



vineland
RESEARCH & INNOVATION CENTRE



THE 2025-2026 INNOVATION REPORT

Growing Together:
Fostering Collaborative
Innovation in Canada's
Horticulture Ecosystem



Message from the President & CEO



Ian J. Potter
PhD FCAE President
and CEO

Collaboration - a very open and commonly used word, but one which is rarely understood in execution. For Vineland, effective collaboration often underlies the foundation of what is required for innovating in ourselves and innovation for Canada and what needs to happen from a systems perspective to execute well – not always right, but hopefully never wrong.

It is evident that both in the present and more so in the future, tailored innovation strategies will be needed to both cope with and exploit the economic value chains – regionally, nationally and globally. If executed effectively and meaningfully, collaboration is a key strategic advantage: the top innovators don't try to do everything themselves – they collaborate with a wide range of stakeholders, both inside and outside their companies, sector and with other industries. Collaboration can speed time to market and improve product design and quality. Collaboration is common at the pre-competitive stage of a product but is also occurring more at the later stages in the product development lifecycle. Collaborative joint ventures or consortia which tap into expertise in other industries and new segments of the value chain such as horticulture, require diverse skills sets ranging from plant breeding, production, pathology to engineering systems, robots and automation to the toolkit of data driven digital and artificial intelligence processes – building these skills internally takes time, effort and risk management. A nearer term solution is the collaborative model of project execution.

Most of what is written about collaboration is positive – the general theme seems to be that if you don't collaborate then you must be wrong or lack understanding and team spirit. However, collaboration is often viewed as dangerous. Inherently, collaboration says something is happening outside of one's immediate control.

Over the years, various articles, especially in business related journals, have pointed to the challenges of collaboration, such as:

- Not knowing the answer with each participant needing to be comfortable with a certain amount of ambiguity;
- Unclear or uncomfortable roles, where roles/responsibilities are often fluid, changing from phase to phase of the work;
- Too much talking, not enough doing;

- Information (over)sharing where topics are rarely left in any silo but is shared and often combined in unexpected ways to reframe problems;
- Fear of fighting and the need to deal with conflicting priorities; and
- The excuse culture – in a collaboration, it's hard to know who to praise and who to blame. Collaborative projects are judged on the outcome, more than the individual efforts that went into them. Basically, you win together and you fail together.

However, to Vineland these areas are the critical management tools required to know the pitfalls, but without the following characteristics, collaboration will not work:

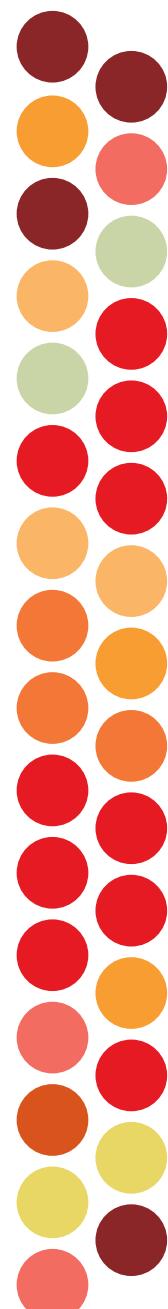
- Firstly, a common outcome, recognizing that each stakeholder may have different metrics to show success in the collaboration.
- Secondly, respect for each other – being open to discuss issues and compromise – never letting issues fester.
- Thirdly, leadership across all levels of the collaboration.
- And lastly, trust, you have to take a risk, but good leadership will give trust to others at the outset – if any party in the collaboration fails the trust test, then their future involvement is in question.

I would also say that collaborative work is not right for every organization, or in every project – so don't force it where it's not needed. Research shows it works best for organizations that need to solve problems across different parts of the business, where cross-pollination of ideas improves the output, where speed to market is crucial, and where getting people to co-own the solution will create more velocity in the execution of the work. This is the space that Vineland works within, with collaboration being one of our core corporate values – its tough work, even internally at Vineland but when we succeed, we see true innovation. The articles in this years Innovation Report are testament to our collaboration, and as a result, impact to the sector.



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Connecting Innovation: Introducing Our New Website

We're proud to unveil our redesigned website — a refreshed, responsive platform that highlights both our innovative spirit and the people and infrastructure that make it possible.

Launched in December 2025, the site is designed to strengthen stakeholder and community engagement while advancing our Environmental, Social, and Governance (ESG) goal of building stronger connections. It also reflects our forward-thinking culture and commitment to delivering real-world outcomes by:

- Enabling faster technology adoption
- Translating research into innovation practice
- Promoting sustainable horticulture
- Supporting Ontario and Canada's innovation and agri-food goals

As Canada's horticulture sector evolves, so does our commitment to accessibility, transparency, and collaboration. The new site features a Thought Leadership section, directing visitors to publications, news, events, and research updates. We've also created clear pathways to our commercial brand, 49th Parallel Collection, and our industry consortium, Greening the Landscape. Now visitors can explore Vineland's latest research, discover collaboration opportunities, and learn about the people and relationships driving change in horticulture — all in one place.

Built for exceptional user experience, our new site offers intuitive navigation, engaging visuals, and accessible content across all devices. The website's fresh look has also become the foundation for a broader refresh of Vineland's marketing and communications — from social media and newsletters to this very Innovation Report. By aligning our digital and print presence, we're presenting a consistent, modern, and engaging identity across every channel.



Our goal was simple: to create a digital space that reflects who we are today — innovative, collaborative, and deeply connected to our industry and community.

We invite you to explore the new site, see what's new, and stay connected by signing up for our quarterly newsletter.

Top 3 Highlights of Vineland's New Website

1. A Modern Look

Fresh visuals and a responsive design reflect our innovative spirit and the culture that drives our work.

2. Easier Connections

Improved navigation provides clear pathways to research, publications, consortiums, and commercial brands — making it simple for stakeholders to engage with us.

3. Collaboration in Action

The site spotlights the people, projects, and stories shaping horticulture, showing how working together drives real impact.

"Our new website marks more than just a digital refresh, it's a strategic step forward in how we engage with industry and government. Designed to be accessible, intuitive, and forward-looking, it reflects our commitment to transparency, collaboration, and innovation. Whether you're a grower, policymaker, or entrepreneur, we invite you to explore the site, connect with our team, and work with us to shape the future of horticulture."



Scan or
click to visit.



Building New Bridges to Turn Waste into Value

Turning waste into opportunity is no small task. Known as waste valorization, it's work that requires collaboration spanning industries, geographies, and supply chains – and Vineland is playing a key role in helping to bring solutions to life.

"Waste to one company can be a valuable resource to another," explains Alexandra Grygorczyk, Research Scientist at Vineland. "Due to our networks and expertise, our role in this space is mapping gaps, identifying the right collaborators, and helping them connect in ways that create new value across Canada's horticulture and food industries."

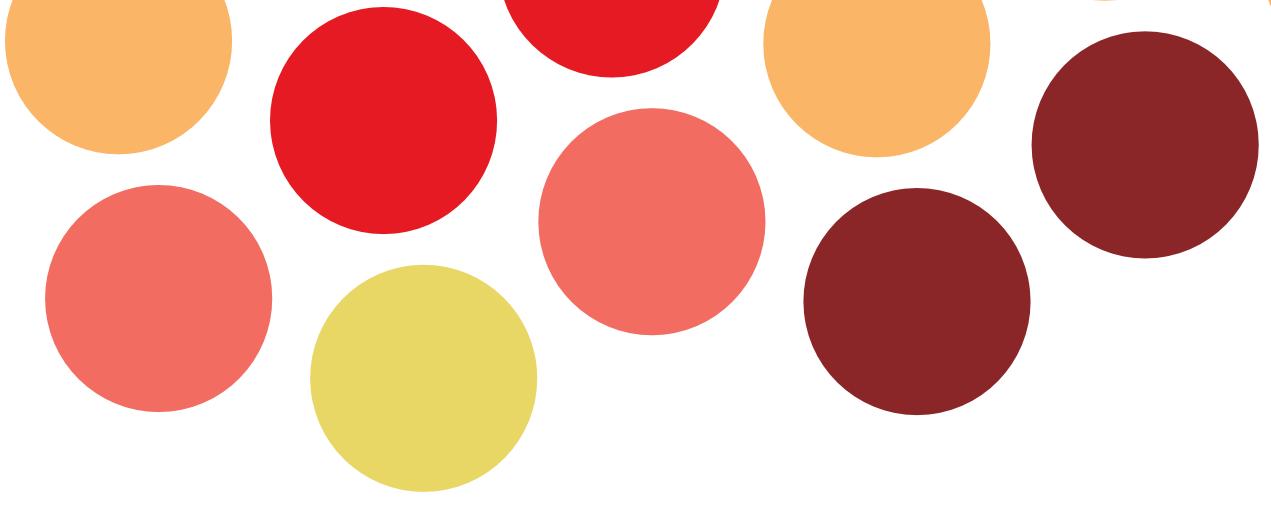
Taking a whole-systems approach

Waste valorization begins with understanding how different value chain members are affected by by-products and surplus materials. Vineland's work involves:

- **Mapping gaps and opportunities** – studying how issues affect different sectors and who could help address them.
- **Identifying players and roles** – understanding challenges, needs, and potential contributions of each stakeholder.
- **Connecting the dots** – bringing stakeholders together through joint research projects and pilot initiatives.

In some cases, Vineland's work in this space has shown that the missing link is closer than anyone realized, Grygorczyk notes.





"We've been able to introduce companies who were geographically located just minutes apart who had never crossed paths because they operate in different parts of the supply chain," she says. "These connections can spark new pathways for by-product use, while in other cases, research is needed to create solutions that don't yet exist."

Turning by-products into resources

Vineland has completed research on 13 types of fruit and vegetable by-products and five types of non-food by-products generated in horticulture. These studies highlight opportunities such as:

- Using vegetable processing by-products in industrial fermentation.
- Connecting fruit and vegetable processors with ingredient suppliers.
- Linking biodigesters to the biofertilizer industry.
- Supplying tree nurseries with surplus material from vegetable processing.

Each of these opportunities demonstrate how rethinking waste can strengthen local supply chains and reduce environmental impact.

Spotlight on greenhouse waste streams

A major focus is a project funded through the Agriculture and Agri-Food Canada Clean Technology program. The project was launched this past winter to look for solutions for greenhouse production waste. Specifically, this means surplus or imperfect cucumbers, tomatoes, and peppers, as well as vines, plastic plant clips, and growing media at the end of the season.

Vineland is exploring ways to give new life to "edible grade-outs", i.e. oversized or imperfect cucumbers and other produce that don't meet Canada No. 1 Grade Requirements. Instead of being sent to landfill or spread back onto fields, these products could be turned into juices, purees, or powder.

"We are looking at global practices from Asia, Europe, and the U.S. about how grade outs are being categorized and managed in those markets to see what we can learn from them in terms of not just solutions or R & D, but also policies, procedures and regulations," adds Mithun Shrivastava, Research Scientist, Vineland.

Another big cost for growers is disposing of vines at the end of a crop cycle, an expense that adds up to tens and sometimes hundreds of thousands of dollars a year depending on farm size.

With rising landfill tipping fees and shrinking landfill capacity, there's a real need for viable, practical alternatives. Research is underway at Vineland on compostable strings and clips, commercial composting, and soil benefits of used rockwool; work on commercial composting of greenhouse waste is also underway elsewhere.

Stakeholders range from waste management companies and composters to insect protein startups. Together, they are testing whether separating materials or adopting compostable alternatives could create scalable, cost-effective solutions.

"In order to find any kind of solution to waste, we need collaboration outside of our traditional buyers and customers in the industry and we are seeing opportunities by making linkages and working with companies who haven't traditionally worked with the greenhouse sector for example," says Grygorczyk. "We're breaking down silos and helping potential collaborators find each other."



Alexandra Grygorczyk PhD



Dr. Lara Ramdin

Building upcycling momentum through collaboration

This past June, after several years of research and relationship-building, Vineland hosted the Canadian Upcycled Food Networking Event, drawing about 70 participants from across the industry. Nearly two thirds of attendees came directly from business sectors including fruit and vegetable processors, consumer packaged goods companies, growers, waste management firms, pet food manufacturers, cosmetics producers, and ingredient suppliers.

- **Fast-pitch presentations:** 35 companies shared short introductions about their needs, challenges, or resources—whether that was surplus pomace, innovative processing technology, or a new product idea.
- **Panel discussions:** Representatives from Fruit d'Or, Upcycled Food Association, Belmont Food Group and Terra Bioindustries sparked lively conversations about opportunities and barriers in the field.
- **Keynote speaker:** Dr. Lara Ramdin, a systems and design thinking leader at the forefront of innovation and sustainability, shared her perspectives on transforming complex food systems.



"The energy in the room reflected the value of the groundwork Vineland has laid in this area and many attendees made connections that are continuing beyond the event, reinforcing the importance of a collaborative approach," she says.

This work was supported by the Ontario Agri-Food Innovation Alliance, a collaboration between the Government of Ontario and the University of Guelph.

What's next

Vineland's on-going work will be focused on capturing lessons, ensuring industry buy-in, and determining what kind of permanent network could support Canada's upcycling and valorization sector in the long term.

For Vineland, the waste valorization journey has underscored one clear lesson: tackling waste requires breaking down silos. By bringing unlikely collaborators together, Vineland is helping to transform by-products from a disposal problem into a platform for innovation, sustainability, and new economic opportunities.

COLLABORATION AT WORK

- **Turning waste into opportunity** – Vineland has uncovered new uses for fruit and vegetable by-products and non-food by-products, by linking sectors like food processing, biofertilizers, and nurseries to reduce waste and strengthen local supply chains.
- **Developing greenhouse waste solutions** – Through research funded by Agriculture and Agri-Food Canada, Vineland is tackling costly greenhouse waste streams such as surplus fruit and end-of-season vines, exploring options from juice and puree production to compostable strings, land application, and soil amendments.
- **Building tomorrow's upcycling network** – Years of groundwork culminated in the Canadian Upcycled Food Networking Event, connecting 70 industry players and sparking new collaborations that will shape a long-term network for Canada's upcycling and valorization sector.

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"The mission of this industry is important. Sometimes companies don't even realize the resources or potential collaborators that are available to them. I think what Vineland is doing — bringing people together and encouraging cooperation — is exactly what we need."

- Diana Valtierra
Director of Sciences
Agri-Neo

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Cultivated for Canada, Shared with the World: Vineland's Collaborative Approach to Developing Resilient Crops

Adapting crops to changing climatic conditions while meeting evolving consumer tastes is no small task. At Vineland, that challenge has become an opportunity to develop and bring resilient varieties of apples, pears, tender fruits, roses, sweet potatoes, and tomatoes to market—with a focus on Canadian growers but also an eye on global opportunities.



Michael Pautler PhD

"Vineland occupies a unique role in Canada's innovation landscape as a non-profit, horticulture-focused research centre," notes Michael Pautler PhD, Director of Commercialization, Vineland. "Our breeding programs deliver varieties that are locally adapted, climate-resilient, and commercially viable and we have built strategic relationships across the value chain to ensure new varieties make their way from trial plots to greenhouses, orchards, and ultimately grocery shelves."



Apples: building a global nursery network

Although the first plantings of varieties coming from Vineland's apple breeding program are still a few years away, the collaborations at its foundation show how Canadian innovation can be scaled worldwide.

Through a collaborative framework with the Associated International Group of Nurseries (AIGN®)—a network of 11 members across the globe—Vineland's advanced apple selections are being trialed not only in Ontario, Quebec, and Nova Scotia, but also in countries like the United States and South Africa. Clean, disease-free material is safeguarded in both Canadian and European repositories, enabling safe global distribution.

This collaborative approach ensures new Vineland-bred apples aren't just adapted to Canadian conditions but have a chance to reach growers and consumers worldwide.



Pears: a commercial breakthrough with Happi Pear®

Not every Vineland success story begins with a Vineland cross. The Happi Pear®, whose origins can be traced back to the former Agriculture and Agri-Food Canada breeding program, has found its commercial home thanks to Vineland's evaluation and market development efforts and expertise.

A collaboration with Stemilt Growers, a major fruit marketer based in Washington State, has been key to Happi Pear's success. With significant plantings now established in Washington and across Canada, commercial harvests continue to increase, and fruit is making its way to more retailers and consumers every year. This collaboration exemplifies how strategic partnerships can bring innovation to market - uniting Stemilt's leadership in North America with AIGN's international reach to position a promising pear for global success.



Roses: from Canadian gardens to international markets

Working with the Canadian Nursery and Landscape Association, Vineland's 49th Parallel Collection, which also traces its roots to breeding work by Agriculture and Agri-Food Canada, has become a recognizable retail success across Canada, synonymous with hardy, low-maintenance roses suitable for Canadian gardeners from coast to coast. But the program doesn't stop there.

Thanks to collaborations with nursery stakeholders in both Canada and the United States, dozens of additional rose varieties stemming from the same genetic material bank are currently part of growing trials. A showcase garden at Vineland allows commercial stakeholders to view more than 100 top selections, choosing which to propagate and bring to market. Relationships with nurseries such as Bailey Nurseries are helping promising varieties enter the U.S. market, ensuring Canadian-bred roses continue to bloom far beyond our borders.

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“Bailey Nurseries has a long history of working with Canada on new plants, from the Morden Monarda to the Parkland and Explorer rose series of the past. We are excited to continue our collaboration on roses with Vineland. Their thorough testing and vetting of accessions before we even obtain plants is very helpful to our test process. Hardiness and disease resistance is excellent, and we look forward to adding Vineland bred roses to our Easy Elegance® brand well into the future.”

- Debbie Lonnee
Senior Product Developer
Bailey Nurseries

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Sweet potatoes: Canadian innovation with international reach

Sweet potatoes were once a challenge for Canadian growers, but varieties developed to thrive in Canada's shorter, cooler growing seasons, have changed that. By expanding the network of licensed slip propagators throughout Canada and the United States, growers will have access to reliable planting stock, enabling larger acreage plantings and ensuring a healthy domestic industry while opening the door to US market entry.

As a next step, Vineland made-in-Canada innovations are pushing even further afield. Five new Vineland-bred sweet potato varieties are already licensed in the European Union through an agreement with Volmary GmbH. European growers are now benefiting from Vineland's new varieties, with 60 acres under cultivation in 2024 and plans to increase plantings substantially in the coming years.

Tomatoes: tackling greenhouse growing challenges through collaboration

Greenhouse tomatoes are a cornerstone of Canadian horticulture, particularly in southwestern Ontario, the epicentre of North American's greenhouse vegetable industry. Vineland's tomato breeding program is producing varieties with strong disease resistance and local adaptation for Canadian growers, but bringing these to market requires resources and supports that Vineland cannot manage alone.

"The greenhouse tomato industry needs special certified seed production and there are only a small number of certified production sites in the world," explains Pautler. "Vineland also typically cannot fulfill all sales, marketing, and distribution functions, so we rely on carefully chosen relationships to help with seed distribution."

These relationships are laying the groundwork for the next generation of disease-resistant tomatoes, including future lines targeting resistance to Tomato Brown Rugose Fruit Virus (ToBRFV). Vineland's first generation of tomato-on-the-vine (TOV) varieties—eight in total—are now being trialed with growers in Canada, the U.S., and Mexico.



Designed for Canada, shared with the world

At its core, Vineland's climate resilient crops are built for Canadian growers, nurseries, and consumers. Local adaptation ensures new varieties thrive in Canadian conditions while offering fresh choices for growers and shoppers.

But through collaboration, the benefits extend far beyond Canada's borders. Whether it's apples in South Africa, pears in Washington, sweet potatoes in Europe, roses in the U.S., or tomatoes in Mexican greenhouses, Vineland's collaborations make it possible for Canadian-bred innovation to have global impact.

As climatic changes continue to reshape agriculture, Vineland's collaborative model shows that working together—across crops, sectors, and borders—is the key to resilience and long-term success.

COLLABORATION AT WORK

Relationships power commercialization – Vineland works with nurseries, marketers, propagators, and seed distributors to bridge the gap between research and market, ensuring new climate-resilient crops reach growers and consumers.

Collaboration drives global reach – From apples trialed worldwide through the AIGN® network, to sweet potatoes licensed in Europe and roses entering the U.S. market, Vineland's Canadian-bred innovations are expanding internationally through trusted relationships.

Shared success across the value chain – By building strong collaborations, Vineland delivers benefits not only for Canadian growers and nurseries but also for international collaborators, proving that resilience and innovation grow best when developed together.

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"The Vineland team successfully selected a pear with characteristics that make it grower and consumer friendly. We see that as an ideal combination for building a brand that will delight consumers across the globe, and we are excited to be part of this collaboration."

– West Mathison
President
Stemilt

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Rose Buitenhuis PhD

Shared Research in New Pathology Laboratory. Leads to Shared Solutions

When it comes to safeguarding crops against emerging plant diseases, no single organization can do it alone. That's why collaboration has been at the heart of Vineland Research and Innovation Centre's new Advanced Pathology Laboratory (APL) — a facility to conduct biosecure plant pathogen trials that would otherwise be too risky to execute for conventional greenhouses.

Meeting an urgent need

A catalyst for developing the APL was tomato brown rugose fruit virus (ToBRFV), a highly infectious pathogen that has become an international threat to greenhouse tomato production. Conducting trials with such viruses in Vineland's main research greenhouses wasn't feasible: even the smallest breach could endanger years of breeding work.



"We saw a need to be able to do testing and research with plant pathogens that are a priority for the industry but could pose a risk to some of our existing installations," says Rose Buitenhuis PhD, Director, Biological Crop Protection, Vineland. "For example, if we were to do trials in our normal greenhouse on a pathogen like rugose, the risk to our entire tomato breeding program would be immense, so we knew we needed a workable solution."

Instead of stepping away from industry needs, Vineland saw an opportunity. By repurposing a remote campus building and enhancing it with a customized genomics trailer, Vineland, partly funded by (ARIO), an agency of the Government of Ontario, was able to create a biosecure facility.

The APL contains six independent growth rooms. With the strict management of quarantine measures, Vineland scientists are able to safely run trials, screen breeding material, and test disinfection and disease management products without risk to surrounding research.

"We're now in a position where we can do research the industry really needs and we have a few projects already successfully running," says Buitenhuis.

For example, researchers can screen breeding material – including Vineland's own tomato collections – for resistance to pathogens like ToBRFV, to help bring more resilient varieties to market.



Rugose Infected Tomatoes





Built on collaboration

The new facility is a direct result of collaboration between Vineland and ARIO to support several small- and medium-sized enterprises (SMEs) in the industry.

- **ARIO**, as the Vineland Research Station property owner and a critical investment partner, highlighted plant health as a research priority and contributed to capital costs.
- **Vineland** contributed operational expertise and oversight of the facility's farms and infrastructure.
- **Industry clients** joined forces in shared trials, pooling resources in an evidence-based approach that reduces costs and accelerates time to market for new technologies and innovations that solve real industry problems.

One of the lab's first major shared trials, run by Vineland's plant pathology team, involved testing surface disinfection treatments against rugose virus.

Participating companies paid to have their products be part of the trials, and Vineland's researchers then compared their performance against commercial standards. This collaborative model has already proven successful and is now being applied to other areas such as insecticide trials in vineyards and disease detection technologies.

"We are starting to do more and more shared research trials where we connect different companies in the same trial to make the whole process more affordable and accessible for everyone," says Buitenhuis. "It's a very successful model we are starting to apply more and more and serves as a very interesting – and mutually beneficial – model of cooperation."





Benefits for industry and research

The new lab is already delivering clear value for both Vineland and the horticulture sector:

- Biosecure testing environment – The lab allows work with high-risk horticulture plant pathogens present in Canada, without needing to build a full Canadian Food Inspection Agency Plant Pest Containment Level 2 facility.
- Support for plant breeding – Vineland can now screen its own breeding material as well as collections from others in the industry for disease resistance, strengthening future crop resilience.
- Shared trials model – By connecting multiple companies into the same trial, Vineland lowers costs, fosters pre-competitive collaboration, and ensures evidence-based outcomes.
- Service offering for industry – The facility is available as a testing service for clients developing technologies against tomato viruses and other pathogens.

Looking ahead

Vineland will continue to meet emerging industry needs and provide the suite of pathology and pest management research that will be able to respond to current, and future challenges.

Ultimately, the lab reflects what Vineland does best: bringing together public, private, and academic collaborators to solve pressing horticultural challenges. In doing so, it not only safeguards Ontario's greenhouse sector but also positions Canada as a leader in collaborative, science-driven plant health innovation.

COLLABORATION AT WORK

Safe research on high-risk plant pathogens – Vineland's Advanced Pathology Lab provides a biosecure environment to study threats like tomato brown rugose virus without endangering breeding programs or existing facilities.

Collaboration that accelerates innovation – Built through cooperation with ARIQ and industry SMEs, the lab enables shared research trials that pool resources, reduce costs, and speed evidence-based solutions to market.

Direct benefits for growers and industry – From screening breeding material for disease resistance to offering testing services for new technologies, the lab strengthens crop resilience and supports a more competitive horticulture sector.

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"We're starting to do more and more shared research trials...connecting different companies in the same trial to make the whole process more affordable and accessible."

– Rose Buitenhuis PhD
Director, Biological Crop Protection
Vineland

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Greening the Landscape: How Collaboration is Driving Healthier Urban Forests

Vineland Research and Innovation Centre's Greening the Landscape Research Consortium is proving the power of collaboration in shaping greener, more resilient cities. Now in its second phase, the consortium has brought together a diverse group of partners from across the urban tree value chain to address the challenges and opportunities of urban forestry in Canada.

Building on early success

The first three-year phase wrapped up in 2024 with valuable case studies ranging from faster detection of oak wilt to ensuring urban forest canopies are planted with an eye to social equity.

For example, research helped municipalities understand how to spread tree planting more fairly across neighbourhoods, including those with fewer resources, so all residents can benefit from green space. Other projects explored the economics of using smaller nursery stock and balancing tree survival rates with impacts on growers and landscapers.

Consortium members include nursery associations and suppliers, landscape contractors, municipal foresters, developers, landscape architects, arborists, and non-profits.

With this strong foundation, phase two launched in July 2024 with five new projects, fresh collaborations, and new members who are expanding the consortium's expertise and reach.

A value chain approach

"At its core, the consortium is designed to be inherently collaborative. Urban trees don't exist in isolation—they are influenced by a wide range of people and organizations at every stage of their life cycle," says Rhoda deJonge PhD, Director of Plant Responses and the Environment, Vineland.

"From seed and nursery care to site planning, planting, and long-term maintenance, each step has its own stakeholders and challenges," she adds. "By bringing all of these voices together from the start, we can test potential solutions against the realities of the entire value chain, ensuring they are practical, effective, and sustainable."

Expanding membership and expertise

Recent additions to the consortium have further strengthened the network. Connon Nurseries and Bartlett Tree Experts have come on board, offering opportunities for knowledge exchange about Canadian urban forestry challenges.

National non-profits Forests Canada and Tree Canada have joined as well, broadening the consortium's reach beyond its original base in Ontario to include cross-Canada perspectives. With new comfort around virtual collaboration and the use of GIS expertise, the consortium is now well-positioned to take on projects across Canada.

Collaboration in practice

The strength of the consortium's approach to collaboration doesn't stop just at research and project trials. Members have also been coming together to work directly on solving real-world challenges. For example:

- Municipalities are working with a consortium nursery partner to source and grow trees suited to their communities' needs.
- A consortium member is testing its soil amendment products on other members' sites to demonstrate how they improve young tree establishment.
- Municipalities are benefitting from clearer planting guidelines they've been able to develop in collaboration with a landscape services provider who is part of the consortium.





Extending reach beyond the consortium

Extending its impact beyond the consortium, Vineland works with the Niagara Parks Commission (NPC) on urban landscape initiatives. This collaboration includes developing specialized soil restoration plans and designing a step-by-step framework for establishing a food forest, in consultation with NPC's culinary and maintenance teams.

The Niagara Parks Commission is one of the initial collaborations we identified where we could provide support outside of the consortium," notes deJonge. "The Niagara River corridor has been home to Indigenous Nations for thousands of years prior to colonization. Its distinctive geography and cultural significance present unique soil restoration challenges. By monitoring and maintaining the soil health, we help ensure better survival outcomes for the trees.

Looking ahead

The Greening the Landscape consortium is more than just a research network. It is a collaborative platform where each member contributes expertise, learns from others, and helps shape urban forestry practices that benefit communities across Canada.

As phase two unfolds, the consortium is continuing to tackle critical challenges—whether social, economic, or ecological—through the combined strength of its diverse members. The result is not only healthier urban forests but also stronger partnerships along the entire urban planting value chain that will help ensure solutions are practical, enduring, and built to last.

COLLABORATION AT WORK

- **Collaboration across the urban tree value chain**
 - By involving nurseries, landscape contractors, municipal foresters, arborists, developers, non-profits, and more, the consortium ensures solutions are practical, effective, and sustainable from seed to long-term care.
- **Expanding collaboration for broader impact**
 - New members are strengthening the consortium's expertise and extending its reach beyond Ontario to a national scale.
- **Real-world problem solving through joint efforts**
 - Members are teaming up on projects such as sourcing region-specific nursery stock, testing soil amendments in the field, and creating clear municipal planting guidelines, demonstrating the tangible benefits of shared knowledge and collaboration.



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"By monitoring and maintaining the soil, we give the trees a greater chance of survival."

- Rhoda deJonge PhD
Director of Plant Responses
and the Environment

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Breaking Barriers to Ag-tech Adoption by Connecting Growers and Innovators

Canadian agri-food is at a crossroads. Labour shortages, economic challenges, and the pressure to stay globally competitive mean incremental improvements aren't enough to stay ahead of the curve. True transformation and the tools for a strong industry in the future will only come through collaboration and technology adoption — and that's exactly the focus of work underway at Vineland.

Learning from other industries

Sectors like manufacturing, automotive, and healthcare have long embraced automation, artificial intelligence (AI), robotics, and data-driven decision-making. Their experience shows that adoption happens when end users are involved early, when return on investment is clearly demonstrated, and when intermediaries help translate complex technologies into real-world applications.

"We don't need to reinvent the wheel — we just need to adjust the tire pressure for the farm," says Brian Lynch PhD, Director, Horticultural Technology System. "That means working with growers from the start, so solutions are practical, affordable, and built with their realities in mind."

Collaboration as the key to uptake

Too often, notes Lynch, agricultural technologies stall before reaching the farmgate because they're designed without input from growers and processors. Vineland is helping change that dynamic by bringing together growers and producers, technology developers and entrepreneurs, researchers, and government funders to co-design, validate, and scale innovations.

That collaborative approach addresses critical issues such as pricing models, data privacy, and usability. It also helps overcome barriers unique to farming — thin margins, limited time, the pressures and limitations of the seasonal growing cycle, and the fact that "good enough" practices already in use on the farm can often delay the adoption of new tools.

"Growers want to see proof that a new system is worth the investment," says Lynch. "That's why hands-on trials and demonstrations in real farm environments are so important. They help take the risk out of innovation for growers."

The Critical Technologies Initiative: a catalyst for change

Vineland is a Technology Demonstration Site through the Critical Industrial Technologies (CIT) stream, part of Ontario's broader Critical Technologies Initiative (CTI) administered by the Ministry of Economic Development, Job Creation and Trade.

The CTI aims to strengthen Ontario's innovation capacity and economic resilience by advancing the development, commercialization, and adoption of technologies identified as critical to the province's long-term competitiveness. Within this framework, the CIT stream supports small and medium-sized enterprises (SMEs) in six critical technology areas across four sectors, including agri-food.

Until September 2026, Vineland's objective is to assist more than 20 companies in de-risking and validating their technologies for commercial adoption.

Projects underway include:

- Robotics for apple thinning and asparagus harvesting
- AI/vision systems for pepper disease detection and tomato packaging optimization
- Next-generation pest and disease scouting tools
- Robotic weeding systems for carrots and onions
- AI systems for carbon sequestration monitoring



According to Lynch, these efforts are supported by Vineland's unique strengths: multidisciplinary expertise across horticulture and technology, extensive research infrastructure including perennial crops, and expertise in specialized tools such as robotics, artificial intelligence and imaging systems.

Demonstrating collaboration in action

A major recent milestone for Vineland was the Critical Technology Demonstration Day, held this past June in collaboration with Ontario Centre of Innovation. The event drew over 100 participants and featured live demonstrations of 13 emerging Ontario-based technologies in orchards and fields.

Attendees — including growers, technology developers, researchers, and policymakers — saw firsthand how robotics, sensors, and automation tools perform in real horticultural conditions.

"Seeing is believing when it comes to accelerating adoption of new technologies — there's nothing better than seeing it with your own eyes," remarks Lynch.

In addition to demonstrations, participants took part in guided tours explaining technology performance, integration challenges and benefits, creating new connections, and sparking additional collaborations.

Looking ahead: building a shared vision

Vineland's vision is clear: by combining government and industry investment, business insights, and applied research, Ontario has become a global leader in sustainable, tech-enabled food production.

"Collaboration will remain central to sustaining the vision", asserts Lynch.

"It's not just about fitting technology into existing farming practices. It's also about adapting our growing methods, infrastructure, and even crops themselves to unlock the full potential of innovation. That's the change collaboration makes possible," he concludes.

COLLABORATION AT WORK

Driving adoption through collaboration: Vineland connects growers, technology developers, researchers, and government funders to ensure solutions are practical, affordable, and built around grower needs and break down barriers that often prevent new agtech from reaching the farmgate.

De-risking innovation for the industry: Through the Critical Technologies Initiative, Vineland is validating robotics, AI, sensors, and bioengineering tools in real-world trials, helping companies move promising technologies from concept to commercial adoption.

Building momentum for change: Events like the Critical Technology Demonstration Day showcase innovation in action, creating confidence among growers, sparking new relationships, and positioning Ontario as a global leader in sustainable, tech-enabled food production.

“

"We truly value events like this for the chance to engage directly with potential partners, and to learn more about Grower needs."

Derek Davy
Founder & CEO
Econse

”

Growing Together Through Innovation and Collaboration

In the realm of horticultural advancements, the synergy between innovation and collaboration is the cornerstone of success. This principle is exemplified by the relationship between the Vineland Research and Innovation Centre and Sunrise Greenhouses Ltd. Since 2007, Vineland has been at the forefront of driving horticultural innovation in Canada, supported by substantial government investments. This is the story of how government investment of over \$60 million has enabled the success of the sector by empowering Vineland to develop cutting-edge technologies and services that address the unique needs of the horticulture industry.

Empowering Innovation Through Government Investment

Government support since 2007 enables Vineland to develop products and services addressing existing gaps in Canada's horticulture industry and facilitated the development of **39 distinct plant varieties** with formal Plant Variety Protection, **and five patented technologies**.



Nearly 90% of Vineland developed technologies/projects are either commercialized or actively being utilized in collaborative R&D.

Additionally, Vineland has developed over **30 distinct services** to support over **200 horticultural businesses**.

By leveraging government investment, Vineland has scaled advanced technologies through the Technology Readiness Level (TRL) framework. This structured approach ensures that innovations are thoroughly tested and validated under real-world conditions, progressing from conceptual stages to market-ready solutions. As a result, growers gain access to the latest tools, products, and services tailored to their specific needs, enhancing productivity and sustainability within the horticultural sector. Rodney Bierhuizen of Sunrise Greenhouses, an innovator and head grower, has effectively utilized Vineland's resources to develop and implement new technologies.

Innovator Spotlight – Rodney Bierhuizen

Bierhuizen co-owns Sunrise Greenhouses, which spans 1,000,000 sq.ft. and produces a range of exclusive crops. Named Greenhouse Canada's Grower of the Year in 2023, he exemplifies strong work ethic, leadership, initiative, and innovation. Bierhuizen's passion

for horticulture has led to the development of advanced technologies like moisture sensors and robotic transplanters. He also serves as the President of Flowers Canada, advocating for the floral industry locally and nationwide, making Sunrise a leader in greenhouse automation and innovation.

Rodney serves on Vineland's Stakeholder Advisory Council as the member representative from Flowers Canada Ontario. Additionally, Sunrise has collaborated with Vineland in various ways since 2009. Rodney Bierhuizen highlights Vineland's approach:

“Vineland equips growers with the tools they need by helping them choose effective solutions and providing access to resources and innovations for success in horticulture.”

Working with Vineland has allowed Sunrise Greenhouses to access new product lines, improve production practices with innovative tools, and utilize Vineland's R&D services directly, leading to advancements in their operations.

Driving benefits to growers

The collaboration between Vineland Research and Innovation Centre and Sunrise Greenhouses Ltd. showcases how strategic governmental support is driving forward the horticultural industry. This collaboration has not only brought advanced technologies to the forefront but has also empowered growers with innovative solutions tailored to their unique needs. The mutual efforts have resulted in enhanced productivity and sustainability, showcasing the transformative power of innovation and collaboration.

Access to new products

With the support of Vineland's genomic expertise, Sunrise Greenhouses introduced the versatile Pixie™ Grape to the Canadian market in 2012. This relationship facilitated the development of an exclusive

ornamental product for Sunrise. The Pixie™ Grape, a unique variety of *Vitis vinifera* derived from Pinot Meunier—a grape traditionally used for wine and champagne production—distinguished itself as an exceptional ornamental, mini-sized grapevine featuring tiny clusters of red-skinned grapes. It serves as an ideal decorative piece for indoor and outdoor settings, gardens, or balconies. This client driven project enabled Sunrise to successfully expand this product internationally, reaching markets in Europe, Japan, and the United States.

Advancing production practices

Vineland has contributed to the development of new tools for greenhouse production, benefiting operations like Sunrise. By working with Vineland, Sunrise has implemented AI-based irrigation systems that optimize watering strategies for various crops.

Bierhuizen transitioned from manual to automated pneumatic valves, reducing operational costs. Vineland's AI system, connected to wireless sensors, predicts watering needs based on soil moisture and climate data, providing insights to help growers make informed decisions. This approach has positioned Sunrise as a leader in smart irrigation technology, improving both plant health and resource efficiency.

R&D services

Sunrise specializes in unique *Campanula* (Bellflower) varieties, with an emphasis on compact growth, increased flowering, and vibrant colors. These hardy perennials thrive in zones 3-8. Sunrise develops its own varieties, with formal plant protection marketed under their 'Majestic' brand label.

Over the years, Vineland has completed five projects with Sunrise to support their ongoing plant breeding and variety improvement efforts. Among other services, Vineland provides genotyping by sequencing (GBS) services to accelerate Sunrise's plant breeding and trait development. GBS is a cost-effective method for discovering and genotyping Single Nucleotide Polymorphisms (SNPs). Vineland's Deep Variant Scanning (DVS) combines GBS with chemically induced variation to identify new plant traits, thereby reducing the time required to develop new varieties.

Through government investments and Vineland's strategic support, growers like Sunrise Greenhouses have been able to access new product lines, adopt advanced production practices, and leverage cutting-edge R&D services. Ultimately, Vineland's commitment to empowering growers and advancing horticultural practices ensures a sustainable and prosperous future for the industry.



sunrisegreenhouses.ca

COLLABORATION AT WORK

Empowering Growers Through Government Investment Since 2007

Key Achievements

- 39 plant varieties developed with formal Plant Variety Protection
- 5 patented technologies created
- 90% of projects commercialized or actively engaged in R&D
- Over 30 distinct services to support horticultural businesses
- 233 companies supported

Services Offered

- Product development
- Evaluation and testing
- Analytical services
- Commercialization and IP management
- Training
- Consultancy

Impact of Government Investment

- Direct support for growers
- Enhancing sustainability and profitability
- Enabling innovative and sustainable practices
- Ensuring long-term viability and success in the horticulture industry
- Sustaining and growing jobs in the sector



Driving Impact: Embedding ESG into Vineland Operations and Innovation

In 2024-25, Vineland launched its Environmental, Social and Governance (ESG) Framework, setting the foundation for a more sustainable and resilient organization. In 2025-26, we finalized our goals and metrics, and executing our strategies in all our priority areas, including:

- **Environmental Pillar:**
 - Energy Management
 - Water Use Management
 - Vineland Waste Management
 - Travel Management
- **Social Pillar:**
 - Workplace Safety
 - Employee Wellbeing
 - Human Capital Development
 - Employee Retention
 - Client Relations
 - Equity, Diversification and Inclusion
 - Intellectual Property
 - Community Relations
 - Privacy and Data Security
 - Procurement Practices
- **Governance Pillar:**
 - Board of Directors: Accurate and Timely Reporting
 - Board of Directors: Fiduciary Accountability
 - Board of Directors: Ethics and Transparency

As a result, this year's ESG Report summary showcases how we've transformed insights into tangible impact, strengthened our performance, and sharpened our focus. It reflects the dedication of our people, the collaboration with our stakeholders and our shared commitment to embedding sustainability in everything we do.

2024-25 Progress and Priorities

Considerable progress was made this year, especially in waste management, Equity, Diversity, and Inclusion (EDI) and client relations. Below, we summarize our key achievements and ongoing commitments across the three fundamental pillars of ESG: Environmental, Social, and Governance.

Environmental Aspect:

In 2024-25, Vineland advanced its environmental stewardship through improved energy use, water utilization, and waste management practices. Greenhouse gas emissions were benchmarked against natural gas and hydro usage, laying the groundwork for future efficiency and sustainability initiatives. Water consumption continued its gradual five-year decline, supported by enhanced leak detection, proactive maintenance, and a strong commitment to conservation. At the same time, Vineland has reduced its landfill footprint year over year, reflecting effective waste management strategies and progress toward a more sustainable operational model.

CALLOUTS (VS 2019 BENCHMARK):



Social Aspect:

Vineland strengthened its commitment to people by prioritizing safety, health, and professional development. Workplace safety remained exemplary, with zero lost days due to incidents and a continued decline in overall safety incidents, supported by proactive near-miss reporting. Employee well-being also demonstrated resilience, with stable mental health indicators and strong engagement. Investment in human capital also advanced, with more support to professional development, underscoring Vineland's focus on continuous learning.

Annual staff fundraising initiatives to benefit local community non-profits have also made a significant impact, leading to a 53% increase in monetary donations and a 66% increase in food donations since tracking began in 2022. These efforts highlight the strength of employee-driven community engagement and Vineland's broader commitment to supporting the communities it serves.

CALLOUTS (VS 2019 BENCHMARK):



Governance Aspect:

Vineland advanced its governance priorities in 2024-25 by strengthening client relationships and deepening its commitment to equity, diversity, and inclusion (EDI). Client satisfaction reached record levels, with high returning client rate, demonstrating trust in our relationships.

On the EDI front, Vineland continued to embed inclusivity within its governance framework by developing meaningful metrics to track progress and accountability. These efforts reinforce our commitment to creating a workplace culture that values diverse perspectives and supports equitable opportunities across the organization.

CALLOUTS (VS 2019 BENCHMARK):



Looking Ahead:

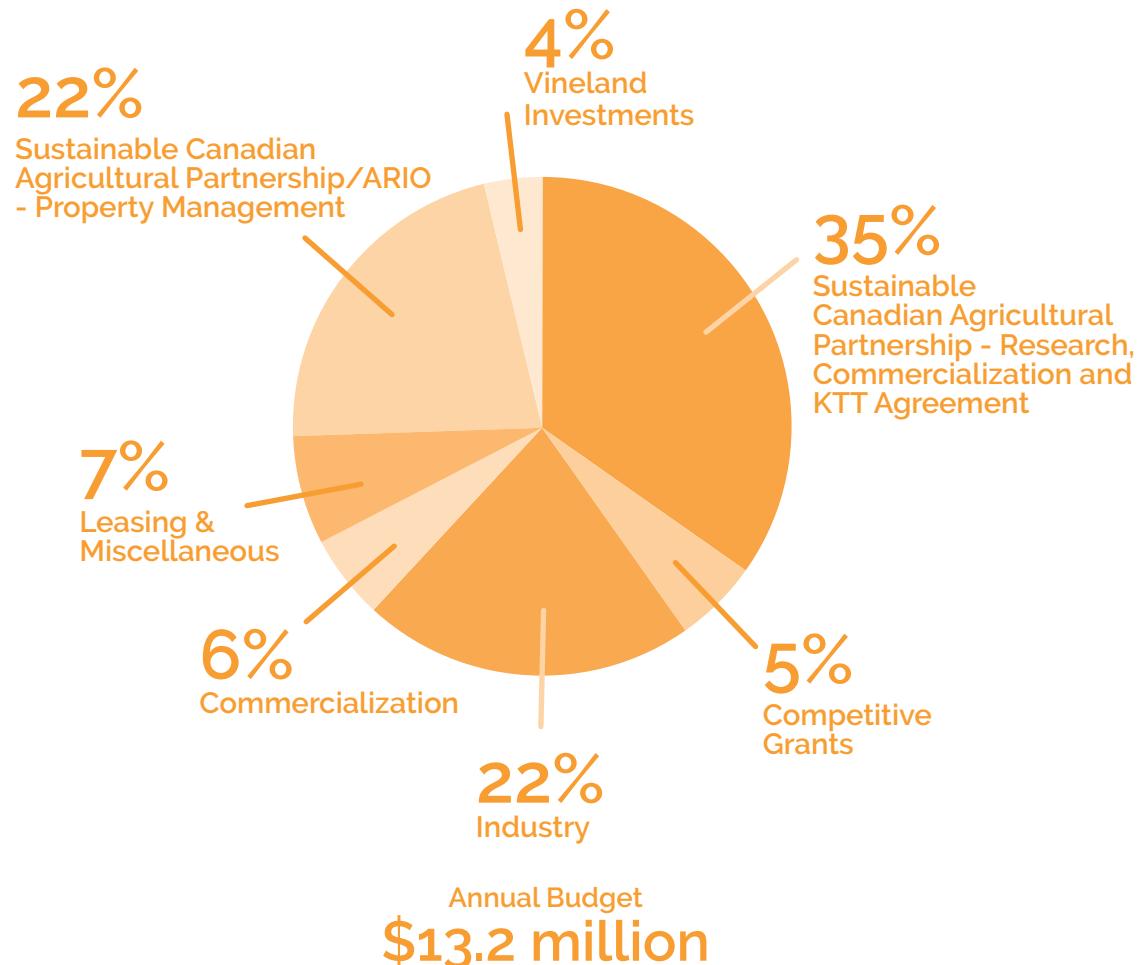
We will continue our focus on enhancing workplace safety, supporting employee health and wellness, and an increasing focus is the evolution of the 'Client Relations' factor. Building stronger client relationships will be central to our success, with a more focused commercialization approach supporting the long-term sustainability and growth of the organization and our ability to invest in person, infrastructure and equipment.

Our commitment to ESG remains as strong as ever, not as a checklist, but embedded in our operations and innovation practices. The progress captured in these pages is just the beginning. With the dedication of our people and the support of our stakeholders, we'll continue turning bold goals into lasting impact.



Vineland at a Glance

Revenue April 1, 2024 - March 31, 2025



Commercialization since 2007

4

Vineland developed technologies with patents issued/filed

14

trademarks registered/filed

32

plant varieties with Plant Variety Protection issued/filed in Canada

76

per cent of Vineland's protected IP is commercialized or under further collaborative R&D with business partners

Collaborators

361 total* **330** industry **7** academic **24** government

From

9 Canadian Provinces

(Alberta, British Columbia, Manitoba, New Brunswick, Nova Scotia, Ontario, Prince Edward Island, Québec and Saskatchewan)

16 Countries

(Canada, United States, Switzerland, India, Malaysia, The Netherlands, Belgium, Germany, United Kingdom, France, Australia, Israel, Norway, Sweden, Spain, Finland)

(As of April 1, 2024 - March 31, 2025)



May Chang, Board Chair

Vineland's Board of Directors (2025-26)

May Chang, Board Chair

Tony DiGiovanni,
Board Vice Chair

Ian Potter,
President and CEO

Lori Hall

John Groenewegen

Derek Lothian

Rick Mastronardi

Mark Picone

Glen Price

Liz Stokes Bajcar

Angela Zangari

Scott D'Cunha

Research capacity and performance

15

research scientists

\$217,293

research intensity (research revenue generated per researcher)*

\$44,393

innovation strength (royalties generated per researcher)*

42%

proposal success rate*

Job Creation, education and training

77

full-time staff

45

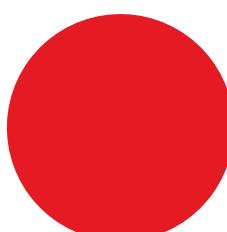
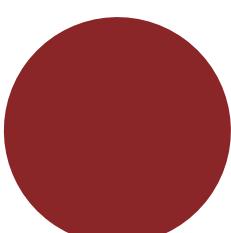
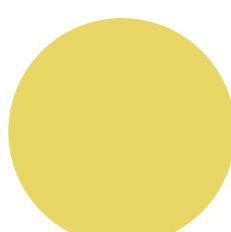
highly qualified positions

2

PhD Students

As of April 1, 2024 - March 31, 2025

As of April 1, 2024 - March 31, 2025





vineland
RESEARCH & INNOVATION CENTRE

Vineland Research and Innovation Centre is a uniquely Canadian results-oriented organization dedicated to horticulture science and innovation. We deliver innovative products, solutions and services through an integrated and collaborative cross-country network to advance Canada's research and commercialization agenda.

Vineland is situated on treaty lands. These lands are steeped in the rich history of the First Nations including the Hatiwendaronk, the Haudenosaunee, the Anishinaabe and the Mississaugas of the Credit First Nation. Many First Nations, Métis and Inuit people from across Turtle Island live and work in Niagara today. Vineland stands with all Indigenous people, past and present, in promoting the wise stewardship of the lands on which we live.

We are an independent, not-for-profit organization, funded in part by the Sustainable Canadian Agricultural Partnership (Sustainable CAP), a five-year, federal-provincial-territorial initiative. The property and, in part, buildings at the Vineland Research Station are owned by Agricultural Research and Innovation Ontario, an agency of the Government of Ontario.

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Sustainable Canadian
Agricultural Partnership



Ontario

Canada