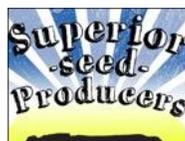
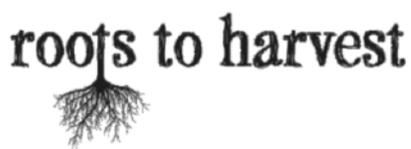


Agroecology and Seed Sovereignty in Northern Ontario Year II Report (2019-2020)



This project is supported by the
Lakehead University Agricultural Research Capacity Development Program

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Land Acknowledgement

This project involves people that are living and working on the traditional land of the Anishinabek people— signatory to the Robinson Superior and Robinson Huron Treaties of 1850. We acknowledge the political representatives of Indigenous Nations in northern Ontario: the Anishinabek Nation, Grand Council Treaty #3, Nishnawbe Aski Nation, and independent First Nations. We also acknowledge the original custodians of this land who have protected the land, water, and beings for time immemorial despite ongoing efforts to displace and disconnect them. We aim to support their work by building and continuing relationships with the Indigenous people around Gitchi-Gami based on the principles of mutual trust, respect, reciprocity, and collaboration in the spirit of reconciliation.

Project Overview

The availability of healthy, locally produced food is essential for food security, ecological sustainability and economic prosperity. Building on the relationships with Lakehead University faculty, staff and students, the Lakehead University Agricultural Research Station (LUARS), Roots to Harvest, The Superior Seed Producers and a number of community partners, the *Agroecology and Seed Sovereignty in Northern Ontario* project's goals are to improve knowledge, skills and capacity to produce healthy and sustainable food in Northwestern Ontario. Adopting a community-based, participatory research methodology, the project has four broad objectives:

1. To increase access to ecological seed varieties adapted to Northern Ontario's agro-ecosystems through participatory, farmer-led research;
2. To support peer-to-peer knowledge exchange about seed saving and help farmers scale-up, diversify, and increase the quality of regionally adapted seed;
3. To improve biological conservation, food security and farmer livelihoods through improving the viability of ecological farming and food businesses; and,
4. To make LUARS a hub in Northwestern Ontario for ecological agriculture and sustainable food systems through strengthening partnerships with regional farmers, nonprofit organizations, small businesses and Indigenous communities.

The project was initiated by a team that included Drs. Charles Levkoe, Lindsay Galway and Brian McLaren at the Sustainable Food Systems Lab¹ Lakehead University and community partners with expertise in ecological agriculture, including Roots to Harvest², Superior Seed Producers³, Bauta Family Initiative on Canadian Seed Security⁴, the Ecological Farmer's Association of Ontario⁵, and the Lakehead University Sustainability Office. These primary partners helped to guide and implement the project and manage knowledge mobilization. With the establishment of the Lake Superior Living Labs

¹ The *Sustainable Food Systems Lab* is a hub for academics and community-based practitioners engaged in sustainable food systems research and action (<https://foodsystems.lakeheadu.ca>).

² Erin Beagle, Executive Director at Roots to Harvest, a non-profit organization providing educational and employment opportunities through agriculture and cultivate healthy communities (<http://www.rootstoharvest.org>)

³ Evalisa McIlffaterick, Owner/Operator of Root Celler Gardens and members of Superior Seed Producers, a collective of growers that promote saving and distributing locally adapted, sustainably grown, open-pollinated seeds, while educating and supporting about saving seeds (<https://superiorseedproducers.wordpress.com>)

⁴ Aabir Day, Director and Helen Jenson, National Research Program Manager of the Bauta Family Initiative on Canadian Seed Security, a Pan-Canadian organization working to conserve and advance biodiversity, maintain public access to seed, deliver research and training programs, and promote the wisdom and knowledge of farmers (<http://www.seedsecurity.ca>)

⁵ Rebecca Ivanoff, Research and Seed Program Coordinator, Ecological Farmers Association of Ontario (<https://efao.ca>)

Network in 2019 (funded through a Social Science and Humanities Research Council Partnership Development Grant; www.livinglabsnetwork.org), the *Agroecology and seed Sovereignty in Northern Ontario* project has become a core project of the Thunder Bay Hub.

In the first year of the three-year funded project, we focused on establishing the partnerships and hiring a community grower at Roots to Harvest. We also focused our collective energy on feasibility and research planning to determine current needs, interests and capacity to meet the project objectives. We worked closely with staff at LUARS to plant and maintain plots for ecological seed trials of carrots and peppers.

In year two we continued to build partnerships and grow for the seed trials focusing on radicchio, carrots and spinach. February of 2020 saw the onset of the COVID-19 pandemic and the shutdown of all in-person research and gatherings for the remainder of the year. During the Spring-Summer of 2020, Rachel Portinga joined the project as an intern funded by a Mitacs Research Training Award. Rachel brought additional capacity to the project through research with local seed savers, a literature review, and a series of virtual workshops on planting, cultivation, harvesting, preserving, and seed saving.

Budget

In 2018, the *Ecological Agriculture, Food Security and Economic Prosperity in Northern Ontario* project received a \$30,000 award from the Lakehead University Agricultural Research Capacity Development Program. The funding has been used to support a community grower staff position (\$10,000/year) in partnership with Roots to Harvest. Through this partnership, the community grower spent approximately eight hours per week on the project and with the Roots to Harvest staff, played an important role in integrating the work into broader agroecological and food systems work across the region. Other contributions to the project included a cash contribution from the Bauta Family Initiative on Canadian Seed Security (\$500/year), and in-kind time and resources from all the partners. This included support from the Superior Seed Producers to organize workshops and providing overall advisory duties. A Research Training Award from Mitacs (\$6,000) funded an intern through the summer of 2020, to support the project. In addition, the SSHRC Partnership Development Grant entitled Lake Superior Living Labs Network awarded in 2019 contributed funds and resources to this project.

Roots To Harvest and FSRN Garden Seed Variety Trials

Prepared by Janna Van Blyderveen

In partnership with Roots to Harvest, a community grower was employed to coordinate the Canadian Organic Vegetable Improvement (CANOVI) orange carrots, red carrots and radicchio seed trials. The variety trials are part of a national project coordinated by the Bauta Family Initiative on Canadian Seed Security to observe and participate in the CANOVI Project. The CANOVI Project works with the growers to determine the best parent line for breeding. Through participatory breeding, vegetable varieties are optimized for specific geographical locations and organic growing. In addition, Evalisa McIlffaterick, owner and operator of Root Cellar Gardens coordinated a spinach seed trial. Guidelines for the spinach trials were designed by Evalisa McIlffaterick and Rebecca Ivanoff, Seed Program Manager with the Ecological Farmers Association (EFAO). Once evaluations are complete, they are uploaded to a national app called [Seedlinked](#). The data collected is made available to farmers and seed growers to help determine which variety will grow best to their local conditions. The seed trials were grown on three sites in the Thunder Bay area; Roots to Harvest's Lillie Street Urban Farm at 125 Lillie Street South, the Food Security Research Network (FSRN) Garden on the Lakehead University campus, and Root Cellar Gardens located southwest of the city of Thunder Bay.

Spinach Trials

About 80% of commercial spinach seed is grown in only a handful of places. Thunder Bay offers a unique climate such as long day length to stimulate spinach seed production. According to the protocol,

The purpose of the trial is to identify which varieties of spinach are well suited for seed production in northwestern Ontario. As it seems that the region is a viable, but not ideal, location for spinach seed production. This project will seek to see if there is a difference among varieties when it comes to viable, vigorous seed production. This trial will also seek to access which planting dates produce the best spinach seeds.

The seeding began on May 6, 2020. The soil at the Lilly Street Urban Farm was amended with alfalfa pellets adding to the organic matter of the soil. Rock phosphate was applied in a dust form to increase the phosphorus content of the soil. The soil was

tilled and beds were shaped with a BCS walk behind tractor. Six varieties of spinach were planted. There was minimal maintenance of the trials (the occasional weeding and thinning). Majority of this work was completed by the Roots to Harvest's Seasonal Horticultural Outdoor worker staff and Rachel Portinga.

Dimensions of garden plot:

Length 28 ft

Width 14.5 ft

Dimensions of rows:

Row length 13 ft

Row width 2.5

Plants evaluated at 4 stages:

- emergence
- leaf maturity
- bolting
- seed maturity/harvest

Layout of Trials and Taste Test of Spinach Varieties

S-05 Abundant Bloomsdale robust, solid, strong, bitter ending	S-06 Longstanding Bloomsdale bitter, juicy, bitter, not bitter	S-07 Popeye thick leaves, high water content, nutty, minerally, liked	S-08 Matador full, soft, not chewy, watery, nice after flavour, swiss chard taste
S-01 Buffer thick, enjoyable, would recommend, bitter	S-02 Butterflay thin leaf, sweet, not bitter, no mineral taste, pleasant, light, not juicy	S-03 Giant Winter fuzzy, bitter, bittersweet, little savoury, velvety, chewy	S-04 Buffer bitter, mineral, odd texture, minerally

This is the evaluation of all 4 stages. (1 is the best, 6 is the worst)

Trait	Bloomsdale Longstanding (A)	Abundant Bloomsdale (B)	Giant Winter (C)	Butterflay (D)	Matador (E)	Popeye (F)
Germination rate	1	1	1	1	1	1
Vigour	1	1	2	2	1	2
Disease resistance	1	1	1	1	1	1

Do you like it?	1	1	1	1	1	1
Bolt Resistance	2	2	2	1	2	1
Resistance to Lodging	3	2	3	3	3	2
Seed Yield	2	1	2	2	2	2

Notes

Germination	All trials were consistent and had fully emerged in the week of May 17-23, 2020.
Vigour	All trials performed well.
Disease Resistance	Nothing notable. All varieties were healthy.
Do you like it?	We performed a taste test of the trials and the results varied. See table 1.
Bolt Resistance	Butterflay and Popeye bolted on the week of June 29-July 3. All the other trials had bolted the previous week of June 21- 27.
Resistance to Lodging	Abundant Bloomsdale, Matador, buffers were less susceptible to lodging. We had a large rain event in July where the other trials collapsed under the weight of the rain and seed.
Seed Yield	Abundant Bloomsdale was the most successful. Butterfly, Giant Winter, and buffer seeds got mixed together due to lack of storage space.

The first replication produced a lot of seed, however the lack of dry space led to the mixing of several varieties. Seeds were dried at the four-season greenhouse on-site. Seeds were placed in harvested bins or on bread racks and were

rotated twice a week to ensure even drying. This space is not ideal for drying seeds because of the high temperature +30°C, high humidity, lack of airflow and hanging space. Due to this our data on seeds produced by Buffers, Giant Winter and Butterflay varieties are inconclusive.

The first harvest of spinach varieties S-03, 04, 06, 07,08 was collected by the grower and volunteers from the Lakehead Rotary Club. Working with volunteers connects the community to issues on seed security and food sovereignty. During the second harvest S-01, 02, the lack of space led to the piling of spinach seeds without dividing by variety.

Summer seeding was missed in its place; a fall seeding was planted on October 6 and germinated October 20th. The intent of this replication was that it will produce seed about the same time as the spring seeding, however, the survival of the spinach germinating through winter is unlikely. Evaluations will continue through 2021.

Frost seeding happened on November 3, 2020. Evaluations will continue into 2021.



Cleaned seeds from replication 1



Lillie Crew planting spinach trials on October 6, 2020

Next Steps/Recommendations.

The spinach trials are ongoing and final results will be taken in the fall of 2021. Determining a drying space for a large volume of seeds will increase the number of viable seeds produced. The addition of a germination chamber would increase our capacity for testing seeds, allowing the partnership to have a more detailed picture of the state of our seed trial.

Carrots Trials

Carrots are a crop that farmers and growers have a difficulty cultivating. These challenges include small seeds that require frequent watering at an early stage, thinning, weed pressures, pests and diseases.

According to the Canovi protocol objective,

One of the goals of this project is to create a national network and platform where existing varieties and new breeding lines can be evaluated for their performance in a range of regional organic and ecological farming conditions through on-farm variety trials. Varieties that are sold to organic and ecological farmers in Canada have not necessarily been trialed on sites that reflect the diversity of Canadian farming conditions. Through a co-ordinated trialing network across Canada and integration with partner networks in Canada and the United States, we can gather information about both existing varieties and new breeding lines grown under organic management and across a range of farming conditions. The information gathered through this trial network will be used to help farmers:

- Identify the best-performing varieties in your region, both for market garden production and seed production;
- Identify which varieties would be suitable as parents for future regional breeding projects;
- Build the capacity of farmers to conduct on-farm variety trials useful for their farming operation.

Orange storage carrots were planted June 11, and harvested September 24, 2020.

Orange storage carrot evaluations (1 = very low, 5 = very high); Highlighted varieties were transplanted into the greenhouse to produce seeds.

Variety	Would you grow this variety again?	Germination	Vigour	Disease Resistance	Insect Resistance	Canopy Closure	Bolt Resistance	Yield	Appearance	Uniformity	Marketability	Flavour
Dulcinea Fruition	Yes	1	2	5	5	2	5	1	4	4	5	4
Storage Bolero	Yes	4	3	5	5	4	5	4	4	3	4	5
Storage Rumba	Yes	4	3	5	5	2	5	2	4	4	5	5
Naval	Yes	5	5	5	5	5	5	5	5	5	5	4
Nantes Di Chioggia	Yes	1	1	5	5	2	5	3	2	2	3	3
Nash Nantes	Yes	3	3	5	5	3	5	3	4	2	5	4
Jerda	Yes	4	4	5	5	4	5	4	4	4	4	5
Dolciva	Yes	3	3	5	5	2	5	2	3	4	4	5

The recommended layout was not followed because of the size of garden plots available. FSRN garden plots are 10 ft by 10 ft. Carrot variety were planted 1.5 rows (8ft with an additional 4 ft) to get the recommended length of 12ft. Rows were spaced a foot apart.

Garden Layout

Border	Border									Border
	Nash Nantes	Nantes di Chioggia	Nantes di Chioggia	Naval	Naval	Storage Rumba	Storage Bolero	Dulicne a Fruition	Dulicne a Fruition	
		Nash Nantes			Storage Rumba			Storage Bolero		
Border										



Nash Nantes



Storage Rumba



Naval



Storage Bolero



Dulcinea Fruition



Nantes di Chioggia

The gardens allocated for the trials had many weeds. The garden was weeded and soil loosened before seeding carrot rows. The trials were covered in burlap to keep the soil moist until germination. The plots were watered once or twice a week depending on how hot or the amount of rainfall received. No amendments were added to the sandy clay loam soil.

Carrots were harvested and tried by the Community Grower, who selected Naval and Storage Bolero as the favourites to be saved for seeds. Roots to Harvest does not have a root cellar for winter storage. Selected varieties were replanted in the greenhouse to produce seeds. Varieties will be monitored to determine if this method will work.

Kim McGibbon and Gavin Morito-Karn, Roots to Harvest staff facilitated a taste adventure with students from Gull Bay First Nation. Their favourite carrot was: Storage Bolero (5 voted the best), Storage Rumba (5), Dulcinea Fruition (3), Jerda (2).

The leftovers of this trial and the red carrot trials were pickled by the Roots to Harvest program, Cooking for Credit.



washed carrots ready to be made into bite size pieces for the taste adventure



pickled storage carrots and red carrots offered for sale at the Roots to Harvest store

Red Carrots

The red carrot trials were prepared and cared for the same as the orange storage carrots.

Red Carrots (1 = very low, 5 = very high)

Variety	Would you grow this variety again?	Germination	Vigour	Disease Resistance	Insect Resistance	Canopy Closure	Earliness	Yield	Appearance	Uniformity	Marketability	Flavour
Red Vampire	Yes	1	1	5	5	2	2	2	4	3	3	5
Sun Osbourne	No	2	2	3	3	3	3	3	2	3	2	3
Nutri Red	Yes	3	3	4	4	4	3	3	4	4	4	4
Kyoto Red	No	4	4	5	5	3	2	4	3	2	2	3

Red carrots were planted on June 15, harvested November 10, 2020.

Remaining orange storage carrots were planted in the same bed as the red carrot trials. Bed dimensions are the same as the orange storage carrots.

Border	Border							Border	
	Red vampire	Red Vampire	Sun Osborne	Nutri Red	Nutri red	Orange storage Jerda	Orange Storage Dolciv a		Orange Storage Dolciv a
		Sun Osborne			Orange Storage Jerda				
Border									



Carrot trial bed



Nutri Red



Red Vampire



Sun Osbourne



Kyoto Red

The red carrots varieties produce fewer carrots than the orange storage carrots. The Nutri Red carrot was the most uniform with medium yield. The kyoto red carrot produced the most carrots but went to seed in their first year. When carrots seed the texture becomes woody, not ideal for consumption. Red carrots are esthetically pleasing but desired yield and uniformity is not there.

Radicchio Trials

Radicchio trial evaluations (1 = very low, 5 = very high)

Variety	Would you grow this variety again?	Number of seeds that germinated. Out of 30.	Germination	Vigour	Bolt resistance	Yield	Marketability	Appearance	Winter Hardiness	Uniformity
Lusia Bel Fiore	Yes	10	4	4	4	5	5	4	4	4
Castlefranco Lucrezia Osbourne	Yes	6	3	3	4	3	4	4	4	4
Castle Franco Fenice Osbourne	Yes	6	3	3	4	5	5	5	4	5
Red Chioggia Indigo F1	No	3	2	2	4	2	3	3	4	3

Treviso Bottiglime Treviso osborne	No	1	1	1	4	1	3	4	4	3
Treviso TVG1 Osborne	Yes	6	3	3	4	4	4	4	4	4
Red Chioggia Verona Guilietta Osbourne	Yes	5	3	2	4	2	3	3	4	2
Treviso Early Treviso Wild Gardens	Yes	9	4	4	4	4	5	4	4	3

The radicchio trial included four varieties: castelfranco (green and red speckled), lusia (green and red speckled) chioggia (round and red), treviso (oblong and red). Each trial consisted of 30 seeds of each variety to be started indoors mid-June and to be transplanted in mid-July. Roots to Harvest does not have a greenhouse that is suitable to start seeds indoors. Seeds were directly seeded on June 17, 2020.

The radicchio trial bed size was 16 ft in length x 10 ft wide. Each row was spaced 8-10 inches apart. The garden plot was weeded and broadforked. Burlap was placed on top to reduce surface dry out while seeds were germinating. On November 10th radicchio varieties were small and their heads were just beginning to form. They were removed from the plot and transferred to the greenhouse located at the Lillie street Urban Farm for further evaluation.



The following photos are of the largest radicchios of each variety



Lusia Bel Fiore



Red Chioggia Indigo F1



Castlefranco Fenise Osborne F1



Castlefranco Lucrezia Osborne



Treviso Bottiglime Osborne 1



Treviso TVG1 Osborne



Treviso Early Wild Garden



Red Chioggia Verona Giulietta

Conclusion

Farmer-led variety trials are a good way for farmers and growers to determine what varieties are best suited to their land, climate and farming practices. The Thunder Bay trials, spinach and orange storage carrots had the greatest success. Spinach trials will continue in 2021 and will determine whether or not to scale up on spinach seed production. Naval and Storage Bolero were the favorites of orange storage carrots. These varieties have been replanted in the greenhouse to produce seed. Through the trials the grower determined that Nantes varieties produce well and will be grown for Roots to Harvest market garden. Red carrot and radicchio variety will be planted again in 2021 to see if there has been an increase in yield and vigour.

Additional space to dry, clean, and overwinter biennials would greatly increase capacity to save seeds.

Root Cellar Gardens Seed Variety Trials

Prepared by Evalisa McIlffaterick

Root Cellar Gardens is a market garden located about 40km southwest of Thunder Bay. We grow produce for both a summer and winter CSA, as well as save/produce seed. Approximately 60% of our production space is for vegetable growing, 30% is for both seed and produce, and 10% is for exclusively seed production.

This summer we took part in the CANOVI variety trials. Specifically, we trialed orange storage carrots, red bell peppers, and rutabagas. We also designed and began a two-year spinach variety trial as part of the Ecological Farmer's Association of Ontario Farmer-Led Research program. While our trials were not specifically a part of the Agroecology and Seed Sovereignty in Northern Ontario project, they mirror in a small part some of the on-farm work that the project is doing. Below is a summary of the results of the variety trials conducted at Root Cellar Gardens.

All trials were planted in 50 ft x 3 ft raised beds. We trialed four varieties of orange storage carrots in the summer of 2020. They were: Bolero, Dulcinea, Rumba, and Naval. In the field all performed well with respect to germination, leaf growth/canopy closure, and insect/disease resistance. Rumba and Naval had the best canopy closure (ability to shade out weeds). Upon harvest, some carrots of all varieties were rotten at their tips from the wet soil conditions. Rumba was the variety that seemed least affected of them all. The yield of Rumba was greatest, while the yield of Dulcinea was the lowest. Twelve of each variety of carrot were then put in cold storage for two months. After this time, they were evaluated for taste. This was done by providing all of our winter CSA members (42 households) samples of each of the 4 varieties in their CSA share one week and asking them to rate them for us. Nearly half our members shared results, and based on this Bolero was the best tasting. Runners up (in order from best to worst) were: Rumba, Naval, and Dulcinea.

Our pepper trial consisted of eight varieties of red bell peppers. They were evaluated for many traits such as insect and disease resistance, resistance to lodging, yield, flavour, earliness, vigour and germination rate. As a market garden in Northwestern Ontario, we were primarily interested in which variety could yield a ripe pepper in our short season. Four varieties managed to do this: King Crimson, Red Ace, Red Knight, and the Seed Works Breeding line. Of these four, Red Ace and King Crimson had the highest yield, while King Crimson and the Seed Works Breeding line were the tastiest.

We decided to participate in the rutabaga variety trial to see if any variety had particularly good resistance to cabbage root maggot (a problem for rutabaga in our garden). We trialed eight of nine varieties on offer. All grew vigorously and produced varying uniform tubers. Unfortunately, all were heavily damaged by cabbage root maggot upon harvest. The best of each variety was put in cold storage for 2 months before evaluation for flavour. The best tasting variety in our trial was Helenor, which was also our favourite overall.

Finally, we also began a two-year spinach variety trial designed to see if there is a particular variety of spinach that lends itself well to seed production in our region. This trial involves three plantings of six varieties of spinach: one planting in the spring of 2020, one in the late summer of 2020, and one in the late fall of 2020. Spinach is evaluated for its germination rate and early vigour, its taste and ease of harvest, its overall health and disease resistance, and finally its seed yield and viability. Each planting's data will be evaluated individually, and then comparisons across planting dates will be made to determine the role that timing plays in good spinach seed production in our area. Seed yield results and viability were quite different between Root Cellar Gardens' spring planting and the one done at Roots to Harvest. Both yields and germination rates were nearly double in the seed produced at Roots to Harvest than the seed produced at Root Cellar Gardens. One explanation for this may be the hot summer experienced in 2020, and thus the favourable microclimate at Roots to Harvest provided by Lake Superior (spinach seed requires temperatures below 28 degrees C for good seed development/production).

Workshops and Events

Prepared by Rachel Portinga

Many people took up gardening in 2020, seeds sold out locally and access to seeds online was slowed due to increased demand.⁶ Additionally, Roots to Harvest received numerous calls requesting gardening advice. In response to this interest, Roots to Harvest, Superior Seed Producers, and the Sustainable Food Systems Lab collaboratively developed a webinar series to provide basic education on gardening topics. Rachel Portinga served as the webinar series facilitator as part of a research internship.

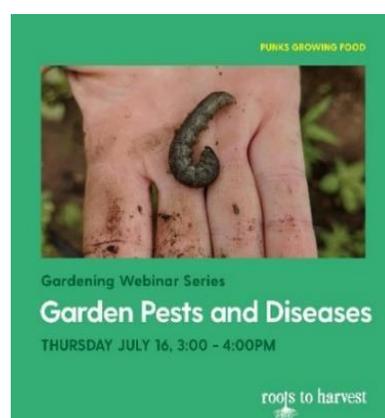
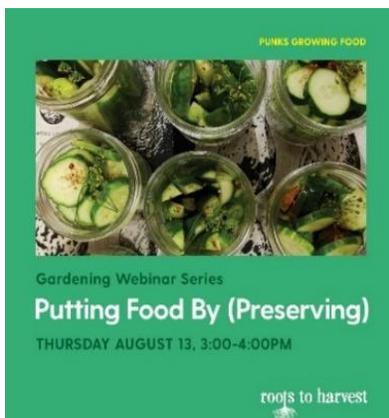
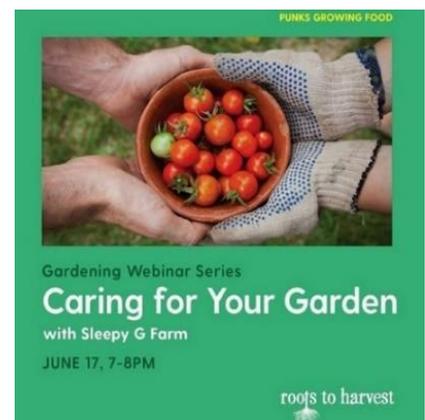
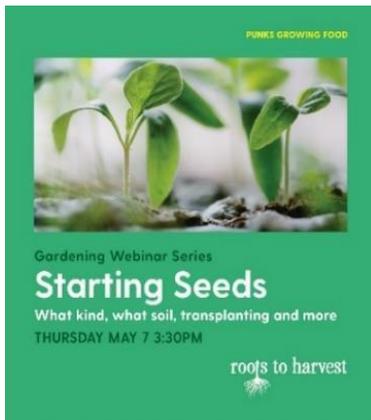
Webinar Development

Six webinars were hosted between May and August 2020. A seventh webinar “Putting your Garden to Bed for Winter” occurred in Sept 10, 2020, but is not included in this report.

Webinar panelists were suggested by Roots to Harvest staff and the webinar facilitator. The webinar facilitator connected the panelists together to discuss the outline and approach for each webinar. Webinars shared photos, tables, PowerPoints, a living example (e.g., holding up a transplant in the pot for viewers) and/or videos over zoom. One webinar used pre-recorded videos and shared them over zoom. The webinar facilitator scheduled a practice zoom session as required based on panelist comfort level with zoom. They also sent panelists questions from registrants to consider ahead of time.

Each webinar was advertised using Roots to Harvest social media accounts (see images below) and posted to the organizational website in advance of the webinar. Additionally, the webinar facilitator sent out an email with each webinar’s information to the Lake Superior Living Labs Network email list. From this point, the sharing of the webinar is unknown but it is suspected that social media posts were re-shared on Facebook and Instagram in stories, as posts, or direct messages to friends, and emails were forwarded to interested people.

⁶ Anderson, C. 14 May 2020. *Good for the spirit: Northern Ontarians turn to gardening during COVID-19*. TVO50. <https://www.tvo.org/article/good-for-the-spirit-northern-ontarians-turn-to-gardening-during-covid-19>



The webinar facilitator created a zoom meeting with required registration (included: name, email, town, state/province, country, and “do you have any questions?”) for each webinar. Each webinar was recorded and then made available on the Roots to Harvest YouTube channel and on the Roots to Harvest website (with help from Roots to Harvest staff). Then the webinar facilitator emailed the link to the video to all registrants for that specific webinar.

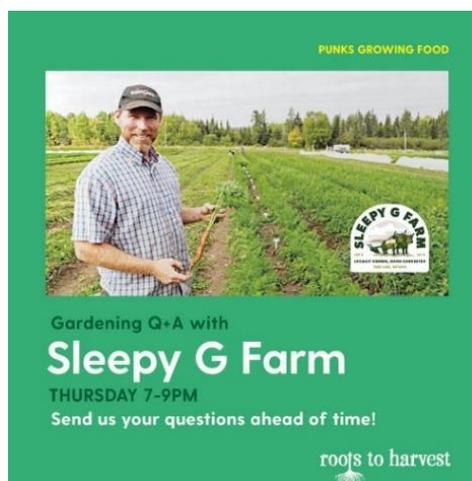
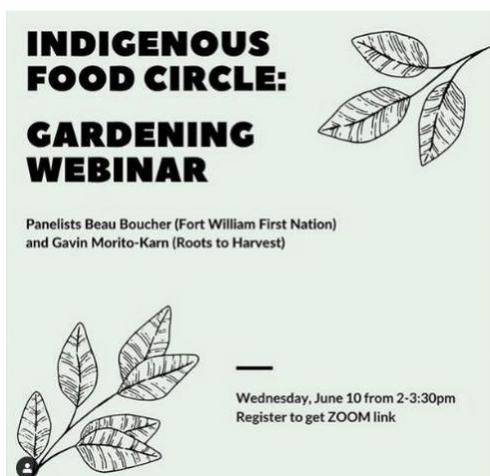
Webinar Name	Date	Time	Panelists	Media Used
Q and A with Sleepy G	4/28/2020	7pm	Marcelle and Brendan Paulin	NA
Starting Seeds	5/7/2020	3:30pm	Janna Van Blyderveen, Lucie Lavoie, Wendy O'Connor	Image, PPT
Short Growing Seasons	5/14/2020	3pm	Graham Saunders	PPT

Caring for your Garden	6/17/2020	7pm	Marcelle and Brendan Paulin	Images
Garden Pests and Diseases	7/16/2020	3pm	Dr. Ken Deacon	PPT
Putting Food By	8/13/2020	3pm	Kim McGibbon, Diana Bockus	Video
Seed Saving	8/26/2020	7pm	Evalisa McIlffaterick, JoAnne Henderson	Videos
Putting your Garden to Bed +Garlic	9/10/2020	7pm	Wendy O'Connor, Janna Van Blyderveen	NA

Additional Gardening Webinars in 2020

Roots to Harvest hosted an additional webinar “Gardening Q and A with Sleepy G Farm” in April 2020. The panelists were Marcelle and Brendan Paulin. This is an annual offering with Roots to Harvest, was facilitated a bit differently, and had many views.

Additionally, the Indigenous Food Circle (IFC) hosted a Gardening Webinar in early June with Beau Boucher (Fort William First Nation), Gavin Morito-Karn (Roots to Harvest), and Janna Van Blyderveen (Roots to Harvest) as panelists. The Roots to Harvest webinar facilitator assisted with this webinar in a similar fashion in collaboration with IFC staff. It had higher attendance (as expected) from participants living in northern communities with very short growing seasons.



Webinar Attendance and Recording Views

This table was updated on August 30, 2020.

Webinar Name	#of Participants	#of Registrants	% of Registrants who attended	# of YouTube Views	Total Views
Q and A with Sleepy G	NA ⁷	NA	NA	131	128
Starting Seeds	26	142	18	61	87
Short Growing Seasons	73	130	56	104	177
Caring for your Garden	9	49	18	38	47
Garden Pests and Diseases	20	60	33	33	53
Putting Food By	10	38	26	13	23
Seed Saving	19	52	36.5	NA ⁸	19
Putting your Garden to Bed + Garlic	NA ⁹	NA	NA	NA	NA

There are a few realities to consider when viewing these numbers. First, one person could have attended a webinar and watched the recording later (as many times as they wanted); and second, multiple people can watch a zoom meeting from one device. With these realities in mind, these numbers are not perfectly representative of the number of people that interacted with the webinars, but it is a decent estimate of interest level and engagement.

Webinar Registrant's Location

Webinar registrants were largely from northwestern Ontario, but we regularly had small numbers of attendees from Sault Ste. Marie, Southern ON, and Minnesota. There were also a few individuals occasionally joining from British Columbia, Manitoba, Nova Scotia, Washington, or Illinois. The participants from Sault Ste Marie and the United States were often connected to the Lake Superior Living Labs Network (with one third of members being in Duluth, MN) or personally connected to the webinar facilitator (who is from Minnesota and promoted each webinar on her personal social media).

Reasons for High or Low Attendance

Webinar attendance was regularly discussed by the webinar facilitator and Roots to Harvest staff to see what might explain high or low attendance. We noted very high registration and interest in the first three webinars: Gardening Q and A with Sleepy G

⁷ Registration was not required, and attendance was not recorded at this time.

⁸ The Seed Saving webinar has not been posted to YouTube, so views are currently unavailable.

⁹ This webinar has not happened yet. Numbers could be updated at the end of September if desired.

Far, Starting Seeds, and Short Growing Seasons. These occurred in April and May when Ontario was still very closed due to COVID-19, so folks were home much more, with few activities happening in the community, restaurants closed, and cooler weather. As we entered June, the weather became more enjoyable for evening activities outside, more people returned to work, and activities outside the home were more available. We suggest that all three of these reasons contributed to the lower registration and attendance as summer progressed.

There appears to be high interest in information specifically about short growing seasons. The Putting Food By webinar had the lowest attendance and fewest views on YouTube, which may reflect that the people who follow Roots to Harvest on social media (or others who received the webinar announcement) feel more comfortable with this activity, and do not desire additional instruction. For example, one viewer sent the webinar facilitator a message indicating that she watched the video and knew all of the information already (and was therefore grateful to her mother and grandmother for teaching her). Although interest appears low, there are always people starting to preserve, or expanding from freezing to canning or jamming – so perhaps this video should be shared in the future for those beginners (as opposed to re-hosting a live webinar). Roots to Harvest staff does intend to promote this video in fall 2020 through social media accounts and it will be interesting to see if that timing increases the number of views.

Future Programming Considerations

Due to the popularity of these webinars, we know there is interest among gardeners to learn more about gardening and increase their skills each year. We have evidence that local growers want to continue learning new skills and that they trust Roots to Harvest to provide locally grounded knowledge. Additionally, there will always be new gardeners who start for various reasons – although 2020 has brought a surge of interest. I would therefore suggest that Roots to Harvest use this enthusiasm to continue offering publicly available webinars through the winter in the lead up to the next growing season.

Regardless of what happens with COVID-19, the interest in gardening is higher than usual, and with many people finishing their first year of gardening (or having an increased garden size), they will have learned many lessons over the past season. Roots to Harvest could offer a few webinars that provide spaces for folks to consider what they did last year, consider alternative options, and begin planning for summer 2021.

Some topic suggestions for future workshops include:

- Seed Purchasing and Seed Sources – Why local? Why hybrid? Why organic? What do each of those choices mean?
- Garden Planning/Layout – for growing food and/or for growing seed

- Starting Seeds (but hosted in January or early February before Seedy Saturday so folks can identify supplies. Many new gardeners do not know seeds are started this early).
- Soil testing and amendments – this may be for more advanced gardeners who now have mental space to explore this area
- Fruit Trees and Fruit – types that do well in Northwestern Ontario, sources, care, pests, cycles of production
- Annuals – Raspberries, blueberries, strawberries, currants, asparagus, chives, rhubarb – offering tips for pruning, watering, harvesting, and where to plant them (food forest concepts). While many people have these plants already, they are a forgotten part of the garden because they require minimal care and attention (evidenced by many interview participants forgetting about them when asked what they grow; Seed Saving in Northwestern Ontario Report).
- Garlic in spring, summer, fall – as a follow up to the September 2020 Garlic Planting webinar, schedule a second webinar that provides some tips about how to harvest, clean, cure, braid, and store garlic.
- Advanced Seed Saving techniques (see Seed Saving in Northwestern Ontario Report for Beyond Basics and Biennials suggestions)

Timing of webinars – We would suggest that future webinars be scheduled in revised ways as one hour was usually a bit too short. Any of the following could be explored:

- Cover less material per webinar and host more webinars (they could be back-to-back, potentially with the same panelists depending on length; allowing attendees to commit to a shorter, focused time on a topic they are interested in).
- Post the agenda with specific topics for the webinars so attendees can join and leave as their interest level allows.
- Schedule webinars for 90 minutes and maintain the same level of content; now there is more time for questions.

We highly suggest creating a webinar series calendar by October or November 2020 and advertising the webinars all at once in the fall so folks know that these resources will be available to them during the winter. I would suggest asking at least one member of Superior Seed Producers to assist in determining the time of year to host each of these (and coordinate with Seedy Saturday). Then one to two weeks before each webinar, we could post to social media to promote each specific webinar.

Using Zoom worked fairly well for the webinars this summer. However, sharing videos over zoom can be difficult for many of our participants who do not have fast internet. Therefore, if videos are going to be used, they should be posted to YouTube (and/or the Roots to Harvest website) for separate viewing after the webinar. Photos and PowerPoint slides can be shared fairly successfully, unless the person sharing them has slow internet or using a hot spot on their phone. Location of the panelists should be taken into consideration when making media decisions.

Finally, we would recommend that Roots to Harvest consider creating a winter webinar series about gardening and preparations for the coming year. There was a lot of increased interest in gardening this year, and Roots to Harvest can keep that momentum and conversation going into the winter, we can help support new and returning gardeners who want to improve next summer. This could also remind folks that growing food is a year-round activity in many ways and continue connecting them with food knowledge. For first year gardeners, they would also have some experience now to relate back to the webinar information – and may perhaps have more questions than before.

Research Summary (Spring-Summer 2020)

Prepared by Rachel Portinga

Research was undertaken by Rachel Portinga through an internship at Roots to Harvest for the PhD in Health Sciences program at Lakehead University. The following summary builds on the Agroecology and Seed Saving project, Evalisa McIlffaterick had conversations with four key food growers in the region over Winter 2020 and analyzed results from a survey at Seedy Saturday (Feb 2020). The information from that study informed some of the questions we asked in this research during the summer 2020.

This research project explored how food growers in Northwestern Ontario engage with food security, sustainable food production, well-being, and resilience through seed saving. It focused on the barriers to seed saving and the opportunities to increase seed saving in the region. The seeds currently available to Northwestern Ontario growers are often grown and harvested in southern Ontario and the United States, so their viability in Northwestern Ontario is less certain. This is particularly concerning in the face of climate change when the climatic conditions are rapidly changing; having locally adapted and diverse seeds provides a higher likelihood of successful regional food production. Therefore, the accessibility to locally adapted seeds can support resilience, food security, and well-being as part of climate change adaptation.

There are already regional examples demonstrating interest in developing stronger Northwestern Ontario seed systems. These include the semi-formal community seed bank coordinated by the Superior Seed Producers, small cooperative plant breeding efforts among regional farmers, and the LUARS Agricultural Research Capacity Development Program. For those growing “kitchen gardens” or gardens in their yards, locally adapted seeds are available through Superior Seed Producers or their own seed saving efforts.

Goals of the Research

This study addressed the overarching research question: What value do seeds contribute to well-being and resilience in Northwestern Ontario? We also explored sub questions including:

1. How are Northwestern Ontario growers (large and small) saving seeds?
2. What seed saving barriers do Northwestern Ontario growers face?
3. What seed saving opportunities are Northwestern Ontario growers looking for?
4. How and where do Northwestern Ontario growers access their seeds?
5. What are the experiences of different subpopulations around seed saving in Northwestern Ontario (e.g. Italian, new Canadian, Indigenous, market farmer)?

For the purposes of this report, we provide information primarily on Questions 1, 2, and 3 as they relate to the programming interests of Roots to Harvest, and the seed saving interests of Superior Seed Producers.

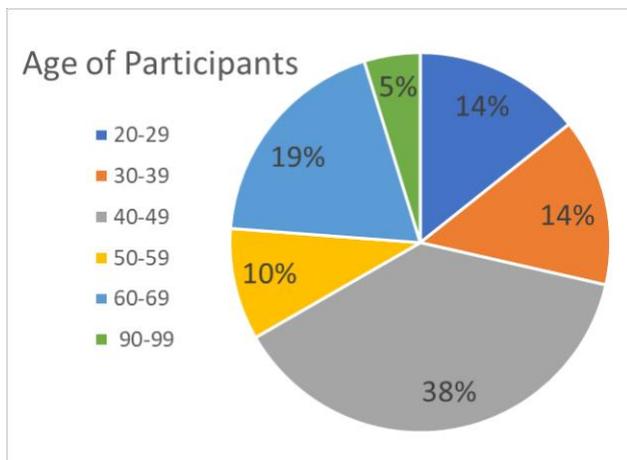
Methods

We conducted semi-structured interviews with participants in July and August 2020. Seven participants were initially recruited by emailing people who completed a Seedy Saturday survey and left an email address at the end of the survey indicating their willingness to be contacted (which was optional). An additional 10 participants were recruited by emailing food growers with whom Roots to Harvest staff or Rachel Portinga had a relationship. Four of those individuals are members of a local seed saving organization. We used a snowball technique to recruit the final four participants (by emailing people who were recommended by previous participants). Interviews lasted between 29 minutes to 1 hour 24 minutes, with most interviews taking one hour.

Participant Demographics

Age

Ages ranged from 24 to 93, with a higher number of growers between 40 and 49.¹⁰



Years Growing Food

¹⁰ We asked for participant's year of birth, not their age directly. To calculate age, we assumed everyone already had their birthday in 2020. While this likely led to a few individuals being given a one-year age bump, this still provides us with a general estimate of grower age groups.

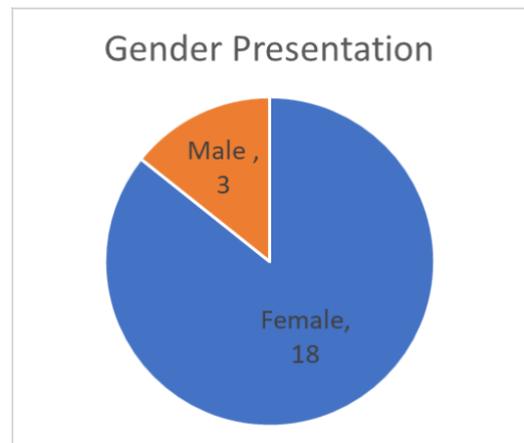
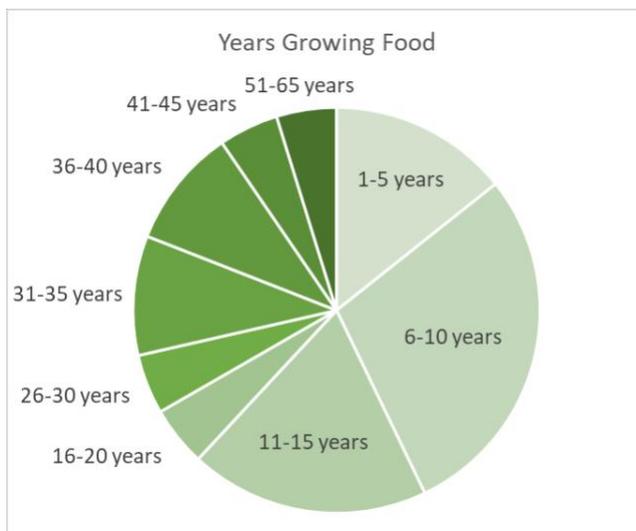
The range of years growing food (in and out of Northwestern Ontario) was varied but indicates that a majority of participants were growing food for 15 years or less. This is included as an estimate of gardening experience.

Gender Presentation

We did not ask for participant's gender identity; therefore, we can only report their gender presentation here. There was a strong representation by female-presenting participants. While it is possible that women are growing food and/or saving seeds more than men, the difference is likely not this drastic in the broader community. There are many possible contributing factors to the large number of female-presenting participants.¹¹

Ethnicity

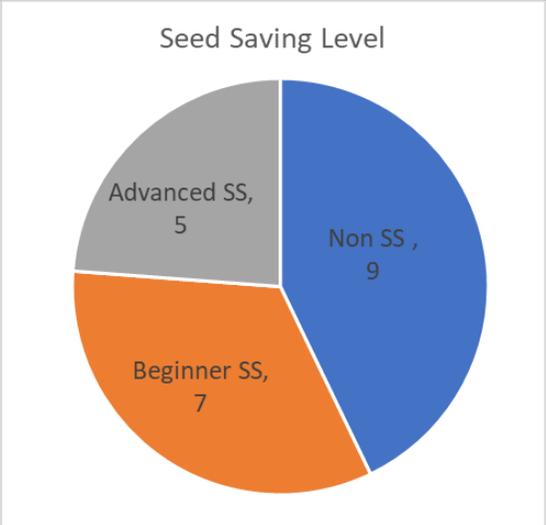
We asked individuals how they identify their ethnicity. While many said "Canadian", we asked for a bit more clarity on ancestry. Based on this, 20 participants are Caucasian of European descent. One participant identified as half Caucasian and half Native (Ojibwe). This information tells us that the results of this study should not be applied to the entire Thunder Bay community as the results are lacking information from Indigenous, Black, and People of Color (BIPOC), who constitute ~18% of the Thunder Bay population (Pucci, 2017). We know through conversations and observations that BIPOC individuals are growing food in Northwestern Ontario, but our recruitment efforts did not reach them, and it is a limitation of this study.



¹¹ The bias towards female-presenting participants could be due to many filters along the research process: who was approached to complete the Seedy Saturday survey, who agreed to complete it and leave an email address (which was largely female names), who replied to the recruitment email, and which individuals were suggested for the interviews by others. Additionally, in four interviews the male partners of four female participants were home and were named as active gardening partners during the interview. However, it was the women who participated in the interviews. This could be due to the nature of the interview request being sent to one individual, not a couple.

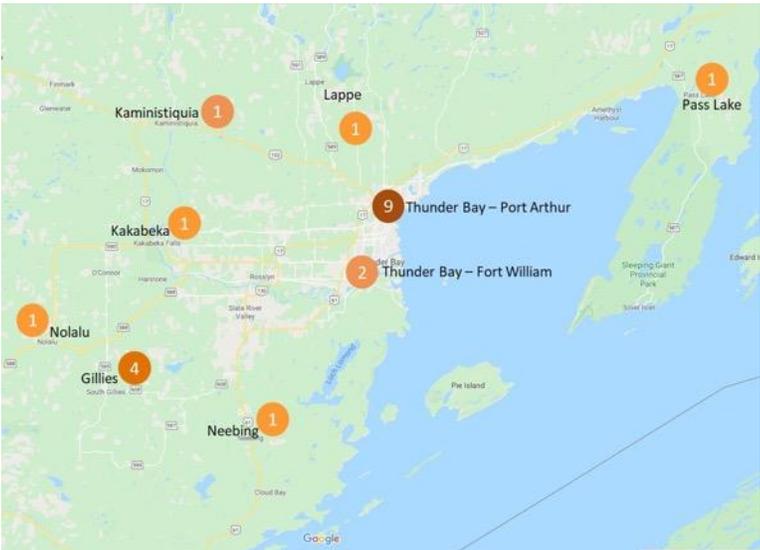
Seed Saving (SS) Level

Participants self-identified as non-seed savers (non-SS) or seed savers (SS). During the analysis, we divided SS’s into beginner SS or advanced SS based on the number of plants they saved seed from and if they sold seeds.¹²



Geographic Location

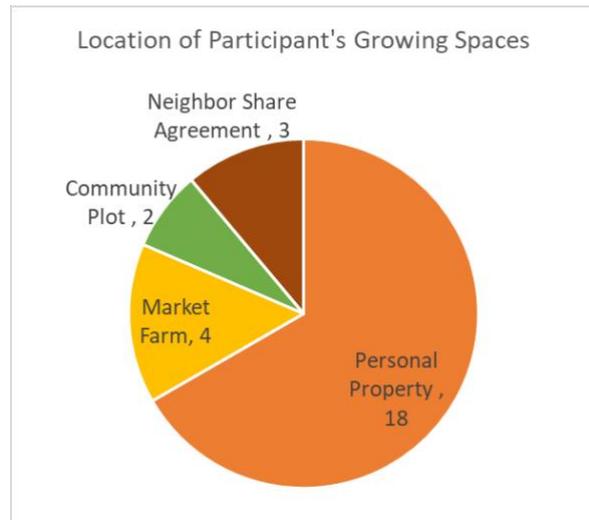
There were 11 participants living in Thunder Bay proper, and 10 participants living in the surrounding rural regions, including a small cluster of four participants around Gillies. It is notable that only two of the participants are originally from Thunder Bay, while 18 moved to Thunder Bay at some point in their lives from other parts of Canada or Europe (one participant did not respond). Many participants referenced that they, their parents, or their grandparents immigrated to Canada – and that connected them to growing, preserving, and eating food in meaningful ways that promoted their own gardening.



¹² Non-SS = those who identified as non-seed savers currently, although three participants had tried saving seeds in the past; Beginning SS = those who save seeds from one to six plant types; Advanced SS = those who save seeds from nine or more plant types and/or sell their seeds

Where Participants Grow Food

Some participants grow food in more than one place, therefore these numbers will not total 21 as each location was counted as one place. The Neighbor Share Agreement took three different forms¹³, but we combined them into one category because in each example two or three households were working collectively to grow food on at least one household's property.



Results

1 - Seeds Saved by Participants

Participants were asked to list the seeds they saved. Each participant was recorded as one saver of those seeds (even if they saved 4 types of tomato seeds). Some participants also indicated that they saved seeds for flowers and medicinal plants. Based on many individuals remembering more varieties as the interview progressed, we think it is possible that participants forgot a plant or two when sharing their list of seeds saved. Regardless, the information below provides an estimate of which plants are most popular for seed saving in 2020. The most popular seed types to save were tomatoes, peas, beans, cucumbers, squash, zucchini, garlic, and carrot.¹⁴ These appear to be the "entry-level" crops for seed savers.

¹³ The three neighbors that share agreement examples were: 1) three neighbors in Thunder Bay planted seeds together, helped build each other's greenhouses, and shared tools, while each person grew food on their own properties, and ultimately, they will share produce within the group; 2) three neighbors in a rural area collaborate to grow food in one large plot owned by one household. Tasks (and food) are split among the three households; and 3) a participant grows food on her property, a community plot, and on land provided to her by a market gardener friend for free. Food is exchanged between them.

¹⁴ Multiple varieties of beans, tomatoes, and squash were often saved by one participant.

Seeds Saved	# of participants
Tomatoes ¹	8
Peas	7
Beans (dry, bush, and/or pole) ^{1,2}	7
Cucumbers	6
Squash ¹	5
Zucchini	5
Garlic	4
Carrots ³	4
Potatoes	3
Peppers	3
Corn	2
Onions	2
Rutabaga	2
Beets	2
Spinach	2
Kale	2
Cabbages	2
Hot Peppers	2
Dill	2
Cilantro	2
Parsley	2
Sunflowers	2

Seeds Saved	# of participants
Leeks	1
Sweet Potato	1
Parsnips	1
Radishes	1
Lettuce	1
Arugula	1
Lamb's Quarters	1
Choys	1
Broccoli	1
Tomatillos	1
Melons	1
Ground Cherries	1
Herbs	1
Basil	1
Sage	1
Chives	1
Bread seed poppy	1
Borage	1
Flowers and Medicines	
Flowers	3
Calendula	2
Cannabis	2
Pink Mallow	1
Nasturtium	1
Cosmos	1
Marigolds	1
Tobacco	1

2 - Barriers to Saving Seeds

We asked all 21 participants about their barriers to seed saving. The following emerging themes were expressed by both seed savers and non-seed savers (except where noted below).

Major Barriers:

1. Limited Time (62% of participants)

- Non-seed savers commonly thought seed harvesting time aligns with food harvesting and processing time in the fall. These participants already felt “full” at this time of year.
- Participant’s time is already busy with work, school, and/or kids, therefore they do not prioritize seed saving.
 - Importantly, some choose this because they know local seed is available.

- Participants need time to learn how to save seed.
- Adding bags to prevent cross-pollination is too demanding of time.

“If I could just go out and save seeds [without the time requirements to isolate plants], I would save them all.” (Wendy Wright)

“Would you like to save more seeds?” → “Always, but time” (Cat McFarlane)

2. Lacking Education, Training, and Knowledge (62% of participants)

- Participants identified their own lack of knowledge around all aspects of seed saving. They considered it an advanced or expert skill, and they simply were not at that level.
- Participants did not know enough about:
 - Isolation distances
 - Population size minimums
 - How to harvest seeds
 - When to harvest seeds
 - How to store seeds
 - Notably, cleaning seeds was not mentioned – this may indicate that non-seed savers do not know this step exists

“That’s a big one: how and when.” (Melanie Hofmann, beginner seed saver)

3. Lacking Correct Isolation Distances (33% of participants)

- Participants know they lack isolation distances, so they do not bother saving seeds
- Participants know “isolation distances” are something to worry about, but they do not have enough knowledge to know if it affects them, so they skip saving seeds.
- Participants were not willing to sacrifice variation in their food for the ability to save seeds

“Isolation distances – cause things like corn I think it’s like 2 kms or a km and a half. We know, because we’re in an urban environment, there are problems with that.” (Lucie Lavoie)

4. Limited Space in garden to devote to seed saving instead of food growing—particularly for biennials (33% of participants)

“I don’t have the space to grow 40 carrots that I’m not going to use”. (Lucie Lavoie)

“I feel like seed saving conflicts with the production of the food, in the sense of, often you need to over-mature a plant in order to produce the seed, which you know, is prohibitive when you’re trying to sell the plant product.” (Marcelle Paulin)

5. Regular gardening issues – Weather and Pests (28% of participants)

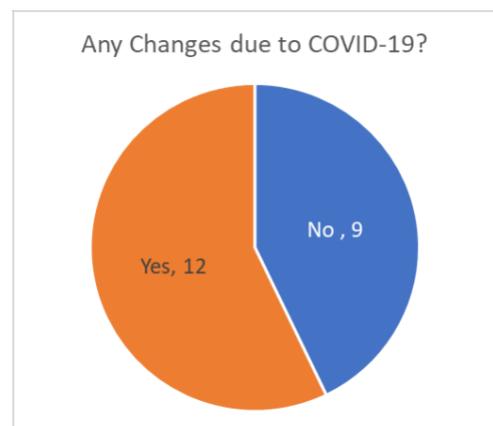
- Short growing season and early frost prevents ripening of fruits and seeds
- Too much rain in the fall leads to moldy seeds
- Pests eat the seeds before they can be harvested

Less Common Barriers:

1. Transient Lifestyle prevents gardeners from trying to save seeds. There were concerns roommates would throw them out, they may move to an entirely different region, or not know if a new rental house will have cool, dry storage. This was particularly noted among younger gardeners who do not own their homes.
2. The reliability of the seed is more important than saving it themselves. This was especially important for market farmers.
3. There is no urgency to learn seed saving (because of grocery stores, Superior Seed Producers exists, and currently lacking capacity).
4. Limited Space (or materials) for drying and/or storing seeds
5. Keeping the seeds viable over winter
6. It is too hard (seed saving in total, and cleaning seeds in particular)
7. Participants already own too many seeds, and do not want to waste them.

3 - COVID Impacts on Gardening and Seed Saving

All 21 participants were asked if they had changed any of their food growing or seed saving activities because of COVID-19. Nine participants responded “no”, any changes they did make this year were already planned and in the works before COVID-19 became disruptive. The remaining 12 participants made some adjustment in response to the pandemic (or were impacted by other community member’s responses).



1. Grew more food. Seven participants (33%) grew more food because of COVID-19. Some specified growing more tomatoes, potatoes, or squash, while others simply increased garden size and grew more of everything. Most grew more because the fragility of the food supply system was highlighted this spring when shelves were not restocked. For example, one participant described being “horrified to see” that garlic was unavailable from her usual online supplier and that created a little bit of a panic, so she planted more potatoes. Participants were anticipating more disruptions of the industrial

food system in the coming year, and they want to be capable of weathering a few weeks of poorly stocked grocery shelves or increased food prices.

- Four participants (all under the age of 40) were able to increase their garden size because they were home from work/school significantly more, had more free time, and/or had access to roommate/neighbor support for gardening. This allowed expansion projects to be pursued and prioritized.

“This has been a great year – I’ve actually been home!” (Cat McFarlane)

“AND COVID made my neighbors be laid off as well. And so fountain of knowledge - Wes [neighbor] grew up on a farm so he had all the tools that I needed, I didn’t have to go over to my Dad’s place to get them, we built tables. And suddenly I woke up one day and there was a space heater in there. And it was just tons of sharing. Not that that wouldn’t have happened without COVID of course, but we were just around more – so wake up early, share coffee, start gardening.” (Farren Tropea)

2. Saw increased sales. Three participants had changes in sales of seeds, transplants, and/or CSA shares. This had either never happened before, or never happened so rapidly.

3. Planted more for seed production. In response to seed sales, two Superior Seed Producers members said they responded to COVID-19 by planting more to grow seeds 1) to refill the Superior Seed Producers stocks that were depleted by the rush on seed purchasing, and 2) in anticipation of higher seed sales next spring.

4. Changed garden-related behavior to social distance. Four participants indicated a change in their behavior to allow for social distancing including:

- Avoiding the garden stores for purchases
- Changing how they worked with others to social distance while in the garden
- Changing sales of food to reduce contact
- Increasing gardening because it was an outdoor space away from people

5. Experienced limited supplies. People experienced limited gardening supplies or had to purchase their own supplies that were previously provided by community plot organizers. Sometimes, this led to increased sharing among friends or neighbors.

6. Observed an increased number of people asking them about gardening and seed saving. Three Superior Seed Producers members indicated that since COVID-19, they had been approached by more people than usual about volunteering in the gardens, asking questions about seed saving, and requesting presentations on seed saving. There was a noticeable *interest* now - more than ever before.

7. Grew less food. One market farmer chose to grow less food because there was uncertainty about whether the Kakabeka Market would be open this year.

8. Reinforced the reasons they grow their own food.

4 - Seed Saving Opportunities in Northwestern Ontario

All 21 participants were asked “If anything could change in our community around seed saving, to support your seed saving, what would it be?” All participants except two¹⁵ were very excited about the idea of expanded opportunities. Their initial ideas were noted and then I continued to ask for their feedback about specific examples. This led to five overarching themes of support that participants would find helpful: Convincing people to garden, Education, Connections to SS community, Seedy Saturday changes, and a Seed and Tool Library.

1. Convincing People to Garden/Normalizing Gardening

Being able to grow food was seen as a prerequisite to saving seeds. This is the first step for someone who does not engage with food production at all.

“Until people learn how to grow food, you can’t really talk about seed saving.”
(Lucie Lavoie)

2. Education

This was far and away the most common opportunity participants were seeking. An overarching theme was the ability to have education about seed saving specific to our geographic region – many felt that local seed saving advice would be more trustworthy, less threatening, and more applicable to them.

“Because everybody learns differently, some do it on their own with websites, and others like to be there in person asking questions. So if it’s possible, a bit of everything.” (Vera McDonald)

“If people knew how easy it was, they’d be doing it more I think.” (Cynthia¹⁶, Beginner Seed Saver)

2a. Online Resources (28% of participants)

- Many participants were interested in the possibility of going to the Superior Seed Producers website, being able to click on “beets” and then see a single page infographic and/or checklist that explained what they needed to do to save beet seeds (how many plants, isolation distances, years needed, etc.). There was

¹⁵ The two participants who were not seeking expansion acknowledged they knew seed savers, and how to access information, but ultimately they didn’t need any more opportunities – their seed saving would happen if and when they wanted to.

¹⁶ Pseudonyms are used when participants chose to remain anonymous.

interest in being able to find this information specifically for ONE plant (as opposed to having a whole book or the internet).

- Make online resources printable.

2b. A Seed Saving Handbook

- Some participants were interested in having a small handbook about seed saving that was specific to Northwestern Ontario and our short growing seasons (these participants did not know about “*How to Save Your Own Seeds*” from Seeds of Diversity Canada).

2c. Workshops and/or Webinars (42% of participants, typically younger)

- Offering workshops at the Thunder Bay and Gillies Seedy Saturdays.
- Include an agenda for seed saving workshops so participants can join for the portions that interest them.
- Present research on seeds to the community
- Participants recognized that in a COVID world, we may only be able to do webinars on zoom, but there was a notable interest in hands-on learning opportunities.

“Seed saving is a very tangible, it’s very tactile, and so it’s one thing to hear someone talk about it, ... it’s great to hear it. But what does that look like? And if there are these different times in the season when you’re to be doing seed saving for different things. It would be nice, even to have a hands-on thing to be like “hey this is about the time for saving cucumbers, come to this workshop and bring A CUCUMBER from your garden. And we can DO this process together.” (Courtney Strutt)

2d. Bring in Outside Experts

- The advanced SS often commented that they are not experts, so bringing in speakers or seeking out conferences are needed for their own progress.

“There’s a really neat seed saving community in town here, but there’s still definitely a lack of expertise. So, a big need to look outside the community and travel to conferences in Oregon or wherever to learn that next round of stuff that’ll kinda take you to that next step further in your seed saving.” (Evalisa McIlffaterick; advanced seed saver).

2e. Garden Tours

- A few participants indicated that garden tours with local seed savers would be very helpful so they could learn from each other’s spaces and approaches.

2f. Big Seed Saving Event

- Two participants mentioned that a big seed saving event where community members could gather to discuss seeds, attend workshops, clean their seeds with provided equipment, and other fun engaging activities would be very helpful¹⁷. This type of event could incorporate many of the opportunities above. It was noted that this type of event requires funding and personnel resources which currently do not exist.

“That’d be neat to have a workshop where everybody showed up in November when your seeds are ALL dry, definitely dry, and do like a group cleaning” (Dan Morrison)

“One of the limiting factors to what we can do right now is we’re all growers and we’re all seed savers, and I would love to spend two weeks putting together a kick ass 3 day seed saving whatever in the middle of the summer... and have a whole bunch of tents set up and seed cleaning equipment, and people can just come and see stuff happening and try cleaning stuff and bring their own seeds or whatever. But I don’t have time to do that [seed saver friend name] doesn’t have time to do that, none of us have time to do that. But I think something like that would be really fun. It would be really valuable. It would be really approachable for people. And I think it would encourage more people to save seed and get involved.” (Evalisa McIlffaterick)

2g. Mentorship program (38% of participants)

- Many participants were excited about the opportunity to be paired with a more experienced seed saver as part of a mentorship program (their personal connections were not providing access to seed savers). One Superior Seed Producers member indicated that organizing the logistics of this may not be of interest to the Superior Seed Producers, but the participation as a mentor who answers questions may be more appealing.
- The participants discussed a variety of formats:
 - A person you could call or text when you have questions
 - A person who could visit your garden in the spring to help you be intentional about seed saving (visit in spring to plan the layout, visit in summer to help with rogueing, visit later for harvesting, etc.).
 - A “pod” of 3-4 gardeners partnered with one mentor, and then that small group gathers and learns together.

“I would like that. I would participate. If somebody could go through a year with us, like a semester thing - I would love that.” (Vera McDonald)

2h. High School Curriculum Development

- One participant, a former teacher, suggested that adding seed saving and food growing to school curriculum would be an excellent way to promote these

¹⁷ This idea was suggested late in the interviews, so I was not able to ask the previously interviewed participants about their interest level in this idea.

activities from a young age. They outlined a plan of winter term (planning the garden and planting seedlings), the summer offering part-time employment to garden and have a weekly market, then a fall course (harvesting, cooking, and seed saving). It was suggested that Roots to Harvest may be able to develop something like this, but the requirements from the ON government were unknown.

3. Building Connections to Seed Saving Community

Participants, largely the Beginner SS indicated that increased connections to the seed saving community would help them save seeds. Participants did not mention “exclusion” as a barrier to seed saving, but their language indicated that they feel separate from the local SS community. Some mechanisms that participants suggested for increasing this connection included:

- Social Media group
- Access to a chat thread
- Planned seed saving gatherings for discussion
- Increased ways for the beginner and intermediate SS (“*the non-Evalisa’s*”) to participate in the SS community
- Coordination of seed saving efforts among many disparate households (An agreement to say I’ll grow 24 zucchini to save their seeds if you grow the tomatoes to save those seeds, and then we’ll swap the food and the seeds). This would alleviate the need to have space for 24 zucchini and all your other food.

4. Seedy Saturday Changes

Participants referenced many ways Seedy Saturday could be adjusted or expanded to be more accessible in the future. This included the timing, number of events, location of events, and convincing more people to see it as a swap where seeds are exchanged, not just purchased. Some of the recommendations included:

- Having more than one Seedy Saturday - one in Feb, March, and April.
- Hosting an event in Kakabeka as a central location (as both Thunder Bay and Gillies were an hour drive for this participant).
- Broadening the advertising around Seedy Saturday (the Chronicle Journal, the country music station, or the multicultural center) to increase the number of people who know about it.

Participants did not mention looking online for locally produced seeds, but rather using nurseries, garden centers, farm stores, and big box stores if they missed Seedy Saturday. This tells us participants feel that local seed is ONLY available at Seedy Saturday.

- Convince more people to bring seeds IN to Seedy Saturday (and help them feel confident in those seeds)

There was recognition by SS and non-SS that for Seedy Saturday to expand, the community would need more participants bringing seed IN to the event. While there was interest around bringing in their own seeds, participants were not confident in their skills (again indicating the need for more education). One target audience for this may be more established gardeners who may have more mental capacity to add seed saving to their annual activities.

Finally, three younger non-SS indicated that they would be more willing to save seeds if they knew it was locally threatened and they better understood the argument FOR saving seeds. They generally understood that it was sustainable, but they were requesting to be convinced of why it was important to do now. They were not opposed to it, but they remain disconnected from the reasoning and would like to know more. This knowledge would likely connect them to the broader movement, which would provide motivation to prioritize seed saving. Seedy Saturday could be a place to provide that knowledge and motivation.

5. Seed Library and Seed Cleaning Tool Library

A final idea was around a semi-permanent Seed Library where participants knew they could go if they missed the Seedy Saturday event. There were still relatively low expectations of availability (perhaps once/month or 6 days/year for a few hours). The benefits of this approach, as opposed to multiple Seedy Saturdays, is that the programming would not need to be included. Although it might offer a good opportunity to pair Seed Library hours with a “Seed Savers Coffee Hour”.

Seed libraries/banks/exchanges can be operated in many ways (for more exploration see Helicke, 2015 and Soleri, 2018). Participants in this study did not delve into the details. Rather, they were excited to have slightly more access throughout the year (particularly for those with busy work schedules or living out of town) that could provide more access to a greater diversity of local varieties. Some additional ideas included:

- If there was a requirement to contribute to use the library that may increase their own accountability for saving seeds.
- Use a program such as “for every five seed packs purchased, we donate one pack”.
- If they were to bring seeds, they would want to know they were “*totally awesome*” and would need more education and confidence before they contributed seeds. When asked about a semi-permanent physical location - “*Oh yes, yeah, yes that would be lovely ... because I would prefer, if I could, to get most of my seeds locally*”. (Melanie Hofmann)

A related suggestion was a Seed Cleaning Tool Library, where seed savers could borrow equipment (individually or as a “package” to take home or use directly in that space to clean their seeds. This would be particularly to those without space to store tools or access to buy them.

5 - Climate Change Observations

We asked participants about their observations of changing weather patterns. In response, many participants noted that they had not lived here long enough to comment on climate observations (and therefore did not offer an answer or shared what they heard from long-term residents). Some of these participants did make comments about the short growing season and the presence of annual variation that always accompanies gardening.

To consider how climate change may be impacting gardeners and seed savers, I used data from seven of the participants who have lived in Thunder Bay for 33-65 years. Their observations are:

- Summers are hotter, drier, and perhaps a few days longer. This was sometimes perceived as a negative (lacking good water sources) and other times as a positive (tomatoes ripening sooner).
- More extremes in weather (drought, rain, storm intensity)
- Less predictability in weather
- Fall is wetter causing seeds to rot in the field (if you cannot dry them indoors)
- New insect pests have arrived

“Some things that I’ve definitely seen that are indication that the climate is changing is that we have pests up here that could never have been up here before. So, we now have striped cucumber beetle, which we never had, we never had potato beetles before, so things are coming in and are surviving the winters, where they would not [have] been able to before... So that’s a good living indication that things are changing.” (Lucie Lavoie, co-gardens with an entomologist)

6 - Well-Being

Participants were asked to reflect on how growing food and saving seeds contributed to their well-being. It was hard for many to separate the seed saving from growing of food – for the seed savers, this was simply part of the annual “gardening” activity. As such, we have combined results from all participants in this section, so it more accurately represents how food growing interacts with well-being (than seed saving; these will be further analyzed in the coming months for a scholarly publication).

Mental and Emotional Health

- Happiness, Fun, Joyful
“I literally skip in my garden.” (Farren Tropea)
“I can’t conceive of living in a yard without a riot of plants around me. It would be really depressing.” (Lucie Lavoie)
- Being content, present, and whole
- Peaceful, Calmed, Relaxed

- Therapy and Meditation
"It's therapy. It's so much." (Cynthia)
- Having a unique sense of satisfaction, pride, confidence in food security, and self-reliance
"It [gardening] makes me feel warm and fuzzy inside and, a sense of pride, it's enjoyable, it's food for the soul to see plants growing and thriving." (Melanie Hofmann)
"It feels empowering". (Vera McDonald)
- Helps you get through the winter, particularly because Seedy Saturday and seed ordering comes in February when the winter blues are strong.
- Provides motivation to the grower, provides sense of purpose both daily and more broadly *"There is a garden out there that needs me to go out and do things. I can't put it aside. If I do put it aside it's to the detriment of myself and my garden and a whole bunch of us eating from it... so it motivates me to go."* (Wendy O'Connor)
- Connection to the land
"I'll start with the connection to the land. I think it's a very spiritual connection. Just to sit and watch things grow. It's a lot of work, but there is excellent value for your mental health." (Cynthia)
- Positive feelings around food being grown ethically, free of chemicals, and in ecologically supportive ways.
"As an antidote to any sort of feelings of overwhelmingness around issues of climate or justice, or whatever. I just feel that it's something, which is kinda why I got into it too. It's like something really like hands on and tangible but, although not solving all of the world's problems, feels like it's not making them - At the very least it's not making them worse. Right? Hopefully. For me, in that way, it's important in terms of mental health just knowing that and feeling reassured in that and being hopefully in some way being something I think is important and valuable as opposed to just being overwhelmed by all the things that I find challenging in the world." (Evalisa McIlffaterick)
- Provides connection to community
"I really enjoy when I say 'hey come by for dinner, come by for lunch', and we sit here outside, and I cook some food right here, right next to the garden, and I get to share that with people, and they enjoy it, and you know most of the food in the meal has come right from my property. You know, that's a really good feeling for me too. That's how I can use my garden to connect with others too." (Dan Morrison)
- Provides a space for yourself (and kids) to learn about impermanence, patience, and change
- Provides a space for adults to learn, be challenged, and be creative – keep the mind active
- It's good work
- There is always more to learn, more to improve, and being "perfect" is just out of reach

A few participants also noted the stress that can arise from growing food and saving seeds. This could be due to the weather or your own mistakes. Gardeners know that this activity is a lot of work, sometimes they dread it, but once they have actually been IN the garden, they leave with feelings of being calm, happy, and content. They all still love it.

Physical Health

The following physical health themes emerged from both seed savers and non-seed savers:

- A source of daily movement for all participants (or at least multiple times/week)
- Springtime and harvest bring heavy labor
- Mid-Summer is not heavy labor, but participants complete daily walks, and may do some weeding, pruning, or watering which contributes to their movement and provides breaks from the computer
- A source of fresh and chemical-free food which improves the diet in the summer – but this healthier diet is also extended into the winter with a changed palate that enjoys vegetables.

It is notable that many participants took it upon themselves to point out that they enjoy adventuring outdoors in physical ways (hike, bike, camp, paddle, etc.), but there was a unique aspect to the act of gardening that provided something different in an outdoor space than those adventure activities.

7 - Resilience

Every participant demonstrated that they are resilient in their gardens by adapting, innovating, always learning, and/or sharing and collaborating with community. Resilience has been reported as an outcome of gardening activities which buffer the household from disturbances (Taylor and Taylor Lovell, 2014). This area of the research will be explored in greater detail for a scholarly publication, but a summary is provided here:

Adaptation Examples:

- Adapting to the field, land, and climate in your unique area
- Adapting to a changing climate
- Building greenhouses
- Starting seeds in winter
- Adapting to new pests (or returning pests)
- Crop rotation
- Developing supports for beets, carrots, and tomatoes
- Planting cover crops
- Changing irrigation approaches
- Building raised beds for aging bodies

- Hybrid version of square foot gardening
- Mulch choices
- Adapting an erosion control method to keep weeds out of garden

Innovation Examples:

- Human Resources management
- Trellis development
- Seed selection for northern climates (working on their own breeding programs or participating in seed trials)
- Using boulders in the garden to create microclimates for Zone 4 and 5 plants
- Building outdoor structures to support garden efforts
- Growing cucumbers vertically in greenhouse

Participants recognized that they were constantly learning as a gardener, in every aspect of gardening.

“Almost every week something comes up that I have to sort of “ok, get out the book, get out the phone, or whatever and take a picture, and use iNaturalist or see if you can figure out what the bug is” (Elise)

“Gardening is a big ol’ experiment to me” (Cat McFarlane)

“Everything we do is entirely based on innovation and adaptation”. (Marcelle Paulin)

Community Collaboration and Sharing was also noted as a way that participants learned and adapted. Their community was a source of knowledge, support, fun, and supplies. These social networks allowed gardeners to be more resilient in response to challenges because they had reliable resources to help them find a solution.

“Having a community to help solve, to come up with solutions, I think is really important... the collaboration among people is, you know, really helpful” (Katharine)

Superior Seed Producers Seed Production Considerations

One of the most important take-aways from these results is the number of people who increased their garden size in 2020. Participants gave no indication of returning to smaller sizes in the (near) future, which means that there will likely be increased demand for seed in the future among those who were already gardening pre-COVID but have now expanded. There remains much speculation about whether new gardeners will continue in 2021, but we think an increased demand for seed (compared to pre-

COVID) is a reasonable expectation given the expanded gardens that were created in 2020.

Roots to Harvest and Superior Seed Producers Programming Considerations

In this section we apply the results from the interviews to future programming possibilities. Based on increased sales of seeds in Thunder Bay (Anderson, 2020) and interview responses, there appears to be an increased interest in gardening and seed saving in the community this year. However, many food growers and beginner seed savers said their lack of SS knowledge was holding them back. This deskilling (or loss of skills) around seed saving was also recognized in British allotment gardeners as the result of seed catalogs being released, offering new varieties, and being perceived as trustworthy sources of information (Gilbert, 2013).

While many of the barriers to seed saving cannot be controlled or alleviated by Roots to Harvest or Superior Seed Producers (weather, pests, work schedules, limited space in gardens, etc.), it is well within Roots to Harvest and Superior Seed Producers abilities to improve education and correct misconceptions. We recommend taking advantage of the current enthusiasm and curiosity around seed saving to create programming around seed saving for the 2020-2021 fall/winter. The interest may fade if people feel unsupported and unsuccessful in 2020, but connections to the seed saving community, and opportunities to learn more and improve next year may convince more people to continue gardening and seed saving into next summer.

We have outlined many options here to provide choices to Roots to Harvest and Superior Seed Producers. These options fall under five categories: 1) general framing; 2) online resources; 3) in-person (or zoom) educational opportunities; 4) increased ease of access to local seeds, and 5) increased access to tools. Pursuing all of these is by no means needed, but I hope the development of any programming or resources can be informed by these results.

1. We recommend that Roots to Harvest and Superior Seed Producers consider how future workshops, resources, and conversations around seed saving address any (mis)conceptions that people have. The annual timing of seed saving activities, the amount of work needed, and the required space and tools were often unknown. Further, participants did not have the time or social network to learn about it. Sharing basic information around seed saving could demystify it and open gardeners to the possibility of starting.

2. Additionally, programming that provides tips for working seed saving into a busy life will be appreciated by those with many responsibilities and demands on their time. This

could include garden planning and timing, which seeds are the easiest to save, and how seeds can be stored to save space and time.

3. Programming should regularly consider our local northern context and short growing season. Participants noted that books and the internet only offer so much information (and are often by authors in warmer places). The ability for Roots to Harvest and Superior Seed Producers to make seed saving information contextualized and place-based will bring real value to their events and resources.

4. We recommend taking advantage of the current enthusiasm around seed saving by creating a Seed Saving Winter Webinar series. This could continue to keep folks interested in food growing and seed saving during the winter, help them feel prepared to pursue it in 2021, and increase their success in seed saving. It is important to note that zoom and hands-on learning are not necessarily mutually exclusive – intentional facilitation could allow various ways of learning. These are the four webinars I would consider hosting this winter, or in the future.

- a) “Basic Seed Saving” on the easiest and most popular options: tomatoes, peas, beans, cucumbers, squash, zucchini, and garlic
 - i) I would recommend pairing the seed saving technique for a popular plant with a less popular plant (when the techniques are similar). For example, a video or workshop about tomatoes could also include information about tomatillos.
- b) “Beyond the Basics” programming about seeds that only need one year to mature, commonly grown for food, but not commonly saved for seed (e.g. corn, peppers, herbs, arugula, spinach, garlic, and potatoes).
- c) “Biennials” programming about all biennials and overwintering techniques (e.g. carrots, rutabagas, radishes, beets, onions, brassicas, kale, chard, cabbages, and leeks).
- d) Planning your Garden Layout would offer an opportunity to suggest ways to layout a garden to maximize space and time for seed saving purposes. This could certainly be interactive where folks bring the dimensions of their garden with them and start thinking of ideas given their space and then pair up with another attendee.
- e) An alternative idea is structuring a series of meetings around the book “*How to Save Your Own Seeds*” (purchased by all participants, Seeds of Diversity Canada, \$15 each). Each meeting could discuss a designated number of plants that were pre-assigned to participants (who could read about it before the meeting). With this approach, I would recommend having one facilitator to organize the meeting logistics (in person or zoom) and having at least one advanced SS attend each meeting as a resource for answering questions. The advanced SS at each meeting could rotate.

5. Beyond this year, I would suggest continuing workshops of various types around seed saving (experts presenting, locals presenting, hands-on, garden tours) to reach new, beginner, and advanced SS. Opportunities to engage with the seed saving community in real time will be very important to certain seed savers.

6. Consider a seed saving mentorship program. I think a mentorship program could be very successful with relatively minimal facilitation. This could be piloted next year with one to two gardeners partnered with one Superior Seed Producers member. Gardeners could sign up in January (maximum 8 participants), they would be paired with an Superior Seed Producers member based on location to reduce driving times (subject to who signs up). The facilitator would schedule an initial meeting for January or February in a neutral location (perhaps Roots to Harvest, or on zoom as allowed) where these mini groups could meet each other and learn about each other's interests and gardening goals. Then the facilitator could encourage each group to arrange a time to do a garden tour in each location in the spring. From there, mentors and mentees could text or call each other when questions arise, but if a mentor or mentee wanted to arrange a group gathering in summer or fall, that is great. A final fall wrap up meeting in the fall could be simple but allow everyone to brainstorm about how to improve the program for next year.

7. We recommend that Roots to Harvest and Superior Seed Producers consider mechanisms for developing and expanding the local seed saving community. This might require a reflection on what it means to be part of Superior Seed Producers vs part of the seed saving community – and how “the non-Evalisa’s”, as one participant said, could participate (meaning non-experts). This community building could be paired with formal workshops and webinars, but there is a unique desire to have access to a community of seed savers where questions can be asked and answered without a formal gathering.

a) At the very least, I would consider creating a Facebook group about seed saving in Northwestern Ontario where questions can be asked and answered (much like the Thunder Bay Ag and Gardening FB group, but specific to saving seeds).

8. We recommend that Roots to Harvest and Superior Seed Producers consider the best way to share online or paper resources about seed saving *in our local context* - as resources about short growing seasons are extremely valuable according to participants. I have provided some options below, by no means are these all necessary.

- a) Both the Roots to Harvest and Superior Seed Producers websites promote the book “*How to Save Your Own Seeds*” by Seeds of Diversity Canada with direct hyperlink (\$15 including shipping) in place of creating their own content.
- b) Create handouts for different types of plants that are available online (and printable). Ideally would include an infographic and/or a checklist of basic information needed to grow seeds for that plant (which would basically be an adaptation of the SODC chart).
 - i) If pursuing this, start with the most popular plants
- c) Create videos (10 already exist) to be shared on Roots to Harvest and/or Superior Seed Producers websites that outline how to save seeds in this region.

- ii) If these videos already exist on the internet, they could simply be linked to the Roots to Harvest and Superior Seed Producers websites – perhaps with an annotation.

9. We recommend finding the best method for making local seeds available more than one day per year (Seedy Saturday changes or Seed Library-type access). Although Superior Seed Producers seeds may be available in other locations around town, that knowledge was not reaching the participants of the study (they assumed Seedy Saturday was the only option).

a) Seedy Saturday

- i. An immediate action could simply be raising awareness in new ways about the availability of Superior Seed Producers seed online or in certain stores.
- ii. Consider ways to broaden Seedy Saturday advertising. This is particularly important for new gardeners and New Canadians who 1) may not think about seed purchasing in February and 2) may not know Seedy Saturday exists.
- iii. If pursuing two Seedy Saturdays, hosting one in April or May for plants that can be directly sowed could be a successful way to connect with (new) gardeners getting a late start while still encouraging them to grow food (and seed) from local seeds. This second event would not need to have programming accompanying it.

b) Seed Library

- i. This suggestion would require the most resources but may have the greatest long-term gains (see below). A slightly more permanent seed library would need a location for storage and for sales and at least one staff member or volunteer to set up seeds, collect money, and update inventory. A governance structure to make decisions about policies and track funds could also be helpful.
- ii. In other cities, seed libraries have been housed in book libraries and that should be explored. Alternatively, Roots to Harvest could consider serving as the host. Options should be explored by Roots to Harvest and Superior Seed Producers, but at a minimum, there would be stackable containers (making them portable), which could be stored in X location, but then brought out and spread on tables for the open library hours.
- iii. Community seed banks can serve many functions including community-based management of agricultural genetic diversity, enhancement of seed access, seed availability, and associated knowledge, and promotion of seed and food sovereignty (Vernooy et al., 2014). Community seed banks can also be a key part of climate change adaptation (Vernooy et al., 2017). These functions of community seed banks interact with different goals of Roots to

Harvest, Superior Seed Producers, and the participants, and as such may be a worthwhile long-term project to pursue.

10. I recommend considering opportunities to increase access to seed cleaning knowledge and tools (and advertising this access). This could be through a seed cleaning event or a tool library – but either could help beginner seed savers develop and expand their seed saving efforts with support.

Programming Summary

In summary, there is a great amount of interest around seed saving in the Thunder Bay region, and interest in both growing food and seed saving has increased because of COVID-19. However, there are many misconceptions and lack of knowledge preventing people from saving seeds or saving them with confidence. This provides an opportunity for Roots to Harvest and Superior Seed Producers to develop programming for this year in anticipation of supporting gardeners through all of 2021 with seed saving in mind. In the previous sections I have outlined suggested methods for providing online resources, providing live workshops/webinars on various seed saving topics, facilitating a mentorship program, developing opportunities for seed savers to engage with one another and develop community and collaboration, and provide spaces for seed access and seed cleaning tools access.

Limitations of the Research

The most obvious limitation of this research is the lack of ethnic and gender presentation diversity among participants. This research provides a rather thorough understanding of what white female-presenting individuals are doing, and are interested in trying, around seed saving. However, it is lacking representation from BIPOC individuals and different gender presentations. This should be kept in mind when making programming decisions based on this report – these recommendations may be great for white female-presenting folks, but there is much diversity among gardeners in the Thunder Bay region, and other individuals may benefit from different programming, and that should be strongly considered – perhaps more can be learned by discussing this topic with community organizers engaged with these groups.

Future Research Directions

Should the qualitative research aspect continue, the researcher should use different recruitment methods to recruit and interview BIPOC individuals to see how they are engaging with seed saving. This could possibly include collaboration with the Indigenous Food Circle, the Multicultural Center, and/or Fort William First Nation gardens. Recruitment of couples who garden, or male gardeners could possibly provide

different insights. Interviews with new Canadians may also prove fruitful as these individuals may not be familiar with Seedy Saturday, Roots to Harvest, Superior Seed Producers, local varieties of produce, or how to grow in short growing seasons. There is some evidence that gardening can support cultural reproduction and be a positive support for immigrants, but this has not been explored in the literature in a meaningful way (Taylor and Taylor Lovell, 2014). Many opportunities exist for expanding this work in the future.

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Seed Saving, Seed Security, and Seed Sovereignty Literature

Prepared by Rachel Portinga

This list of literature was created with Roots to Harvest staff and Superior Seed Producer members in mind. The literature at the beginning of the list is largely focused on the Global North, and some additional articles about the Global South are in the last category. While these are sorted by category, some of them could easily be cross-referenced in other categories.

Home Gardening

Gilbert, P. R. (2013). Deskillling, agrodiversity, and the seed trade: a view from contemporary British allotments. *Agriculture and Human Values*, 30, 101-114.

This article was very focused on allotment gardening in the UK. It specifically makes the argument that while there are a lot of avid gardeners, they do not save seed, and because of seed companies existing and promoting their catalogs, and UK gardeners only growing for food and not seed (and they have delegated the process of gene flow management to professional breeders and salespeople) UK allotment gardeners have lost the skill of seed saving (deskilling). Many of the gardeners trusted commercial seed more than their own saved seed. Gardeners like to try new varieties and catalogs provide that. Gardeners follow the recommendations of seed catalogs more than recommendations of other growers. "Constant release of new varieties conceals the ever-narrowing genetic base from which cultivars are bred".

Veteto. (2008). The history and survival of traditional heirloom vegetable varieties in the southern Appalachian Mountains of western North Carolina.

Provides big history of Appalachian farming, interviewed people in a few counties about the heirloom varieties they still grow. Found that people generally save the seeds that are easiest and culinarily important, there have been a number of seeds lost because no one saves them anymore, developed a classification of heirloom varieties in that region (and only mentioned here, the author created a seed bank/registry of the various varieties he learned about in interviews). The most seed saving activities were occurring in the 40-49 age range. Could be a helpful article if Roots to Harvest or Superior Seed Producers wanted to also create a registry of sorts.

Taylor, J. R. and Taylor Lovell, S. 2014. Urban home food gardens in the Global North: research traditions and future directions. *Agriculture and Human Values* 31, 285-305.

Identifies a lack of literature on urban home food gardens in the global north (they found only five articles in a 2014 search). Gardens are on a public-private continuum and are influenced by historical (and current) marginalization and exclusion. They used three theories to explore this in Illinois and have seven properties or effects of a garden: food security and access, resistance and empowerment, community development, social and cultural reproduction, biodiversity and other ecological properties, agrobiodiversity, and resilience. They make a big call for additional research on home gardening in the Global North.

White, M. M. 2018. Sisters of the Soil: Urban Gardening as Resistance in Detroit. *Race/Ethnicity: Multidisciplinary Global Contexts*, 5(1), 13-28.

May be very applicable to some of the work Roots to Harvest is doing. This article focuses on a community garden in Detroit, MI serving Black women who are active in urban agriculture resurgence. Detroit is known for social and economic ills, which may make it interesting to read about as a larger city with some similar concerns as Thunder Bay. The author uses ecofeminism as a theoretical framework for the article. She also identifies that the women expressed farming as resistance, self-determination, and safe spaces for women in the community.

Schupp, J. L. and Sharp, J. S. 2012. *Exploring the social bases of home gardening. Agriculture and Human Values*, 29, 93-105.

Used the Ohio Survey of Food, Agriculture, and Environmental Issues to look at gardening trends along urban/rural continuum, socioeconomic status, and house style. There is also some history of gardening in Ohio noting the drastic change in the 1920's where it fell off in only one generation, the role of WWI, the Great Depression, and WWII. They found that today, gardening is not associated with rural, suburban, or urban settings, but having a free-standing home, a farm, or being in the countryside were associated with having a garden. Economic hardship was associated with have a garden, and participation in the local food system and activities was also associated with having a garden. Calls for using qualitative research about sustainable ag or food security on home gardeners.

Climate Change

Bulla, B. and Steelman, T. 2016. Farming through change: using photovoice to explore climate change on small family farms. *Agroecology and Sustainable Food Systems*, 40(10), 1106- 1132.

Used photovoice and focus group meetings with farmers in North Carolina to see how they perceived climate change. The emerging categories were: observed changes in rainfall, pests, invasive species, using adaptive behaviors to deal with climate change (diversity in field, innovation in field, traditional strategies to protect crops, collective strategies, sequence strategies, recognition strategies,

and resilience behaviors (biotic, intrapersonal, and interpersonal). Farmers saw their livelihoods being reliant on creativity.

Chiefari, S. M., Gravely, E., and Rabinowicz, J., and Mantha, E. 2017. Breakfast in 2040: Imagining and understanding how and why our food system will change. *Alternatives Journal*, 43(2), 24-29.

The stories at the beginning and the end are particularly powerful and worth reading – could be used in future trainings or resources. This is a short but powerful general population “magazine” article about the impacts of climate change on the Canadian food system by imagining what life (and breakfast) will look like in 2040. There is reference to a lack of maple syrup (because the maples died) and coffee (because it’s too expensive). The beginning and end follow an aunt and nephew preparing their meal as a story. The two middle sections provide factual information about climate change, food production, and saving seeds.

Vernooy, R., Sthapit, B., Otieno, G., Shretha, P., and Gupta, A. 2017. The roles of community seed banks in climate change adaptation. *Development in Practice*, 27(3), 316-327.

This article is a really rich source of information about how community seed banks help with climate change adaptation through (conservation, access and availability of locally adapted seeds, and seed and food sovereignty work) in the Global South. It provides some functions and activities of community seed banks, and then provides three examples from Bhutan, Brazil, South Africa, Uganda, a multi-country example, Nepal, Central America, and Mexico. Although it is based in the Global South it is worth the read to consider the various ways community seed banks could help with climate change adaptation in the Global North (which is not really discussed in the literature so far). There ARE many community seed banks in existence, policy that is forward-thinking does exist, we need to make sure future seed banks in the LSLLN (or anywhere) has a strong foundation when it starts to promote longevity. This paper is critical for connecting seed systems work to climate change work.

Community Seed Banks/Seed Libraries/ Seed Systems

Helicke, N. A. 2015. Seed Exchanges networks and food system resilience in the United States. *Journal of Environmental Studies and Sciences*, 5, 636-649.

I think parts of this paper are very applicable to Superior Seed Producers and Roots to Harvest future plans around a seed library or improving Seedy Saturday. This paper explores the seed exchange networks in the US, looking at small formal and informal options and how they can interact through networks with participatory breeding programs, and other international breeding efforts. There is a section about seed libraries reviving seed exchange at the grassroots

level. Then there is some information about the role of seed companies and civil society models and building financial and social sustainability for seed exchanges. There are some specific examples from the US. They point out that seed exchanges bring the problems of the seed industry to light for the public.

Coomes, O. T., McGuire, S. J., Garine, E., Caillon, S., McKey, D., Demeulenaere, E., Jarvis, D., Aistara, G., Barnaud, A., Clouvel, P., Emperaire, L., Louafi, S, Mertin, P., Massol, F., Pautasso, M., and Violon, C. 2015. Farmer seed networks make a limited contribution to agriculture? Four common misconceptions. *Food Policy*, 56, 41-50.

This is an article that was written as the result of a conference where many people working in the field came together to correct four misconceptions they saw as prevalent in the world of farmer seed networks (primarily in the Global South, but also in Europe). The four misconceptions are: Farmer networks are inefficient for seed dissemination, seed networks are closed, conservative systems, farmer networks ensure ready, egalitarian access to seed, and farmer seed networks are destined to weaken and disappear. Ultimately, they make the argument that farmer seed networks are flawed, but they provide necessary access in many places where conventional seed is unavailable or unaffordable.

Phillips. C. 2008. Canada's Evolving Seed Regime: Relations of Industry, State, and Seed Savers. *Environments Journal*, 36(1), 5-18.

This article describes in some detail the specifics of Canadian seed policy, the role of industry in developing that policy, and the role public initiatives on seed saving. It is useful for policy information and seeing how industry is entangled with the policy decisions.

Soleri, D. 2018. Civic seeds: new institutions for seed systems and communities – a 2016 survey of California seed libraries. *Agriculture and Human Values*, 35, 331-347.

This would be a good place to look for examples of specific options for a library such as hours, being in a book library, where to host the library, models of returning seeds, and barriers to returning seed, etc. This article looks at all the seed libraries in California and then describes their functions and different operations styles. She compares the movement of genetic material compared to a formal seed system and commercial seed. Then she describes the various locations and operating practices of these seed libraries.

Vernooy, R., Sthapit, B., Galluzzi, G., Shrestha, P. 2014. The multiple functions and services of community seedbanks. *Resources* 3, 636-656.

This is an extremely helpful article to read when new to the conversation/literature around community seed banks (CSB). It outlines their

origins, the evolution over time in both the Global North and the Global South, and then dives into the three major functions/services of CSB (conservation, access and availability, seed and food sovereignty) with descriptions and a case study for each. It also discusses the funding and sustainability of CSB which is a key item to all of them. They also discuss the challenges of upscaling a CSBs and legal and policy details.

Windfeldt, L., & Madsen, L. M. (2018). Communicating plant genetic resources for food and agriculture to the public—A study of grant-receivers with demonstration-projects in the Danish Rural Development Programme. *Land Use Policy*, 77, 512–523. <https://doi.org/10.1016/j.landusepol.2018.04.025>

Interesting concepts around rural development programs and requiring communication with the grants. Some creative ways of communicating provided - could be interesting for SSP, R2H, and LSLLN. There are some ideas embedded in the text about how to disseminate seed information - and they have 900 members in their seed network. Nation-wide I think? How do you make that happen?

Seed Sovereignty

Breen, S. 2015. Saving seeds: The Svalbard global seed vault, Native American seed savers, and problems of property. *Journal of Agriculture, Food Systems, and Community Development*, 5(2), 39-52.

This article compares ex situ conservation through seed vaults and in situ conservation through seed growing and sharing within Native American communities specifically. Folks who are engaged with one form are often untrusting of the other, with Native Americans often feeling that giving seeds to a seed vault causes the loss of ownership and access to those seeds. On the flip side, in situ conservation is seen as having a higher likelihood that seeds will be lost as “protection” of the seeds is not provided by concrete and locks. Three different Native American seed projects in the current United States are described. The understand among Native Americans that seeds are living means they should not be locked away in a vault. Conclusion that seed sovereignty is needed for food sovereignty and ideas around ownership and property are essential to understanding the different approaches.

Wincott, A. 2018. Treasure in the vault: the guardianship of “heritage” seeds, fruit, and vegetables. *International Journal of Cultural Studies*, 21(6), 627-642.

This article dives into the discourse around seed saving and how the term “treasure” is used to evoke feelings of something worth keeping secure and protected. However, this metaphor can actually work against the maintenance of diversity because the seeds are taken out of their native environment to be placed in a vault where they are inaccessible to those who wish to grow them.

Nittle, N. 2020. Feeding an Indigenous community and rematriating seeds in Minneapolis. Civil Eats. <https://civileats.com/2020/06/09/feeding-an-indigenous-community-and-rematriating-seeds-in-minneapolis/>.

This is an online article about a seed rematriation project in Minneapolis. Definitely worth a read to learn about what our geographic neighbors are working on around seed sovereignty.

Hanson Harrison. M. 2018. Sisters! Keep the seeds in your hands: From West Africa to the US Heartland. Commentary. *Peace and Freedom*, 1.

This is a one-page piece that is critical of corporations and capitalism destroying life for peasant farmers, and identifying women, particularly the elders as the guardians of life – of seeds. A call for radical transformation and decolonizing the food system. It appears to be an introduction to a journal but is nonetheless inspiring.

Kloppenburg, J. 2010. Impeding dispossession, enabling repossession: biological open source and the recovery of seed sovereignty. *Journal of Agrarian Change*, 10(3), 367-388.

This paper introduces the idea of applying open source software legal frameworks to seeds – and the Open Source Seed Initiative (OSSI) that grew out of this effort. Some good background on intellectual Property Rights and the different laws that influence (limit) seed access and seed sovereignty.

Kloppenburg, J. (2014). Re-purposing the master's tools: The open source seed initiative and the struggle for seed sovereignty. *Journal of Peasant Studies*, 41(6), 1225–1246.

This paper follows up on the Open Source Seed Initiative (OSSI) creation and the challenges it faces. This is also a key paper for an attempted definition of seed sovereignty and discusses it at length by discussing the concepts of seed freedom and food sovereignty within Navdanya and La Via Campesina.

Food Sovereignty

Grey, S. and Newman, L. 2018. Beyond culinary colonialism: Indigenous food sovereignty liberal multiculturalism, and the control of gastronomic capital. *Agriculture and Human Values*, 35, 717-730.

This article is not related to seeds but presents a very interesting argument about the role of colonialism on gastronomy and also how multiculturalism is in fact harmful to gastronomy and food sovereignty. There is an example from Peru and another example from Canada (Salmon on the West Coast). This article

challenged me to think in new ways, looks into Indigenous cuisine and its absence from the Canadian culinary landscape. It argues for the withholding of Indigenous foods from the market system as an act of Indigenous food sovereignty. It's worth the read

Ritchie, I. 2016. Food Sovereignty in Whaingaroa: Perspectives of food providers in a small, coastal New Zealand Township. *Anthropological Forum*, 26(3), 289-300.

This article discusses the local food system around Whaingaroa, New Zealand and how the people in that system are ultimately using food sovereignty concepts to guide their decision-making and prioritization, but they did not name food sovereignty. They used interviews, very interesting to see perspectives from a small coastal town with a local food system, but very little connection to seeds.

Meek, D. and Tarlau, R. 2016. Critical food systems education (CFSE): educating for food sovereignty. *Agroecology and Sustainable Food Systems*, 40(3), 237-260.

This paper proposes Critical Food Systems Education as a framework developed by the authors, discuss it in detail, and then use an example of a seed bank at IFPA-CRMB (part of Brazilian landless workers' movement = MST) to illustrate what this framework can look like in practice

Participatory Plant Breeding

Healy, G. K. and Dawson, J. C. 2019. Participatory plant breeding and social change in the Midwestern United States perspectives from the Seed to Kitchen Collaborative. *Agriculture and Human Values* 36, 879-889.

A practical example of variety breeding in a regional context with relationships with farmers, researchers, chefs, and the community (and in WI - relatively close when we consider the whole world). Very relevant - the role of a university in participatory plant breeding programs, the community-campus relationships, and questioning the open source seed initiative approach.

Lyon, A., Silva, E., Zystro, J., Bell, M. 2015. Seed and plant breeding for Wisconsin's organic vegetable sector: understanding farmer's needs. *Agroecology and Sustainable Food Systems*, 39, 601-624.

A good article to read about plant breeding program in a geographically close region. Did a survey of organic farmers in WI about their needs and interests. There were similarities in interests of the farmers in developing seeds specific to their region, especially tomatoes and melons

Dawson, J. C. and Goldberger, J. R. 2008. Assessing farmer interest in participatory plant breeding: Who wants to work with scientists. *Renewable Agriculture and Food Systems*, 23(3), 177-187.

This was a survey to determine if wheat farmers in Washington state would like to be involved in Participatory plant breeding projects connected to Washington University, which inherently include seeds. There was good support, and different factors influenced which groups of people may be more interested – one major (surprising) conclusion is that farmers of all sizes may be interested in PPB.

Uncategorized (green citizenship, social enterprise, policy)

Phillips, C. 2005. Cultivating Practices: Saving Seed as Green Citizenship? *Environments Journal*, 33(3), 37-49.

This article briefly describes how seed savers are often forming networks and not just saving seeds for future food production, but as a form of green citizenship. The remainder of the paper dives into the different ways seed savers do, or don't, match their activities to the model of Stewardship as Green Citizenship and Eco-Deliberation as Green Citizenship. Ultimately, the important conclusion she reaches is that seed savers are engaging in political behaviour, but it isn't recognized as such because it doesn't involve loud public debate.

Johanisova, N., Crabtree, T., & Fraňková, E. (2013). Social enterprises and non-market capitals: A path to degrowth? *Degrowth: From Theory to Practice*, 38, 7–16. <https://doi.org/10.1016/j.jclepro.2012.01.004>

Very interesting to consider the economic perspectives of social enterprises and what an alternative to our current dominant reality could be. To reach a sustainable degrowth economy [needed to support the planet and people on it from not being polluted and killed], the authors say "We suggest that community land trusts, credit unions, co-operative umbrella groups and village seed banks are all instances of institutions safeguarding non-market capital." (p. 15)

Haylock, K. and Connelly, S. 2018. Examining the Insider/Outsider dimensions of local food system planning: cases from Dunedin and Christchurch New Zealand. *Planning, Practice, and Research*, 33(5), 540-557.

Authors looked at Food System Planning at the local level – wanting to bridge insider and outsider (to city council) strategies. Used two case studies in New Zealand with 21 interviews and they summarize the pros and cons to working with city council vs. outside city council. This may be more applicable for the Thunder Bay and Area Food Strategy.

Carpenter, S., Walker, B., Anderies, J. M., Abel, N. 2001. From Metaphor to measurement: resilience of what to what? *Ecosystems*, 4(8), 765-781.

Very theoretical. Good for writing article on resilience, generally not of interest to Superior Seed Producers or Roots to Harvest.

Global South

Seed Sovereignty

Duthie-Kannikkatt, K., Shukla, S., Rao, S. M. L., Sakkhari, K., & Pachari, D. (2019). Sowing the seeds of resilience: A case study of community-based Indigenous seed conservation from Andhra Pradesh, India. *Local Environment*, 24(9), 843–860. <https://doi.org/10.1080/13549839.2019.1652800>

I think Roots to Harvest would find this really interesting from the perspective of being an organization that supports Indigenous Food Systems. It's in India, but a lot of the context (remote Indigenous populations are similar, although the percent of farmers is probably different)

Garcia Lopez et al. 2019. Seed sovereignty and agroecological scaling: two cases of seed recovery, conservation, and defense in Colombia.

Reviews two case studies of community seed banks in Colombia – and their connection to Indigenous governance and people. Agroecological scaling is considered and “seed custodians” and seed advocacy are common phrases to explain this work. Multiple efforts to promote seed sovereignty are discussed.

Peschard, K., & Randeria, S. (2020). ‘Keeping seeds in our hands’: The rise of seed activism. *Journal of Peasant Studies*, 47(4), 613–647. <https://doi.org/10.1080/03066150.2020.1753705>

Excellent base of knowledge for seed activism as it relates to intellectual property rights and global movements (and national movements)

Women and Seeds

Patnaik, Ruivenkamp, and Jongerden. 2017. Marginalized community, space of commons and autonomy: the case of the Deccan development society of South India.

Paper shares details about a successful seed bank in India – hosted and run by a marginalized group of women (by caste and gender). It discusses the importance of social relations in the community seed bank and how it influences self-reliance and collective resistance.

Seed Systems

Leunufna, S., & Evans, M. (2014). Ensuring food security in the small islands of Maluku: A community genebank approach. *Journal of Marine and Island Cultures*, 3(2), 125–133. <https://doi.org/10.1016/j.imic.2014.11.001>

Possibly R2H or IFC - if we think of the Reserves as "islands" in the way Maluku is made up of many islands in the Pacific (especially the fly in only, remote reserves), the same arguments could be applied here. Even Thunder Bay could be considered "remote" when we think about the transportation delays in delivering food

Not Yet Reviewed, but Look Promising

Kloppenburg, J. R. 1988. *First the Seed: The political economy of plant biotechnology 1492 – 2000*. Cambridge University Press. Cambridge.

Demeulenaere, E. 2014. A political ontology of seeds: the transformative frictions of a farmer's movement in Europe. *Journal of Global and Historical Anthropology*, 69, 45-61.

Mendum, R. and Glenna, L. L. 2010. Socioeconomic obstacles to establishing a participatory plant breeding program for organic growers in the United States. *Sustainability*, 2, 73-91.

Grey, S. and Patel, R. 2015. Food sovereignty as decolonization: some contributions from Indigenous movements to food system and development politics. *Agriculture and Human Values*, 32, 431-444.

Raster, A. and Gish Hill, C. 2017. The dispute over wild rice: an investigation of treaty agreements and Ojibwe food sovereignty. *Agriculture and Human Values*, 34, 267-281.

Aistara. 2014. Latvia's tomato rebellion: Nested environmental justice and returning eco-sociality in the post-socialist EU countryside. *Journal of Baltic Studies*. 45(1), 105-130.

Anderson, C. R., Maughan, C., Pimbert, M. P. 2019. Transformative agroecology learning in Europe: building consciousness, skills, and collective capacity for food sovereignty. *Agriculture and Human Values*, 36, 531-547.

Reuter. 2017. Seeds of life, seed of hunger. Corporate agendas, agricultural development policy, and the struggle for seed sovereignty (East Timor, Indonesia).

Jyoti Dutta and Thaker. 2019. "Communication Sovereignty" as resistance: strategies adopted by women farmers amid the agrarian crisis in India.

Bezner Kerr. 2013. Seed Struggles and food sovereignty in Northern Malawi.

De Boef, W. S., Dempewolf, H., Byakweli, J. M., Engels, J. M. M. 2010. Integrating genetic resource conservation and sustainable development into strategies to increase the robustness of seed systems. *Journal of Sustainable Agriculture*, 34, 504-531.

Sisay et al. 2017. Seed producer cooperatives in the Ethiopian seed sector and their role in seed supply improvement: a review.

Montufar and Ayala. 2019. Perceptions of agrodiversity and seed-saving practices in the northern Andes of Ecuador.

Kumbamu. 2018. Building sustainable social and solidarity economies: place-based and network-based strategies of alternative development organizations in India.

Manzanilla and Johnson. 2012. Seeds of Life in Nepal (newspaper article?)

Lopes et al. 2015. Harnessing social capital for maize seed diffusion in Timor-Leste.

Kansiime and Mastenbroek. 2016. Enhancing resilience of farmer seed system to climate induced stresses: insights from a case study in West Nile region.