentation can be reduced by modifying the cattle's ration. It's one option the farm hopes to use, provided the change is compatible with its existing facilities. The number of replacement animals is also low, which helps reduce emissions from the farm," states Ms. Deschesnes. "Emissions from soil depend on how the crops are fertilized and what the soil conditions are, including their location and texture," the agrologist adds. In this case, the possible measures to improve manure management could kill two birds with one stone. "The emissions from manure management depend on what type of manure is produced, how long it is stored, and what the weather conditions are like," explains Ms. Deschesnes. "The improvement the farm owner is hoping to make would be to empty the pit and spread manure on the fields after the first cut, which would help reduce emissions from soil and manure management." According to the agrologist, this practice would lower the manure level in the pit during



© Photos: Courtesy of la Ferme Jodani

Hay production, an area where the farm owners want to see better performance in the coming years.

the hottest months of the summer, which in turn would lower methane emissions from the pit. Planting cover crops in fall is another short-term change being considered.

Planning differently

Mr. Lamy's goal is to align performance objectives with carbon footprint objectives. "Together with Cloé and our resource at Agriclimat, we are working to develop methods that will be profitable for our business while still improving our carbon footprint," the farmer says, noting that solutions must be implemented according to the availability of resources at certain times of the year. "The farm has shown a great deal of interest in finding solutions and integrating new practices to improve its carbon footprint," says Ms. Deschesnes, who works with the different stakeholders to implement effective solutions to help the business reach its objectives. "The carbon footprint, both short- and long-term, is now taken into consideration in all of the farm's initiatives," Mr. Lamy says. ■



Growing hay ensures the soil has plant cover year-round.

FERME JODANI

Represented by: Martin and Daniel Lamy
Production type: Dairy
Advisor: Cloé Deschesnes
(Groupe Envir-Eau-Sol inc.)

Regional Agriclimat Partner: Stéphane Tremblay
UPA Mauricie Federation

WHAT DOES THE SCIENCE TELL US?

Methane is produced when the temperature of liquid manure is higher than 10°C. The longer liquid manure is stored, the more methanogenic bacteria develop. Two approaches that can help reduce GHG emissions: emptying the manure pit in spring to ensure the manure stays cooler, and emptying the pit more frequently in the summer.

FERME BEAU-PORC

RUNNING A BUSINESS IN THE FACE OF CLIMATE CHANGE

Billy Beaudry, the co-owner of Ferme Beau-Porc, a farm business that specializes in raising pigs and growing corn and soybeans, is always seeking ways to optimize his business. This is what sparked his interest in participating in the Agriclimat project.

"We felt how climate change was affecting us. Heat bursts, heavy rainfall, endless humidity... We were seeing more extremes than in the past: we wanted to see what the future might look like and prepare for it," says the farmer, who is based in Saint-Valérien-de-Milton. The prospect of estimating GHGs generated by the business and figuring out its options for carbon sequestration was also appealing. But Billy Beaudry's GHG carbon footprint held a few surprises in store... "We thought that with our conservation practices and green manures we would be able to sequester carbon. We were expecting that diesel consumption, tractor use, and propane for the drying process would be our biggest emissions sources. The reality completely changed our perception. In fact, 13 percent of our emissions come from our fuel, and our soil is not sequestering carbon," says the business owner.

"To determine Mr. Beaudry's carbon footprint, we looked at emissions from soil, fertilizer manufacturing, the pigs' feed, and the livestock and manure practices. Then we combined these data with the organic matter situation in the soil, based on the soil testing history," explains Geneviève Deniger,

an agrologist at Agri-Conseils Maska, who helped the farmer calculate his carbon footprint. "Several different GHGs are estimated in the carbon footprint, and later expressed in CO₂-equivalent," says the agrologist, who points out that 43 percent of emissions from Ferme Beau-Porc are in the form of CO₂, 37 percent in the form of nitrous oxide, and 20 percent in the form of methane.

Aspects to capitalize on

Despite this unsettling observation, certain practices improve the business's performance. "We have greatly improved our building insulation, which allows us to save on propane. We have been doing crop tests and direct seeding for a number of years. We've also seen that getting our winter wheat established early in the autumn makes a big difference," says the producer, who is also thinking about how he can reduce emissions from manure spreading. Mr. Beaudry feels that the research on organic matter and living roots are, however, one of the strong points of the program. "I learned a lot about organic matter. We want to take better advantage of this aspect so we can make our soil more resilient," the farmer adds.

Cindy Beaudry, co-owner of Ferme Beau-Porc, with her brother Billy.



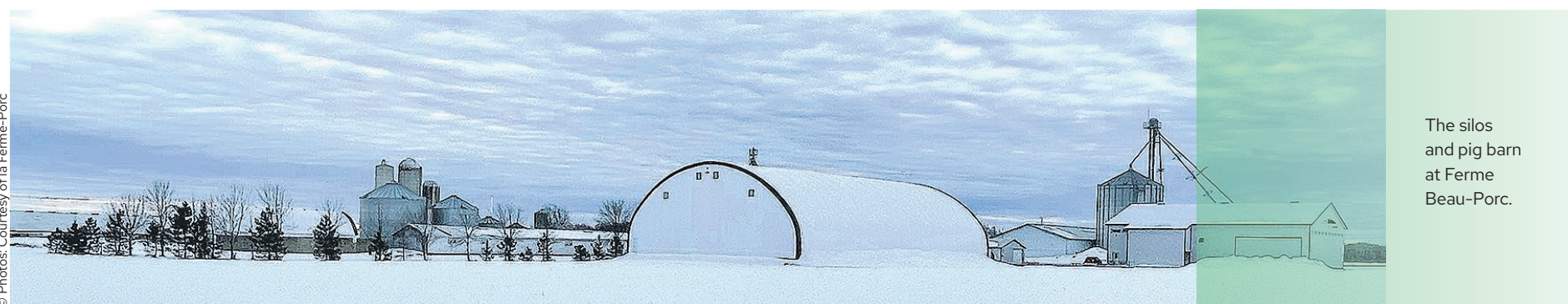
« We were expecting that diesel consumption, tractor use, and propane for the drying process would be our biggest emissions sources. The reality completely changed our perception. In fact, 13 percent of our emissions come from our fuel, and our soil is not sequestering carbon. »

– Billy Beaudry, Ferme Beau-Porc

Contradictory issues?

Florence Pomerleau-Lacasse, an agrologist and biologist with Agri-Conseils Maska, speaks to some of the subtleties that can be confusing for producers. "The agrological and environmental aspects don't always point in the same direction. Finding solutions to reduce GHGs within the business may seem counterintuitive at times, because a win for agrology or the environment isn't necessarily a win for GHGs, and sometimes you have to pick the best of two options," she says. "From the farm operator's point of view, the GHG balance is a new environmental aspect, but there are also other aspects, both economic and environmental, to be considered. Implementing practices that are beneficial in all these aspects remains our priority for the business," the agrologist says in summary. In Mr. Beaudry's case, one of the solutions being considered is reducing the amount of nitrogen used to grow his annual crops.

While there is no quick fix for soil carbon loss, the positive impact of direct seeding and cover crops, practices already used on Ferme Beau-Porc, is a sure bet. Mr. Beaudry created more test plots this year and plans to recalculate his carbon footprint in 2023. ■



The silos and pig barn at Ferme Beau-Porc.

FERME BEAU-PORC

Represented by: Billy and Cindy Beaudry
Production type: Pork and field crops
Advisor: Geneviève Deniger (Agri Conseils Maska)

Regional Agriclimat Partner: Caroline Charron
UPA Montréal Federation

WHAT DOES THE SCIENCE TELL US?

In addition to protecting soils in the spring and fall, cover crops reduce the need for nitrogen fertilizers in the year following establishment. Some studies show that cover crops also contribute to an increase in soil organic matter. Planting cover crops is an indispensable approach to improve the soil's carbon balance for plant production.

VERGERS MULTI-POMMES

MAXIMIZING RESOURCES

In the world of apple growing, increasing temperatures pose a number of challenges. “Summer heat causes problems for water access, because water deficit in summer can affect the size of apples at harvest time.

But the May-June period is also critical to the trees’ vigour,” explains the producer who is based in Saint-Joseph-du-Lac. “The heat also affects workers and plays a role in pest pressure and in the potential arrival of new crop pests.”

What the numbers say

Despite all these climate-related concerns, calculating the carbon footprint was a positive experience for Mr. Lauzon. He learned that 69 percent of emissions from his orchard come from fuel and electricity (both manufacturing and consumption), while 21 percent come from the manufacturing of mineral fertilizers. N₂O emissions from soil (which are associated with mineral fertilizers) and pesticides manufacturing account for 8 percent and 2 percent, respectively, of total emissions. So what does this mean on the ground?

Agrologist Ly-Anne Hamel, Mr. Lauzon’s coach in the project, interprets the data as follows. “Energy consumption, primarily from tractor

fuel, the irrigation system, and gas used in vehicles for workers, represents the largest source of emissions for the business. However, these emissions might be overestimated because we weren’t able to isolate the exact proportion of energy used for the orchard alone in the study, since the business operates three different apple production sites, in addition to producing cereals. So, it would be interesting to run the calculations again with more precise data,” Ms. Hamel says.

According to the agrologist, the growing of perennial crops and the presence of coarser-textured soil, which is more appropriate for an orchard than heavy soil, worked in the orchard’s favour. “This means N₂O emissions are much lower than CO₂ emissions, which can be advantageous, considering the difference in warming potential between the two,” she explains, adding that changes in organic matter (OM) rates in the soil is another non-negligible factor. “Since OM has been increasing in recent decades according to available data, we can estimate how much carbon is sequestered in the soil each year. The effect is strong enough to compensate for the orchard’s emissions, such that its overall carbon footprint could be considered close to carbon neutrality.”

Mr. Lauzon made the move towards growing more resilient apple varieties to better adapt to climate change.



At Vergers Multi-Pommes, apple growing is a family affair. Here, Olivier Lauzon (right) and his father Réjean are joined by Olivier’s nieces, Justine and Keliame.

© Nathalie Laberge

Work to be done

Energy consumption is still the business’s most attractive area for improvement. “Because the solutions are less intuitive, the Agriclimat team is planning a meeting for participating businesses with similar carbon footprints in order to identify potential solutions,” states Ms. Hamel. Meanwhile, the business is already using localized treatments and predictive models to limit the need for field interventions.

Carbon sequestration in soil is a promising area that the orchard could still develop. “Although the alleys are covered with grass, it is still common to see bare soil under the apple trees. Adding ground cover plants to the rows would be advisable, as long as they don’t compete with the trees for water, space, and nutrients or encourage crop pests,” observes Ms. Hamel. The proposed actions include planting a trial plot with different ground cover species on the rows and creating flower strips between rows. “These measures are designed to increase organic matter and biological activity, improve the

soil structure, compete with weeds, and encourage the presence of pollinators and natural predators. We want to use this approach to foster carbon sequestration and limit the impact of increased pest pressure,” the agrologist says.

Another concern for Mr. Lauzon is the frequency and duration of drought periods. “Because we know that water needs are greater in the spring, we plan to create a snowmelt harvesting pit and channel underground drainage water toward it so that we can collect as much water as possible in the spring,” explains the farmer. “All new apple tree plots that we’re planting are equipped with a drip irrigation system, and irrigation times are managed with a tensiometer in the soil to ensure that the right amount of water meets the apple trees’ needs.” Mr. Lauzon is also moving toward growing more resilient varieties. “In renewing our orchard, we have used different apple varieties to adapt to climate change as well as consumer demand,” the proactive farmer concludes. ■



© Courtesy of Vergers Multi-Pommes

VERGERS MULTI-POMMES

Represented by: Olivier Lauzon
Production type: Apples
Advisor: Ly-Anne Hamel (Club Agropomme)

Regional Agriclimat Partner: Maria Jose Maezo
UPA Outaouais-Laurentides Federation

WHAT DOES THE SCIENCE TELL US?

In the climate of the future, the total amount of summer precipitation should remain stable; however, rain will be more intense, localized, and in the form of storm cells. Water requirements for irrigated crops will increase as surface water could be more difficult to access. The priority will be obtaining secure access to a reliable water source and optimizing its use.

FERME MALTAIS

THE STRENGTH OF TEAMWORK

Ferme Maltais has been a family affair for the last four generations. For this dairy and field crop operation, which also does seed screening, “looking ahead” is a key value. With the help of experts and advisors, Pascale Maltais is now at the helm of the business with her brother Olivier. She is responsible for determining what actions to take on the farm to fight climate change.

Measures for measures

The farm’s carbon footprint indicates 4,100 tons of CO₂-equivalent. GHG emissions from the business account for 60 percent of this amount, with soil carbon loss making up the remaining 40 percent. Pascale Maltais doesn’t find this surprising. “We knew dairy cows would be the big item in terms of emissions,” says the farmer, conceding that the 1,800 tons of CO₂-equivalent from soil organic matter loss caught her by surprise. “Firstly, we chose GHG emissions reduction scenarios that would show fast results in these two areas. We set our objectives for 2022, then got to work on scenarios we wanted to accomplish within 3 to 5 years, with plans to go even further in the future,” the producer explains.

Management practices on the farm were modified in its first year of participation in the Agriclimat project. “We looked at the number of replacement animals on the farm and aimed to have exactly the minimum number of heifers that would meet our needs. The goal was to avoid overproducing,” explains Ms. Maltais, adding that the decision operates on multiple levels. “Reducing our livestock saves us from having to produce unnecessary feed. We don’t have to buy as much feed from off the farm, we use less space, and emissions from the animals are lower.”

Ferme Maltais also took action to promote carbon sequestration. “We

planted a windbreak with 176 trees and shrubs of different varieties,” says the farmer, admitting she did have to shift her expectations. “According to the Agriclimat estimate, we were only sequestering 500 kg in CO₂-equivalent per year. That’s when we realized that we were going to make progress a little bit at a time,” chuckles Ms. Maltais, pointing out that even modest reductions help improve the carbon balance. “The professionals in the project give us another perspective on the actions we are taking, plus plenty of potential solutions we never even considered,” the farmer says.

Personalized coaching

Martine Bergeron, the agrologist assigned to Ferme Maltais, is part of the network of advisors involved with the Agriclimat team. She points to coaching as one of the main strengths of the project. “The project is first and foremost an exercise in sharing and raising awareness,” she says. “We want to know how the producer experiences climate change on his farm. Does it show in how the herd behaves or how healthy the animals are? In lower yield from the field or forage quality?” explains Ms. Bergeron. “Once we get a sense of this, we select the solutions that are of interest to farmers over the short, medium, and long terms. We seek out professional skills that will enable the business to increase productivity while reducing emissions. It’s really a team effort,” observes Ms. Bergeron.



Pascal Maltais and her brother Olivier, the fourth generation to take up the torch of the family business.

© Photos: Courtesy of la Ferme Maltais



Camil Maltais, Pascale’s father (left) with his brother Léon, who are both still heavily involved in the business.

“We set our goals for 2022, then got to work on scenarios we wanted to accomplish within 3 to 5 years, with plans to go even further in the future.”
- Pascale Maltais, Ferme Maltais

Looking three to five years ahead—with excitement!

The coming weeks are shaping up to be exciting ones for Pascale Maltais. “We’ll be working on our three- to five-year emissions reductions scenarios! With the help of professionals from the project and specialists from other sectors, we’ll determine what

actions we can take with respect to feed, for example, so that our cows emit less methane,” mentions the producer, who looks forward to this multi-sector collaboration with excitement. Dealing with animal heat stress, improving feed conversion, and altering manure management practices are other possible actions being considered in this phase of the project. “We want to continue taking action to improve our farm’s performance, both economically and in terms of GHGs,” the farmer says proudly. ■

FERME MALTAIS

Represented by: Pascale Maltais
Production type: Dairy and cereals
Advisor: Martine Bergeron (Groupe multiconseil agricole Saguenay–Lac-Saint-Jean)

Regional Agriclimat Partner: Marie Mazerolle
UPA Federation of Saguenay–Lac-Saint-Jean

WHAT DOES THE SCIENCE TELL US?

A dairy herd’s feed management program can reduce GHG emissions from animals at the farm level, at the individual animal level, and per litre of milk produced. Your advisor can help you determine how options like increasing the rate of fat in the ration, or the digestibility of forages, can help.



THE AGRISOLUTIONS CLIMAT PROJECT CONTINUES

The goal of **Agrisolutions climat** is to encourage the adoption of beneficial management practices that reduce greenhouse gas (GHG) emissions among the vast network of agricultural producers.

The project comprises three phases: climate change, cover crops, and nitrogen management (Sentinelle network).

Climate change

Coordinated by the Conseil pour le développement de l'agriculture du Québec

Goal:

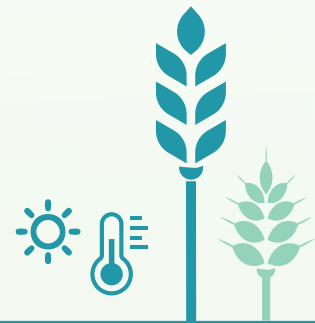
To deepen an understanding for and increase expertise in how to mitigate the effects of climate change.

Benefits for agricultural operations:

- Complete an Agriclimate diagnosis to determine how to mitigate the effects of climate change.
- Help the farm adapt to changes in our climate.
- Reduce GHG emissions.

Advantages:

The on-farm diagnosis is conducted by a trained Agriclimate expert. There is a maximum of 100 diagnoses offered during this phase of the project.



Would you like to participate in the Climate Change phase?

Speak to your advisor and see the website for more information.

upa.qc.ca/agrisolutions-climat



Cover Crops

Coordinated by the Producteurs de grain du Québec

Goal:

To develop knowledge and expertise about how to establish cover crops.

Benefits for agricultural operations:

- Learn how to establish and/or optimize cover crops.
- Learn how to reduce GHG emissions and how to boost carbon sequestration in agricultural soil.

WOULD YOU LIKE TO PARTICIPATE?

Speak to your advisor and see the website for more information.

Nitrogen Management in Grain Corn (Sentinelle network)

Coordinated by the Producteurs de grains du Québec

Goal:

To optimize nitrogen fertilization through participation in the Sentinelle network.

Benefits for agricultural operations:

- Learn how to reduce GHG emissions generated by synthetic nitrogen fertilizers.
- Learn how to avoid over-fertilizing grain corn with nitrogen.
- Learn how to improve nitrogen management on the farm.

WOULD YOU LIKE TO PARTICIPATE?

Speak to your advisor and see the website for more information.

Agrisolutions climat was developed by the UPA and is made possible through a partnership with the Producteurs de grains du Québec and in collaboration with the Conseil pour le développement de l'agriculture du Québec within the framework of the On-Farm Climate Action Fund, part of Agriculture and Agri-Food Canada's Agricultural Climate Solutions Program.



Agriculture and Agri-Food Canada

Agriculture et Agroalimentaire Canada

This project was financed through the On-Farm Climate Action Fund, part of Agriculture and Agri-Food Canada's Agricultural Climate Solutions Program.