PARTNERING TO SUPPORT ONTARIO'S AGRICULTURE SECTOR

ONTARIO'S UNIVERSITIES

Across the province, universities are partnering with industry and local communities to support Ontario's agriculture and agri-food sectors. Through work-integrated learning, upskilling and reskilling opportunities and research and innovation, Ontario's universities are helping ensure the province has the highly skilled agriculture workforce and technology it needs to remain competitive, support healthy communities, and drive economic growth in regions across the province.

The University of Guelph, for example, has a reputation for advancing research and innovation in agriculture as Canada's food university and continues to drive discovery through initiatives like the Arrell Food Institute. Below are more examples of the many ways Ontario's universities are supporting the future of farming and food production in Ontario.

Building Ontario's agri-food talent pipeline

- The wine industry has a $4.4 billion impact on Ontario's economy, according to Grape Growers of Ontario. To support industry growth and help fill important workforce development needs, **Brock University** is launching Ontario's first winemaking and cider production micro-credentials program through Brock's Cool Climate Oenology and Viticulture Institute (CCOVI). By working with industry partners from the Ontario Craft Wineries and the Ontario Craft Cider Association, the program will help students and workers reskill or upskill, ensuring they have the latest and most relevant skills in their fields.

- Agricultural waste is being used as a valuable resource for creating new sustainable consumer products in Ontario. **University of Guelph** researchers in the Bioproducts Discovery and Development Centre are currently developing bio-based resins for a range of commercial uses, including the world's first coffee pod certified as completely compostable and durable and lightweight biocarbon-based composite for electric vehicle manufacturing. These U of G applications demonstrate that sustainable materials are possible without compromising function while remaining cost competitive.

- To help farmers and other agriculture professionals develop their leadership and business skills, **Ontario Tech University** developed the Agricultural Leadership Certificate Program. The interactive, hands-on program helps workers develop new skills and enhance existing ones, such as marketing, advocacy and change management so they can be successful in the industry.

- To prepare students to lead in the agricultural sector and manage change, **Trent University** launched an ecological agriculture course through the Trent School of the Environment. By partnering with local farmers, students are able to understand the issues facing the agricultural and agri-food industries and are exposed to the environmental, social, economic, political and cultural complexities of agriculture and agri-food through hands-on learning.

- Ensuring the next generation of farmers and agriculture professionals understand the global food system can help spark new ideas to expand Ontario's agriculture presence around the world. To help prepare students for careers in the agriculture and agri-food industries, **Nipissing University** launched a Geographies in Agriculture course through their Certificate in Environmental Management program. Students explore the global processes and trends in sustainable food systems and local food supply networks as they prepare for careers in the agriculture industry.

Advancing research and innovation in agriculture

- Dedicated to building healthy and resilient communities, the NORDIK Institute at **Algoma University** is a community-based research hub that aims to help local communities tackle environmental issues and labour force development plans. Some of its most recent research investigated the emerging economic impacts of northern Ontario's agri-food sector, with a goal to increase efficiencies, local development and sustainability throughout the region.

- Helping local farmers in northern communities grow their own fresh produce can reduce the costs of importing fruits and vegetables. To support local farmers, **Laurentian University** architecture students designed a modular sustainable farming structure that takes advantage of aquaponics and vertical farming for northern communities.

- In order to help farmers across Ontario maintain high crop yields under the combined threats of the global reduction in farm land and climate change, researchers from the Hoare Lab at **McMaster University** are developing soft nanoparticle and sprayable hydrogel formulations, helping to improve the delivery of bioactives to plants and crops.

Small-scale farmers often face financial barriers to accessing emerging technologies that could accelerate their production. Through the research project Diversity by Design, researchers at the **University of Ottawa** are working to understand what type of digital technologies can best serve small-scale farmers in an effort to help them save costs and adopt only the technologies that best suit their needs.

Just as understanding the human immune system is important to the development of effective drugs and vaccines, understanding the plant immune system is important for effectively managing crop diseases. Microbial diseases and pests among food crops pose substantial threats to global food security, which is why a **Queen's University** researcher and her team are harnessing the power of genetics to understand how immune proteins are activated and repressed, allowing plants and crops to defend themselves against infection.

With a goal to help farmers achieve better crop yields efficiently and sustainably, a Mississauga-based agricultural technology start-up from the **University of Toronto** has developed a nanoscale, polymer-based technology called, Allospere that allows for precise delivery of insecticide and fungicide. The technology also enables farmers to cut back on labour, fuel and water cost, and is biodegradable and safe for the environment.

To help promote the healthy growth of plants and help farmers increase crop yields, a former **University of Waterloo** student is partnering with Velocity incubator to develop a unique microbial technology that improves nutrient uptake, regulates plant stress and produces natural growth promoting hormones in crops. The new technology will help farmers harness the power of these microbiomes so they can grow more food on less land.

Flax production was an integral part of southwestern Ontario's economy until the industry was replaced by the production of synthetic fibres in the 1950s. Now, with an increase in demand for natural fibres in the textile and automotive industries, researchers at **Western University** are testing the performance of fibre flax under the soil and climatic conditions of southwestern Ontario to help revive the industry, which could lead to the creation of new jobs and industry in the region.

To help farmers across Ontario improve crop yield predictions, a **York University** professor partnered with Growers Edge, a fintech agricultural company that uses graph signal processing and deep learning. By leveraging this technology, farmers can improve decision making and risk management.

Helping make food more accessible to Ontarians

Corn production in Canada is a vital industry that requires a healthy product. However, changing climate conditions has led to the growth of dangerous mycotoxins that are threatening the corn we use for food, animal feed and biofuel. In order to help improve the health of corn crops in our communities, a **Carleton University** researcher and his team have discovered an enzyme to detoxify dangerous toxins that keeps corn healthy and safe for consumption.

As the domestic and international demand for Ontario maple syrup increases, preventing sugarbush damage as the climate changes will be critical to ensuing the sector continues to thrive. To support the local production of maple syrup, **Lakehead University** are partnering with Camphill Communities Ontario (CCO) to develop adaptation strategies that will ensure CCO's maple syrup operation can adapt as the climate changes and even enhance production.

With a goal to produce affordable and standardized designs to help provide food security to local communities, the SymBioLogical Lab at **OCAD University** looks to create opportunities for winter urban agriculture in cities across Ontario through innovative, solar-heated greenhouses. The greenhouse designs range in size from apartment balcony sized to one that could be built on existing rooftops, parking pads, or alley garage spaces.

To help produce and distribute food, facilitate research and engage the local community though ecological initiatives, the Urban Farm at **Toronto Metropolitan University** operates two rooftop farms on campus. The farms aim to support the health and well-being of the community and surrounding ecosystem by using practices that are ecologically, socially and financially just. This includes growing foods, medicines and plants for the campuses diverse communities.

With a goal to build a healthier and socio-ecologically resilient future that is grounded in sustainable local food systems, **Wilfrid Laurier University** launched the Voicing Change: Co-Creating Knowledge and Capacity for Sustainable Food Systems project. The three-year project connects community partners from around the world and celebrates local food expertise and traditional knowledge that contributes to traditional, equitable, and culturally appropriate community food systems through a Community of Practice.

By drawing on the expertise from the university and local community to support urban agriculture, the Campus Community Garden at the **University of Windsor** is building healthy, interactive urban communities through the collective production of locally grown and organic food. The garden emphasizes education and sustainability, while helping to improve food security in Windsor-Essex.