

Introduction: Yes, We Can Grow Vegetables Year- Round...and Why We Should

In Quebec and most northern parts of the US and Canada, comes winter. This seasonal change is inevitable and leads us to easily abandon the idea of eating in-season year-round. In most people's minds, the fresh season starts in June and lasts until October, perhaps a bit earlier the further down the longitude line you live. "See you next year! We're going to miss your tasty veggies!" is what most growers hear every year when outdoor markets come to an end. Come fall, as colder nights start kicking in, everyone suddenly stops celebrating local farming. The weekly act of buying fresh produce from a neighboring farm suddenly comes to a halt. This is the sad reality of growing vegetables in northern climates or so it was...

In many small-scale farms, the status quo is evolving. When the season stops, we just keep planting and harvesting. This was the famous call to action of the pioneer of winter farming, Maine's own Eliot Coleman. A call that has been answered by thousands of organic growers in all parts of the northern states and provinces who benefit from a strong market for local products. This is where our story starts.

The "eat local" movement has made some tremendous strides in the last twenty years, creating in many communities a market for year-round local products.

For the last ten years, I've been trying to figure out how to grow year-round and out of peak season, and doing so with a profitable, low-tech approach. My journey in winter farming first started by visiting growers in Europe and parts of the US and Canada and by attending every farmer conference I could. Along the way, I took notes about the different approaches and results that growers would gladly share.

Then my professional life took an interesting twist. After ten years of successfully running my own market garden operation, I was asked by a Canadian businessman and philanthropist to develop a farm like no other, one that could demonstrate an alternative way of producing food in a holistic and ecological manner. This farm—Ferre des Quatre-Temps—would provide nourishing products for its local clients and become a training ground for young Canadians seeking to start their own farming projects. It was here that the idea of developing techniques for year-round farming in northern climates blossomed. And so, since 2016, I've been testing and trialing different patterns in order to achieve what became the farming manual you now hold in your hands. Along the way, a former apprentice of Ferre des Quatre-Temps and professional agronomist, Catherine Sylvestre, took my place as the farm's main vegetable grower, and together we conducted research on best practices for winter farming. Catherine and I are what you can call... geeks. We love winter farming because of the challenge, and for many years, the advancement of our techniques was driven by this quest to learn and improve our practices. This was true until the pandemic hit and our research at Ferre des Quatre-Temps came under the light of a new paradigm. What If winter farming became essential?

Going local year-round

Throughout the year, our grocery stores receive an abundance of fruits and vegetables from around the world, delivered via efficient and relatively cheap transportation systems. Today's supermarkets know no seasons, and when environmentalists criticize the ecological costs of these systems, their complaints are heard as such...complaints! The modern lifestyle allows us to eat however we want, whenever we want, and we are no longer condemned to the fate of our ancestors, who ate nothing but potatoes, carrots, and turnips in the winter months.

2 This narrative was perhaps true before the effects of the COVID-19 pandemic awoke many folks to the fragility of our modern grocery store supply chain. We then learned that in the Northeast, roughly 70 percent of vegetables sold in grocery stores come from California, Mexico, or

elsewhere in the world. When this supply chain was compromised, we also learned that it takes about three days to deplete the supply of fresh fruits and vegetables. Suddenly, we could see that these imported products came with some disadvantages. Perhaps the vulnerability of this food system was worth planning against.

Although the consequences of the pandemic and the temporary shutdown of borders did not reach red alert with regards to food accessibility, they served as a warning, an eye-opener for some policy makers who decided to take action. In Quebec, one of the main policies was a massive investment program to double the number of greenhouses within five years. Suddenly it became a matter of national security to grow in winter. Unfortunately, the idea only got picked up by large-scale producers who already could invest in building new greenhouse complexes. These producers grow summer crops in monoculture regardless of the season.

Catherine and I decided then to propose our alternative: Is it better to invest \$20 million to bolster a twenty-hectare tomato greenhouse complex or, instead, to invest the same amount towards better equipping and educating fifty family farmers, so that they can use greenhouses and extend their growing season to provide a diversity of seasonal and local produce?

Why not aim for real food sovereignty and decentralize the production with thousands of smaller greenhouses all over the province of Quebec?

This would, we imagine, create the independence we seek for our province. And so we decided to share our insights and, most importantly, our production techniques. The idea, as with many new things, is to first convince by showing the evidence.

Winter growing, the kind we practice at Ferme des Quatre-Temps, requires little energy and is in tune with the seasons. Many vegetables can withstand cold and even below-freezing temperatures when protected from icy winds. These are the plants we work with, and the goal is to master their growth in new, more challenging conditions. We have learned to select cold-hardy and disease-resistant cultivars (varieties), to protect our crops with simple and affordable shelters, to plan our successions properly, and to adjust crop densities to account for inhibited plant growth and diminished sunlight. From spinach, to celery, to parsley, we grow nearly thirty different vegetables that can be harvested in winter months. Our experiments with heating at different levels also gave us some insights into growing these veggies economically. The factor that contributes to the success of our winter farming depends on one variable: the empirical knowledge of humans who are convinced that we can grow vegetables differently.

If you are reading this, you are likely a vegetable grower or a consumer hoping to reinvent northern agriculture as we know it. We invite you to follow us and join in this movement that is sure to change the agricultural landscape. Eating according to the seasons is both beautiful and wholly logical. We never cease to be amazed, from the first sweet spring radishes to delicious heirloom tomatoes in the summer, flavorful squash in the fall, and spectacular spinach in the winter.

Without further ado, let's dive into *how* we can get there.



Ferme des Quatre-Temps, or Four Season Farm, refers to a Canadian native flower with four petals, also known as bunchberry. Each petal represents one of the four very distinct seasons in Quebec where we farm. The name is also an homage to Eliot Coleman's famous Four Season Farm in Maine, with his blessing.

The concept behind Ferme des Quatre-Temps, located in Hemmingford, Quebec, was developed by Jean-Martin Fortier and a team of permaculture designers. Their objective was to strike a sweet spot between intensive production of organic farming while creating a landscape designed for biodiversity. The farm is holistic as it is thought of as a whole that includes gardens, pastures for mob grazed beef, free-range chickens, and hogs that have access to rotational grazing. The site includes nearly ten acres of land used for biointensive vegetable production, as well as greenhouses and high tunnels for winter productions.



Every year, Ferme des Quatre-Temps welcomes apprentice market gardeners who spend two seasons learning the techniques and methods developed on the farm. A Quebec TV series called *Les fermiers* features this unique educational program that gives each participant the opportunity to take on a management role and oversee all operations.

The knowledge developed on the farm is also advanced and shared through the Market Gardener Institute. The goal of the Institute is to equip and support the new organic growers of today and tomorrow who are changing the world by growing healthy food for their communities. The Institute disseminates this knowledge through various media, including its online course, The Market Gardener Masterclass.



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The Knowledge and Skills of Northern Growers



The first salads or radishes are harvested in January, the first carrots or turnips are harvested in March, and the first ripe melons are in April.

— Joseph Vercier, *Culture potagère*, 1911

Some ideas that may seem avant-garde are in fact quite old; this is certainly the case with northern agriculture. In 1942, Abbé Maurice Proulx produced a short film showing how winter vegetables could be grown using hotbeds (*couches chaudes*).

As early as January, growers would dig squares roughly three feet deep into the snow, then stake twelve-inch boards into the ground. Into this hole, they added an eight-inch layer of hot manure and covered it with topsoil. The soil would be warm, having been stored in bags left indoors since the fall. Young tomato, onion, and lettuce seedlings were then planted in the soil and kept warm by the manure. The hole was sealed using a frame with glass panels (like a window) built for this purpose. On sunny days, the frames were propped open to prevent overheating. This simple shelter, combined with the heat generated by manure, allowed growers to harvest crops several months before other gardeners. The tomatoes were later transplanted into the vegetable garden, while lettuce and onions could be eaten in March and April.

Our ancestors knew how to extend the harvest season using nothing but simple shelters. They also had an abundant supply of fresh manure, which is an indispensable heat source for hotbed systems.

In France, Abbé Proulx studied the methods of Parisian market gardeners who had mastered the art of growing vegetables in the off-season. For more than 200 years, these market gardeners fed the millions of people inhabiting the French capital with vegetables and several types of fruit grown year-round. On small diversified farms that harnessed knowledge and skills to grow crops in an entirely ecological manner, a single plot could see eight successions in one year. And at this time, petroleum-based fertilizers, pesticides, and herbicides were not yet available!

Yet even in France, this approach gradually fell into oblivion. As it became more efficient to ship perishable goods, produce could quickly be moved from one region to another and, eventually, from one continent to another. Local off-season agriculture was replaced by imported fruits and vegetables grown in warmer climates and parachuted into major cities like Paris.

Fortunately, the extraordinary know-how developed by 19th-century French gardeners was not entirely forgotten. American Eliot Coleman is without a doubt one of the pioneers who revitalized these methods. A contemporary thought leader for many vegetable growers in the organic farming world, Coleman spent more than forty years on his farm in Maine modernizing methods for market gardening. He documented his observations in several influential books like *The Winter Harvest Handbook*, which remains the best reference for growing vegetables in the cold season.

Obviously, Coleman and Abbé Proulx are not the only ones who applied and documented these methods. With a little research, you will discover a trove of resources. Today, the revival and dissemination of this expertise have become even more relevant as the agricultural industry searches for a greener path forward. The book you are holding in your hands and our experiments at Ferme des Quatre-Temps are a part of this process.

Abbé Proulx was a priest, agronomist, and filmmaker who documented the transition from peasant farming to industrial agriculture for more than thirty years. As a scholar, he traveled extensively to learn about European methods for growing vegetables and was the first to make educational short films about good agricultural practices. His documentaries are uniquely beautiful and portray a not-so-distant past.



Photo courtesy of the Archives de la Côte-du-Sud et du Collège de Sainte-Anne.

Eliot Coleman is one of the pioneers of the American organic movement and lives in Maine, just a few hours from the border with Quebec. Thousands of American market gardeners, especially in the northeastern United States, used the tenets of his work to develop new strategies and run their own farms. The result has been a lively and captivating proliferation of disciples who have shared their discoveries (and their mistakes!) over the past twenty years.

Coleman largely draws from the expertise of 19th-century Parisian gardeners and their approach to small-scale intensive vegetable production. In recent years, he published new techniques and methods for winter growing. These publications marked a critical milestone; they democratized winter growing, allowing the public to access previously unavailable information and furthering the northern market gardening movement as a whole.



Photograph by Barbara Damrosch. Photo courtesy of Eliot Coleman.

Sharing Our Collective Knowledge with New Farmers

Founded in 2015, Ferme des Quatre-Temps is an educational farm that aims to train future growers according to a regenerative market gardening business model. The farm has two sites: one in Hemmingford, southern Quebec, and the other in Port-au-Persil, in the northern Charlevoix region. At both locations, experiments are strongly encouraged and celebrated.

Since the farm's inception, winter growing has been an integral part of the methods we actively strive to adopt and improve. Through this approach, we aim to find ways to make the least productive months profitable, establishing best practices for successful winter growing in Quebec.

We went through many rounds of trial and error, some resulting in frozen vegetables and freezing hands, and others revealing surprising successes. Eventually, we implemented procedures that, in recent winters, have shown proven results. In this book, we will shed light on our past efforts, and we hope that it will inspire many people to consider adopting these methods in their own market gardens.

Through our experiments, we identified five key principles that guide our approach to winter growing. We will further explore these concepts throughout the chapters of this book.

- **The most significant limiting factor for winter vegetables is a lack of sunlight, and not a lack of heat.**
- **Many vegetables and cultivars can withstand freezing temperatures.**
- **It is possible to increase the cold hardiness of some crops.**
- **By using simple shelters and layering them like onion peels, we can create favorable microclimates that allow vegetables to grow in winter.**
- **By working with minimal heating, we can limit the investments required to make winter crops profitable.**

Before going any further, we want to acknowledge the incredible contributions made by an entire community. They enhanced our collective knowledge and skills, helping us to uncover these essential concepts. Our approach to farming and this book would not have been possible without the long-standing knowledge transfer network established by farms in the United States, Ontario, and Quebec, and their combined expertise. We wish to thank them for their generosity in enhancing our collective understanding and driving our movement forward.

It is estimated that there may have been up to 10,000 small farms surrounding 19th-century Paris. These gardens managed to feed the city without modern technology like electricity, heat from fossil fuels, and plastic. This shows us that it is possible to transition to a form of agriculture that is different from the one we know.

Of course, the lives of these vegetable growers were certainly a far cry from our modern-day context. Some worked up to 18 hours a day! But by combining simple shelters, a strong understanding of plants, adaptability, radiant heat sources (manure, at the time), and incentives to produce (business was good in Les Halles), these growers developed an approach to production that remains a useful reference even today. And it is not so far removed from what we currently know.

We are careful here to avoid the trap of nostalgia, claiming that everything was perfect in the past. But we can reliably say that these vegetable growers were one step ahead of their modern-day counterparts who operate only six or seven months a year. The general lack



Photo courtesy of the Bobigny commune archives, in France.

of local winter production has left a void and enabled large-scale commercial and global operations to fill this market void with imported produce requiring a lengthy, fragile, and fossil-fuel-intensive supply chain.

Most books that explore methods used in the past are only available in French, the language of the Parisian market gardeners. However, we've found an English equivalent written by John Weathers in 1909 called *French Market Gardening*. Weathers recognized that French gardeners were one step ahead of British gardeners in terms of intensive market gardening techniques and season extension.

To bridge that gap and increase food sovereignty in English cities such as London, he took upon himself to document and publish the French gardeners' techniques in English. The level of detail in his book is quite advanced; we can see how inventive and resourceful the Parisian gardeners were, and we can learn from them even now and actualize their techniques!





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