How does Canada's agricultural sector contribute to the economy?

Canada's agricultural sector is a key economic driver. It creates job opportunities, supports local businesses, and is a key pillar of so many rural communities in our country. Last year, the sector added over

Consumers care about where their food comes from and the way it g produced. By helping our farmers innovate and make their operations easily all their powers and the services here in Canada and around the world. Over the last two years, we've invested \$1.5 billion in programs to help our farmers reduce their on-farm emissions and grow their operations so we can continue to be a reliable supplier and leading exporter of world-class products like canola, wheat, pulses, beef, and pork.

Read the full interview with Minister MacAulay at innovating canada.ca.

How a High-Tech Water Model is Future-Proofing Manitoba's Farms, Soils and Grasslands

 $Manitoba\ Forage\ and\ Grassland\ Association\ have\ partnered\ with\ technology\ firm\ Aquanty\ to\ put\ leading-edge\ water\ forecasting\ tech\ in\ the\ hands\ of\ Manitoba's\ farmers.$

D.E. McCourt

he prairies are the heartland of Canada's food supply and home to so much of the nation's biodiversity. But this is not promised. Though the native grasslands of Manitoba have served as a bountiful ecological reservoir since before humans ever walked those fields, the advent of climate change and largescale market pressures mean today that the irreplaceable soil and the vital water resources that keep this landscape flourishing must now be carefully managed.

As a farmer-led organization, Manitoba Forage and Grassland Association (MFGA) is extremely sensitive to the needs of those who rely on the land for their livellhood. But they also recognize that the economic pressures of our current reality do not always incentivize the practices that will keep Manitoba's prairies healthy and productive for future generations.

lt's time for a whole system approach to agricultural resiliency and soil health

"In 2018, we declared our position on regenerative agriculture, especially around soil-boosting practices such as armouring the soil, covering the land, and livestock grazing integration," says MFGA Executive Director Duncan Morrison. "Regenerative agriculture aligns with natural areas. We want to help advance ecological goods and services, which are all those natural benefits

provided to society such as water, biodiversity, and carbon, while ensuring the ability for farmers to be profitable. We need to shift the paradigm into systems-based thinking from single-focus solutions."

There is nothing adversarial in this philosophy. Farmers and stakeholders want the same thing, sustainable land and a prosperous tomorrow. Thanks to funding from the AAFC and the Province of Manitoba, MFGA has partnered with Aquanty, a water resources science and technology firm in Waterloo, Ontario, Aquanty's world-leading hydrogeological modelling platform provides never before available insight into the myriad of ways in which the health of Manitoba's agriculture land revolves around water.

"What the software does is simulate the movement of rainfall and snowmelt through the soil profile, over the land surface, through the river and stream channels, and through the groundwater system," explains Aquanty Senior Scientist Steven Fre, "The technology's ability to simulate the integrated groundwater and surface water system gives us a much better ability to simulate water availability for crop growth. This is a leading-edge tool that helps farmers adapt their management practices in the face of more extreme climate. Nothing like this exists anywhere in the world other than Canada right now."

Putting the highest tech solutions directly in the hands of farmers

Aquanty and the MFGA have rolled out this forecasting technology — in the form of the MFGA Water Forecast Portal — for use across the Assiniboine River Basin of Manitoba, Saskatchewan and North Dakota as well as the Pembina River Watershed in the Red River Basin. The response from farmers has been overwhelmingly positive-including alandmark partnership with the Dairy Farmers of Manitoba. Many, of course, are still kicking the tires and considering how best to integrate this new technology into their decision making, It will be a learning process, but farmers are eager to learn. Soto are conservation agencies, industry groups, and Indigenous communities.

"When you don't have water, you do have problems," says Lawrence Knockaert, chair of the MFGA's board, and a dairy farmer. "With the right focus and support, this tool can be a difference-maker around water and carbon by championing the natural areas and farmer-led soil management practices needed for our ag lands to prosper via profitability with added climatic resiliency and boosting the incredible values that our agricultural areas provide."

The flow of water is the key to under-

The flow of water is the key to understanding and protecting the magic locked in Manitoba's soil. And now, for the first time, those who work that soil have the tools they need to make the strongest decisions for the future.

Visit mfga.net to learn more about Manitoba's farmer-led efforts around water and soil or hydrologic modeling at aquanty.com.

This article was sponsored by lanitoba Forage and Grassland Association and Aquanty.

forage grassland
Association

aquanty

Biodiversity is Food Security: Nature-based Solutions to Keep Canada Fed

The long-term resilience of Canada's food supply depends on a harmonious coexistence with our natural environment. Ducks Unlimited Canada is showing the way.

DE MaCaust



Kristine Tapley Agriculture & Food Sustainability Lead, Ducks Unlimited

s we move into the future, it is time to remember that we are all part of the natural environment. Environmental preservation, biodiversity, clean water, and healthy wildlands are not simply ends in themselves, they are also the means by which we ensure the resiliency and sustainability of our society, our climate preparedness, and our food supply.

Acknowledging and acting upon this truth requires that we break down all of our notional boundaries between "natural" spaces and "working" spaces. Blo-diversity isn't only found in untouched natural areas. Working landscapes such as farms also host biodiversity both above and below ground. We need to recognize that Canadian farms and ranches produce more than food. They also produce a variety of environmental benefits that society relies on.

"Biodiversity can help build resiliency," explains Kristine Tapley, Agriculture and Food Sustainability Lead at Ducks Unlimited Canada (DUC). "Diversity in the species we plant—like in pastures and fields—can ensure there is a strong foundation that helps protect our soil even though conditions may be inconsistent or extreme. Diversity across the landscape means including natural spaces that can hold water in times of drought, filter our groundwater, store carbon, and enhance pollinator activity to help produce the food we need. All these benefits are already being offered by Canadian farms and ranches, but they are not currently recognized or rewarded for it."

For Canadian agriculture, being the best isn't enough

The interconnection between biodiversity and our food supply is becoming clearer, and it's a positive message Canada is well positioned to promote. We are already a world leader in sustainable agriculture, but there is always more that we could be doing. "By embracing technology—such as crop protection products, precision agriculture, and genetic research—we can strive for sustainable intensification," says 'Tapley. "Sustainable intensification means we can grow more on the same or less land and stop growing food on land that isn't

productive. These marginal areas can be used to

provide other benefits by being restored to nature or habitat like grasslands or wet-lands. At Ducks Unlimited Canada, we always say to farm the best and leave the rest."

Making this ambition into reality will, however,

Making this ambition nto reality will, however, require a shift in the way we measure and incentivize practices and productivity. In our current model, natural spaces integrated within farms are generally not considered as assets, despite their incredible value in terms of biodiversity and climate resilience. Reimagining our foundational approaches to how we value nature is no simple process, but conservation groups like DUC are collaborating to blaze trail towards a new framework of nature-based solutions. International initiatives such as the Taskforce on Nature-related Financial Disclosures (TNPD) — which DUC joined last year — are doing the essential work of formalizing recommendations that can protect both businesses and biodiversity.

"The TNFD is a global voluntary discosure framework for corporate reporting on nature-related risks, aimed at supporting a shift to nature-positive outcomes," says Alana Hannaford, National Sustainability Analyst at DUC. "DUC provides nature-based solutions at scale, and is well-positioned to support industry partners looking to integrate the TNFD recommendations as part of their own corporate sustainability reporting."

Making food choices that support modern Canadian agriculture is important.

Everything is connected: from nature to the market

Every element of our society — from urbanization to agriculture — flows from the systems and incentives that we collectively put in place. Decisions that impact Canadian biodiversity don't happen only in the legislature, in the boardroom, or on the farm. They happen also at the grocery store and in the kitchen.

"Making food choices that support modern Canadian agriculture is important," says Tapley. "For example, the prairie ecosystem needs a large grazing animal for rejuvenation and to foster biodiversity. In Canada, cattle fill this role and are extremely important in maintaining one of the world's most art-isk ecosystems, the prairie grasslands, which are located right in our own backvard."

By understanding all the angles of biodiversity and appropriately valuing nature on the farm and elsewhere, we can ensure that our agricultural lands are sustainable and our food supply secure. The best path forward is one that adequately prioritizes both sustainable food production and environmental preservation. Because in the long term, these two things are one and the same.

Learn more a ducks.ca.

This article was sponsored by Ducks Unlimited Canada.







Growing for the Future: Olds College is Shaping Next Gen of Agriculture

Olds College's Indoor Agriculture Certificate program designed to break new ground in the area of indoor agriculture and vertical farming.

Anne Papmel



Dean, Werklund School of Agriculture Technology, Olds College of Agriculture and Technology

anadian agriculture is changing. Issues of climate change, food security, loss of agricultural land, and sustainability are transforming the way we grow crops. One such innovation is the shift to indoor farming in smaller, confined spaces using technology and cutting-edge processes.

It's called indoor agriculture, or controlled environment agriculture (CEA), and includes greenhouse operations, hydroponics, urban farming, and vertical farming. In fact, vertical farming is being used to support Canada's domestic target of \$140 billion in sales of agriculture and food processing products by 2025. The emerging vertical farming market is expected to show a compound annual growth rate (CAGR) of 28 per cent between 2022 and 2030. Such rapid sector growth means high demand for skilled workers.

Breaking away from traditional concepts

of agriculture
Olds College of Agriculture and Technology has been

Olds College of Agriculture and Technology has been training Canadians for the agriculture sector since 1913. The College offers programming in agriculture, horticulture, land and environment management, and food production, along with a 3,600-acre Smart Farm to test and validate new farming technologies.

Olds College is also recognized as one of Canada's top research colleges by Infosource and as a leader in CEA. "Having been around a long time, we pride ourselves on being experts in traditional methods of agriculture while also on the cutting edge of what's new to solve real issues like food insecurity and environmental sustainability," says Jay Steves, Dean, Werklund School of Agriculture Technology, Olds College of Agriculture and Technology.

Solving real world issues is part of the College's social mission to transform agriculture for a better world. "Innovation in agriculture is an absolute must," says Steeves. "With a growing global population, the need to feed people isn't going away any time soon. We need to look for new efficiencies. At the same time, we recognize food production has to be done sustainably and in a way that meets the needs and expectations of a much more aware and socially conscious customer base. We also need to create a more inclusive environment for agriculture by letting our urban partners play a bigger role."

New program in indoor agriculture

To meet the strong demand for skilled professionals in the CEA field, Olds College recently created the new Indoor Agriculture Certificate program which will see its first intake in the fall of 2024.

Four months in duration, the program aims to provide students with the knowledge and skills to manage

and sustain optimal growth conditions in diverse controlled agricultural settings like greenhouses, urban farming facilities, and vertical farms. "This program is the first of its kind in Ganada, offering students an early credential that sets them apart in this rapidly growing industry," says Steeves.

Topics covered include crop selection, CEA systems, growth crop supervision, problem identification, and troubleshooting. Program delivery will be through a blended approach of on-campus, online courses, and experiential learning through real-world field placements in the second term to gain viable industry

"I think the work integrated learning option is one of the program's biggest strengths," says Steeves. "It allows students to take the skills that they've learned and apply them in actual indoor agriculture facilities with our industry partners, gaining not only practical experience but also opportunities for networking and potential job offers," he says.

Tying it into the broader social purpose, Steeves says, "This program has the potential to provide real, practical solutions to the challenges many communities face. For instance, people in the north often struggle to get fresh fruits and vegetables. These new technologies could provide a more local, sustainable way to meet these needs compared to current methods," he says.

Program open to anyone

As for who qualifies for the program, the short answer is everyone. You don't need to have any prior education or experience. "It's for essentially anyone interested in innovative, sustainable agricultural practices and the future of indoor farming," says Steeves. This includes students graduating from high school, hobbyists, environmental enthusiasts, mature students with no prior agricultural experience or simply people with a passion for growing food locally. "During the pandemic, a lot of people became very passionate about growing their own food. Our program is a great option for them," says Steeves. "It's also a great option for those considering a career change, current CEA professionals looking to enhance or diversify their skills, and post-secondary students looking to stack credentials and increase their employability in the sector," he adds.

It's for essentially anyone interested in innovative, sustainable agricultural practices and the future of indoor farming.

Learn more about the program and how you can apply by visiting oldscollege.ca/programs.



This article was sponsored by Olds College of Agriculture & Technology.

Greenhouse-Grown Vegetables Good for Economy, Consumers, and Planet

Ontario's greenhouse sector is a major powerhouse for the Canadian agriculture industry. It's also a big advantage to consumers.



Greenhouse Vegetable Growers

anada's agricultural industry has a long history of success in the global marketplace. It's especially renowned for producing greenhouse vege-tables and exporting a significant portion of produce to the U.S., which receives about 99 per cent of all Canadian vegetable exports.

Canada's reputation for producing high-quality, safe, and sustainable greenhouse products is due largely to investments in research and development, the adoption of cutting-edge technologies and practices and the use of efficient and environmentally friendly production methods.

Ontario is a powerhou agriculture

Ontario is one part of the country where these investments are showing substantial payoff. particularly the southwest region, which has become a major production hub. "Windsor-Essex is known as the heart of Ontario's agriculture and agri-tech sector," says Richard Lee, Executive Director of Ontario Greenhouse Vegetable Growers (OGVG), a not-for-profit representing about 170 growers of tomatoes, cucumbers, and peppers across 3.800 acres in Ontario, "The region is one

of the largest greenhouse clusters globally, employing over 32,000 people and producing more than 503 kilograms of fresh, nutritious, healthy greenhouse products each year."

The recent Innovative Growth and Prosperity Study by OGVG and AIRM Consulting Limited reports that Ontario's overall farm gate value (market value after selling costs) for greenhouse tomatoes, peppers, and cucumbers is \$1.4 billion and that Ontario's greenhouse sector contributes \$2.3 billion to the provincial GDP. The study additionally reports that Ontario contributes to 81.6 per cent of Canada's greenhouse vegetable exports.

Standing by a commitment to the environment
"These findings underscore the significance

of greenhouse agriculture and our contributions from Ontario as well as Canada-wide to feed North America," says Lee. With a projected industry growth rate of five per cent annually for the next decade, the greenhouse vegetable sector is poised for further job creation and economic contribution.

One hallmark of Ontario's greenhouse

vegetable industry is its commitment to reducing its environmental impact by promoting sustainable agriculture, thereby contributing to the overall health and well-being of the region. "Technologies and practices like high-tech greenhouses, precision irrigation, and integrated pest management allow growers to increase efficiencies, conserve resources, and grow more food per acre of land," says Lee. The proximity of farmers to markets is a bonus as it means shorter driving distances and fewer greenhouse emissions. "Most OGVG farms are less than a one-day drive from the markets they serve," says Lee.

What "greenhouse-gro

Greenhouse vegetables are sold at major retailers across the country and are instantly recognizable by their "greenhouse-grown" produce certification label. "We've learned that a lot of consumers don't really understand how to identify Ontario grown greenhouse produce, so we've been working to educate Ontario residents and the general public on the association between greenhouse-grown, the health benefits and environmental attributes of greenhouse vegetables through our Greenhouse Goodness campaign," says Lee.
One benefit the Greenhouse Goodness

campaign speaks to is freshness. "These vegetables are grown 365 days a year, ripened to perfection and picked at their peak, and then packed and shipped to consumers within 24 hours to ensure they're at their most flavourful and nutritious," says Lee. Another benefit is consistency of quality thanks to the controlled environment in which the vegetables are grown. That means they're always delicious. This closed and controlled environment also allows for the early detection of pests and diseases, so consumers get minimal exposure to pesti-cides. At the same time, being grown in a controlled environment doesn't mean that the vegetables are propagated artificially. Greenhouse-grown produce takes advantage of natural pollination from nature's best pollinators — bumblebees — which are housed in hives strategically placed throughout the greenhouse. "We also utilize other beneficial insects like ladybugs, which protect our crops from plant feeding pests with an end result of a consistently high-quality product with minimal chemical intervention,"

In addition to educating about the benefits of greenhouse-grown produce, the Greenhouse Goodness campaign shares tasty recipes using greenhous vegetables and invites conmers to submit recipes of their own.

says Lee.

takes off

If you happen to be traversing through Windsor Airport anytime soon, expect to see OGVG's Green-house Goodness campaign up close and interactive. As of this past September, the airport's baggage claim area has been turned into a model of a greenhouse farm and is expected to stay that way for the next two years.

"The Windsor Airport takeover is designed to showcase the high concentration of greenhouses, achievements, and sector innovation in southwestern Ontario to people entering the region," says Lee. As passengers step off the plane and proceed to claim their baggage, they'll be met with educational messaging that promotes the health attributes of greenhouse vegetables and sustainable growing practices that our farmers adopt. "The area abounds with easyto-read infographics, colourful displays, and life-sized images of crops to draw the visitor into the experience," says Lee.

innovative practices of Ontario produce

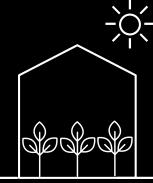




A SPECIAL INTEREST SECTION BY MEDIAPLANET



The increased adoption of automation on greenhouses means that plants are grown under increasingly precise conditions, providing the plant with the best environment to produce a consistent and safe product.



Ontario greenhouse growers can yield over 15 times more produce per square metre than outdoor agriculture.

The controlled environment, hydroponic growing technology and other innovations such as LED lights allow growers a uniform crop year-round while reducing waste, and maximizing yield and quality.





to identify pests and diseases early, further reducing the need for pesticides.





Greenhouse growers practice Integrated Pest Management (IPM)

where good bugs are deployed, such as ladybugs and beneficial mites, w protect greenhouse crops from plant-feeding pesticides.



THE END RESULT

is a consistently high-quality product with minimal chemical intervention.

Future-Proofing Canada's Agri-Food Industry

Oan Canada's agri-food system meet the global demand for products that are better for people, animals, and the planet? Natural Products Canada OEO says we can - and introduces eight companies leading the way



Natural Products Canada

anadian innovators are reimagining the agri-food industry. They're making sure it reaches its full potential as a reliable source of sustain-able products for the world and an economic powerhouse for Canada. Tapping into ingenious solutions from natural sources, these companies are helping Canada meet the growing demand for planet-friendly solutions, while mitigating the risks of climate change, food production, and much more. Shelley King, CEO of Natural Products Canada, a leading investor and champion of sustainable innovation, explains how these world-class companies are leveraging the power of biology to improve productivity, create economic opportunity, maximize quality, and optimize resources within the agri-food industry — and well beyond it into manufacturing, textiles, and more,

How are Canadian start-ups creating new economic opportunities for the agri-food

The opportunities stem from a different way of thinking. We work with over 1500 startups across the country. These founders are not just creating products; they're building businesses with a vision to create meaningful, sustainable industries for their com

munities, while making sure they leave the planet better than they found it. More and more, the global investment world is seeing

the value in that and rewarding them for it. For example, Bast Fibre Tech (BFT) is a material sciences company with a completely new

approach to manufacturing everyday items. They use plants like hemp to produce fibres for items like clothing, textiles, and menstrual

products. BFT is diligently focused on having a positive impact across the whole life cycle of products. Starting with regenerative farming practises that make soils healthier, they are enabling Canadian brands and retailers to create products that move consumers beyond sustainability to regeneration. This has the potential to create a new industry for Canada, leading the world in the creation of positive impact products for everyday purchasing choices.

Another example is Sunnydale Foods.

much mor

naturalproducts canada.com

Natural Products

They're tackling the Canadian problem of shipping locally-grown crops to other countries for value-added processing. Sunnydale's novel manufacturing process uses less water and fewer chemicals to transform Canadian crops into ingredients for the growing plant-based market. They also recently acquired Loyingly Made Ingredients to expand the potential for food manufacturing right here in Canada.

Both companies have caught the attention of public and private funders, including Natural Products Canada, because of their u vision and approach to these important issues.

Farmers are under pressure to produc more without harming the envir How are thes olutions helpir

Many of our clients are developing power-

ful solutions to help farmers increase their vields. BioSun Solutions has proprietary biostimulants and biofungicides that strive to enhance plant and root growth while improving soil productivity over the long term — reducing the need for synthetic chemical application.

The use of antibiotics in livestock is another big issue for farmers. As antimicrobial resistance develops, antibiotics may be less effective. NovoBind has developed gamechanging alternatives to antibiotics called NBXs that shut down a pathogen's ability to infect an animal. Novobind recently published research that showed NBXs can replace or prevent the use of antibiotics in poultry, which welcome news to farmers

We only have so much land and water to work with. Can you explain how these solutions are maximizing our

One of the ways is in upcycling — transforming waste into valuable products. Crush Dynam ics has developed a food ingredient from the waste of the wine industry. It enhances the flavour of foods, which allows food formulators to reduce sugar and salt content. Crush partnered with Purdy's chocolate last year, in which they were able to create a delicious chocolate with 50 per cent less sugar.

Another unique product is being developed by Flaura Cuir Végétal. They are using waste from the apple industry to create alternatives to leather that can be used for clothing, fur-niture, and decor. The interior design and fashion industries are working hard to reduce their environmental impact, and removing animals and petroleum-based products from their supply chain is one way to do that. Although Flaura is in early stages, they have an interesting prototype and a lot of interest from some major names in the design industry. It's this kind of thinking that shows the true potential for Canada's agrifood industry.

These references to global in players are interesting. What is it about

Canadian innovation that they lik It comes down to quality. Canadian founders are fantastic to deal with, but their commit-ment to excellence is where they stand out. Take Prairie Fava. They are North America's only supplier of fava beans that are certified to be free from residue of the herbicide glyphosate and low in the allergen, vicine. So they have this completely clean fava bean packed with protein, fiber, and vitamins that is in high demand by international food proces-

sors. And it's only in Canada.

In a different category, we have Index Bio who has a transformative approach to food traceability. They use baker's yeast to create microscopic barcodes that preserve the identity of products from farm to fork. This is an incredible advantage, BioTags can reduce product recall size by 10 times and verify sus-tainability claims. This allows Index to provide market-leading insurance to an underinsured food system.

These examples just scratch the surface. With partners like the Government of Canada, and NPC's network of investors and other experts who see the incredible value in these solutions, the Canadian agri-food industry is ready for its future as a reliable resource of sustainable products, and an even stronger economic engine for Canada.



BIOLOGICALLY-BASED INNOVATION

IMPROVING PRODUCTIVITY



Biofungicides and biostimulants that improve the health of our ecosystems while helping farmers increase yields



A unique solution that tackles disease in animals, as well as the issue of antimicrobial resistance

CREATING OPPORTUNITY



Relying on regenerative farming methods and patented technology to turn hemp into sustainable clothing, textiles and more.



manufacturing facilities that increase market opportunities for Canadian-grown, plant-based products.

MAXIMIZING QUALITY



PRAIRIE FAVA

Inventors of BioTags, microscopic barcodes for food system risk mitigation and advanced traceability, from farm to fork.

North America's only glyphosate-free, low-vicine fava bean ingredients to serve the growing demand for plant-based foods.

OPTIMIZING RESOURCES





Sustainable alternatives to

derived from the wine industry that help food formulators reduce sugar and salt by as much as 50%.

NATURAL PRODUCT np can be a source of both food and non-food ducts, and helps to restore the soil. Photo Credit: Bast Fibre Technologies Inc.