

# Kwantlen Polytechnic University

Department of Sustainable  
Agriculture and Food Systems

ANNUAL REPORT(2020)

City of Richmond Department of Parks, Recreation,  
and Cultural Services Committee

March, 2021



# Introduction

KPU has now completed three growing seasons on the Garden City Lands. We are excited to share our progress since our last report in the spring of 2019. Highlights include a new irrigation system, a produce washing station, and the addition of three sliding high tunnels for season extension. In 2020 we harvested 15 tons of produce from the site, with a retail value of more than \$75,000. This was sold at Tuesday afternoon farmers markets across from City Hall, or donated to the Richmond Food Bank. Our capacity to scale up is limited only by labour.

Our organic transition is almost complete, and we expect to begin offering certified organic produce from the site when the market opens in 2021.

We have risen to several unexpected challenges brought on by the global pandemic. Students were not allowed to come to the site between mid-March and mid-June.

The applied learning course that normally runs through the summer semester had to be cancelled. Our in-person outreach has been curtailed, but we continue to engage with our community in many creative ways.

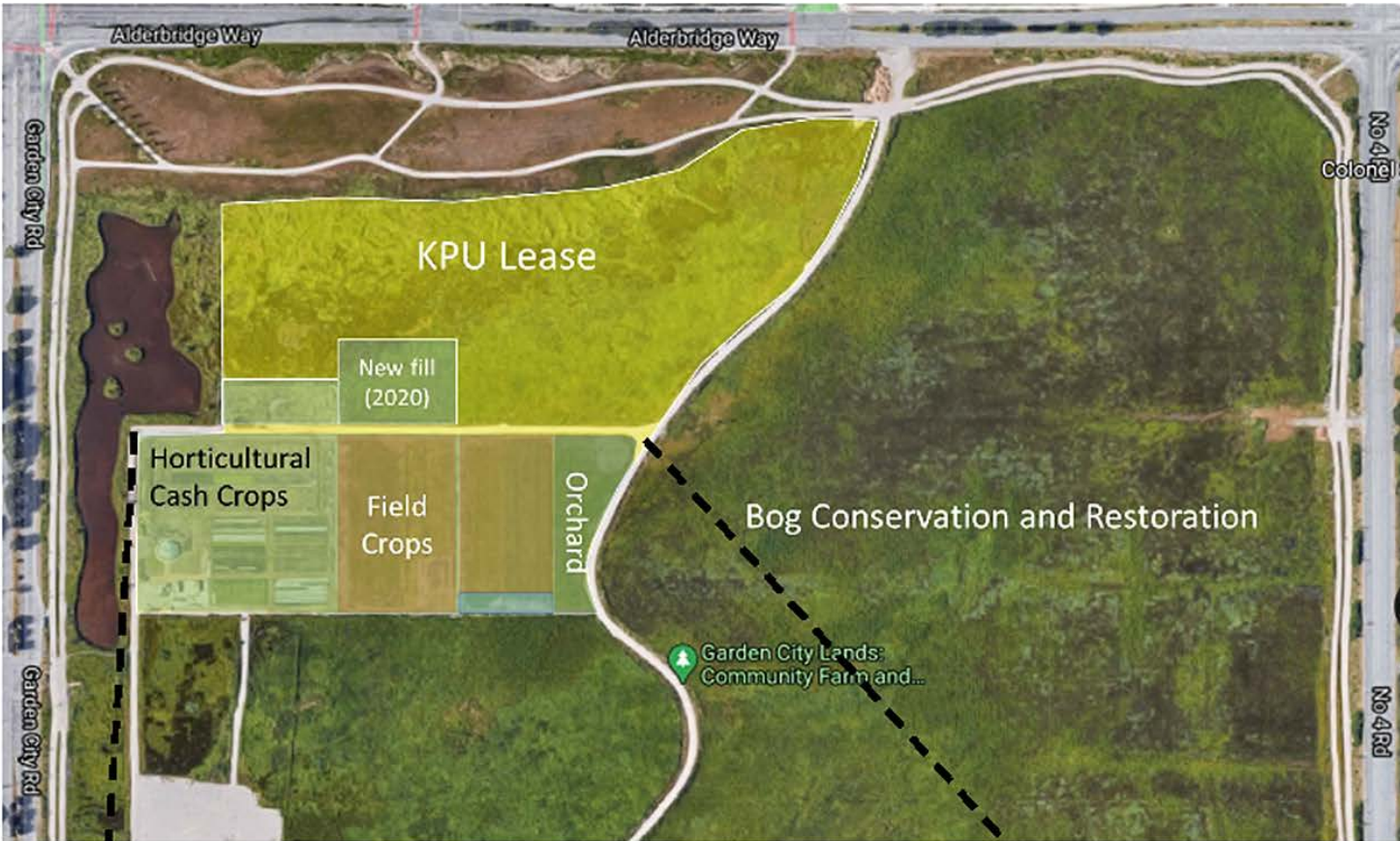
We were pleased to welcome students back to the farm for in-person experiential learning in the fall semester of 2020 and again in the spring semester of 2021. All of us are hoping for a return to normal in 2021.



Socially-distanced instruction, November 2020.



# Farm Maps—2020



# Pandemic Response

The 2020 growing season was shaped by the global pandemic. Our students started crop planning and transplant production in January and February, but KPU took all classes online in March. The university prohibited students from coming to the farm for in-person classes. Our summer experiential learning course at the Garden City Lands had to be cancelled. Only essential employees were allowed at the site.

We abruptly revised our cropping plans to eliminate the most labour-intensive perishable crops, like tomatoes and green beans, and expand production of lower-labour storage crops, like cabbage, potatoes, and winter squash. Our plans to sell produce to KPU Food Services were scuttled as the campus cafeterias shut down. The campus pop-up markets that had been successful in 2019 were impossible in 2020. In the early days of the pandemic, we weren't even sure if our farmers market would be allowed to run. We were relieved with the province declared farmers markets an essential service, and the City found a new spot for us in the lacrosse court across from City Hall. From mid-May to mid-December, the market ran every Tuesday afternoon with face masks, physical distancing, and a limit of 50 people on the site at once.

We were able to carry on with a farm manager, two faculty, and three hired students. The third full-time faculty member in our department returned to his home in Mexico at the end of spring, and we began a search for his replacement. We were fortunate to hire Dr. Alex Lyon, who brings her expertise in participatory plant breeding from the UBC Centre for Sustainable Food Systems, where she has worked since 2015. She began work with our department just before Dr. Rebecca Harbut, our past Chair, left for a year of study leave in Sweden.

Gradually, we were allowed to bring students back to the farm. Several students conducted individual field research projects at the Garden City Lands over the summer, and we were granted permission to resume in-person outdoor teaching at the farm in the fall semester. We had a small class of students who were thrilled to get their hands dirty again, and to interact with our dedicated customers at market.



Student workers prepare for the first farmers market of the pandemic, May 17, 2020.



Faculty record a video message of congratulations to graduating students, June 4, 2020.



Farmers market designed for distancing on the lacrosse court across from City Hall, July 28, 2020.

# Soil Management

## Site Preparation

In 2017, clean sandy-clay loam sourced from Sea Island (YVR) was layered over 3 ha (7.5 ac) of native peat soil in the southern portion of the leased property. The strategy was necessary to address contamination concerns, but had the added benefit of conserving carbon long sequestered in the underlying peat. The mineral soil was amended with organic poultry manure (Rabbit River Farms), municipal compost (Net Zero Waste), and clean Lulu Island peat rescued from building sites. Soil-building cover crops, including tillage radish sorghum-sudangrass, and grass-legume mixes were planted to add soil organic matter and fix biological nitrogen.

Tile drains were laid 65 cm below the soil surface at 10 m spacing to remove excess water from the mineral soil layer without drying the underlying peat. Drains feed into a header drain that runs along the southern boundary of the leased area, and carries drainage water to the pond west of the leased area.

In 2020, clean sandy soil sourced from a renovated playing field was layered over a 0.3 ha (0.75 ac) area in the northern portion of the leased property. This brings the filled area north of the service road to 0.5 ha (1.2 ac). Another 4.5 ha (11 ac) has yet to be filled.

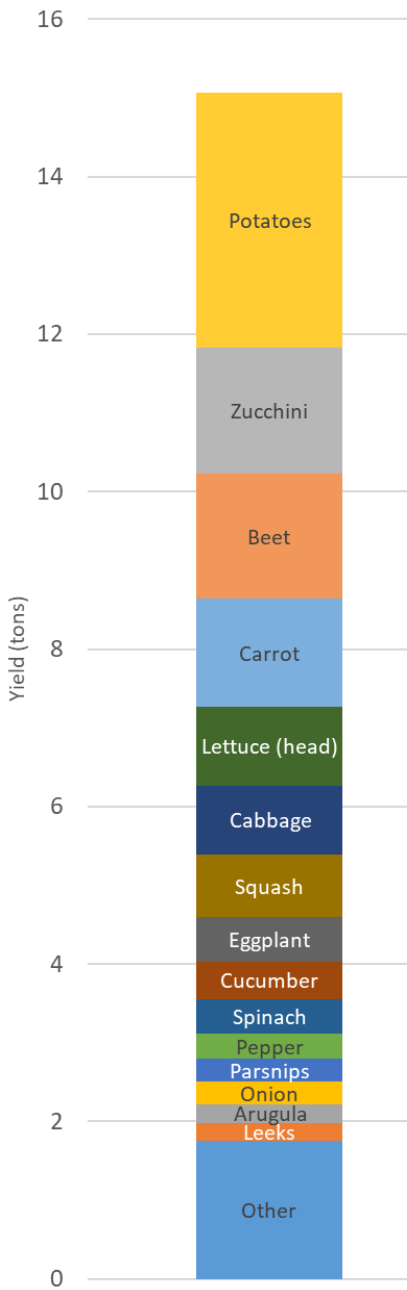
The newly deposited soil is being amended with municipal compost and cover cropped to add organic matter and nitrogen.

Amending freshly deposited soil with compost gives a KPU student tractor-driving practice, September 2020.



# Crop Production

## Crop Yield (tons)



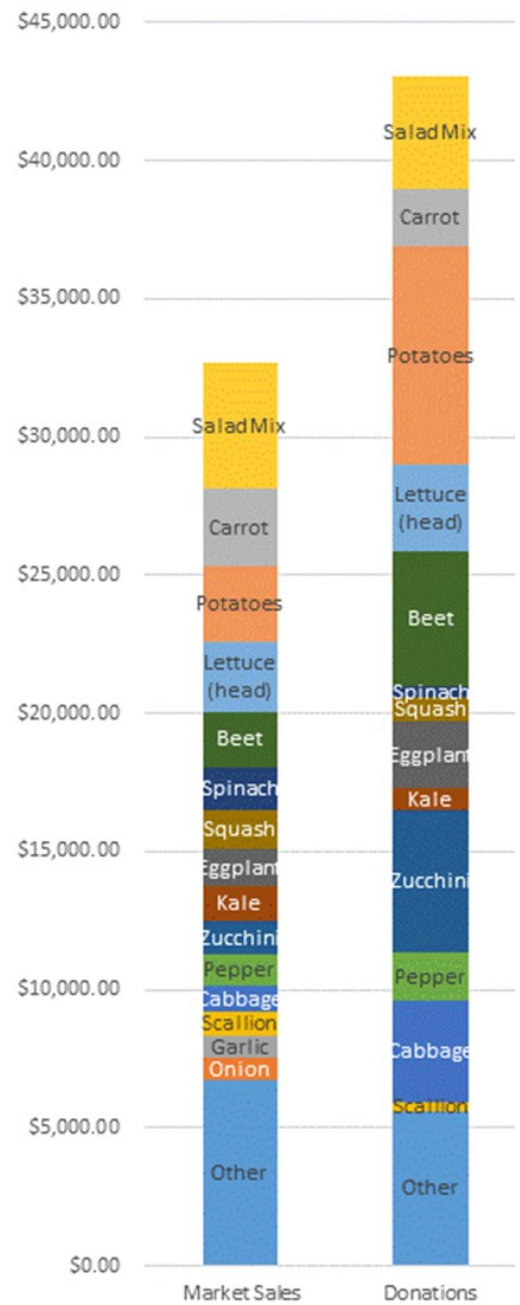
Thirty-three different crops were grown in 2020, yielding more than 15 tons of marketable produce (left).

Farmers market sales exceeded \$33,000. More than \$43,000 worth of produce was donated (right).

The Richmond Food Bank received most of the donations. Smaller donations went to the Sustainable Agriculture Students Association and Odd Squad Productions.



## Crop Value (\$ retail)



# Infrastructure

## Drainage

Tile drains were laid 65 cm below the soil surface at 10 m spacing to remove excess water from the mineral soil layer without drying the underlying peat. Drains feed into a header drain that runs along the southern boundary of the leased area, and carries drainage water to the pond west of the leased area.



Drain tile installation, June 2018

## Irrigation

Permanent irrigation lines were buried in July, 2020. Lines run along the southern edge of the property, with pop-up faucets providing easy access to irrigation water in all fields. Separate lines serve the solar greenhouse, the moveable high tunnels, and the market garden plots. Each line can be controlled independently and the solar greenhouse now has year-round access to irrigation.



Irrigation line installation, July 2020

## Solar Growing Dome

The solar dome greenhouse was built in October, 2018. Its primary purpose is early production of spring vegetable transplants while avoiding the greenhouse gas emissions normally associated with greenhouse heating systems. It has remained frost free during the winters of 2018-19, 2019-20, and 2020-21, providing a stable environment for transplant production to begin in late January or early February. It also demonstrates various low-input solar heating and cooling techniques.



Seeding transplants with snow on the dome, Feb. 4, 2020



Transplants in the dome, ready for the field, Apr. 1, 2020

# Infrastructure

## Moveable High Tunnels

Three 9 x 21 m (30 x 70 ft.) moveable high tunnels have been constructed at the farm. These are passively-heated plastic-covered hoop structures that harness the energy of the sun to extend the growing season for soil-based crop production. They are securely attached to steel tracks, each anchored by six one-ton concrete blocks. A tunnel can be detached, rolled to a different position, and reattached to its tracks. Moving the tunnels facilitates crop rotation, prevents salt accumulation by exposing previously covered areas to rainfall, and reduces soil-borne disease incidence.



Interior of High Tunnel A, Dec. 12, 2020

The tunnel side walls and end vents automatically open and close to allow passive ventilation and stabilize internal temperatures. Automation is driven by electric motors and controlled by a computer attached to environmental sensors. The system is powered by photovoltaic panels, allowing the tunnels to operate without any connection to the electrical grid.

The three tunnels were constructed in phases, as outlined in the table below.

	High Tunnel A (North)	High Tunnel B	High Tunnel C (South)
Spring 2019		<ul style="list-style-type: none"> <li>Track laid</li> <li>Hoops built</li> </ul>	
Summer 2019		<ul style="list-style-type: none"> <li>Planted to tomatoes</li> <li>Tomato harvest</li> </ul>	
Fall 2019	<ul style="list-style-type: none"> <li>Anchor blocks buried</li> <li>Track laid</li> <li>Hoops built</li> </ul>	<ul style="list-style-type: none"> <li>Anchor blocks buried</li> <li>Moved to cool-season root plot (carrots, beets)</li> <li>Covered with plastic</li> </ul>	<ul style="list-style-type: none"> <li>Anchor blocks buried</li> <li>Track laid</li> <li>Hoops built</li> </ul>
Winter '19-'20		<ul style="list-style-type: none"> <li>Carrot &amp; beet harvest</li> </ul>	
Spring 2020		<ul style="list-style-type: none"> <li>Automated</li> <li>Planted to cool-season crops</li> <li>Moved to warm-season plot</li> <li>Planted to cucurbits</li> </ul>	<ul style="list-style-type: none"> <li>Covered with plastic</li> <li>Planted to solanums (pepper, eggplant)</li> </ul>
Summer 2020	<ul style="list-style-type: none"> <li>Covered with plastic</li> </ul>	<ul style="list-style-type: none"> <li>Cucurbit harvest</li> </ul>	<ul style="list-style-type: none"> <li>Automated</li> <li>Solanum harvest</li> </ul>
Fall 2020	<ul style="list-style-type: none"> <li>Automated</li> <li>Moved to cool-season greens plot (lettuce, spinach)</li> </ul>	<ul style="list-style-type: none"> <li>Moved to cool-season root plot (carrots, beets)</li> </ul>	<ul style="list-style-type: none"> <li>Moved to cool-season brassica plot (kale, mustard, arugula)</li> </ul>





KPU Farm at the Garden City Lands in summer, fall, and winter, 2020. Note changing positions of sliding high tunnels on left.

# Infrastructure

## Produce Washing Station

In the fall of 2019, a covered produce washing station was constructed between two shipping containers used for tool storage on the gravel pad at the farm's main entrance. A peaked canvas tent over the station provides year-round protection from sun and rain. The station has two wash lines, each consisting of three stainless steel sinks with stainless steel counters on either end. Concrete tiles along each wash line provide a mud-free surface for those washing produce.

Bins of freshly-harvested produce are placed on the counters north of the sinks for washing. After washing, the cleaned produce is placed in clean bins on the counters south of the sinks, where it can be weighed and transferred to the refrigerated trailer.



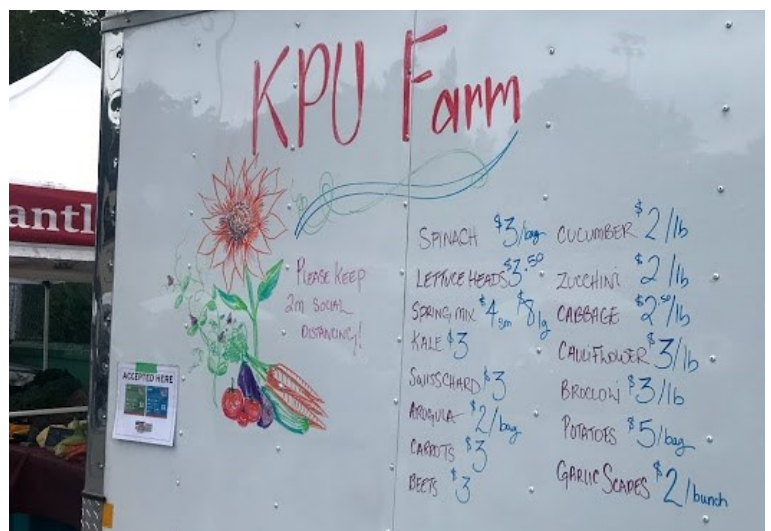
Washing and bagging salad mix, Oct. 2020

## Refrigerated Trailer

A lockable insulated box trailer with electric refrigeration was purchased in the spring of 2020. It is usually parked beside the tool shed south of the produce washing station, where it can be plugged in. Produce that has been washed and weighed is typically transferred to the trailer for short-term storage. The trailer can be disconnected from its power source and towed to market. The white metal sides of the trailer serve as a whiteboard for market price lists.



Refrigerated trailer parked on the farm to be easily accessible from the washing station.



Refrigerated trailer parked at market, where produce is unloaded and displayed. Market price lists are written on the walls.

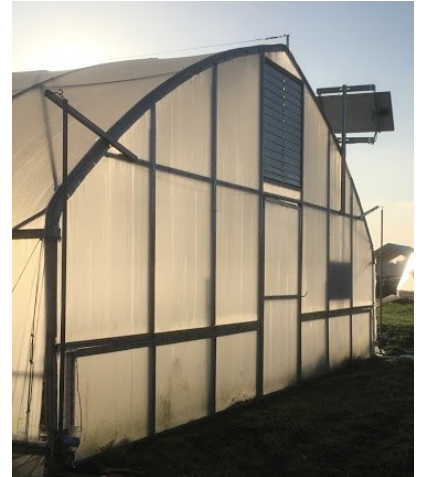
# Birds

## Promoting Biodiversity

The farm is managed to provide habitats for a diversity of bird species. Abundance and richness of birds is increasing at the site. Owl boxes and swallow houses have been installed along the farm edges, providing nesting sites for important predators. Hawks and eagles are frequently sighted.

## Protecting High Tunnels from Birds

Soon after the first high tunnel was covered in plastic, we found that large birds — crows, hawks, and the occasional eagle — liked to perch on the peak, and were piercing the plastic with their talons. The problem was solved by stringing a single wire about 15 cm above the peak of each tunnel.



A wire above the peak of each high tunnel discourages bird perching.



Canada geese grazing on winter cover crops, January 2020.

## Deterring Geese

The Garden City Lands are near the Vancouver International Airport (YVR), on a major flightpath. Representatives of YVR voiced concern that the green cover-cropped fields of the KPU farm could attract snow geese in winter, which could be hazardous to airplanes. Although snow geese have not been seen at the site, Canada geese sometimes graze there in winter and spring. Strings of reflective flags were hung across the fields in December, 2020, as a snow goose deterrent. So far, they seem to be deterring Canada geese too.



Strings of reflective flags erected to deter geese., December 2020.

# Community Engagement

## Farmers Market

Our program continues to sell our produce at a weekly Tuesday market (12-4 pm, April—December). This year the market was held in the lacrosse court in Brighthouse Park, across from City Hall. The new location allowed control over how many people were on the site at once.

The market was a particularly important connection with community members seeking fresh locally-grown produce in the pandemic. Demand was strong, and people were willing to line up to visit the stand one-by-one in order to maintain physical distancing. We developed a strong following of appreciative customers, facilitating many learning opportunities for both our students and community members.



Preparing for market with masks and distancing, May 2020.

## Informal Conversations with Neighbours

As the community is increasingly using the trials on the Garden City Lands, there have been many conversations with neighbours about what is happening on the farm. There is a great deal of interest in activities on the farm.

## Student Research Projects

Several students conducted experimental field studies in collaboration with community stakeholders at the Garden City Lands in 2020. These included a test of seaweed as a fertilizer for grapes, several tests of organic mushroom manure compost as a mulch for vegetable production, and a test of products being developed for organic growers by a company based in North Vancouver.



Setting up a student research project, April, 2020.

More information about this year's student research projects can be found at <https://www.kpu.ca/agriculture/student-research/2020>.



## **BC Seeds Gathering: Nov, 2019**

The biennial BC Seeds Gathering is held at KPU's Richmond campus, next to the Garden City Lands. The event attracts seed growers, researchers, students, advocates and community seed organizers, facilitating connections and conversations to build a strong local seed sector. Participants were invited to tour the KPU Farm at the Garden City Lands.

## **Certified Organic Associations of BC Farm Tour: Feb., 2020**

The Certified Organic Associations of BC held their annual conference in Richmond at the end of February, 2020. Participants visited the KPU Farm to learn about the soils, the market farming operation, and the solar season greenhouses.

## **Odd Squad Junior Videos**

The Odd Squad Junior video series profiles educational topics for youth. The videos feature 10 year-old Tobin Hinton Jr, who introduces young viewers to a wide range of topics. In July, 2020, Tobin visited the KPU Farm at the Garden City Lands to film a five-minute 'How to' video about growing beets on an organic farm, from seeding through harvest. Another five-minute video featured Tobin selling vegetables from the farm at a farmers' market. See <https://oddsquad.com/osp-junior-series/>.

## **School Tours**

Although most school tours have been cancelled because of the risk associated with bussing students during the pandemic, a class of Richmond High School students walked to the Garden City Lands for a farm tour on October 30, 2020.