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# ELECTRIC CARGO DRONE TRANSPORTATION OF LIGHT DENSITY CROPS WITHIN THE



## GREAT LAKES BASIN CORRIDOR

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By Leah Dyck



## CLIMATE CHANGE & AGRICULTURE

Climate change is affecting the length of produce growing seasons in The Great Lakes Basin due to increased weather events on agriculture processes causing significant reductions in crop yield outputs. The long-term impacts on the surrounding population is decreased nutrition intake. Soil and crops need to be adapted to the changing climate in order to continue feeding the surrounding population. By investing in agriculture processes (any of them; growing, processing, packaging, storing, transporting, etc..) we are increasing agricultural production and thereby creating food access within targeted regions.

## PROJECT GOAL

Develop the infrastructure needed to start transporting light-density crops within the Great Lakes Basin Corridor, as well as in northern and remote communities using electric cargo drone transportation.







## CLIMATE CHANGE IS CHANGING AGRICULTURE

Electric drones have multiple uses, including crop spraying. The proposed investment's dual-purpose functions will hopefully increase its likelihood of getting funded as well. In July 2023, Pyka secured authorization from the Federal Aviation Administration (FAA) for commercial operation of its autonomous electric crop protection aircraft, Pelican Spray, in the the United States. Their focus is on specialty crops. Currently, drones for spraying crops isn't legal in Canada but that will change in a few years. In the meantime, we need to start planning the infrastructure.

## FOOD SECURITY IN NORTHERN COMMUNITIES

One strategy for determining "distribution hub" locations is by having partnerships with Indigenous communities on reservations. There are three main benefits here;

### 1. COASTLINES

Many reservations are located on coastlines, which is also where many produce-growing regions are located.

### 2. INDIGENEOUS TRIBES

Reservations will stay reservations indefinitely, and the new proposed trade routes can be "resurrected" using modern technology.

### 3. ECONOMY

This can be one way our government demonstrates its commitment to empowering Indigenous people to gain economic opportunity.

## BUILDING A MORE COMPETITIVE & SUSTAINABLE AGRI-FOOD SECTOR

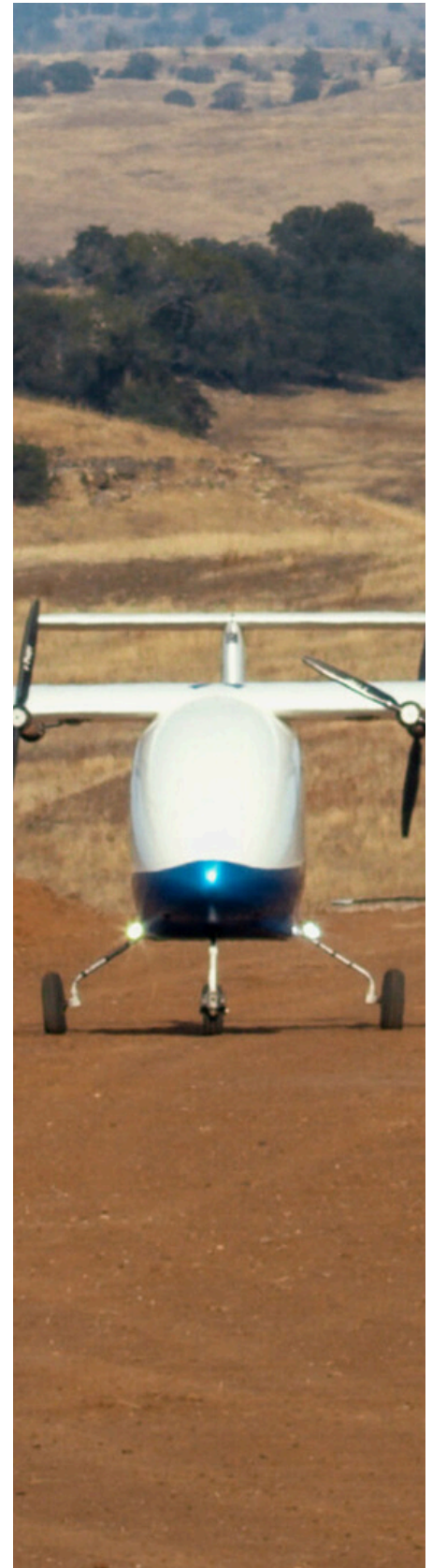
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A tremendous amount of food can be produced in Ontario by expanding production north. The evaluation of light-density crops and wool-producing livestock could undoubtedly create new economic opportunities at unprecedented levels (the wool of animals living in high-altitude regions is finer and therefore more valuable). The focus on light-weight commodities is due to the fact that it's the most efficient use of current technological capabilities, which is a 400-pound maximum payload for PYKA, the electric cargo drone of choice.

On-farm and on-station research studies assisted by commerce not only creates sustainability, but it also creates a surplus of free, fresh food that can be leveraged to create food access and security in targeted locations. Collaboration among research institutes to build agri-food production capacities and market developments can also be designed to address population-wide food insecurity.





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## UNEXPLORED TERRAIN

New modes of cargo transportation networks for the distribution of agriculture goods to new markets, including northern and remote markets is required to sustain growth in the agriculture sector. Furthermore, it's only a matter of time before it's a requirement for national security. The establishment of electric cargo drone infrastructure to transport light-density 'agri-commodities' creates a whole new corridor for unexplored markets in northern and remote markets where the soil is good and where altitudes are high.



Given that northern Ontario has a tremendous amount of land classified as type two, three or four, it means it can be cultivated for a wide range of crops now, and even more with research and innovation. There could potentially be a doubling of the amount of cropland currently being farmed in the entire province. [source] Furthermore, the rapid onset of climate change's increased temperature averages could improve agriculture production capabilities more than anticipated due to influences not yet being measured.

Investments in agriculture create food surpluses; Fresh Food Weekly witnessed this in Simcoe County between 2020 and 2024, when it conducted weekly, biweekly and monthly fresh food deliveries to low-income families. The Holland Marsh is currently a research station and its' entirety has a +\$1 billion economic impact on the region each year.

Even before Fresh Food Weekly received charitable status in July 2022, the vast majority of our produce donations were coming from The Holland Marsh throughout growing seasons. In addition, all produce donations received from Marsh farmers were given in an on-going and unlimited basis. Yes. You read that correctly. Our Marsh farmers have so many vegetables, they donated as much as we needed, whenever we needed it. The only condition was, we had to pick it up.

This is why Fresh Food Weekly is so focused on transportation.

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## MAIN OBJECTIVE

Create a new food trade economy with farmers in Ontario, Michigan, New York, Wisconsin, Illinois and Ohio to achieve population-wide household food security. This requires a multilateral trade agreement between Canada, the US, Indigenous Tribes of North America and Disadvantaged Persons. It also requires a manufacturing agreement with an electric cargo drone company.



## OVERALL STRATEGY

Make strategic agriculture investments based on research (this includes soil and plant adaptation to climate change) to grow and strengthen the proposed food trade economy. There are many different government grants available, including grants through the Department of Foreign Affairs and International Trade's Anti-Crime Capacity Building Program. This program provides funding to states and organizations to enhance international capacity to prevent and respond to threats posed by international criminal activity, including human trafficking. The department's Stabilization and Reconstruction Task Force provides policy, programming and operational tools (including civil deployment) for crisis response, stabilization and reconstruction efforts in acutely fragile or conflict-affected countries.

What does human trafficking have to do with this?

Simcoe County is a human trafficking hot spot and +30,000 people in The City of Barrie alone are starving (this information was discovered through Freedom of Information requests). Despite this, the people in charge don't care. Please see the PDF titled '[Breaking Chains of Oppression](#)' to learn more about the affects that international human trafficking is having on the economy in Simcoe County.





## GOAL

Develop the structural governance of the proposed food trade economy, and fund its infrastructure development, beginning in The Holland Marsh, Ontario. This will require a feasibility study to determine specific investments.



## A NEW FOOD TRADE ECONOMY

Produce surpluses can be used as commodities in a second food trade economy: one that's for philanthropists - or a new type of tax bracket with similar and better special tax exemptions.

Tony Gaetano of Gaetano Green Acres Ltd., in The Holland Marsh heard a Rock 95 radio advertisement promoting [Fresh Food Weekly's](#) 2022 Easter meal boxes one day in April 2022 and that's when he discovered Fresh Food Weekly. He then reached out by email and offered to provide unlimited celery, celery root, romaine lettuce, red leaf lettuce and green leaf lettuce during their growing seasons.

It was a jaw-dropping moment for us and of course, we were and still are beyond grateful for the incredible generosity of Tony and the many other farmers and packers who donated to our organization during this time. Leah recalls a conversation with one farmer (not listed in this document, but he was a Marsh farmer) who said he knows some farmers who wouldn't give their extras to "poor people" because they don't work. But since he himself knew hard times too, and he could see that what we were doing was tremendously needed, he chose to donate his produce.

During this time of building relationships with Marsh farmers, we learned that the nutrient levels in the Marsh's soil are very high and deplete slower than other types of farmlands. As a result, farmers in The Marsh are coveted by grocery stores and now, there's a ton of Marsh farmers with big grocery store contracts.

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## SURPLUS SOURCE #1

When farmers have contracts with grocery stores, they need to be able to guarantee their supply to cover all the store's demand - whether there's a lot of demand or a little. This is the case for Tony, who supplies local Loblaws with various lettuces, as well as celery.

He also ships his product to New York as well. Tony says that some grocer agreements use computers to recommend a volume based on the previous year's sales, and then he increases production by 10 percent over the contract volume to guarantee supply.



*For Tony's contracts, it means he needs to have a minimum of two extra fields available per item under contract. This usually leads to having an extra two fields of produce to be donated instead of ground back up in the soil by the till.*



In the event of reduced demand, Tony harvests the product and stores it in refrigerated stores until demand resumes back to normal. This practice has drastically limited their waste which is almost down to zero because he donates to local food charities.

Tony believes that The Holland Marsh is the richest natural resource in the world, and to protect this productive soil, he says Marsh farmers have adopted conservation practices such as cover crop and oil seed radish. One prevents soil erosion and the other releases natural nutrients that become trapped within the soil. Farmers in The Holland Marsh are continuously experimenting to improve their practices and this is why it still remains so nutrient-rich today.



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Another key ingredient to The Holland Marsh's excellent food growing rates is its climate. Tony says that a good, deep frost in the winter kills harmful bacteria and diseases, which reduces the use of pesticides. Additionally, every year he performs a soil analysis test to evaluate the nutrients a plant requires for optimum quality and shelf life. Tony conducts tissue analysis tests three times on the plant while it's growing - sometimes four times - to top up any nutrients that are deficient due to extreme weather conditions such as excessive rainfall or extreme drought.



## SURPLUS SOURCE #2

Grocery stores classify produce by “one’s” or by “two’s”. Produce is sorted by physical appearance; perfect fruits and vegetables acceptable for selling are sorted as “ones”. Two’s on the other hand, are still edible but simply don’t look perfect. Carrots sometimes grow curly and onions can get nicked from the harvesting process, but this food is still perfectly good for human consumption.

Tony Tomizza is the owner and operator of Dominion Farm Produce Ltd. in Bradford, Ont., and is the longest packer and shipper of carrots and onions in Ontario, and also packs parsnips and beets. Ninety percent of what they pack is from farms in The Holland Marsh and the surrounding areas. Due to the growing seasons of onions and carrots in our region, there’s a few months of the year in which Dominion imports carrots from Georgia, USA, and Mexico. Onions are also imported from California when it’s not our regional onion season.

Being the longest packer of carrots and onions in a region with where carrots have a farmgate value of \$130 million annually and onions have a farmgate value of \$160 million annually, Dominion supplies all the major grocery store chains except for Sobeys and Walmart, with their largest customer being Loblaws. They’re also the largest donor of onions to The Daily Bread Food Bank who pickup by the crate weekly (crates contain 1,100 pounds of produce). Tony also donates their root vegetables to other charities throughout the GTA including Second Harvest, The Mississauga Food Bank, HarvestHands, and The Ontario Christian Gleaners to name a few.

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## SURPLUS SOURCE #3

New farmers need a lot of expensive certifications in place before they can start selling produce to grocery stores. This often takes years to do and in the meantime, they usually can't sell all their product. This produce could also be used in the proposed new food trade economy.

## ELECTRIC CARGO DRONE TRANSPORTATION OF LIGHT DENSITY CROPS

Autonomous air transportation provides opportunities for unprecedented economic growth in Canada, as our climate and geography creates expensive logistical challenges with the current modes of cargo and freight transportation.

The Pelican, a cargo plane, offers some first-of-its-kind benefits, including the ability to take off and land with very little ground structure, which makes it well-equipped for remote areas. [In this article](#), the U.S. Air Force's Master Sgt. Brian Crea, 3rd Wing Director of Innovation called the technology "a game changer" because they could now "fly in contested areas without the loss of life" and that it would also be cheaper than using traditional cargo aircraft.

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*In no stretch of the imagination can the exact same thing be said about this technology for food security in Canada.*

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Electric cargo planes could change the face of food insecurity within The Great Lakes Basin. Based on the plane's [capacity limit of 400 pounds](#), its slowest speed of 150 km per hour, and its low cost of \$15 an hour to operate, it could transport a myriad of light-density crops.



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## WHERE TO START

The Marsh System is governed by the Holland Marsh Drainage System Joint Municipal Service Board. The Service Board was formed in 2007 in joint partnership with the Township of King and Town of Bradford West Gwillimbury with the mission to maintain and manage the Holland Marsh drainage system, to plan any future development for the Holland Marsh and tackle any possible environmental issues.

The proposed implementation of new research stations to produce food for northern and remote locations will require the management of a complex water management system at each station since water is essential for yielding high crop outputs. The concept of a Food Systems Planning Office to support regional food access is further supported by the fact that an entire service board was commissioned in The Holland Marsh to manage its drainage system.

Additionally, these cargo planes only take 90 minutes to charge to full, and only require a 400-foot runway to land and take-off from. Furthermore, these are surplus produce items so they are donated and therefore, are 100 per cent free.

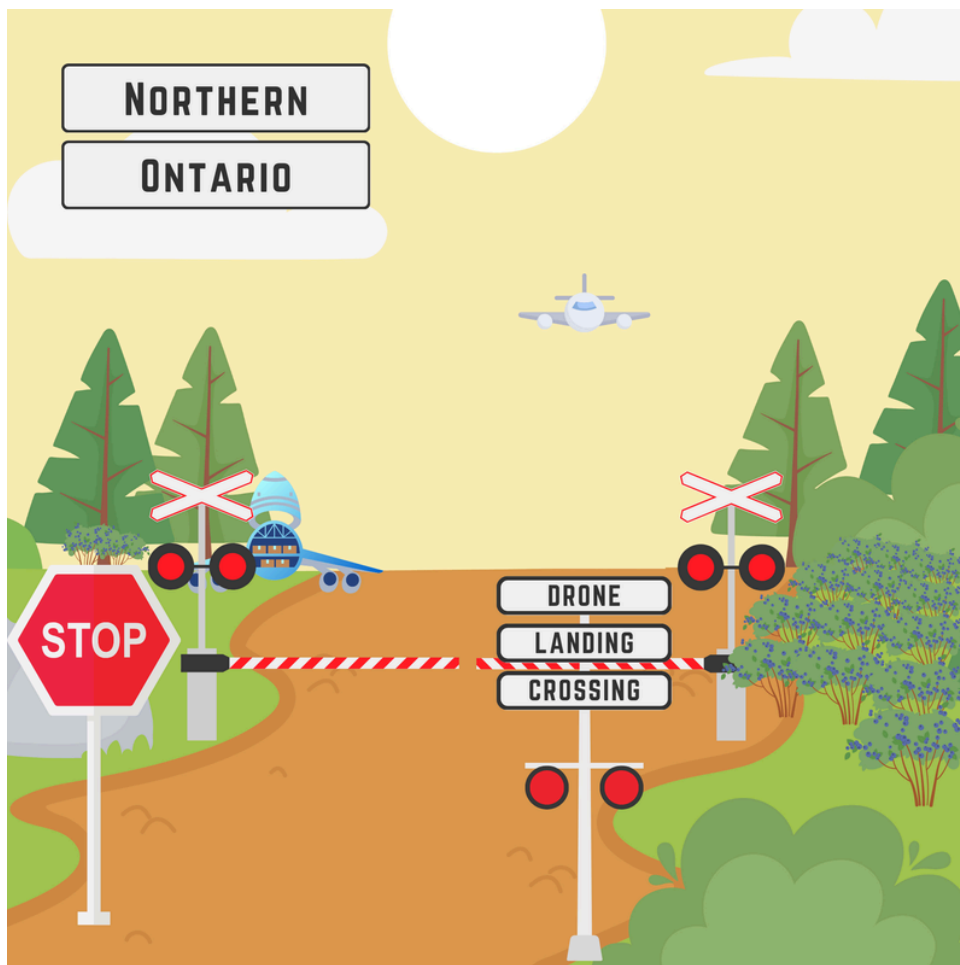
If the infrastructure for this logistics platform was in place, it would help small farmers and food businesses gain economic opportunity, increase their sales, and most importantly, break down food access barriers plaguing disadvantaged populations in Canada.

Back when Leah would drive the roads of The Holland Marsh to harvest lettuce, she would dream about putting those freshly harvested lettuce cases on the back of a plane and flying them to Barrie in 14 minutes for the same cost as a city bus, instead of driving them in 40.

## AERODROME CONCEPT SPECIFICS

The cargo drone requires take-off capability right from the field; we really want to focus on getting the harvested food 'in transport' as soon as possible because the shelf-life of light-density crops is so short.

A Special Flight Operations Certificate for a Remotely Piloted Aircraft System for a specific purpose under special conditions will be required. Additionally, we propose a 'loading pad' be created for each field, orchard, vineyard, etc., that will have 'take-off' capability. We propose a 'drone landing crossing' to be on pre-approved roads bordering each field, in the exact same way a 'railway crossing' is used for trains that intersect with roads. In the same way a train crossing lights up with flashing red lights, and the 'barricade-arms' come down, the proposed 'drone landing crossing' will be blocked off by similar barricades that light up and make loud sound. At the edge of the road, a 'pad' will be carved into the field large enough for the drone, so it can park upon landing.

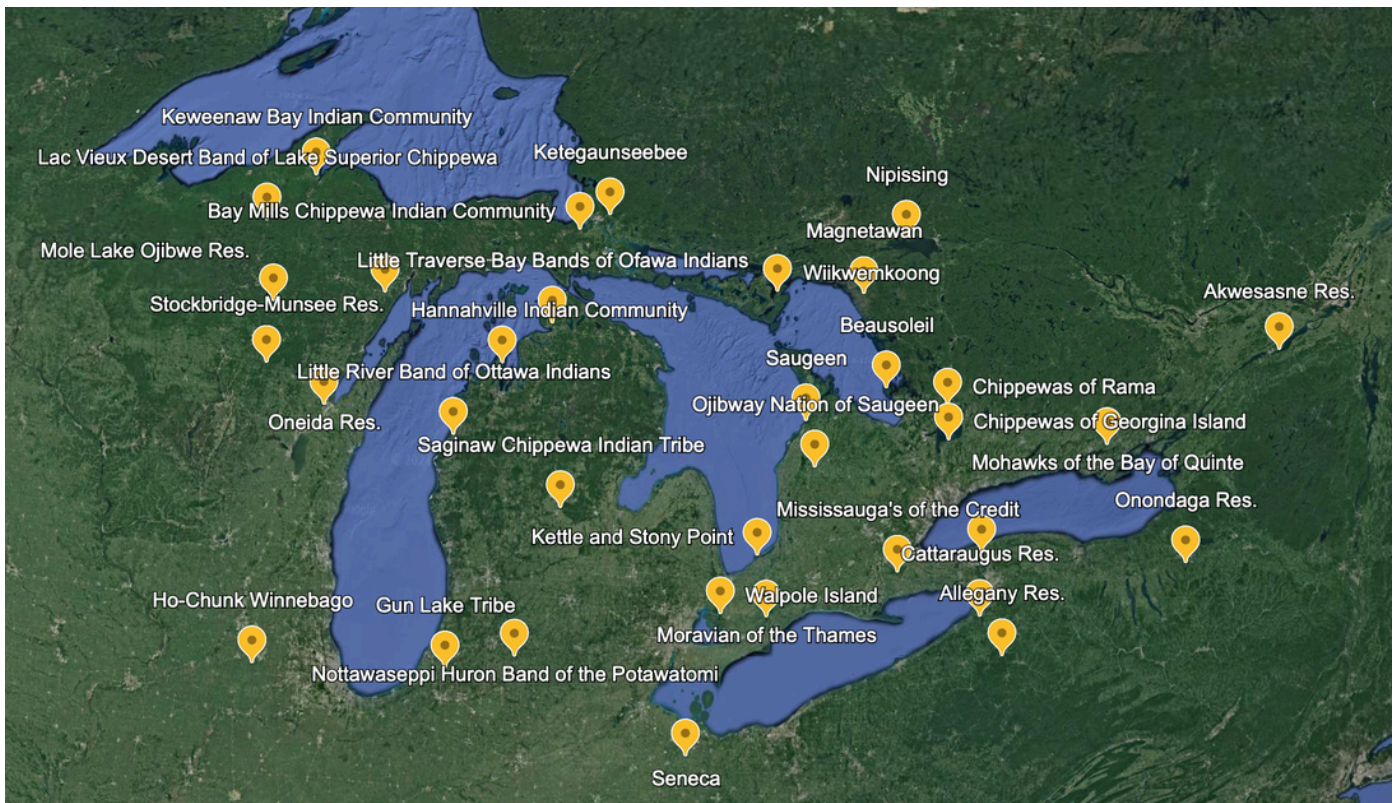




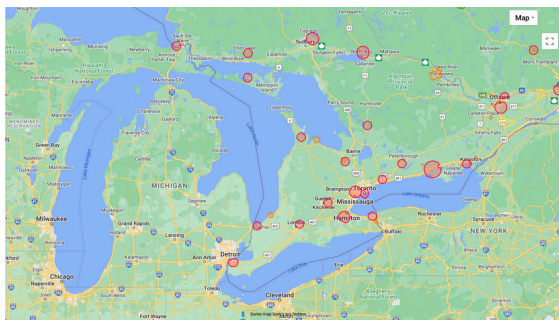
Please keep in mind, when gleaners glean fields, its best to glean in the early evening when it's not as hot, and when teenagers are done school. Gleaning fields is a very popular way for high school students to get their 40 mandatory community service hours to graduate high school. Therefore, when drones are used to transport light-density crops for the purpose of trading (or giving without receiving), they'll be used in the evenings only.

That being said, there will indeed be a great demand to use these drones for other agri-food commerce activities, especially during the day. Another area we'd like to explore is the transportation of wool to and from northern, and/or remote, and/or high-altitude locations. There's no need to transport a commodity like wool in the evening (unless that becomes the requirement). Further exploration into the governance of the proposed 'drone landing crossing' for roads lining 'certified take-off fields' is needed.

### Indigeneous Tribes of North America



### Canadian No Fly Zones



### American No Fly Zones

