

# Innovation from field to fork to achieve resilient, thriving, and socially just food systems for all.

The Centre for Sustainable Food Systems (CSFS) at UBC Farm is a teaching and research centre and local-to-global food hub working towards a more sustainable, food-secure future. The 24-hectare UBC Farm includes an integrated organic farm and forest ecosystem located on the traditional, ancestral, and unceded territory of the həṅðamiðam-speaking xwmaðkwaðam (Musqueam) people. A key part of the Faculty of Land and Food Systems, the CSFS supports collaborative research, teaching and learning opportunities for UBC students, faculty, and staff as well as local and international academic and community partners. CSFS members work on the development of innovations in agroecosystem management for food security and ecosystem services, while honouring, respecting, and protecting diverse ecosystems and knowledge pathways within Indigenous and agrarian food systems.

We are grateful for the dedication, commitment and tenacity shown through difficult times over the past two years: to our faculty members who kept advocating for the CSFS and UBC Farm, community members who supported us as market shoppers, and participants in our online events, our staff who worked incredibly hard to adapt so our growing season and programs could be safe and successful, our amazing volunteers who help keep the farm running, our donors who champion our vision and support our future, and to the students — from those who started the UBC Farm in 2001, those who helped save it, to those today whose learning is our purpose:



Since it started, the Centre for Sustainable Food Systems (CSFS) at UBC Farm has grown to become an international leader in the food-environment nexus. The CSFS brings together researchers and those who work in agriculture to create solutions that truly address diverse, regional needs.

Now, a strong focus of the CSFS is climate change. More than ever our leadership at this nexus is relevant and essential. The impacts of the climate crisis came into sharp focus in 2021, with the devastating heat dome, wildfires, and floods in B.C. alone. These events underscored the fragility of our food system and raised the urgency and importance of our work to adapt, and work to reverse climate change.

Our researchers and staff are responding to the challenge, bringing forward new and innovative programs to move toward a sustainable and food-secure future. A future that is better for everyone, and that incorporates and respects Indigenous land stewardship.

It has been rewarding for me to serve as interim Academic Director during the past year and a half. During this time, the CSFS has faced the challenges of COVID with resiliency, and undergone a governance review to ensure it is in a good position for the next decade.

For the next phase of the CSFS, we are excited to be making changes to ensure we are in a strong position to collaborate – particularly on projects addressing the climate crisis; to continue knowledge sharing; and to inspire everyone to "achieve resilient, thriving, and socially just food systems for all." Stay tuned for more details as we'll be sharing out news in the coming months.

#### **Rickey Yada**

Interim Academic Director, CSFS and UBC Farm Dean and Professor, Faculty of Land and Food Systems



In 2021, the UBC Farm celebrated its 20th anniversary. It was in 2001, that students put forward a bold vision of a learning and research farm at UBC. Their dedication made it a reality, and many people from the UBC community and beyond advocated to save the Farm from development, which

led to us becoming a formal academic unit in 2011 with the launch of the Centre for Sustainable Food Systems at UBC Farm. For our anniversary we had a COVID-safe celebration through social media, special merchandise and created *Growing A Farm*, an original documentary podcast about the origins and saving of the UBC Farm, where we showcased the voices of those who saw our value from the very beginning.

We had a strong growing season this past year thanks to our great staff team and marked our 20th annual UBC Farm Farmers' Market. We welcomed small groups and classes back to the Farm, including the return of the UBC Farm Practicum in Sustainable Agriculture after its pandemic hiatus in 2020. Feeding Growth stayed online and culminated with an in-person keynote event, and we increased our global reach with the second annual Future of Food webinar series featuring CSFS experts, researchers from across Canada, and those working on the frontline of our food systems. We also ensured the continuation of important research projects and supported Indigenous community access to their thriving gardens and ceremonial spaces.

As with many non-profits, the pandemic forced us to drastically reduce our programming and revenue-generation. I am proud that we were able to keep on our staff, offering stability at a challenging time and allowing us to restart with a strong team. As we moved into 2022 and the severity of the pandemic receded, we face long-lasting financial realities. We will be developing a new five-year strategic plan, including exploring new and better ways to engage our supporters and community. Your support has been essential to the wellbeing of the UBC Farm from the very beginning, and I look forward to continuing to work together in stewarding the UBC Farm as a key place of interdisciplinary research, experiential learning and exemplary community engagement.

#### Clare Cullen

Operations Director, CSFS and UBC Farm

## RESEARCH



The CSFS is an interdisciplinary and collaborative hub where researchers from faculties and departments across UBC create innovative solutions. In collaboration with international partners, our research explores and tests novel approaches towards a sustainable future that consider agroecological, environmental, and social dimensions – from improving soil and water quality, protecting biodiversity, to supporting climate resilience and food sovereignty.



300
RESOURCES
ON BC FOOD
WEB

PUBLICATIONS CITED 2,100x

30+ ACTIVE RESEARCH PROJECTS







Research at the CSFS is focused on the most pressing issues in food sustainability and food security both globally and locally. Prominent themes include addressing and adapting to climate change, understanding and supporting biodiversity, using the power of human community in research, as well as developing new technologies to address these themes.

#### **Climate Change**

The impacts of climate change became clear and present this past year in BC, with a deadly heat dome, devastating wildfires and smoke across the province, and floods in the Fraser Valley and beyond. A tornado even made landfall at UBC, damaging structures at the UBC Farm. These extreme and unusual weather events have become more frequent – we are learning to expect what used to be unexpected. CSFS Associates are leaders across BC and Canada in responding to the impacts of climate change on agriculture. Dr. Sean Smukler, Faculty of Land and Food Systems (LFS) founded the BC Agricultural Climate Adaptation Research Network (BC-ACARN) in 2017 to spur research and collaboration in this area. His current project at the UBC Farm – Too Much Water Or Too Little: Climate Resilient Vegetable Farming – looks at how different soil management practices impact soil-water dynamics and greenhouse gas emissions from farmland soils. Dr. Mark Johnson, Institute for Resources, Environment and Sustainability (IRES) and Department of Earth, Ocean and Atmospheric Sciences (EOAS), aims to help farmers minimize their water footprint with his Living Laboratory for Water Sustainability project. The project is implementing and testing new, smart, integrated water and climate monitoring technology at the UBC Farm. Finally, Dr. Kai Chan, Canada Research Chair in Re-Wilding and Social-Ecological Transformation, launched CoSphere this past year, a community enabling collective action towards sustainability, of which the CSFS is a partner.

#### **Technology (Ag-Tech)**

CSFS researchers and projects are developing cutting-edge technology to help achieve food system sustainability, improve our understanding of biodiversity, and respond to extreme heat events. Litefarm is a free, open-source application developed by CSFS researchers, in collaboration with farmers and members of the Diversified Agroecosystem Research Cluster. The app is working to advance sustainability science and help farmers improve their financial and environmental management. Digital Detection Web for On-Campus Insects is a project led by Dr. Juli Carrillo, LFS, using remote sensing, machine learning, and the Internet of Things to automate insect monitoring, allowing researchers to forecast insect abundance and pest presence almost like the weather. The project uses Sticky Pi, an open-source computational entomology technology developed by postdoctoral research fellow Dr. Quentin Geissmann, creating smart traps that use artificial intelligence (AI) to study when, where and which insects are captured in the field. This project will enable researchers to monitor insects in real-time, on a scale never done before. Another project using AI at the UBC Farm was developed by students from the UBC Sauder School of Business and Faculty of Applied Science. They are tackling the harmful effects of extreme heat on BC's fruit orchards by using autonomous cameras to monitor the surface temperature of fruit and activate water-cooling systems to prevent heat damage.



Baby coyotes spotted on the UBC Farm by the motion-triggered cameras of the Biodiversity Monitoring Project.

#### **Biodiversity**

Biodiversity underlies agricultural production and contributes essential ecosystem functions and services to food systems. The Living Laboratory For Biodiversity Monitoring project ensures that the diversity of life at the UBC Farm, including birds, plants, and insects, is recorded each year as climate change, surrounding land use, and farm management actions change. The project is led by Co-Principal Investigators Dr. Juli Carrillo, Assistant Professor in LFS and Dr. Matthew Mitchell, Research Associate in LFS. Using this unique dataset, Dr. Mitchell's current work is focused on understanding the

effects of extreme weather events like the 2021 heat dome on terrestrial mammal, bat, and bird activity. Dr. Carrillo is also leading long-term pest monitoring at the UBC Farm, looking at three pests that have major impacts on BC agriculture. Dr. Risa Sargent, Associate Professor in LFS, and M.Sc. student Hafsa Ahmed are looking at the potential benefits of on-farm habitat diversification by creating shelter plots next to pepper plants at the UBC Farm. Dr. Leonard Foster, Department of Biochemistry & Molecular Biology, keeps honey bees at the UBC Farm, and is investigating pathogens and diseases that impact honey bee health. Another project with Dr. Carrillo and CSFS Associate Dr. Claire Kremen, IRES and Zoology, along with graduate students Matt Tsuruda, Rebecca Pain, Carly McGregor, Jenna Melanson, and Sasha Tuttle, and researchers Martina Clausen and Tyler Kelly, looks to provide evidence that restoring semi-natural/natural habitat in agriculture leads to positive outcomes for biodiversity, pest control, pollination, and farm profitability. These diverse projects help the CSFS contribute new knowledge towards sustainably feeding the world while ensuring that agriculture also protects biodiversity.

#### **Participatory Research**

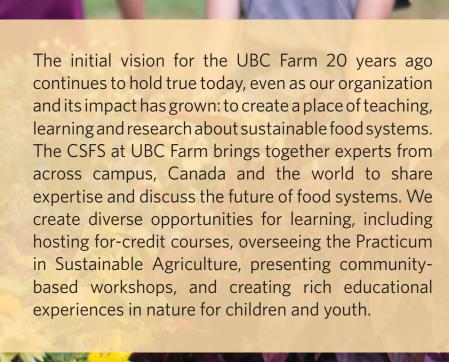
Connecting with people, contributing to reconciliation with Indigenous communities, and communicating scientific understanding are core values of the CSFS and UBC Farm. The Canadian Organic Vegetable Improvement Project (CANOVI), led by Co-PIs Dr. Hannah Wittman, Professor in LFS and IRES and Dr. Solveig Hanson, CSFS Postdoctoral Research Fellow, works with farmers across Canada to breed new varieties of vegetables including carrots, turnips, and radicchio that are suited to the Canadian climate and also tasty and nutritious, with the aim of contributing to the resilience and growth of Canada's organic vegetable sector. This research not only responds to the needs of farmers but includes them in the creation of the research project. Through regional farming organizations, the CANOVI team coordinates a network of on-farm variety trials in which farmers generate and share data about regional variety performance. The UBC Farm serves as the primary research plot, while our Farmers' Market shoppers were among the members of the public who contributed to the research through taste-testing events.



Dr. Solveig Hanson, Postdoctoral Research Fellow and co-PI, Canadian Organic Vegetable Improvement Project (CANOVI), measuring carrots for CANOVI.

For a complete list of all our research projects and publications visit ubcfarm.ubc.ca/research. For research summaries visit bcfoodweb.ca.

# EXPERIENTIAL TEACHING & LEARNING











The CSFS at UBC Farm offers many ways that students can engage with us and enhance their understanding with experiential learning in all aspects of the food system.

#### **Career Development**

The Career Development in Land and Food Systems course (LFS 496) was impacted significantly due to COVID-19. It became particularly difficult to safely place students in the community. Out of an abundance of caution, we only accepted host opportunities that could be completed within a remote work set-up, prioritizing the health, safety and wellbeing of our student community. Even so, students gained valuable experience through the learning opportunities provided by their mentors while also bringing value to the placement organizations.

The UBC Work Learn Program supports and subsidizes meaningful work experiences on campus and allows students to engage with all aspects of work at the CSFS. In 2021-2022 we had 37 Work Learn students as well as four additional student appointments in positions across the CSFS and its projects.

#### **Experiential Tours**

UBC Farm tours provide students and learners with immersive experiences in the fields and forest of the UBC Farm. Despite gathering restrictions, the UBC Farm was able to host limited in-person as well as virtual tours in 2021-2022.

Our tours are tailored to specific learning outcomes with UBC classes, and focus on CSFS research projects, Indigenous gardens, and food cultivation.

- 16 academic tours given to 754 students and faculty members
- 11 community and non-UBC academic tours given to 165 participants

#### **Sustainable Food Systems Minor**

The UBC Minor in Sustainable Food Systems develops students' understanding of the connections between food, health, society and the environment, and gives them the tools to solve complex food systems problems locally and globally.

Launched in 2019, the 18-credit minor is available to all Land and Food Systems and Science undergraduate students in their second year or above. Students completing the minor are immersed in experiential and interdisciplinary learning opportunities, involving several departments and faculties across UBC, as well as off-campus partners. Since 2019, 21 students have completed the minor.

#### **UBC Farm Practicum**

The UBC Farm Practicum in Sustainable Agriculture's mission is to inspire and cultivate new farmers and sustainabilty educators who will transform their communities and their food systems.

The UBC Farm Practicum in Sustainable Agriculture is a six-month experiential learning program designed for aspiring farmers, environmental educators, gardeners, and students interested in applying knowledge about sustainable food systems. The Practicum teaches all aspects of farming from planting and harvesting to business management and marketing.

The Practicum program was cancelled in 2020 due to in-person health and safety concerns. For 2021 we worked to reshape the curriculum to offer the program as a hybrid of in-person and online. We were happy to bring a safe and successful return with a cohort of 15 students. This was the 12th year of the program which has graduated a total of 124 students since 2008.

In 2021, with the generous help of an anonymous donor, the Practicum program developed and piloted an in-community rotation in partnership with Little Mountain Neighbourhood House Food Hub. The Practicum cohort, via this program, engaged in local/sustainable agriculture with a focus on food justice. This exposure and engagement with a community led initiative confronting local food security provided access to community food distribution outside the

traditional market model and engaged the cohort with the question of "who am I farming for?". Practicum students were tasked with growing and providing for food insecure individuals as part of a real-time deliverable, donating that food and assisting with distribution systems. The pilot was very successful and has been fully incorporated into the 2022 program.









The CSFS at UBC Farm is located on the unceded ancestral territory of the hənqəminəm-speaking xwməθkwəyəm (Musqueam) people, whose guidance and collaboration we value and seek to foster.

Four Indigenous initiatives are active at the UBC Farm: the Culturally Relevant Urban Wellness Program (CRUW), developed in 2011 by the Vancouver Aboriginal Child and Family Services Society; the newly revitalized Musqueam Garden; Tal A'xin: Maya in Exile Garden, established in 2000 as one of the longest-running community-based projects at the UBC Farm; and x\*cicosm: Indigenous Health Research & Education Garden, led by LFS Indigenous Research Partnerships. Each year, these initiatives bring thousands of visitors to the Farm and involve hundreds of UBC students in learning about Indigenous culture, land, medicine and food through class visits, group projects, graduate research, and directed studies.



"The 2021 garden season was good compared to 2020. Generally, we had a good harvest of beans, corn, squash, greens and other vegetables. We tried to grow two new varieties of corn from Oaxaca, Mexico (red and black) but we did not succeed, the reason being, they need a longer period of warm season for the cob to fully develop – maybe next time. The attendance of volunteers was very good, at least four were steady, they came every Saturday to help and about three came sporadically. We are very grateful for their help, otherwise it would be more challenging to tend the garden. We would like take this opportunity to thank UBC Farm for allowing us to be connected to the Land and keep our Mayan Culture and ceremony through the work at the garden."

Lix Lopez, Maya in Exile Garden

2005 URBAN ABORIGINAL COMMUNITY KITCHEN GARDEN PROJECT BEGINS (LATER RE-NAMED TU'WUSHT)



2007
INDIGENOUS HEALTH
RESEARCH AND
EDUCATION GARDEN
ESTABLISHED BY DR.
EDUARDO JOVEL.
GIFTED THE NAME
x\*cicasem IN 2016

2011
CULTURALLY
RELEVANT
URBAN
WELLNESS
PROGRAM
(CRUW) BEGINS



CSFS food literacy programs engage youth of all ages in hands-on activities to explore their food systems from field to fork.

#### **FarmWonders**

The FarmWonders program is an education initiative that allows preschoolers through to secondary students to engage in hands-on activities at the UBC Farm through day camps and field trips. Children learn about the social and ecological aspects of the food system through science-based, experiential learning.

In 2021-2022, we began a partnership with UBC Recreation whose expertise running camps allowed us to solidify and externalize the administrative aspects of our children's camp programming. The CSFS kept the FarmWonders curriculum development and staffing "in-house" to ensure high quality delivery of our educational programing, a low ratio of staff to camp participants and the provision of seasonal employment opportunities that are structured to provide UBC undergraduate students with outdoor and experiential education employment opportunities at the UBC Farm.



## Art Roots & Culture (ARC) CommUNITY

In 2021 we partnered with, hosted, and supported the Arts, Roots and Culture (ARC) commUNITY School. ARC has been developed for children 5-11 who self-identify as Black and is designed to complement homeschool programs. ARC centres experiential, outdoor learning that aims to educate from a decolonial, anti-oppressive and anti-racist paradigm. It is a program that centres Black, Indigenous and People of Colour as educators and mentors.





Community education and outreach activities encourage education in sustainability, environmental stewardship, healthy diets and lifestyles, and social development.

#### **Markets**

Our markets explore and exemplify healthy and sustainable food systems, encourage sustainable food literacy, foster socially just food systems for all, and cultivate the local food economy. In 2021 we were still closely following pandemic protocols, but some restrictions were lifted and we were able to almost return to normal. The season was a success thanks to the support from our dedicated customers and staff. We host three weekly markets during the growing season: Our Tuesday Evening Market and Saturday UBC Farm Farmers' Market at the UBC Farm, and Wednesday Market outside the UBC Bookstore. The Saturday multi-vendor market acts as an incubator market for up-and-coming local producers and processors, offering lower fees, opportunities for our Feeding Growth and Practicum alumni, as well as UBC students through the Work Learn program, and serves as a training ground for our Practicum students, who have their own market stand. Our markets strive to increase food literacy with our market outreach booth, which provides food systems knowledge mobilization and engages students and the community in food systems learning and action.

#### **Events**

We curate events for our diverse audiences to support our programming and spark food systems literacy, learning and action. Events in 2021-2022 were greatly reduced due to gathering restrictions, but we were happy to be able to host our Fall Fair, Apple Celebration, and

Pumpkin Fest at the UBC Farm Farmers' Market, while we also hosted special dinners for our donors and the LFS Welcome Back event for staff, students and faculty.

#### **Podcast**

Growing a Farm: The 20-Year Journey of the UBC Farm is a documentary podcast series that tells the story of the beginnings of the UBC Farm in 2001 and the against-the-odds story of saving it. The podcast was hosted by then-LFS student, Anisha Sandhu, and produced by CSFS staff, and endeavored to share the UBC Farm's 20-year history by speaking to the students, staff and faculty members who were key to turning a vision of an educational farm into reality.

#### **Webinars**

Our 2nd annual Future of Food webinar series "Farm to Globe: Transforming Our Food Systems" featured many of the foremost food systems experts from across UBC, Canada, and around the world. The 10-part series focused on investigating solutions to the most pressing issues in the food system. The 2021 series convened 37 expert panelists from across Canada, attracting a total of 1,300 live attendees, with many more accessing the recordings.





#### **Feeding Growth**

Through community engagement and education activities, Feeding Growth amplifies the local food economy and the development of exceptional, healthy, sustainable, and socially responsible retail and packaged goods companies. Feeding Growth quickly pivoted from online to in-person and back to online in 2021 for the "Scale Your Progressive Food Business Workshop Series", increasing accessibility and reach to participants across the province. The community was excited to finally gather in person for the final keynote event, which was also recorded and shared with participants unable to travel to Vancouver. In 2021 Feeding Growth attracted 30 entrepreneurs to its workshop series and 66 in-person keynote event attendees. Feeding Growth is a partnership between CSFS, Vancity, and Brand Natural.

#### **Food Skills Workshops**

CSFS community workshops offer hands-on, integrative, interactive, and experiential learning opportunities for people at UBC and across Vancouver. During lockdown in 2020, these workshops quickly pivoted to online, allowing us to reach four times our previous audience, across geographic boundaries. We offered only a spring series in 2021-2022, to focus the fall on the new Practicum curriculum development. Online



programming is attracting fewer participants post-lockdown, and so we are reassessing the program to offer certain workshops in-person and some online to suit this changing landscape. The spring 2022 series offered five workshops with 171 participants.

#### Volunteering

The CSFS Volunteer Program enhances community food literacy, increases student experiential learning, and supports the organic food production at the UBC Farm.

In the 2021 growing season we were able to return to pre-pandemic levels and welcomed 257 volunteers to return to the UBC Farm for over 2,600 volunteer hours.

- The Urban Farmers volunteer program allows participants to experience sustainable farming firsthand
- Volunteers at the xwcicəsəm Garden gain hands-on experience with traditional foods and medicines and learn from Indigenous Elders
- Market volunteers gain business and retail experience at the UBC Farm Farmers' Market
- Volunteers with FarmWonders learn to lead children's food literacy activities



The UBC Farm is situated within a 90-year-old coastal western hemlock forest that comprises a mosaic of cultivated annual crop fields, second-growth forest, perennial hedgerows, fruit orchards and educational gardens. The UBC Farm models a small-scale, diversified, organic farm, cultivating over 200 varieties of fruits, vegetables and herbs, and also features honey beehives, seed production, flowers, and egg-laying, pasture-raised hens. This living agroecological system provides a broad range of opportunities for collaborative research, teaching and experiential learning for UBC students, future farmers, and the urban community.









Growing and learning about food is key to everything we do. The cultivation and sharing of food at the UBC Farm is what makes grounded, applied research and learning possible.

Food sales through our farmers' markets, CSA and wholesale outlets such as UBC Food Services and Vancouver restaurants create community partnerships, experiential learning and training opportunities for students and staff, campus food engagement, as well as providing an important source of revenue to support the academic mission of the CSFS.

Our food cultivation priorities respond to the needs of our researchers, instructors, students, and customers with a focus on experimentation and innovation to achieve sustainable agricultural practices. We are committed to sharing our knowledge gathering and research, as well as demonstrating transparency in our production practices, including our organic certification process, harvesting, crop rotation and seed saving.

In 2021-2022, climate change contributed to a much hotter summer in BC, including a dangerous heat dome. It had an interesting impact on our crops, cooler weather crops such as spinach did not do as well, while hot weather crops such as melons thrived. We cultivated 10 types of melon including four types of watermelons, three honeydew, two Korean melons and one winter melon.

Since 2018, UBC students receive a ten per cent discount on all UBC Farm produce, thanks to the support of Alma Mater Society (AMS) student fees. This discount increases access to our local, organic food for the student population and plays a part in addressing student food insecurity on campus. There were fewer students on campus in 2021-2022, and so we look forward to an increase in the use of this benefit as students return for in-person learning.

We continue to enjoy support from UBC Food Services. Despite lowered demand due to the pandemic, UBC Food Services chefs and their teams purchased as much UBC Farm produce as possible, and have pledged to purchase \$150,000 in UBC Farm produce in 2022-2023. We also developed a great relationship with Harvest Union, a community-supported, locally-sourced grocery store and noodle soup café, who ran their own CSA throughout the pandemic and often included our produce. Through our relationship with restaurants, UBC Food Services, as well as our market and CSA sales, we continue to support and engage with the local food economy.



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