



# Wintermar Farms (1989) Ltd.

Living in our Environment  
A Sustainability Report

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## Background

This report provides an overview of our impacts on the environment including greenhouse gas (GHG) emissions and our efforts to minimize them and become more sustainable. First, here is some context.

Wintermar Farms (1989) Ltd, is a family-owned farming operation founded in 1965, located in Waterloo Region, ten minutes north of Waterloo, ON. Our crop production is focused on pedigreed seed under the Cribit Seeds brand and grains for on-farm processing under the Wintermar Grains brand. Over 10,000 acres of locally grown contracted crops arrive at our facilities intended for seed or food grains each year. There are five active family members who form the ownership. We have fifteen skilled staff performing tasks across farming operations, seed and grain processing, marketing, research, and administration functions.

The following topics will be addressed in more detail:

## **I. Investment in Advanced Equipment and Technology**

- 1) High efficiency grain roaster
- 2) Dust control systems
- 3) Installation of color sorter/scanner
- 4) Updating of field operations equipment

## **I. Development and Promotion of Sustainable Cropping Practices**

- 1) Development, propagation, and promotion of Cover Crops
- 2) Re-introduction of Winter Barley genetics into Ontario
- 3) Sustainable Agronomy practices
- 4) Support of organizations and sustainable causes

## **I. By Product use and Recycling**

- 1) Directed by-product use
- 2) Construction projects

## **I. Natural Habitat**

- 1) Wildlife habitat
- 2) Woodlot Management

# Investment in Advanced Equipment and Technology

## Food Plant Modernization

In 2019 we replaced most of the equipment in our food plant. The center piece of the 'makeover' was the grain roaster. Two small electric roasters were replaced with one large natural gas roaster. The most significant aspect of the new roaster is its ability to recover heat from above the roasting area, draw it through the incoming grain to greatly increase the unit's energy efficiency. This heat exchange is critical to the entire operation. Further, the heat surrounding the roaster is also diverted into the warehouse next to the food plant acting as its heat source during the cold months of a Canadian winter. Regardless of the season the roaster itself is always transferring reclaimed heat into the incoming grain.

Each kind of grain requires different heat treatment dictated by the end use. In short, it is about a target temperature and duration at that temperature. By adding a hopper in the product flow, we were able to conserve the heat already spent to achieve the desired duration.

To pull all the improvements in equipment together the entire building was re-wired to a central control panel. Start-ups and shutdowns can be sequenced, and equipment performance adjusted from a touch screen to maximize energy efficiency and product flow. In our food plant, energy efficiency comes down to two principles: **heat recovery and heat retention**. That was only achieved with a significant investment in new equipment and technology.

Some of the heat recovered is also used to moderate the operating temperature of the seed and grain cleaning plant at the other end of the food product warehouse. Variable humidity and temperature are the enemies of seed and grain cleaning equipment because the physics of the equipment relies on high volumes of stable air. If the quality, temperature and humidity of the air change, so does the performance and efficiency. Being able to recover heat from the food plant roaster to temper the air quality in the seed and grain has been a huge improvement. This is especially true when processing seed soybeans, which occurs in the months of a year when erratic and undesirable ambient humidity is prevalent.



## Air Quality Control Equipment

Quality of air (humidity, temperature, and particulates) is integral to successful grain movement. Grain handling and processing are dust generating activities. Dust mitigation not only improves processing, but it also provides a healthier environment for those working within it on a daily basis.

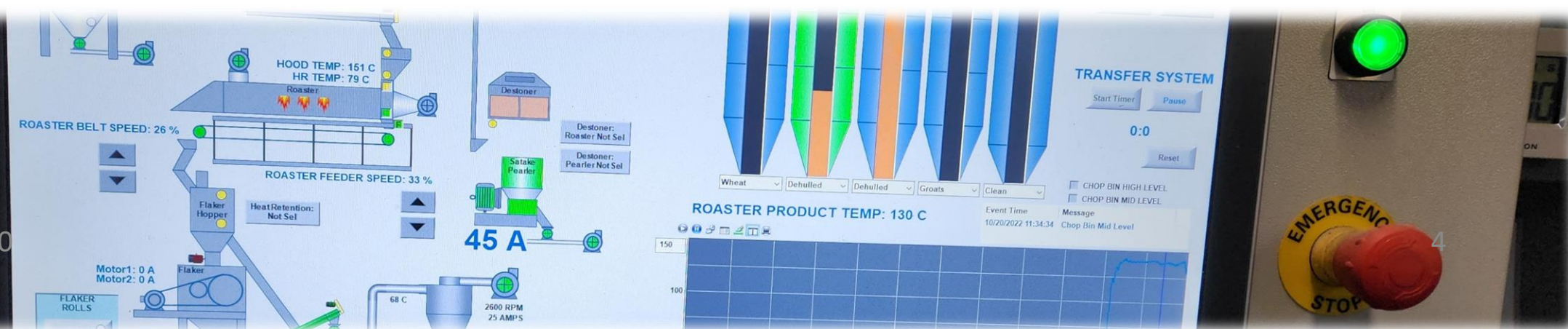


Installation of air quality control system in seed and grain cleaning plant.

Over the past several years we have invested in state-of-the-art dust control equipment including backdraft prevention valves for worker safety in the event of spontaneous combustion occurring in a bag house. To return the dust laden air back into a building it must go through the filters of the bag house without exposing anyone to the risk of an explosion. Following are the benefits of our dust control systems:

1. Safer work environment when dust is removed
2. Clean warm air may be returned to the buildings in cool seasons
3. Warm air may be shared within unheated areas of buildings
4. Dry heat generated from equipment is recycled, allowing for high performance operation even during periods of high ambient air humidity, particularly for soybean seed processing
5. Longer life for equipment and electronic components

While a significant investment, our air quality control equipment improves workplace safety and operating efficiency thereby reducing energy use per unit processed.



## Optical Color Sorter

In the summer of 2021 Wintermar installed a new Optical Color Sorter as a control point within our seed and grain cleaning tower. It was initially seen as a risk mitigation device. This was phase two of three, over three years, resulting in a complete overhaul of the cleaning tower.



A significant side benefit of installing an optical color sorter has been the impact on overall product throughput. With a fully 'trained' machine, the equipment preceding it in the process flow, can now run at full capacity. Depending on the crop kind this has increased product volume by 10 to 15% using the same energy. So, we have significantly reduced the energy requirement for each tonne of grain or seed processed, by installing one piece of technology...an expensive one, but one that demonstrates a payback both environmentally and financially.

## Updating Field Operations Equipment

It would be hard to buy an agricultural power unit, tractor combine or sprayer, built in the past decade that does not have GPS guidance. One might smile that field equipment needs auto-steering, but the efficiencies gained are significant. When a person is steering field equipment manually there is a tendency to overlap passes to avoid gaps. Using guidance technology to steer equipment reduces the overlap. This saves fuel. If product is being applied, it saves product. The following field equipment we own have guidance capability:

1. Tractors pulling tillage equipment
2. Tractors pulling planting/seeding equipment
3. Sprayer applying fertilizer and control products
4. Combines harvesting crop



Wintermar Farms works on acres we own, rent, and share crop with other farmers who grow crop for us. A modest estimate of the reduction of overlapping due to steering guidance is 2%. That small amount of reduction over all guidance-controlled operations, on all acres we cover in a year would amount to the area of approximately three farms...a significant reduction in GHG emissions.



July 9, 2022, a combine with auto-steer is harvesting a seed production field of SU Ruzena winter barley and straw is being chopped and spread for organic matter retention. The combine continually gathers geo-coordinated yield data. Tractor and grain buggy receiving grain 'on the go' increases harvesting efficiency. Tractor, with guidance system, is pulling a no-till drill planting a cover crop or double crop with minimal soil disturbance.

## Development and Promotion of Sustainable Cropping Practises

### Cover Crops

*“Overall, the review results suggest that cover crops increased subsequent crop yield, increased soil organic carbon (SOC) storage, increased weed suppression, mitigated Nitrous oxide emissions, reduced wind and water erosion, suppressed plant pathogens, and increased soil microbial activity and wildlife biodiversity.”*

<https://www.sciencedirect.com/science/article/pii/S0048969722070905?via%3Dihub>

L Van Eerd et al. 2023 University of Guelph, ON Canada

*“Planting cover crops is an effective strategy to increase the capacity of agricultural soils to store carbon. Cover crops are crops grown for benefits other than being harvested for profit. This study confirmed that the amount of carbon stored in soil was between 11 – 22 % greater with cover crops than without cover crops.”*

<https://ses.uoguelph.ca/news/2020/11/cover-crops-help-mitigate-climate-change>

Cover Crops are planted specifically to sequester nutrients in the soil and capture carbon from the atmosphere. Sometimes red clover may be intra-seeded with grain and left to grow after the grain is harvested. Alternatively, oats or oat mixed with other species may be planted after a crop of wheat is harvested. In either case, the cover crop is planted for environmental benefit to the soil.

Three decades ago, Wintermar Farms did on-farm research to discern the benefits and challenges of different kinds of cover crops. Since then, we have offered cover crop seed to farmers to grow in the late summer and fall. In a typical three-year crop rotation including soybeans, winter wheat and corn, the best opportunity for a cover crop is following winter wheat harvest in July of that year. There is still about three months of growing season remaining for frost tolerant crops like oats and peas. Eventually oats or peas will die during the winter therefore not interfering with the following corn crop. Alternatively, cereal winter rye may be planted but it will continue to grow the following spring so may be harvested as forage feed on livestock farms prior to planting of that year's crop.

Ontario farmers collectively grow up to 1,000,000 acres of winter wheat each year. Cover crop use has been increasing over the past decade. The cover crop seed we process will plant over 15,000 acres per year. How much our efforts to understand and promote the use of cover crops has had on grower attitudes is difficult to assess. However, there are thousands more acres that could benefit from the practice each year.

### Winter Barley

Cribit Seeds/Wintermar Farms is a member of SeCan, a national NFP association, that procures the rights to varieties of different crop kinds. As members, we have access to varieties specific to our geography. After procuring a new variety from SeCan, we propagate, process, and sell them. Then we pay royalties to SeCan, to allow them to meet their obligations to variety developers for the use of their genetic intellectual property. SeCan is the source of our cereal seed genetics for oats, barley, and wheat. In a separate arrangement, Cribit Seeds performs small plot research for SeCan to determine which lines of one of these crop kinds will perform well in this area of Ontario. In 2022 we had more than 1,000 small plots across two locations.



Several years ago, in a similar manner, we started testing international genetics of winter barley. Why winter barley versus spring barley? Because it has all the environmental benefits of winter wheat and more, including:

- Late summer planting produces excellent ground cover over winter reducing soil erosion risk
- Immediately starts growth in the spring prior to soil being dry enough to allow spring planting
- Approximately twice the grain yield potential compared to spring planted barley
- Earlier harvest affords opportunity for double cropping of the same land, or a cover crop providing green plant photosynthesis for the full growing season.

Most of these points lead to GHG reduction and increase carbon sequestration. Through our collaborative efforts with SeCan, new varieties of winter barley are being offered to Ontario growers giving them the opportunity to increase the percentage of acres that are green a greater portion of the year.

## Sustainable Agronomy

Sustainable farming and GHG emission reductions begin with reduced tillage. Wintermar has not used a moldboard plow in decades. By minimizing tillage, we lower fuel used and reduce carbon loss from the soil. We test the soil to discern existing nutrient levels and to calculate nutrient application rates for the next crop. This forms part of the 4R's of fertilizer management which include the Right:

1. Source – new focus on this in the past year with respect to nitrogen
2. Rate – we want to achieve an economical yield
3. Place – nutrients need to be available to the root system of the growing crop
4. Timing – we split apply nitrogen fertilizer to reduce nitrogen loss to the environment

## Support Initiatives

In addition to the variety development cereal plot research we perform on farm, we also collaborated with area Soil and Crop Improvement Associations and Ontario Ministry of Agriculture and Rural Affairs to run field trials to develop nitrogen yield response curves. Such work forms the basis for current recommended rates of nitrogen fertilizer for oats and barley in Ontario. This information increases land use efficiency and reduces the risk of excessive fertilizer use and GHG emissions.

Wintermar Farms and Cribit Seeds also partners in research with companies offering biological seed treatments. This is a relatively new area of agronomy. It goes beyond the traditional practice of beneficial bacteria added to soybean seed to enhance plant nodulation to access nitrogen from air in soil. New bacterial and fungal strains are being identified, when present with emerging seedlings have the ability to:

- protect emerging roots and seedlings from disease or other deleterious organisms
- increase root mass
- enhance nutrient mobilization and uptake from the soil

We also support the Canadian Senate initiative to perform a soil health study for Canada.

<https://sencanada.ca/en/Content/SEN/Committee/441/AGFO/AGFO-SS-2-e> The last report of this type was done in the 1980's.

## By-Product use and Recycling

### By-product use

There are several points through our processes where unwanted material is removed or product accumulates during plant clean-downs and changeovers. In the seed and grain cleaning plant the first separation by air removes dust, chaff, pods, and straw which is stored in a separate bin. This material is used by local farms for livestock bedding. The next separations are by size, density, shape, and colour. By weight, these next separations represent between 10-15% of the original weight. In the case of cereals, including facility clean-down product, this material becomes livestock feed sold to local farms. For soybeans, the by-product is returned to the commercial soybean market.

The next process for food grains requires removing the out layer of oats for all oat products and for most barley products. These bulky hull by-products are sold locally and used as a high fibre livestock feed. Wintermar Farms has a designated bin and a custom designed truck box manufactured to handle this material safely, neatly, and efficiently. In the case of oats, hull removal represents about 25-30% of the clean product weight. For barley, depending on finished product requirements, this removal range will be from 10-35% of the clean weight.



These by-products are all high in fibre, mostly undigestible by a humans. Bovine livestock, with a more complex 4-chamber stomach, can create protein from these by-products. The subsequent by-product from livestock, manure, becomes the nutrient for another crop. The cycle continues.

In addition to handling our own by-products in a sustainable manner we also assist by utilizing by-products from other operations. A few years ago we purchased a retired dairy farm across the road from our main farm. The property contained a large concrete tank originally designed for liquid cattle manure. As livestock is not part of our operation, we have made this storage tank available to a bio-gas planted located 15 kilometers away. Whenever they unable to find suitable places to send their bio-digestate by-product they transfer it into our tank. We crop about 400 acres within easy transportation distance of this tank. Each tankful of bio-digestate will provide nutrients for 150-250 acres depending on the crop being grown. This is an example of community-based collaboration between private entities to recycle and reuse public municipal organic waste to generate green energy as well as organic matter and nutrients for local soils to produce crops. The cycle continues.

### Construction materials

For three decades we have invested in our on-farm facilities. This includes buildings, equipment, and grain storage. To do so requires clean fill to provide proper bases for large weight bearing structures. The farm containing the concrete tank, also had several dilapidated buildings and concrete structures. During the cleanup of the property all concrete was crushed and used as fill for an expansion of the seed warehouse. Excavated topsoil was placed on knolls of fields to improve productivity.

## Natural Habitat

Collectively the owners of Wintermar Farms own nine farm properties. Most have sizable woodlots. Over the years hundreds of trees have been planted. Some to the form windbreaks, others to provide permanent protection on erodible slopes. These plantings, to be successful, require considerable maintenance.

In the 1970's we planted many Ash seedlings, infilling in thin areas of woodlots. Ironically, a half century later, after Ash borer had decimated that tree species in our area, we have undertaken to harvest hundreds of trees before they deteriorate. The carbon captured by those trees will now be stored long term in building material. Some new tree planting has begun, and sunlight will now reach the woodlot floors and stimulate new growth. Another cycle continues.



## Summary

At the foundation of our business, we farm. We grow crops. Therefore, we are intimately connected to our soil, most of it the land traditionally cared for by the Attawandaron, Anishinaabeg, and Haudenosaunee Peoples in the watershed of the Grand River. We understand to produce anything on the land we farm, we will have an impact. Sometimes it will be negative, but it can be positive. There will be GHG releases, however, with a discerning use of new and old technology, releases can be greatly reduced. With future use of biological products, we aim to will restore.

The organic that matters, is organic matter. Across the vast area of farmland in this country, the employment of sustainable practices can increase the organic matter in our soils and therefore store more carbon. We will continue to place effort in these areas. We look forward to the day when all nitrogen crop requirements can be met by abundant atmospheric N, either captured using green energy technology or biological means within the soil or from the air.

