# Peterborough Agricultural Roundtable:

## Nominee's Info:

**Name of farm**
Hello Farm

**Owner**
Kiyotami (Zenryu) Owatari and Ava Richardson

**Website**
https://hellofarm.ca/

**Primary crops/livestock/products of the farm operation**
Heirloom organic vegetables and market garden (uncertfitied)

## Description of Innovation

**a) Describe the original problem that the farm was trying to solve**
We recently moved to Ontario from Japan, in July 2021. We are currently in our second year of market garden production here in Ontario (summers of 2022 and 2023). The land we are currently leasing in Havelock (about 1.5 acres) had been fallow for over 25 years. The soil is very rocky, with pockets or gravel, sand, and heavy clay, dominated by aggressive weeds such as Canada thistle, wild rose, and bindweed. A huge challenge in our first year of production was to prepare the soil enough to start growing our organic heirloom vegetables for market sales. We are happy to say that our yield has improved in our second growing season on this land but the soil remains our top priority in terms of fertility, moisture retention and tilth.

**b) Describe the process/research involved in figuring out the solution**
We approached the soil fertility challenge by researching locally available soil amendments like mushroom compost from spent mushroom farm substrate, and composted leaf and wood chip. Our landlord invested in a rotary tiller implement for the tractor to help loosen our compact soil enough to start adding amendments. This has helped improve soil tilth, structure and moisture retaining capacity. We purchased a walk-behind rototiller for individual bed prep as well. We were able to source organically-certified local green manure seed from Merrylynd Organics in Douro, ON. We have been using winter wheat, oats, buckwheat and rye as green manures within our crop rotation

and bed preparations to help build organic material in the soil, bed by bed.

However, the innovative approach my husband, Zen has been using to build soil fertility is focused on soil microbial biodiversity using biochar and wheat bran. This is specifically what I am nominating him for. He applied this technique while farming in Japan using rice husk biochar and rice bran, and decided to apply this same strategy, yet slightly modified technique, here in Ontario using locally sourced organic grain bi-products. We were able to source certified organic wheat bran and spelt husks from Merrylynd Organics to help inoculate bed beds with beneficial biochar and bacteria. We add raw bran and roasted spelt biochar to each bed a few weeks before planting directly into it. We can confirm the use of biochar and bacteria-promoting amendments like bran have helped our soil fertility and productivity in our second year of farming here, when compared to our first year. Our data confirms greater yield for some crops as well as greater income.

**c) Describe the innovation that was implemented in detail. Photos may be uploaded if appropriate**

My husband Zen and I farmed organic heirloom vegetables in our market garden in Japan for 10 years. Zen is Japanese and is constantly innovative in his farming practices. I am nominating him now for being creative and adapting a unique innovation he used in Japan to our new farm practice here in Ontario. The innovation I am referring to is the use of biochar. He learned about the benefits of biochar in Japan with tremendous results. The use of biochar is known to create a perfect habitat and surface area for beneficial bacteria to cling to and thrive. The beneficial bacteria, in turn, support plant absorption of critical nutrients and minerals to thrive. To help achieve this goal of adding biochar to our market garden beds, Zen brought a special biochar chimney from Japan to Ontario. We had not heard of or knew anyone using biochar in this area so we really didn't have anyone local to refer to for guidance or to mentor us. Instead, Zen applied the same principals he used in Japan to our land here in Havelock. Instead of using rice husks, we sourced local spelt husks and successfully roasted enough biochar to add to each of our 50+ garden beds, each 50 ft long and 4 feet wide. To roast the husks, they are spread around the low, portable chimney with a small fire in it. The husks start to roast and after mixing them multiple times over the course of a day, they become blackened and roasted, yet maintain their shape. This process of roasting, rather than burning to ash, is key to creating the surface area needed for the bacteria to cling to.

We have also been adding bacteria-rich wheat bran to each garden bed, along with the biochar. In Japan, we used rice bran, which is widely used to ferment crops like daikon

radish and cucumbers in making pickles. Rice bran is extremely rich with bacteria and when moist, can ferment vegetables within weeks. Zen applied this same principal with wheat bran here in Ontario. He added the bran by evenly spreading it onto each garden bed, alongside the biochar, to inoculate the soil with bacteria. Unfortunately, we have not been able to source a local lab able to test beneficial soil microbial biodiversity in Ontario. We had hoped we could compare first and second year bacterial counts, like we could in Japan. However, since our first year of production here in Havelock, we are delighted to report that our overall crop yields have almost all improved. Potatoes, edamame soy beans, head lettuce and carrots for example all produced greater yields and of course greater sales.

# Benefits of the Innovation

**What benefits has this innovation resulted in?**
Improved water efficiency, Improved soil health, Increased production

**Provide any detail on the benefits identified here: (open response - not required)**
After much research and phone calls to Guelph University's Ontario Agriculture College research department, and other soil testing labs like Lakefield Research, we were disappointed to learn that no one tests soil microbial biodiversity in Ontario at this time. This means that we have not been able to acquire concrete basal data on the living components of our soil in order to make a comparison from year to year. However, when we lived in Japan we did have data for 2 consecutive years after applying biochar, bran, and other bacteria-improving amendments. In 2016 and 2017, our soil was tested for bacterial activity through DGC Technologies (https://dgc.co.jp/soilproject/), an agricultural research company in Tsukuba, Japan. Interestingly, this same lab developed the soil microbial testing method for Japan's space agency, JAXA, in collaboration with NASA for the international space station's growing labs. How cool is that! The data provided by DGC Technologies showed that in 2016, we started with a basal amount of 1.2 million active, beneficial, detectible bacteria per 1g of soil. In 2017, after a year's application of biochar, bran, and other amendments, we discovered that our soil had 1.5 million active,

beneficial, detectible bacteria per 1g of soil. The lab results told us that this amount of bacteria might possibly mean we would not need to add compost or other nutrients to the soil. Meaning; the abundance of bacteria was considered sufficient enough to provide the vast majority of the nutritional needs to the crops. DGC's program even supplied us with special "SOIL-certified" stickers to add to our packaging labels. Of course, we continued to add compost, bran, and biochar non-the-less every year after these test results but it was interesting to learn that our efforts significantly improved our soil bacteria count. We were also able to see a rise in yield and sales across most of our vegetable production. But most notably was how much plant health improved. Plants appeared bigger, stronger, and more resilient to stresses. This is our hope for our new patch of land here in Havelock, Ontario. We hope that with consistent application of biochar, bran, and organic amendments that we will be able to improve our soil quality, microbial biodiversity, yield, and plant health over time. In our two years we have been here we can firmly say we have seen improvements in all those target areas.

## Wider application of the Innovation

**Have any other farms benefitted from learning about this innovation? If so, describe how. If not, could this innovation be useful on other farms? How?**
Yes, we have been sharing our knowledge with several other farmers including Foragers Farms, Lunar Rhythm Farm, The Little Farm That Could, and a host of other farms following us on social media. We have published a lengthy blog post on our website, shared annotated images of the biochar-making process on social media, and have demonstrated the process to farm visitors and volunteers. What would be even more useful however, is the chance to collect concrete basal data on the bacteria count from year to year. This is why I have nominated my husband Zen for this award. He would like to source, or convince, a lab somewhere in Canada or possibly the USA, to test soil bacteria levels for two consecutive years to give us a comparison. We would then be able to provide concrete data to back up our findings about biochar and bran. It would be very interesting to see if spelt is as effective as rice husks for example. Or if rice bran is particularly richer in bacteria than wheat bran. Do Ontario soils require less or more biochar to reach the same levels of beneficial bacteria? Do dryer Ontario summers play a significant role in the bacteria count, with less moisture in the soil? We remain WWOOF (World Wide Opportunities on Organic Farms) hosts for volunteers and continue to share our knowledge about soil health with these future farmers. Thank you for considering this

application for the agricultural innovation award. Sincerely, Ava