

Vineland's Automation Cluster seeds a homegrown industry



The global market for Canadian agricultural production is growing and this is good news.

It also poses a significant challenge. Canadian agricultural producers must now navigate a future in which a strong production outlook and a growing need for labour coincide with a shrinking domestic labour pool and rising costs.

The labour challenge is sizeable. According to a 2014 Conference Board of Canada report, despite employing 2.3 million Canadians, Canada's agriculture and agri-food sector was unable to fill 26,400 jobs, costing the industry \$1.5 billion. By 2025, the sector's labour gap is expected to double, putting nearly 114,000 jobs at risk of going unfilled. This is equivalent to one in four jobs.

The labour challenge is compounded by rising labour costs. The rising minimum wage has narrowed profit margins, threatening to stifle the industry's future growth. In some sectors, labour is the single highest component of production costs.

To meet the labour challenge, Vineland has launched a \$5 million Canadian Agricultural Automation Cluster with support from Agriculture and Agri-Food Canada, through the *Canadian Agricultural Partnership*. The Cluster aims to improve labour productivity using automation, artificial intelligence and precision agriculture technologies. Additional benefits include savings in energy and water usage, input costs and increases in crop yield and value.

The Cluster's initial focus is on automation in horticultural applications to build collaboration with expansion planned into other agricultural sectors. Three projects led by Vineland researchers are currently underway:

- Develop and test robotic harvesters for greenhouse cucumbers and use big data for crop management and decision-making
- Develop smart, wireless irrigation technologies for potted flowers and vegetables
- Develop a full robotic solution for automated mushroom harvesting

Research activities will harness big data and artificial intelligence and make informed production decisions to develop platform technologies and critical components such as vision systems, end effectors, autonomous platforms and robotic systems. The impact will be a set of three automated technologies to improve labour productivity in cucumber, greenhouse floriculture and mushroom production. These technologies will be designed, developed, tested and demonstrated on-farm, resulting in validated prototypes that can be transferred to partners and licensees for commercialization.

The projects form a critical foundational piece for Vineland to expand the partnerships seeded by the Cluster and accelerate technology development through the commercialization phase. Vineland also anticipates using the Cluster as a launching pad to reach beyond horticulture, expanding the Cluster into a cross-Canada network of expertise and leveraging support from other innovation and economic development programs.

Labour productivity gains aside, the Cluster will also drive growth and diversification in Canada's advanced manufacturing sector. The aim is to mobilize Canadian companies, academic expertise, technology developers and equipment manufacturers from along the agricultural value chain to create a collaborative ecosystem focused on this growth opportunity. Broad-based partnerships within agricultural and advanced manufacturing sectors have the potential to establish Canada as a global leader in agricultural automation.

The development of technology in Canada has key advantages. Canadian producers have unique needs including special climate/environmental factors, existing infrastructure and additional/other crop types. Technology discovered or adapted in Canada is most likely to fit the needs and priorities of Canadian producers and solve their most pressing challenges. With improved results and increased profits on the production side, benefits will ultimately be passed to consumers.

Smart, automated production systems have the potential to generate significant labour productivity gains by bringing comprehensive, adaptive and data-driven decision-making needed to minimize labour inputs — in terms of human and labour costs — maximize yield and improve quality. This will boost competitiveness and allow producers to meet the growing demand for top-quality products sold to Canadian consumers and worldwide.