

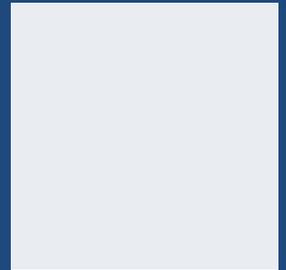
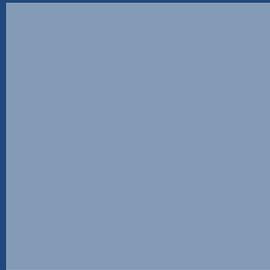
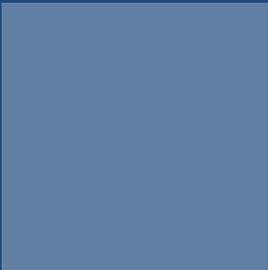
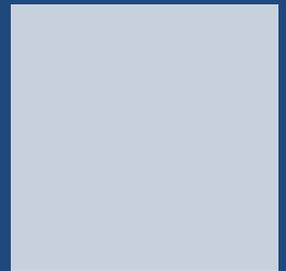
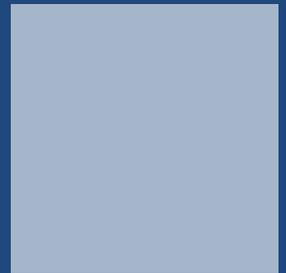
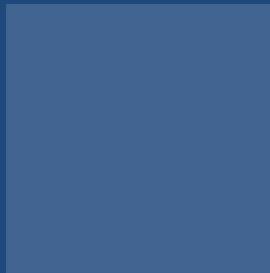
Final Report

Strategic Plan for the Guelph Agri-Innovation Cluster

Prepared for:

Guelph Chamber of Commerce, Conestoga College, University of Guelph,
Guelph Partnership for Innovation, Ontario Realty Corporation and the
Corporation of the City of Guelph

2010 March 3



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Executive Summary

Overview

This strategic plan has been prepared to guide the development of the Guelph Agri-Innovation Cluster in support of a community of local stakeholders who recognize the unique economic opportunity in Guelph to build on existing strengths in the region's food and wellness and agri-business sectors. Its purpose is to create investment and jobs, attract and develop talent, accelerate commercialization of research discoveries and foster economic development for Ontario and Canada. This study also provides recommendations on how the Guelph Innovation District (GID), and Guelph employment lands more generally, can support the cluster's development in keeping with two planning documents: the city's employment lands strategy and the secondary plan for the GID.

The project was directed by a Project Steering Committee comprising representatives from the Guelph Chamber of Commerce, Conestoga College, University of Guelph, Guelph Partnership for Innovation, Ontario Realty Corporation, and the City of Guelph. As part of the plan's development, a large and wide ranging group of stakeholders has been consulted through a number of different mechanisms including interviews, a survey, and workshops with the City Council, the public and core stakeholders. This input has been critical to establishing the scope of the study and informing the analysis and actions.

This plan represents the first of several initiatives by the City of Guelph and its stakeholders to diversify its economy by further developing its innovation-based sectors, as recommended in the broader economic development and tourism strategy, Prosperity 2020. Of the innovation-based sectors in the region, which include advanced manufacturing, environmental technologies, renewable energy, and information and communications technologies, agri-innovation is particularly well suited for strategic development given a strong private sector employment base of 6500 jobs, a world class research base on which to build, and strong global market trends favoring growth of agri-innovation companies.

Cluster scope

The City of Guelph and community stakeholders originally identified two broad economic sectors that were considered to offer a competitive advantage and which were to be a part of the cluster strategy: the life science sector, which was defined as including agri-technologies, agri-food, health, and biosciences; and renewable energy and environmental technologies. Also of

importance were the convergence opportunities that could revitalize traditional sectors, and in particular automotive and related advanced manufacturing.

Focus, however, is essential for the success of a cluster; it helps ensure that there is enough in common among cluster firms and stakeholders to establish i) a consensus for strategic action, ii) a cohesive internal identity among firms and iii) a coherent external recognition of the cluster. HAL therefore recommends that the Guelph cluster definition be adjusted so as to simplify and help communicate to cluster stakeholders the essential expertise and capabilities that exist within the cluster. To this end, HAL has defined the cluster as consisting of two main subsectors, each of which includes several niche areas. The first category, **food and wellness**, includes functional foods and nutraceuticals, as well as food and beverage firms; the second, **agri-business**, includes firms involved in bioproducts, plant science, animal health, agri-energy and agri-tech.

Though advanced manufacturing is excluded from the definition it is, however, considered integral to supporting the Agri-Innovation Cluster, providing a competitive advantage as a local specialized supplier of manufacturing, and as a local ‘demanding’ customer of agri-innovation goods. As for environment and energy firms, those that have an agricultural component, such as agri-based bioenergy, are included in the cluster; the remaining environment and energy firms, which include consulting and testing firms, are classified as supporting the Agri-Innovation Cluster in a manner similar to the advanced manufacturing cluster.

Under this definition, the Guelph Agri-Innovation Cluster comprises over 150 organizations, including 64 companies, 38 food and agri-business associations, 8 cluster support organizations, and approximately 43 research centres and initiatives that are important to the research capacity of the cluster.

A Global Opportunity for the Guelph Cluster

The Guelph cluster stands to benefit from a number of broad trends that are driving domestic and global demand for its products and services. Foremost is a rapidly growing environmental awareness among consumers and businesses that is leading to a major shift to greener products that depend less on petro-chemicals for their manufacturing, have lower carbon footprints, are bio-degradable or which have a lower toxic profile. A second driver is a growing interest in human health and wellness prompted by, among other factors, an ageing population with interest in disease prevention, heightened sophistication among consumers regarding the healthful or unhealthful properties of food and beverages on the market, and rising costs of health care and concomitant interest in preventive health care practices. Third are advances in research and technology which are leading to innovations and new market opportunities in all cluster areas. Advances in agri-technology, in particular, offer the cluster excellent opportunities in the area of developing new plant varieties with desired nutritional qualities, and in bio-products, where research is leading to more effective bio-conversion processes for agricultural feedstock and

biomass in general. Finally regulation from governments who have introduced legislation in response to not only climate change, but also to concerns over energy security has given an additional boost to the sector, the effect of which has been to strengthen demand and open up new markets for cluster products.

Together, these broad trends on the demand side validate the cluster's focus on agri-innovation. Given the global nature of the opportunities both in terms of markets and production chains, however, it is critical for the cluster to be open to, and instigators of, foreign direct investment (FDI). Such an emphasis is important to access the economic opportunities in global value chains and acquire new knowledge and capabilities within the cluster.

The Agri-Innovation Cluster has a number of valuable assets with which to attract firms from abroad. Its comprehensive research base, its niche capabilities in food and wellness and agri-business, together with a highly qualified labour market, can differentiate the region in the global market place and help draw investment, provided that these assets are effectively communicated. To this end, four countries have been identified that offer good potential for establishing FDI links. As newly industrialized countries, both Brazil and China offer a good opportunity given their policy emphasis on agri-technology, as do countries such as Netherlands and Israel which also have similar agri-related interests to Guelph and prominent innovation clusters. Guelph also offers opportunities for companies from these countries to leverage their R&D activities and establish a North American presence. These are also countries that hold potential for outward investment by Guelph companies so as to become full participants of these value chains.

Strategic Analysis

State of the Cluster

Guelph's cluster demonstrates a number of key strengths that make it a good candidate for strategic development. It is supported by a well educated work force that continues to grow; it builds on unique knowledge and infrastructural assets, not least an extensive research base whose areas of expertise are closely aligned with the cluster subsectors; it enjoys a diversified and competitive supplier base that meets a number of specialized industry needs; it is aligned with the broader policy environment at the local, provincial, and federal levels; and finally its broad direction supports community goals of environmental sustainability.

More specifically, the current conditions that support the cluster are generally strong. In particular, factors related to human resources – qualified local personnel and quality of the local lifestyle – are regarded as excellent; as are factors related to infrastructure. There are two areas of weakness. First, according to survey results from Guelph companies, is the business climate and in particular, the perceived relative disadvantage of the Ontario regulatory regime, and the perceived relative disadvantage of costs in Guelph compared to the cluster's competitors.

Second is community support as a result of the perceived state of government policies and programs. There is also a lack of local competition, but this is due to the relatively small number of Guelph firms in any particular aspect of the Agri-Innovation Cluster and is typical of most Canadian clusters.

The cluster's current performance is, however, generally weaker than the conditions. First is the low degree of cluster interaction. There is both a lack of internal awareness of the sector as a cluster and a perception that the external world does not recognize the region as a cluster. The linkages among firms and other stakeholders are also not strong, although there is reasonable involvement of firms in local economic development.

Second is the low projection for growth of firms within the cluster, although this is undoubtedly a result of the current economic times. The number of new firms in the cluster is, however, excellent and does indicate cluster vitality. The fact that few of these firms are spinoffs from other cluster firms stems from the lack of large and strong anchor firms that act to generate talent and companies. Third is the low percentage of firm revenues from exports. While having demanding local customers contributes to innovation, it is exports that provide significant growth opportunities and establish the cluster on the world stage.

The Guelph Innovation Triangle: A Focal Point for Cluster Development

While it is recognized that all of the city's employment areas will continue to support the cluster, and in particular the Hanlon Creek Business Park, a recommended geographic focus for the longer term future of the cluster is the triangle formed by the Guelph Innovation District, the University Research Park, and the downtown core of Guelph. This area, which encompasses much of the University of Guelph, represents the core of the region's competitive advantage in agri-innovation and can meet the current and future needs of the cluster for land, accommodation, infrastructure, and amenities. At the top of the triangle is the historic downtown which is distinguished in scale and architecture of its buildings, cultural activity and institutional amenity as the core of the community. Guelph's historic downtown will play an increasingly important role in attracting investment and supporting businesses in the city's technology sectors

The western vertex of the innovation triangle is demarcated by the University of Guelph's Research Park, a 30 acre site established in 1986 and which is now home to nine cluster companies and a number of associations and support organizations. The research park has been successful in attracting key organizations and benefits from its close proximity to the University and OMAFRA. The park does not accommodate wet lab facilities though this may change when the University develops the north end as part of a second phase of development.

Finally, at the eastern vertex is the Guelph Innovation District (GID) which comprises over 1,000 acres of land and is bounded by York Rd, Victoria Rd S, the York-Watson Industrial Park and the City's southern boundary. The land has a number of important attributes. It has many of the city-wide attributes in close proximity and is well situated within the city context. It is less than four kilometres from the downtown core and neighbours the University's arboretum lands. An

active rail line runs through the western portion of the site and could potentially connect to the GO rail system as it currently ends at a GO staging/storage yard. Eramosa River offers a remarkable natural heritage feature that creates distinct parcelization of the larger site, but also offers connection to the city's larger recreational trail system. The site is also reasonably proximate to major transportation infrastructure: Guelph and Waterloo airports; 15 minute drive from the 401; and bordered by major road connections.

Strengthening local governance capacity for cluster development

The City of Guelph is one of many cities across North America looking to knowledge-based forms of economic development as a means to diversify their economy and secure their future prosperity. A critical factor to the success of such transitions is the system of local governance that helps align the required institutional support, draw down resources from upper levels of government, and deliver on strategic actions needed to support knowledge intensive economic activity. Civic leaders, the municipal government, the local university and college, and local research and innovation support organizations are all key players in supporting the collaborative structures of decision-making and resource mobilization that make for competitive localities.

Local governance in Guelph is characterized by fragmented leadership distributed across five core organizations: the City of Guelph, Guelph Partnerships for Innovation (GPI), Guelph Chamber of Commerce and the Agri-Technology Commercialization Centre (comprising BioEnterprise, OAFT and Soy 20/20) and the University of Guelph. Each of these organizations interacts for decision-making purposes related to cluster development, which they subsequently support further through their respective organizational activities.

The local governance structure currently faces a number of challenges affecting its capacity to foster the development of the cluster, and knowledge-based economic development more generally. Five in particular are identified. These include a shifting organizational landscape brought about by changes in MRI policy and a refocusing among existing organizations. These changes are affecting respective roles of the organizations that support local governance capacity. A second challenge stems from competing responsibilities among key local governance organizations. Though based in Guelph, the organizations that make up ATCC, for example, have provincial mandates, and as such, have no explicit commitment to the Guelph region. Local governance capacity also is weakened by existing leadership. Because of the distributed and fragmented leadership structure, no single organization has the independence and credibility among all stakeholders to lead the governance network that supports the Agri-Innovation Cluster. Moreover, the region has not fostered the development of leaders who could assume the important role of champion for the region. This has left a leadership gap in the region, negatively impacting on the capacity to support cluster development. Further to this is a lack of strategic direction and planning for cluster development, and a commitment to securing available funding from various public sources.

Finally there are a number of important governance functions that are underdeveloped in the Guelph region. This too is due in part to the distributed nature of the current governance

arrangement, as well as to the fact that there has not yet been a strategy to necessitate some of these functions. As Guelph takes steps to implement its cluster strategy, however, these functions will be important to the long term success of its efforts.

Cluster Development Strategy

By undertaking the development of an Agri-Innovation Strategy, the City of Guelph and local governance partners recognize that it can play an important role in strategically supporting agri-innovation capacity, which in turn, supports its broader commitments to economic diversification and sustainability. Guiding the strategy to success are the following vision and mission statements.

VISION: A prosperous and globally significant Agri-Innovation Cluster that reflects the community goal of sustainability and which harnesses local research and industry expertise in food and wellness and agri-business for the social, environmental and economic benefit of local companies, the Guelph region, Ontario and Canada

MISSION: To create an environment that attracts investment, supports industry development, and fosters cluster interactions by mobilizing stakeholders and leveraging local, regional, and national resources and assets towards building agri-innovation capacity in Guelph.

A Strategic Framework has been developed to guide the development of actions for strengthening the Guelph Agri-Innovation cluster. The Framework identifies four key dimensions of cluster development, while taking into account the broader multi-level policy and regulatory environment. The first dimension corresponds to cluster development, which includes those strategic actions aimed at supporting cluster conditions and interactions. The second, company development, covers the four main strategic approaches for expanding company activity in the region: the *expansion* of their activities within the regional economy; the *creation* of new firms within the region; helping established and mature industries with the *conversion* of existing products with cluster technologies; and the *attraction* of firms from outside the region through re-location to Guelph.

The third dimension is that of asset development, which gives focus to land use, existing buildings, facilities and planning zones that can be leveraged through appropriate planning to support the Agri-Innovation Cluster. In particular it examines strategies for employment lands, existing built up sites and the Guelph Innovation District. The last dimension of the Framework is that of cluster governance and leadership, which captures the actions necessary to bring together the appropriate leadership and stakeholder groups who can be tasked with not only implementing the strategy but also providing continuity in strategic direction and support that is necessary for the long term viability of the cluster.

Note that the recommended strategic actions, which are presented in a summary table on the following page, have been identified in the context of public programs that support the cluster specifically (targeted programs) and innovation and entrepreneurship more generally (non-targeted programs) as well as the policies and regulations that shape market opportunities for the cluster at each level of government.

The Figure below outlines the goals, the objectives and associated performance indicators which allow for the monitoring and measuring of results. These indicators establish what success should look like with the successful implementation of the Strategy.

Performance Monitoring Indicators

Goals	Objectives	Performance Indicators
Cluster Development	Business Climate	Time to access services Business opinion Community opinion
	Linkages	Number of inter-firm linkages Number of university-firm linkages
	Identity	Local business opinion External stakeholder opinion
	Innovation	Tech transfer value R&D spending Number of new products and services
Company Development	Expansion / Retention	Employment levels Exports Number of expansions Number of companies in cluster
	Creation	Number of start-ups Number of spin-offs
	Conversion	Agri-innovation revenue ratio
	Attraction	Foreign direct investment Number of new firms
Asset Development	Employment Lands	Infrastructure spending
	Downtown	Accommodation levels
	Guelph Innovation District	Common asset levels
	University of Guelph Research Park	
Cluster Leadership and Governance		Business opinion Funding leverage Company involvement Community support Reduction in overlap/gaps in services Number of local investments, start-ups, and expansions Number of skills development and education programs created

VISION

A prosperous and globally significant Agri-Innovation Cluster that reflects the community goal of sustainability and which harnesses local research and industry expertise in food and wellness and agri-business for the social, environmental and economic benefit of local companies, the Guelph region, Ontario and Canada.

MISSION

To create an environment that attracts investment, supports industry development and cluster interactions by mobilizing stakeholders and leveraging local, regional, and national resources and assets towards building agri-innovation prosperity in Guelph.

GOALS	OBJECTIVES	ACTIONS
<p>CLUSTER DEVELOPMENT</p> <p>A cohesive and visible cluster maintained by a supportive business environment and made vibrant by functional cluster interactions that promote localized learning and innovation.</p>	<p>Business Climate: To make Guelph a nationally recognized leading local for sustainable business that welcomes and supports new and existing companies related to agri-innovation.</p> <p>Linkages: To strengthen the quality, reach and usefulness of linkages between firms and research organizations so as to improve local learning and product development capabilities.</p> <p>Identity: To have the Agri-Innovation Cluster recognized locally by the Guelph business community and public, as well as nationally and internationally.</p> <p>Innovation: To increase R&D activity among all cluster firms through innovation support structures and awareness.</p>	<p>Action 1. Develop a ‘welcome kit’ for cluster businesses</p> <p>Action 2. Establish a single window access for business services</p> <p>Action 3. Build community support</p> <p>Action 4. Leverage funding R&D programs</p> <p>Action 5. Develop a capital network in the region that taps into angel investors</p> <p>Action 6. Develop a business mentoring network</p> <p>Action 7. Develop peer-to-peer networks to promote local learning and economic opportunities</p> <p>Action 8. Establish a capability to identify and facilitate innovation and business opportunities with supporting sectors.</p> <p>Action 9. Establish a forum with regional colleges and cluster companies to identify local skill needs and new training programs</p> <p>Action 10. Launch a major marketing initiative</p> <p>Action 11. Engage university professors and prominent business leaders in helping tell the story of Guelph.</p> <p>Action 12. Promote UofG’s new Business Development Office, IP licensing policy, and tech transfer opportunities to local firms</p> <p>Action 13. Work with the province and industry stakeholders to establish leading edge strategic infrastructure related to agri-bio</p>
<p>COMPANY DEVELOPMENT</p> <p>A critical mass of industry expertise and capabilities that transforms the Agri-Innovation Cluster in to a sustainable generator of regional wealth.</p>	<p>Expansion & Retention: To establish active relationships with all cluster companies for the purposes of information exchange and support related to business needs and expansion plans.</p> <p>Creation: To establish high-value business and specialized infrastructure supports to assist in new company creation.</p> <p>Conversion: To facilitate the adoption of agri-bio technology into production processes and product lines of local advanced manufacturing companies.</p> <p>Attraction: To increase levels of investment that enhances cluster capabilities in research and innovation.</p>	<p>Action 14. Develop rapid action group to company development opportunities</p> <p>Action 15. Maintain strong and active relationships with cluster firms</p> <p>Action 16. Engage multinational firms in Guelph to make them more aware of research and funding opportunities</p> <p>Action 17. Establish low-cost wet lab space</p> <p>Action 18. Identify existing low-cost office space suitable for start-ups</p> <p>Action 19. Promote technology entrepreneurship education through a new MBA stream at University of Guelph</p> <p>Action 20. Engage companies to promote opportunities where they can take advantage of agri-bio and agri-energy tech</p> <p>Action 21. Develop business / research partnership incentives & programs for attracting companies to the cluster</p> <p>Action 22. Engage international collaborative research networks to identify prospective target firms</p> <p>Action 23. Establish a group that can identify prospective small and mid-sized firms for as investment attraction targets</p> <p>Action 24. Establish in-coming and out-going trade missions</p> <p>Action 25. Develop a rapid response process for arranging initial meetings with prospective firms</p>
<p>LAND DEVELOPMENT</p> <p>A competitive advantage derived from the optimum use and development of land and facility assets for the benefit of the Agri-Innovation Cluster.</p>	<p>Employment areas: To provide accessible, attractive, flexible employment lands across the city.</p> <p>Downtown: To align downtown planning and development with cluster development.</p> <p>University Research Park: To have the University of Guelph’s Research Park North be an integral element of the Agri-Innovation Cluster</p> <p>Guelph Innovation District: To establish the GID as a multi-faceted technology park.</p>	<p>Action 26. Continue to ensure Guelph’s employment lands can accommodate a wide range of employment uses</p> <p>Action 27. Apply high design and environmental standards in developing and planned employment areas</p> <p>Action 28. Design & promote Hanlon Creek Business Park for agri-innovation in the short-term</p> <p>Action 29. Locate cluster infrastructure and other supportive investments in the innovation “triangle”</p> <p>Action 30. Continue to distinguish Downtown Guelph through cultural programming, food destinations and sustainable devpmt.</p> <p>Action 31. Develop the University of Guelph’s Research Park North for use by the Guelph Agri-Innovation Cluster.</p> <p>Action 32. Plan GID to accommodate primarily institutional, research and development, and industrial uses that support cluster.</p> <p>Action 33. Plan, promote and facilitate development of an office/research campus on the former Wellington Detention Centre site</p> <p>Action 34. Prepare long-term strategy for development of a “green” live-work community on lands occupied by and adjacent to TGI</p> <p>Action 35. Plan the east quadrant of the GID for eco-industrial uses in the agri/food/energy/environment sectors</p> <p>Action 36. Pursue retro-fitting of historic reformatory buildings for one or more institutions</p>
<p>CLUSTER LEADERSHIP AND GOVERNANCE</p> <p>Effective local leadership and governance that can mobilize and excite stakeholders to work together towards achieving a dynamic cluster.</p>	<p>Leadership: A strong and respected leadership that can lead capable individuals and organizations to take on projects and who brings the community together to respond to economic challenges.</p> <p>Governance: A cohesive and effective local governance structure that provides leadership decision making support for socio-economic development in Guelph.</p>	<p>Action 37. Identify and support the development of a supporting organization that is capable of mobilizing stakeholders to take on strategic projects, providing cluster direction and resolving local and regional impediments to cluster development.</p>

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1. Study Background

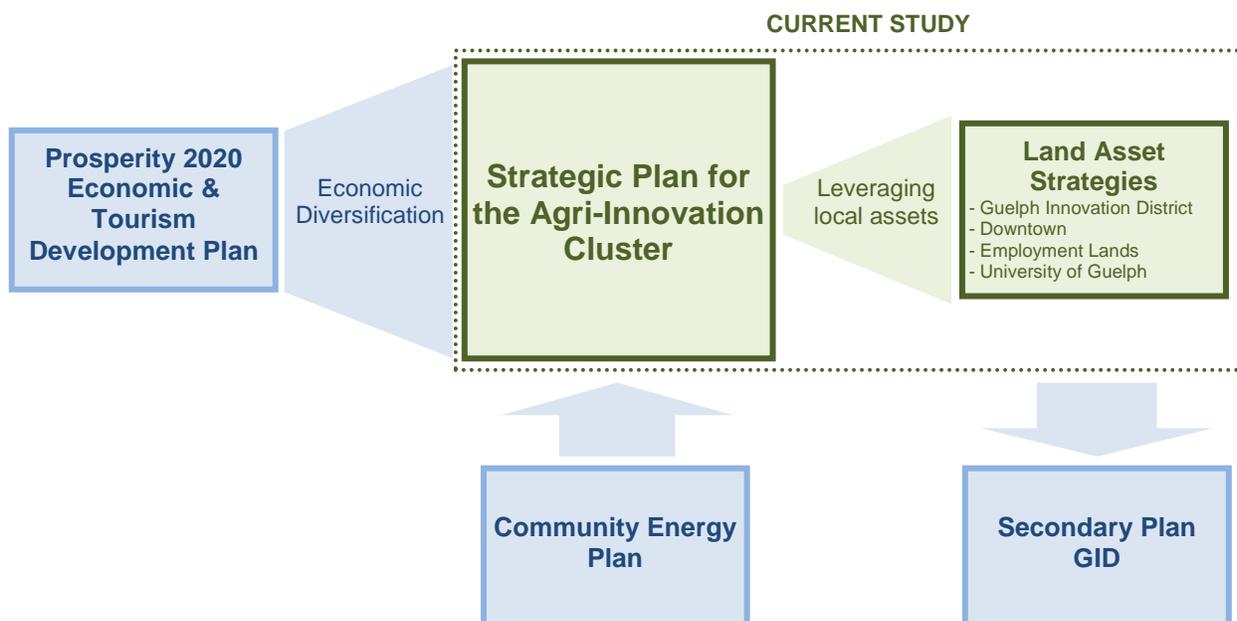
1.1 Objective

This study lays out an action plan to guide the development of the Guelph Agri-Innovation cluster. Its purpose is to create investment and jobs, attract and develop talent, accelerate commercialization of research discoveries and foster economic development for Guelph, Ontario and Canada. This study also provides recommendations on how the Guelph Innovation District (GID), and Guelph employment lands more generally, can support the cluster’s development in keeping with two planning documents: the city’s employment lands strategy and the secondary plan for the GID. The Agri-Innovation cluster is only one of the sectors on which Guelph will focus in its economic development planning; future work will consider how to support these other components of a strong and diversified economy in the Guelph region.

Situating the Cluster Strategy

The City of Guelph and community stakeholders are at a critical planning stage in establishing the direction of its economic future and have undertaken a number of studies to inform decision making on this complex topic. Figure 1 situates the Cluster strategy

Figure 1: Positioning of the Cluster Strategy



1.2 Approach

The development and implementation of the strategy involves the following six steps, four of which have been the focus of this study (see Figure 2):

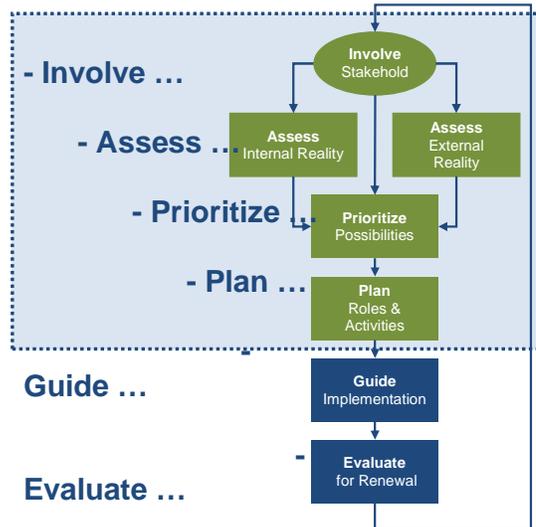
- **Involve** stakeholders within and external to the region. Some forty stakeholders were interviewed for this study, complementing a web survey of companies. The project team was also involved in a community information session regarding the study objectives, a workshop with city council, and has engaged key community representatives.
- **Assess** the region's assets underpinning innovation in the context of the global opportunities and competition. This step included a detailed assessment of the cluster to identify key strengths and weaknesses and a regional and global scan of opportunities.
- Determine and **prioritize** strategic actions for the future from the range of possible visions. In identifying strategic actions, this study took into account the findings from the assessment stage as well as best practices for cluster and innovation park development.
- **Plan** implementation of strategic actions.

The fifth step, guiding implementation of the action plan over time, and sixth step, evaluate progress and make corrections as needed, are outside of the scope of this study and will be the responsibility of the cluster stakeholders.

1.3 Report Structure

The starting point for the remainder of this report is the definition and scope of the Guelph Agri-Innovation Cluster, reached in agreement with stakeholders, and the regional and policy context in which the cluster operates. This is followed in chapter 3 by an assessment of the global economic opportunity for cluster companies, examining industry trends and Guelph's current comparative advantage in attracting foreign direct investment within a competitive global market place. Chapter 4 presents the strategic analysis which informs the strategic framework and actions identified in Chapter 5. The report concludes with an implementation plan that prioritizes actions based on their impact, cost and urgency, sets out time frames and identifies organizations that can be tasked with their implementation and support.

Figure 2: Study Approach



2. The Agri-Innovation Cluster

A cluster develops when firms from interrelated sectors emerge or locate in a particular region, drawing a competitive advantage from the existence of specialized knowledge assets within the region. These assets – such as a university, a highly qualified labour market, a favorable learning and product development environment, or a leading ‘anchor’ firm – support inter-firm learning and connectivity, as well as overall innovation performance, allowing firms to compete more effectively in global markets. This fosters a self-reinforcing dynamic that attracts new firms and talent to the region, lifts wages, accelerates the growth and expansion of existing cluster firms and supports the creation of startups. As the cluster strengthens, the region as a whole becomes recognized for its expertise and establishes itself as a major generator of wealth that extends well beyond the regional boundaries as a result of thicker inter-regional linkages.

Clustering firms often gain a number of benefits that provide a competitive advantage in comparison with a group of firms that are simply concentrated in a given region. For example, cluster firms are often drawn together as a result of common need, be it to access research, talent, key suppliers, or value chains that are localized in a particular region. Also, clustering firms often exhibit interconnectedness with one another and with public research infrastructure, either formally through joint ventures or strategic alliances, or informally through social ties, that foster localized learning within the cluster. Clustering firms may also be members of other clusters, depending on the extent to which their products or services overlap with other industry sectors. Finally, while geographic proximity is a key attribute of a cluster, the boundaries of a cluster are rarely rigid or readily definable. Indeed, they are often ultimately defined by how much time companies are willing to spend to travel for the purposes of meetings and networking with other firms or institutions.

2.1 Cluster Scope

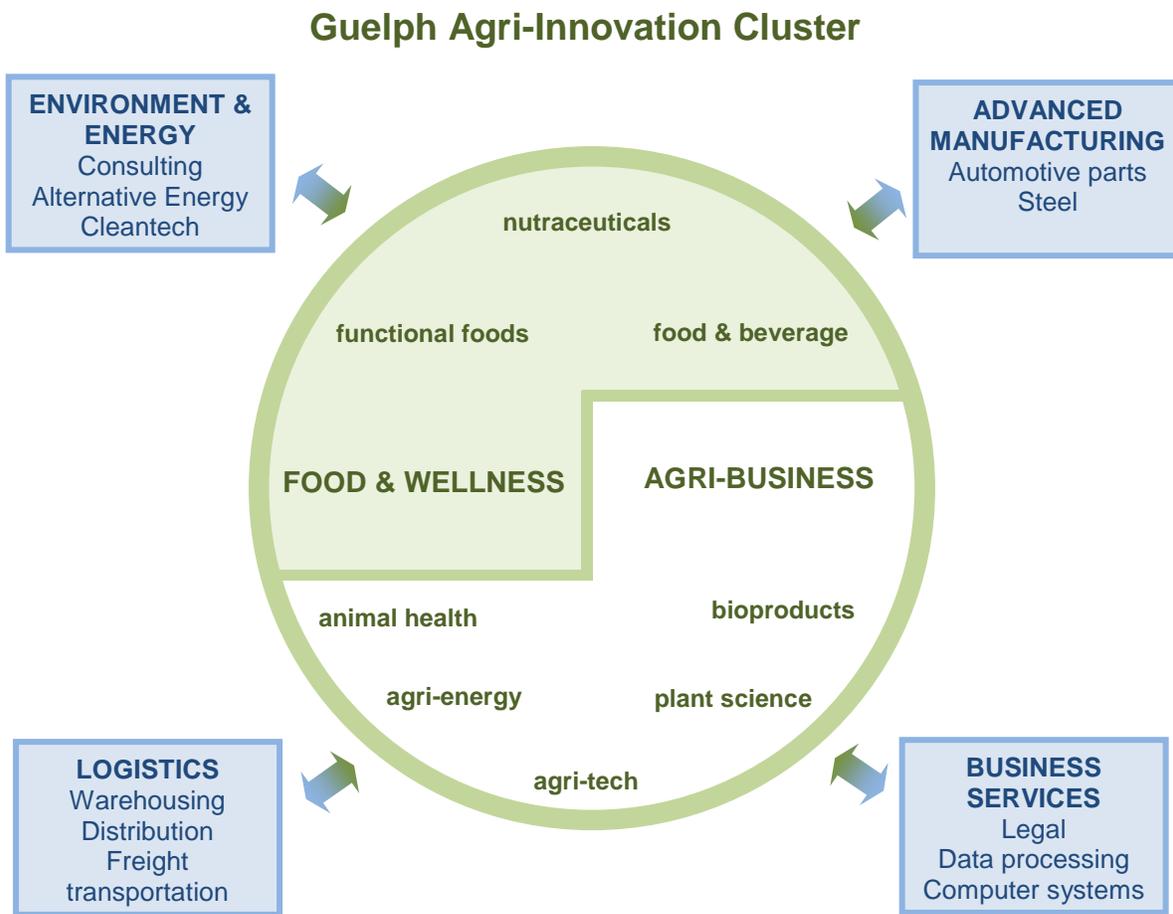
The City of Guelph originally identified two broad economic sectors that were considered to offer a competitive advantage and which were to be a part of the cluster strategy: the life science sector, which was defined as including agri-technologies, agri-food, health, and biosciences; and renewable energy and environmental technologies. Also of importance were the convergence opportunities that could revitalize traditional sectors, and in particular automotive and related advanced manufacturing.

Focus, however, is essential for the success of a cluster; it helps ensure that there is enough in common among cluster firms and stakeholders to establish i) a consensus for strategic action, ii) a cohesive internal identity among firms and iii) a coherent external recognition of the cluster.

HAL therefore recommends that the Guelph cluster definition be adjusted so as to simplify and help communicate to cluster stakeholders the essential expertise and capabilities that exist within the cluster.

To this end, HAL has defined the cluster as consisting of two main subsectors, each of which includes several niche areas (Figure 3). The first category, **food and wellness**, includes functional foods and nutraceuticals, as well as food and beverage firms; the second, **agri-business**, includes firms involved in bioproducts, plant science, animal health, agri-energy and agri-tech. These two subsectors afford many niche opportunities for value creation that align strongly with the infrastructural strengths of the region.

Figure 3: Subsectors of the Guelph Agri-Innovation Cluster



Advanced manufacturing, which is a significant cluster in its own right, is excluded from the definition. It is, however, considered integral to supporting the Agri-Innovation Cluster, providing a competitive advantage as a local specialized supplier of manufacturing, and as a local ‘demanding’ customer of agri-innovation goods. As for environment and energy firms,

those that have an agricultural component, such as agri-based bioenergy, are included in the cluster; the remaining environment and energy firms, which include consulting and testing firms, are classified as supporting the Agri-Innovation Cluster in a manner similar to the advanced manufacturing cluster. To ensure that the potential innovation opportunities related to these subsectors can be realized by Agri-Innovation Cluster firms, this report puts forward recommendations to establish necessary linkages with the advanced manufacturing and environment and energy subsectors.

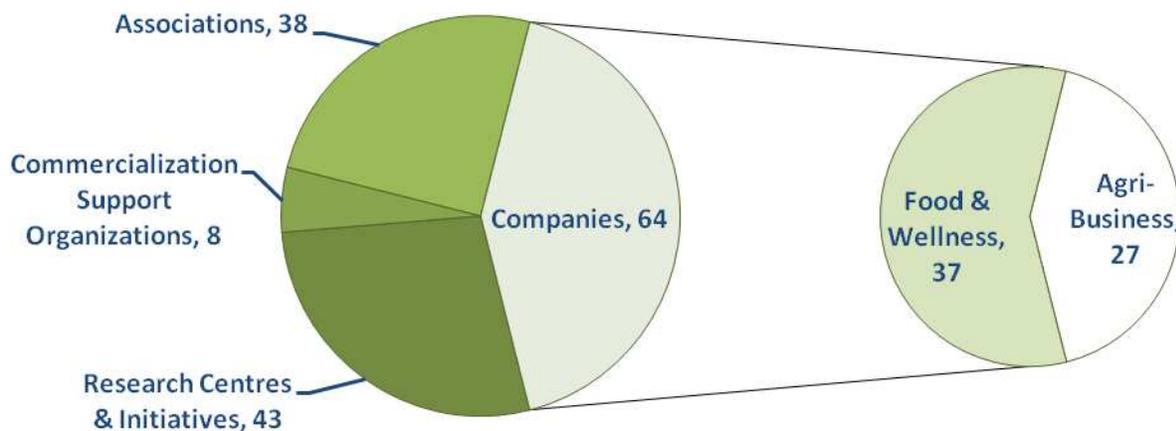
The choice of ‘agri-innovation’ as a name for the cluster takes into account the following factors:

- Guelph’s strength in agriculture, which is generally well-recognized and which is a core area of expertise for the cluster;
- The preference to differentiate the Guelph cluster from the many clusters in Canada and around the world establishing themselves as ‘bio’ or ‘green’; and
- The preference for reflecting the emergent aspect of the cluster’s capabilities.

2.2 Cluster Composition

The Guelph Agri-Innovation Cluster comprises some 153 organizations, including 64 core companies, 43 research centres and initiatives, 38 food and agri-business associations and 8 commercialization support organizations (Figure 4). The research organizations account for approximately \$83 million (2008/09) a year in cluster relevant research, while employment among cluster companies is approximately 6500.¹

Figure 4: Composition of the Guelph Agri-Innovation Cluster



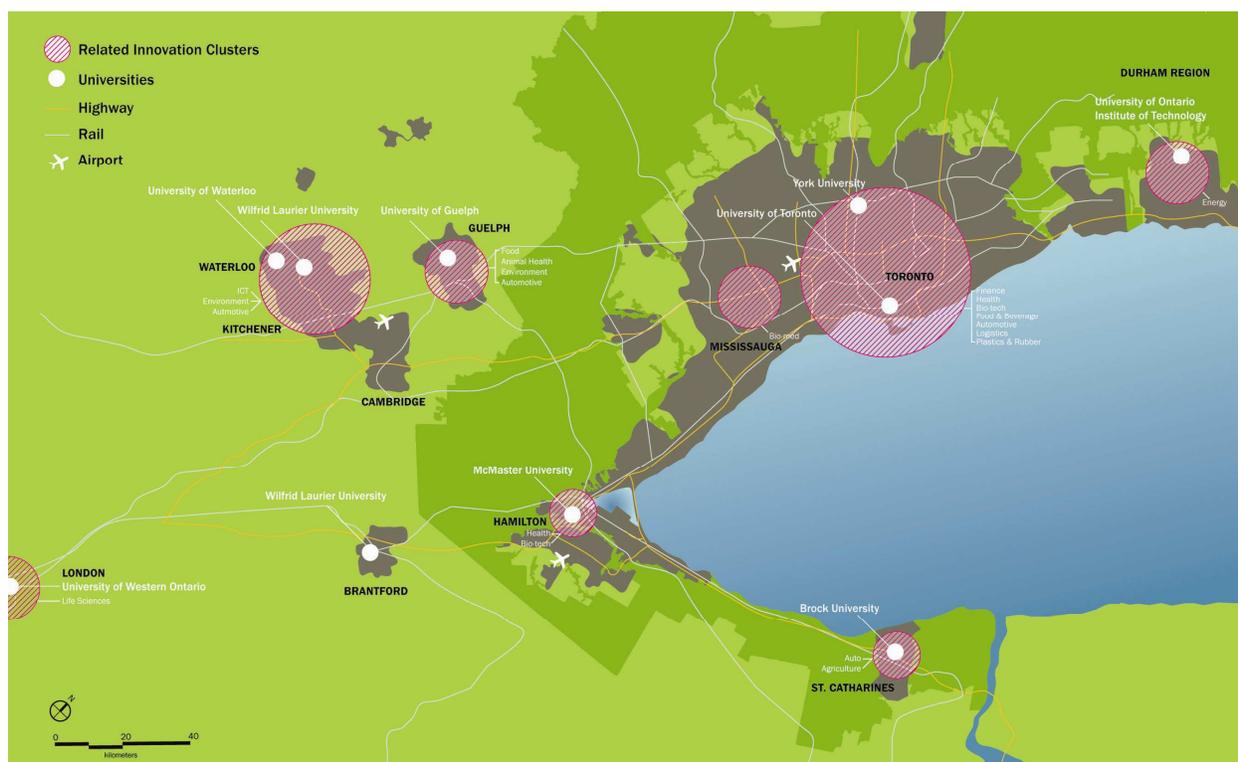
¹ This employment estimate is based on Statistic Canada 2006 census data.

2.3 Cluster Context

2.3.1 Capitalizing on Regional Strengths

The Guelph region is in close proximity to a number of important economic centres, several of which are home to complementary clusters and research infrastructure. To the west is Waterloo with strengths in ICT, automotive and environment; to the south is Hamilton with strengths in health sciences; to the south west is London, also with strengths in life sciences; and to the east is Mississauga and the Greater Toronto Area, which represents the core of the province's economic activity and strengths in a range of related areas including food and beverage, health sciences, agri-technology and advanced manufacturing. The region also benefits from its proximity to key transportation infrastructure, including the main highway corridor of Ontario, rail networks, ports, and regional and international airports.

Figure 5: Guelph Agri-Innovation Cluster in a Regional Context



These regional assets present an opportunity for the Guelph Cluster to strengthen its own capabilities through collaborations and partnerships. Indeed, these regions have benefited from a number of significant investments in research infrastructure that is complementary to the cluster. For example, in the past two years investments have been made to establish:

- The Centre of Innovation for Biomanufacturing at Brock University and Vineland Research and Innovation Centre, both in the St.Catherines region; and

- The Institute for Chemicals and Fuels from Alternative Resources, and the Centre of Excellence for Research and Commercialization at the University of Western Ontario in London, and the Bio-industrial Innovation Centre at its Sarnia campus.
- McMaster University’s Innovation Park in Hamilton, which will be home to the new CANMET Materials Laboratory in 2010.

2.3.2 Adapting to Provincial and Municipal Development Priorities

With its emphasis on employment growth and environmental sustainability, the Agri-Innovation cluster responds to several development priorities at both the provincial and municipal levels.

In 2006, as part of an ambitious suite of policy directions to manage anticipated growth in southern Ontario, the Province released the Growth Plan for the Greater Golden Horseshoe. The Plan provides policy direction and specific targets toward the creation of more compact, healthy and complete communities for all municipalities within the Greater Golden Horseshoe. Policies that are most pertinent to this study include: “where and how to grow”, forecasts for both employment and residential growth to 2031, economic growth, and in particular, employment lands. In the Plan:

- Guelph and the County of Wellington are forecast to grow by 95,000 jobs by 2031;
- The downtown of Guelph is identified as an Urban Growth Centre;
- A future major new transportation corridor and improved inter-regional transit to Guelph are identified infrastructure improvements; and
- Economic development, protection from conversion, and competitiveness of employment lands, are supported.

The City of Guelph has approved a growth strategy that has been incorporated into its Official Plan to accommodate a City population of 175,000 with a minimum of 92,000 jobs by 2031 within the City’s current municipal boundaries. The growth figures equate to 54,000 more people along with 32,400 additional jobs in the City by 2031. The growth management strategy policies in the Official Plan provide a balance of residential and employment areas, intensification areas, mixed use nodes, and urban villages at transit supportive densities.

Together with the Provincial Greenbelt Act and Plan (2005), the Growth Plan has noticeably transformed the momentum of outward growth patterns and, as a result, reinvigorated development interest in existing urban settlement areas. The designated Greenbelt surrounds the Greater Toronto Area and Hamilton (GTAH) and has created a shift in growth and development pressure from more mature and developed suburban areas within the GTAH to the outer communities, including Guelph. Further, communities that have chosen not to accommodate growth by expanding their urban boundaries, such as Guelph, have renewed focus on the utilization of the employment and residential land base within their existing city limits.

While none of these policy directions have explicit implications for the enhancement of the Agri-Innovation cluster in Guelph, many of the infrastructure and employment-related policies complement the objectives of strengthening job and economic opportunity, competitiveness for the Guelph employment uses, and the creation of complete communities with opportunities to live and work.

Similarly, the Green Energy Act, Bill 150, was passed earlier this year to promote the conservation of energy and advance the green economy in Ontario through the implementation and facilitation of renewable energy projects, energy conservation and demand management plans, utilization of energy efficient products, and infrastructure. The focus on the green economy as a growth sector has potential application to the Guelph cluster with regard to sustainable local agriculture, renewable energy sources, and environmental performance of industrial operations and facilities.

These directions are complemented at the Municipal level by the Community Energy Plan (CEP), which aims for Guelph to be a leader in energy efficiency and a role model for comparable North American cities. The City of Guelph has set ambitious environmental goals which provide an excellent opportunity for distinguishing the region as a centre for environmental sustainability. Under the CEP, the city lays out a number of goals to govern decisions regarding future energy demands and a general long-term sustainable approach for development:

- Guelph will be the place to invest, supported by its commitment to a sustainable energy future;
- Guelph will have a variety of reliable and competitive energy, water, and transport services available to all;
- Guelph energy use per capita and resulting greenhouse gas emissions will be less than the current global average;
- Guelph will use less energy and water per capita than comparable Canadian cities; and
- All publicly funded investments will visibly contribute to meeting the above four CEP goals.

The plan is viewed as central to Guelph's success in drawing investment and long-term competitiveness.

2.3.3 Innovation Policy Support

The economic opportunities related to the cluster are strengthened by a supportive policy environment at both the federal and provincial levels. Indeed, several of the niche sectors that make up the cluster benefit from strategic resources at the federal level in the way of grant programs and targeted research support. Niche sectors, such as environment, agri-tech, clean energy and bio products, are at the core of a number of broader government commitments to, for

example, climate change, clean technology, economic development and innovation, and sustainable agriculture, the result of which is a multilayered policy environment supporting Guelph's cluster.

At the broadest level is Canada's federal S&T strategy, *Mobilizing S&T to Canada's Advantage*. As a framework for allocating S&T resources at the federal level, the strategy has already had a number of impacts on the cluster's innovation space. These include its commitments to three related knowledge areas (environmental science and technologies; natural resources and energy; health and related life sciences and technologies).

At the federal departmental level, Agriculture and Agri-Foods Canada (AAFC), one of the largest science-based departments, and with a research facility in Guelph, has in place its own Science and Innovation Strategy through which it is directing resources to increase the scientific capacity and knowledge available to support the agriculture and agri-food sector in using biomass to develop new products, new uses, and new markets. Under *Growing Forward*, AAFC has also committed itself to developing a national bioeconomy strategy which is to have a strong emphasis on bio-industrial products and will provide focus to the development of government policies and programming supporting the capture of new opportunities in the bioeconomy.

NRCan is another federal department with a strategy relevant to the cluster. Called the *Sustainable Development Strategy 2007-2009*², NRCan has made commitments to developing breakthrough technologies that support clean technology, and to increasing the capacity of renewable technologies such as wind, small hydro, and biomass sources. Notably, NRCan is chiefly responsible for realizing the federal government's commitment to renewable fuels which has been most recently expressed through the Government of Canada's Biofuels Bill passed in 2008. This bill gives the federal government the authority to develop regulations for renewable fuels, mandating a 5 per cent renewable content in gasoline by 2010 and 2 per cent renewable content in diesel fuel and heating oil by 2012.

The province, under its 2008 *Seizing Global Opportunities: Ontario's Innovation Agenda*, has also made a strong commitment to four strategic areas around which innovation support will be directed, three of which are relevant to the Guelph cluster. These are the bio-economy and clean technologies; advanced health technologies; and pharmaceutical research and manufacturing. Both the Ministry of Research and Innovation (MRI) and the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), offer a number of innovation programs that support these strategic areas and which are available to Guelph firms. Guelph is also the main beneficiary of the Ontario government's largest targeted research program, the \$59 million partnership agreement with the University of Guelph and administered through OMAFRA, which supports targeted research in several niche areas of the cluster.

² <http://www.nrcan-rncan.gc.ca/sd-dd/pubs/strat2007/PDFs/sds2007.pdf>

3. A Global Opportunity

3.1 Capitalizing on Global Industry Trends

The Guelph cluster stands to benefit from a number of broad trends that are driving domestic and global demand for its products and services. Foremost is a rapidly growing environmental awareness among consumers and businesses that is leading to a major shift to greener products that depend less on petro-chemicals for their manufacturing, have lower carbon footprints, are bio-degradable or which have a lower toxic profile.

A second driver is a growing interest in human health and wellness prompted by, among other factors, an ageing population with interest in disease prevention, heightened sophistication among consumers regarding the healthful or unhealthful properties of food and beverages on the market, and rising costs of health care and concomitant interest in preventive health care practices. This interest has led to strong growth in demand for nutraceuticals and functional foods, both of which draw on agriculture as a source for natural compounds. Related to this is a renewed interest in natural compound drug development within the pharmaceutical industry brought about by lower success rates in product development. Natural compound based drugs, whose bioactive compounds may be derived from plant or marine sources, are valued for their therapeutic value which is generally considered to be high in comparison to their chemically derived counterparts.

Third are advances in research and technology which are leading to innovations and new market opportunities in all cluster areas. Advances in agri-technology, in particular, offer the cluster excellent opportunities in the area of developing new plant varieties with desired nutritional qualities, and in bio-products, where research is leading to more effective bio-conversion processes for agricultural feedstock and biomass in general.

Finally regulation from governments who have introduced legislation in response to not only climate change, but also to concerns over energy security has given an additional boost to the sector, the effect of which has been to strengthen demand and open up new markets for cluster products.

3.1.1 Positioning in Global Value Chains

To fully take advantage of these demand trends, it is important for the cluster to also recognize shifting supply trends, and in particular, the now global nature of many production chains, especially in knowledge intensive goods and services. Increasingly, goods and services are no longer simply sold to end buyers abroad. Instead, they are being imported and exported to and from regions for value-added processing within the frame of global production chains. This

trend, which is driven by companies seeking improved innovation and production efficiencies, is being facilitated by foreign direct investment (FDI), whereby companies from one country invest in the production capabilities of another as part of efforts to build global value chains and foster what is known as integrative trade. For Guelph, this means that there are unique opportunities for companies that can critically assess and position themselves in global value chains. It also means being open to, and being instigators of, FDI so as to become full participants in these global value chains.

3.1.2 Cluster Specific Demand Trends

Food & Wellness

Food and wellness as a niche subsector captures the growing economic and research activity associated with functional foods and nutraceuticals³ (FFN), as well as the broader trend towards healthier food in general. Though it has long been known that food has medicinal or healthful properties, advances in food science have allowed for new food products with enhanced nutrition and supplemental health benefits. Complementing this growth in these ‘functional’ foods, have been expanding markets in nutraceuticals, which are products that combine nutrition with pharmaceuticals, and which draw on techniques that allow for the extraction, isolation, or purification of food components that have demonstrable health benefits, including disease prevention. By one estimate, the global food and wellness market was worth about \$90B worldwide in 2005⁴, indicating significant demand.

The Canadian FFN industry encompasses some 300 firms who employ over 50,000 people, according to a 2005 survey by Statistics Canada.⁵ Of these, Ontario, Quebec, and British Columbia count about 75 firms each. Nearly half the firms are active in nutraceuticals, a quarter in functional foods, and a quarter in both. Plant-based nutraceuticals are the focus of half the firms in the industry. Over half the firms export, more than one-third conduct R&D, and most believe that the ability to make health claims about their products would increase sales. Two-thirds offer fewer than 10 product lines.

In regards to the food and beverage subsector as a whole, it has been growing but more gradually. In the past decade, employment has grown at approximately 0.9% annually across Canada, with total economic activity in the sector reaching \$19.3 billion in 2008.⁶

³ According to Health Canada, a nutraceutical is a product isolated or purified from food that is generally sold in medicinal form not usually associated with food and has been demonstrated to have a physiological benefit or provide protection against chronic disease. A functional food is an ordinary food that has components or ingredients added to give it a specific medical or physiological benefit, other than a purely nutritional effect.

⁴ Scott Wolfe Management Inc. (2002). Potential Benefits of Functional Foods and Nutraceuticals to the Agri-Food Industry in Canada. Report to Agriculture and Agri-Food Canada, March.

⁵ Tebbens (2005).

⁶ Statistics Canada, Employment by Type of Employee and Gross Domestic Product by Industry, 2008.

Agribusiness

Although agriculture as a sector now accounts for but a small fraction of the country's GDP, it remains vital to Ontario's much bigger agri-business economy, and to the social and economic fabric of rural Ontario. Farms, of which there are some 60,000 in Ontario (2006), remain a pivotal source of economic activity. These farms employ over 85,000 (2001), and draw in some \$10.4 billion (2006) in income.⁷ Moreover, agri-business is moving beyond the traditional agricultural commodity base and diversifying into areas of plant science, animal health, and agri-technology.

In agri-tech, in particular, there is strong growth in a number of recently established markets, including alternative fuels that are based on agri-feedstock, and bio-materials that use agri-biomass for developing a range of environmentally friendly products such as biodegradable plastics made with bio-polyols, foams and lubricants. In agri-based biofuels, for example, demand has pushed world production levels of liquid bio-fuels up by a factor of three from 2000 to 2007.⁸ With concerns that the demand for biofuel will lead to unacceptably higher food prices, the dominant opportunity lies with second generation agri-bio fuels which are produced not from food, but from agricultural residuals such as corn husks, stems and leaves. A recent study of Ontario's agri-bio industry found that it currently comprises some 190 firms, mostly small to medium in size, and caters to a range of markets from agri-fuels, to agri-materials and chemicals.⁹

A third component of agribusiness is animal health. Global estimates of the size of the animal health industry are relatively modest, with one study valuing it as USD 13.4 billion.¹⁰ In this market, the fifteen largest national animal health markets account for 81% of the total. One important driver is growth from developing countries. China's animal health market is forecast to reach some \$1.5 billion in 2010, at which point it will be the second largest national market after the US.

3.2 Global Policy Environment

A significant number of countries have policies in place that are directed at related sectors, and regardless of whether a country's economy is advanced, newly industrialized or developing, all are approaching their strategic economic development efforts in a broadly similar fashion and

⁷ In Ontario, Canada's largest farming province, primary agriculture (crop and animal production) represents 0.8% of the province's GDP (www.omafr.gov.on.ca/english/stats/food/gdp_select.htm). Agri-food (primary agriculture plus food and beverage processing) is about 4.2% and is a major sector in the Greater Toronto Area. Neither of these calculations includes the contributions from other industries directly related to agriculture and food production such as food retailing or farm inputs.

⁸ See R. W. Howarth et al. 2009. *Biofuels: Environmental Consequences and Interactions with Changing Land Use*. International Council for Science (ICSU) SCOPE Biofuels Project. p. 2.

⁹ Hickling Arthurs Low. 2009. Agri-Bio Innovation Plan, prepared for the Ontario Ministry of Agriculture, Food, and Rural Affairs.

¹⁰ World Animal Health Markets to 2010, Animal Pharma Reports, 24/11/2003.

with an equally similar objective. The objective is to capture the economic opportunities and associated value added employment that arise from developing a domestic industrial capability that serves global markets with high growth potential. The approach is generally one of strengthening knowledge intensive capabilities with investments in research infrastructure and harnessing this investment towards commercial ends by strengthening the links between the research infrastructure and industry.

As a result of these global efforts, Guelph and Canada as a whole, face stiff global economic competition with countries and regions, many of which dedicate far more resources to strategically developing these sectors. Furthermore, a number of countries are directing resources towards particular regions, often through a rationale of supporting technology clusters. This is in response to the fact that knowledge based industries, such as those being targeted by Guelph, tend to cluster in city regions, especially where there are large concentrations of research intensive institutions. Italy, for example, has allocated close to €350 million for the creation of regional technology districts. Generally, these policies seek to either build capabilities and help create a critical mass of interdependent firms within a region, or they seek to create or improve interaction and cooperation among regional firms. China has sought to address the former through the program “863 Program Mega Projects” which invests in new industrial clusters. In some countries, notably the US, state governments play an essential role in the innovation policy landscape, and often make strategic support available as part of technology based economic development efforts.

This competition, however, is as much an opportunity as a threat. The opportunities lie with the potential for Guelph firms to collaborate with firms and institutes in other countries that are focused on similar problems. In fact, many countries have S&T agreements with Canada, helping facilitate collaboration, and a few countries, notably Germany, offer financial support to companies looking to collaborate with national firms or open their R&D programs up to foreign companies.

3.3 Attracting FDI

The Agri-Innovation Cluster has a number of valuable assets with which to attract firms from abroad. Its comprehensive research base, its niche capabilities in food and wellness and agri-business, together with a highly qualified labour market, can differentiate the region in the global market place and help draw investment, provided that these assets are effectively communicated.

Which assets will most influence a site selector, however, ultimately depends on the sector in which the company competes. Drawing on a review of trade literature and interviews, Figure 6 identifies the most important site selection factors for those sectors related to Agri-Innovation, as well as Guelph’s respective standing. It reveals a number of constraints on the region that must be recognized in attracting FDI.

Figure 6: Key Site Selection Factors for Agri-Innovation Related Industries

Site selection factors	Related industries				Guelph's Standing
	Technology	Food Processing	Pharma	Agri-Fuels	
Talent pool	✓		✓		Strong (Bachelor attainment at 23.9% vs. 18.1 for Canada) Population in the 25-44 age range
Research resources	✓		✓		Strong
Commercialization infrastructure	✓				Mixed: Good commercialization support programs but lacking wet-lab space & specialized agri-bio processing facilities
Venture capital	✓				Poor -typical of smaller urban centres
Cost structure		✓		✓	Good
Physical site size		✓		✓	Good availability of large development sites
Proximity to customers		✓ Importance Varies			Weak overall. Though close to a major centre (GTA), large firms have typically preferred to locate within a major market / urban centre.
Proximity to suppliers				✓	Mixed. Company and input specific.
Incentive packages			✓	✓	No local incentives; good federal & provincial program funding
Distribution networks		✓			Good
Community support		✓		✓	Weak – stemming from public resistance to new developments
Water supply / Wastewater capacity		✓ Importance varies		✓ Important for ethanol	Poor - ground-based water supply a limiting factor for companies with large water demands.

For example, major food processing firms give priority to being in close proximity to suppliers and to customers in deciding on a new site. Guelph is comparatively weak on both of these factors from the standpoint of a large multinational looking to invest in Canada. Another weakness is water availability and waste water capacity, both of which are important factor for some food processing and agri-fuels firms that have high water processing needs. With regard to incentive packages, while on their own they do little to persuade major companies, they are nonetheless an important reality in the global competition for FDI, helping in the final negotiations of the site selection process and in validating a locality's commitment to the prospective company. Because Ontario municipalities cannot offer tax abatements, they must instead rely on federal and provincial programs or innovative partnerships to demonstrate commitment. For example, co-financing industry-university research projects relevant to building cluster capacity, supporting specialized training, and promoting district energy

arrangements that offer a stable, cost-effective, and green source of energy for heating and cooling needs, are all examples of creative partnerships that can be used to attract firms.

Given the above constraints, Guelph's competitive advantage in FDI will be determined by the niche and size of companies that it targets. Most suited to its FDI efforts are promising small and mid-sized companies that are starting to grow and whose products and services are positioned upstream in the value chain where access to proximity to a large customer base and local basic inputs is not critical. For these companies, research resources are more important, as are the range of federal and provincial innovation support programs. There are major opportunities globally for these companies when integrated in global value chains.

3.3.1 Target Countries and Companies

The following is a discussion of suitable target countries for investment attraction, given the competitive advantages of the Guelph cluster. It is important to note, however, that while assessing target countries for FDI opportunities has value, it is equally, if not more, important to understand the structure of global value chains relevant to the Guelph cluster, as discussed in the first section of this chapter. Such an analysis can determine where the regional nodes of value added processing are for a given subsector and how Guelph cluster capabilities intersect with these value chains. The result is a more targeted FDI attraction assessment process that can identify niche opportunities and subsequently yield greater success. Within this context four countries are identified below each having complementary advantages in agri-innovation. As newly industrialized countries, both Brazil and China offer a good opportunity given their policy emphasis on agri-technology, as do countries such as Netherlands and Israel which also have similar agri-related interests to Guelph and prominent innovation clusters. Guelph also offers opportunities for companies from these countries to leverage their R&D activities and establish a North American presence. These are also countries that hold potential for outward investment by Guelph companies so as to become full participants of these value chains.

Brazil

A number of factors make Brazil an attractive target country. It is a powerhouse in agricultural exports, a significant player in agri-fuel and agri-materials markets, yet a minor player in the world's research community, and subsequently could benefit from links to Guelph's research base. Furthermore, as of 2008 a Canada-Brazil Framework Agreement for Cooperation on Science, Technology and Innovation is in place facilitating collaboration.

One prospective recruitment target is Braschem, a Brazilian petrochemical firm and the fourth largest R&D performer in the country. In the last few years, the company has made significant investments in biopolymer production plants, and now is one of the world's largest suppliers of green polyethylene. It has also taken an interest in supporting the work of Guelph-based Ontario BioAuto Council as a way of accessing new markets for its biomaterials.

China

China is another target country where agri-innovation is of considerable interest. China accounts for 22% of the world's population but has only 10% of the world's arable land. An important niche strength of Chinese agriculture is its long history of farming marginal lands. Per capita water resources are less than one-fourth of the world's average.

Promoting independent innovation and enhancing competitiveness of enterprises, including in agriculture, are two main aims of research policy for China. These goals are set out in major policy documents which prioritize, among other areas, agriculture. The specific priorities in the agricultural sector include: exploration of seed resources; health and disease control for animal and poultry breeding and aquatic production; storage and transport of farm products; exploration and utilization of biomass; development and manufacturing of environment friendly fertilizers and farm chemicals; and environment friendly farming.

Netherlands

Netherlands is home to a number of major R&D performing multinationals with five of its leading R&D performers ranking among the top 50 in Europe. Over the last half decade, the policy emphasis in the Netherlands has been on improving innovation performance by various means including through the promotion of public-private interactions and international linkages. Dutch science, technology and innovation funding policies and programs almost all have an international dimension.

Of interest to Guelph is the food and stimulant industry occupies a strong position within the Dutch economy. With 4,515 companies, this industry comprises nearly 10 per cent of the total number of companies in the industry as a whole. Large companies (100+ employees) are responsible for most of the economic activity (77%) and employment (57%). Many are accustomed to working with foreign partners, through collaborations that can be supported by the 'Food & Nutrition Delta' innovation program. One of the program's objectives is for a significant proportion of both domestic and foreign players in this industry to make use of the R&D carried out within the Dutch knowledge infrastructure.

Also notable is the 'Food Valley' partnership based around a research cluster consisting of Wageningen University & Research Centre, NIZO Food Research, TNO Food & Nutrition, Rikilt Institute for Food Safety, Plant Research International, Agrotechnology and Food Sciences Group, the Centre for Biosystems Genomics and the Innovation Centre for Nutrigenomics. The cluster, which employs approximately 10,000 people, is a partnership between businesses, research institutes and Dutch governments and has a long history of knowledge advancement in agricultural production and food production. The Food Valley foundation, a support organization, is a good first point of contact for foreign companies wishing to draw on Dutch innovation in this field. Major companies affiliated with Food Valley include H.J. Heinz, Campina, Nestlé, Sobel, Mead Johnson, Mars, Heineken, Givaudan, Grolsch, Monsanto, Abbott Laboratories, Numico Research and Royal Friesland Foods.

Israel

Israel is a small, densely-populated country, with only 20% arable land and with more than half of the environment considered to be arid or semi-arid. The country produces over 80 percent of its own food and exports over a billion dollars worth of produce annually, along with another two billion dollars in agricultural technology and farming inputs. It also boasts the highest density of start-ups in the world, with some 3,850 now operating within a very dynamic cluster environment. These achievements are attributed, in part, to strong cooperation amongst universities, companies, and the investment community in Israel all of whom are in relatively close proximity to one another and interlinked through an “everybody-knows-everybody” density of Israeli business and social networks.

As a global leader in water management, Israeli successes in overcoming water shortages – through transport, desalination, cloud seeding, drip irrigation and fertigation advances, and wastewater reuse – already provide valuable tools and techniques for developing nations. Today, Israeli farmers and managers are building on these achievements by engaging Israel’s expanding information technology and biotechnology sectors. Together, they are developing, applying and selling many innovations for agriculture across domestic and international markets.

The Agricultural Research Organization (ARO), the research arm of the Ministry of Agriculture and Rural Development, is responsible for most of the agricultural research conducted in Israel. This research aims to improve existing agricultural production systems and to introduce new products, processes and equipment, thereby ensuring the basis of Israel’s future agriculture. Current research priorities of the ARO, which are similar to Guelph’s research strengths include: development of new products and cultivars; improvement of food quality and safety; functional food; integrated pest management (IPM); and agricultural technologies friendly to the environment.

3.4 Conclusion

Despite the strengthening global competition, the subsectors that make up the Guelph cluster are the right choice for Guelph on which to focus its economic development. As a broad sector, these subsectors afford many niche opportunities for value creation that align strongly with the infrastructural strengths of the region. Moreover, given the priority placed by both the federal and provincial government on the various subsectors that make up the cluster, there are promising opportunities for leveraging government strategic investments in support of developing the cluster.

4. Strategic Analysis

This Chapter presents the analysis that informs the recommendations on strategic actions presented in Chapter 5. The analysis gives focus to three aspects of the Agri-Innovation Cluster: an assessment of the cluster's performance, a geographic assessment of cluster capabilities and land assets in the region; and finally, the local governance structure through which the strategic plan will be implemented.

4.1 Cluster Performance Assessment

Guelph's cluster demonstrates a number of key strengths that make it a good candidate for strategic development. It is supported by a well educated work force that continues to grow; it builds on unique knowledge and infrastructural assets, not least an extensive research base whose areas of expertise are closely aligned with the cluster subsectors; it enjoys a diversified and competitive supplier base that meets a number of specialized industry needs; it is aligned with the broader policy environment at the local, provincial, and federal levels; and finally its broad direction supports community goals of environmental sustainability.

This section examines the state of the Agri-Innovation Cluster in the Guelph region, using a cluster measurement methodology developed by HAL which identifies key factors animating a cluster's innovation performance (see Appendix A). The analysis integrates data from a company survey, interviews, as well as data from Statistics Canada.

4.1.1 Current Conditions: Cluster Factors

Labour Force

A supply of well-educated and skilled people is crucial to the long term viability of a world class cluster centred in the Guelph region. For firms in high-technology industries seeking to relocate or expand, access to a pool of well-educated and skilled people can also be a significant attraction.

The Guelph region demonstrates favorable labor force conditions in a number of respects. First, the region, according to 2006 census data, has been experiencing a population growth of 8.2% (2001-2006) and a labour force participation rate of 58.1% (2006), both of which are higher than the national average. These indicate an expansion of the local labour market in the long term. Second, the labour force is on average well-educated, with educational attainment levels well above national average and trending upwards.

The occupational structure of the labour market is also positive, with labour market specialization evident in three areas: manufacturing, education, and natural and applied sciences. In each of these areas, the region maintains above average employment (Location Quotient greater than one) as compared to the Canadian average. The region, however, shows some weakness in business related occupations, a factor of some concern among a number of local firms consulted. While access to qualified technical skills is considered strong overall, it is more difficult to find those with business and marketing skills. On average, though, in the Guelph cluster some 65% of employees are recruited from within the region.

Transportation

The Guelph region benefits strongly from its proximity to critical transportation infrastructure that is essential for cluster development. It is situated just north of the main highway corridor of Ontario and is beyond the traffic congestion of the GTA. It is also within commuting distance to two airports, one primary or international (Pearson) and another secondary or regional (Waterloo). Guelph is linked through the Guelph Junction Railway to both the CN and CPR rail networks, allowing for competitive pricing of transported goods throughout the continent. Finally, Guelph has reasonable access to shipping ports at Toronto and Hamilton. The quality of this infrastructure is reflected in a positive response among surveyed firms. The exception to these favorable views is the Highway 6 (Hanlon Expressway) link to Highway 401 whose at-grade interchanges reduce travel time. Proposed Ontario Ministry of Transportation upgrades to the Hanlon Expressway are expected to address these concerns.

Business Environment

An environment that is supportive of firm formation and growth, conducive to innovation, and which can attract and retain skilled labour, is very important to the vitality and dynamism of the cluster as a whole. On this factor, the Guelph region is mixed. While Guelph is cost competitive in terms of land values and development charges when compared to other municipalities east of the region (i.e. the GTA), it is less so for smaller centres in south-western Ontario.

Second, while the municipal staff is viewed by firms as generally supportive of business, the public and city council have a reputation for being less so. Indeed, citizen groups are quick to mobilize against change on grounds of environmental protection and no-growth sentiments. The result is a widely held view that there is a perceived lack of welcome for industry compared to other regions in the province. The Community Energy Plan presents an opportunity to forge new ties between these two groups, though currently the CEP struggles from limited visibility.

An area in which the city does stand out, however, is in quality of local lifestyle. Among survey respondents, adequacy of local life style is rated highly.

4.1.2 Current Conditions: Cluster Support

Research Infrastructure

The Guelph cluster derives much of its competitive advantage from the University of Guelph, which is the primary source of research undertaken in the region and of the skilled work force employed by cluster firms. In 2007-2008, the university conducted some \$142 million in research, having received some \$50 million from federal granting agencies and another \$54 million from the provincial government for the research partnership program.¹¹ Among the university's important assets are a number of research chairs and world experts whose specialization areas support the cluster. These include a Premier's Chair, thirteen Canada Research Chairs, and four NSERC Industrial Chairs; and another five highly cited scientists, all of whom bring expertise, resources and prestige to the cluster.¹² The Networks of Centres of Excellence Program Advanced Foods and Materials Network (AfMNet) is also an important asset, funding over 20 research projects in the areas of food and bio-materials research.

The top research areas, as determined by publication records, align strongly with the primary cluster focus. Leading the group is veterinary sciences, an area that is supported by the Ontario Agricultural College whose four campuses, nine units, and nine research station, make Guelph a major centre for animal health. This is followed by agriculture, dairy and animal science, and plant science.

Guelph is also home to one of Conestoga College's five campuses that carries out training and applied research in support of a range of manufacturing related areas. At the Guelph campus, Conestoga is planning on establishing a Centre for Alternative Fuel Technologies to train technicians and technologists in the repair and maintenance of alternative fuel vehicles, including hybrids, natural gas-powered vehicles, clean, diesel and electric vehicles, as a result of a knowledge infrastructure program led by the federal government. The college is also establishing a food processing institute nearby in Cambridge in September 2011 to provide skill development and apprenticeship programs that will be relevant to the cluster.

Other notable federal research institutes within the Guelph region include the Guelph Food Research Centre (GFRC) and the Laboratory for Foodborne Zoonoses (LFZ). GFRC is one of Agriculture and Agri-Food Canada's network of 19 research centres, whose 20 research scientists specialize in food safety, quality and nutrition. The centre is also undertaking research in novel bioprocessing to modify agriculture products to enhance properties and commercial potential and includes a specialized Molecular Biology Research Unit with equipment and expertise for studying food DNA, and the monitoring and tracking of harmful food-borne bacteria and a food processing pilot plant with traditional and novel processing equipment (high pressure, temperature, ultraviolet, ozone) used to study food processing and product safety. LFZ is a federal lab of the Public Health Agency which provides scientific information and advice on

¹¹ Source: CAUBO. Financial Information of Universities and Colleges 2007-2008.

¹² The number of chairs was determined from databases made available on respective websites.

minimizing the risks of human illnesses arising from the interaction between humans, animals, and the environment, with special emphasis on infections due to enteric pathogens.

Key Government Programs

The general focus of the cluster currently is aligned with government strategic priorities and dedicated funding initiatives at both the federal and provincial levels in the areas of bioeconomy and clean technology. These include grant programs for commercialization support, as well as specialized support organizations such as those currently housed in the Agri-Technology Commercialization Centre (ATCC). Strategic or targeted programs can be critical to establishing the initial investment in a particular cluster area and provide the basis for additional government support. For example, under *Action Plan*, AAFC administers another four programs which influence research (*Agri-Bioproducts Innovation Program*), commercialization (*Agri-Opportunities*) and biofuels development (*ecoAgri Biofuels / Capital Formation Assistance Program*).

NRCan, for its part, also has a program aimed at biofuels. *EcoEnergy for Biofuels* is nine year program that is to invest up to \$1.5 billion over 9 years in operating incentives to producers of renewable alternatives to gasoline and diesel. Its objective is to make investment in production facilities more attractive by partially offsetting the risk associated with fluctuating feedstock and fuel prices.

At the provincial level, OMAFRA is the primary strategic supporter of agri-technology. Indeed, in addition to its contributions to *Growing Forward*, OMAFRA maintains a number of different programs, each influencing a different segment of the innovation process. In the area of research, OMAFRA has invested in a \$59.1 million partnership agreement with the University of Guelph through which OMAFRA prioritizes several areas of research relevant to the cluster including: bioeconomy (industrial uses), food for health, product development and enhancement through value chains, and production systems.

Other notable initiatives include the Ontario BioAuto Council, which is engaging manufacturers to take advantage of opportunities related to bio products, and the Ontario Bio Car Initiative, which is a partnership between the automotive industry and the public sector aimed at accelerating the use of biomass in automotive materials. This level of public support is reflected among survey respondents who generally view government programs favorably, particularly funding programs.

Community Support

Community support is essential if the city is to maintain a long term development focus on, and commitment to, the cluster. Community support transpires in three ways, each equally important. First is the support from the Guelph community itself. It is important for the city, university, business leaders and the public to each be in agreement with the goals of the cluster and be enthusiastic towards supporting its growth. Cluster development is a long term effort which

cannot continue with weak commitment. The second aspect is having support from community leaders or champions. A community champion is someone who engages and mobilizes public officials, citizens, business leaders, and, or local groups, to take actions towards improving the public good or addressing problems, which in this context would be related to developing the Agri-Innovation cluster. A third aspect to community support is having organizations that can support the leadership of community champions and foster a community's efforts around the cluster's development.

Overall, the Guelph community support requires further strengthening if the region is to maintain its long term commitment to the development of the cluster. While the city has identified a cluster that is in principle in alignment with the environmental values of the public, and in the interest of established clusters, such as the automotive cluster, in reality these two groups have yet to fully support the cluster. Guelph's environmental groups continue to be viewed as adversaries to economic growth in general, as opposed to partners in shaping the region's future socio-economic environment. And the manufacturing and automotive sector – though the largest employer in the region – continues to be a 'second solitude', despite some efforts to engage them in the emerging Agri-Innovation cluster.

An absence of widely recognized and influential community champions or leaders is also a weakness in the community support area. Typically, community champions are most effective when stepping forward from the private sector as opposed to public organizations. While there are a number of potential leaders, the cluster has yet to have the support of a champion who is committed to, and effective in, mobilizing the necessary resources and people towards resolving barriers to cluster development.

Guelph does, however, benefit from a number of community support organizations, such as the Chamber of Commerce and Guelph Partnership for Innovation, which are committed to the cluster. Survey respondents rate the overall adequacy of local community support organizations favorably.

Suppliers

The quality and diversity of specialized suppliers, both in the Agri-Innovation cluster and which can support the cluster, is one of the key competitive advantages of the cluster. At a general level, the business services cluster in the Guelph region is strong and growing. The manufacturing cluster has the potential to be a critical supplier of specialized parts and services that can support product development within the cluster. The cluster is also home to a number of contract research, testing and diagnostics services firms that can provide important inputs into localized value and production chains. The strength of local suppliers is reflected in survey responses which rate their adequacy favourably for both equipment and materials.

Local availability of investment capital is viewed as weaker among survey respondents, though still favorable. Proximity to Guelph-based provincial organizations such as BioEnterprise, which

supports agri-tech startups, and the Ontario AutoBio Council, which financially supports the uptake of bioproducts, is a strength for the cluster.

4.1.3 Current Conditions: Competitive Environment

The cluster's competitive environment is assessed primarily in terms of proximity to competitors and suppliers. In large dynamic clusters, being close to one's competitors and suppliers can be beneficial for innovation and learning. In Guelph, these dynamics are discernable. Local and regional competitors are both ranked as being more important than national or US competitors. Similarly local and regional customers account for the greatest percentage of revenue.

4.1.4 Current Performance: Significance

The significance of the cluster in terms of critical mass and its global reach is one indicator of the strength of the cluster. Currently, the Agri-Innovation Cluster includes approximately 64 core firms in the three subsectors, most of which are medium sized firms with an average of close to 70 employees, which is above average for many research intensive clusters in Canada. The cluster's propensity to create new firms through spin-offs, however, is not as strong, with only 27% of survey respondents identifying themselves as such. Finally, a second weakness is the regionally and domestically focused nature of the cluster. Exports account for less than a fifth of revenue, which is weak in comparison to other technology-based clusters in Canada.

4.1.5 Current Performance: Interaction

An important dimension of cluster dynamics is the network itself as shaped by functional linkages between firms collaborating with each other or between firms and public research organizations. In strong clusters, these relationships generate a localized dynamic process of collective learning and ultimately improved innovation performance. Our methodology examines two aspects of cluster interaction. The first is whether the firms identified as being part of cluster do in fact view themselves as a cluster, that is, as a network of interrelated firms. This gives an indication of whether there is a perceived commonality among local firms that can form the basis for future functional relationships. Currently, the Guelph cluster suffers from low internal recognition with only 15% of firms surveyed recognizing themselves as being part of a cluster.

The second indicator is the extent of linkages themselves. Overall, there are weak horizontal linkages between cluster firms. This is an indication that there is little in the way of collaborative research and product development occurring among firms. Moreover, there is no one firm in the cluster that stands out as an anchor firm, driving interconnectivity within the cluster.

Linkages with the research base and support organizations are better, however, with a subset of the cluster acknowledging ties with key institutions and organizations in the cluster. It is

significant that after the University of Guelph, the most cited institutions are three universities located within the greater Guelph region: Waterloo, Hamilton and London.

4.1.6 Current Performance: Dynamism

Innovation

Overall, innovation performance in the Guelph cluster is relatively low for a knowledge intensive cluster. In terms of R&D, firms report expenditures of R&D equal to about 15% of revenues. Furthermore, on average 40% of revenue is generated from products or services generated in the last three years.

Several explanations have been given for this modest performance. In the recent past, the University has been cited as part of the problem owing to a restrictive Intellectual Property policy, an unresponsive administration, and to an anti-business culture among research staff which has impeded technology transfer either by way of licensing or start-ups. For its part, the university has made significant changes in the last year to its policy and administration related to IP. Rather than a licensing group, the university now has in place a business development office. Together with a new IP policy, it is expected to improve the university's overall innovation performance and integration with the cluster.

Another explanation is the nature of the products being developed in the cluster. Compared to Information Technology, many of the subsectors in the Agri-Innovation cluster face longer innovation cycles, lower margins, and more government regulation.

Finally, though Guelph has a number of multinational subsidiaries, they generally have no R&D capabilities and are instead regional suppliers. Attracting major R&D performers to the region has also been difficult for Guelph, according to several stakeholders, for a number of reasons, including its distance from major markets, such as the GTA, which is key for multinational expansions.

Growth

The Guelph cluster has experienced a modest employment decrease 6% over the past three years, which is understandable given the recent economic conditions. As to future growth, cluster firms expect growth over the next three years of 15%.

4.1.7 Summary

It must be understood that a cluster is the sum of its parts and that any indicator must be assessed in the context of the other elements of that cluster. For this reason, care must be taken when comparing the performances of different clusters on any indicator. A low indicator may or may not indicate a concern, depending on the circumstances of the cluster. Another caveat is that the numbers reported here are based on self-assessments by cluster firms. In some cases, these

assessments may be optimistic, particularly with respect to firm capabilities and growth opportunities.

In terms of current conditions, the cluster performs well. In particular, factors related to human resources – qualified local personnel and quality of the local lifestyle – are regarded as excellent; as are factors related to infrastructure. There are two areas of weakness. First is the business climate as a result of the perceived relative disadvantage of the regulatory regime and the perceived relative disadvantage of costs in Guelph compared to the cluster’s competitors. Second is community support as a result of the perceived state of government policies and programs. There is also a lack of local competition, but this is due to the relatively small number of Guelph firms in any particular aspect of the Agri-Innovation Cluster and is typical of most Canadian clusters.

In terms of current performance, however, there are a number of concerns. First is the low degree of cluster interaction. There is both a lack of internal awareness of the sector as a cluster and a perception that the external world does not recognize the region as a cluster. The linkages among firms and other stakeholders are also not strong, although there is reasonable involvement of firms in local economic development.

Second is the low projection for growth of firms within the cluster, although this is undoubtedly a result of the current economic times. The number of new firms in the cluster is, however, excellent and does indicate cluster vitality. The fact that few of these firms are spinoffs from other cluster firms stems from the lack of large and strong anchor firms that act to generate talent and companies.

Third is the low percentage of firm revenues from exports. While having demanding local customers contributes to innovation, it is exports that provide significant growth opportunities and establish the cluster on the world stage.

4.2 The Guelph Innovation Triangle

The location of existing cluster firms within the urban structure demonstrates the close relationship between employment land and infrastructure for these business operations. Figure 7 illustrates the notable concentrations of existing cluster businesses in Guelph: the employment lands in Northwest Guelph, the Hanlon Business Park / South Guelph Industrial Area, and York-Watson Industrial Parks, the University Research Park, and along major access routes such as York Road and Woolwich Street. Among these areas, the Hanlon Creek Business Park, now being developed, can expect to play an important role in the shorter term as a destination for agri-tech business seeking development-ready sites in an attractive and accessible location.

While it is recognized that all of the city's employment areas will continue to support the cluster, the recommended geographic focus for the future of the cluster is the triangle formed by the Guelph Innovation District, the University Research Park, and the downtown core of Guelph. This area, which encompasses much of the University of Guelph, represents the core of the region's competitive advantage in agri-innovation and can meet the current and future needs of the cluster for land, accommodation, infrastructure, and amenities.

4.2.1 The Downtown Core

At the top of the triangle is the historic downtown which is distinguished in scale and architecture of its buildings, cultural activity and institutional amenity as the core of the community. Guelph's historic downtown will play an increasingly important role in attracting investment and supporting businesses in the city's technology sectors.

In addition to being home to a range of commercial amenities, including shops, restaurants and personal services, the Downtown hosts a number of environmental and other consulting firms, as well as a variety of companies offering business services (financial, legal, graphic design, etc.) and will continue to be the location of choice for such businesses. It also has the capacity to accommodate non-industrial facilities of small and mid-size R&D-oriented companies, in existing or new buildings. For example, the Guelph Chamber of Commerce and the City of Guelph Economic Development and Tourism Services have recently discussed the development of a downtown IT cluster that could also benefit the Agri-Innovation cluster. The vision for downtown, currently guiding a new plan, includes a satellite facility of the University or a college, seen as pivotal to adding vibrancy to the area and supporting the city's knowledge economy.

As the city's cultural hub, rich with heritage buildings and offering a variety of venues and annual events, downtown plays a critical role in attracting and retaining a highly educated workforce. While growing as the city's central business district, the downtown is expected to see its residential population increase by at least 7,000 over the next 20-25 years. For Guelph's existing and future innovators seeking an urban lifestyle, downtown's steadily improving riverfront park system, trail network and transit connections to other parts of the city will also be attractions.

4.2.2 The University of Guelph Research Park

The western vertex of the agri-innovation triangle is demarcated by the University of Guelph's Research Park, a 30 acre site established in 1986 and which is now home to nine cluster companies and a number of associations and support organizations. The research park has been successful in attracting key organizations and benefits from its close proximity to the University and OMAFRA. The park does not accommodate wet lab facilities though this may change when the University develops the north end as part of a second phase of development.

4.2.3 The Guelph Innovation District

At the eastern vertex is the Guelph Innovation District (GID) which comprises over 1,000 acres of land and is bounded by York Rd, Victoria Rd S, the York-Watson Industrial Park and the City's southern boundary. The land has a number of important attributes. It has many of the city-wide attributes in close proximity and is well situated within the city context. It is less than four kilometres from the downtown core and neighbours the University's arboretum lands. An active rail line runs through the western portion of the site and could potentially connect to the GO rail system as it currently ends at a GO staging/storage yard. The Eramosa River offers a remarkable natural heritage feature that creates distinct parcelization of the larger site, but also offers connection to the city's larger trail system. The site is reasonably proximate to major transportation infrastructure: Guelph and Waterloo airports; 15 minute drive from the 401; and bordered by major road connections.

While the GID is large, much of the land is already spoken for (Figure 8). Approximately 430 acres is protected as part of the natural heritage system. Cargill/Better Beef operates on a 32 acre central site east of the river. The City's Waste Resource Innovation Centre services much of the city's waste. The Turf Grass Institute occupies 195 acres of land between Victoria Street and the River.

The former Guelph Correctional Facility, for which the province is exploring reuse opportunities, resides on approximately 225 acres. In total, approximately 73% of the land base of the site is in public ownership, although under the mandate of multiple levels of government and agencies.

The GID, which is currently the subject of a separate land use study, has an important role to play in the long-term future of the cluster. In particular, the area west of the river is of a scale and served by infrastructure that could support cluster businesses. The City's Local Growth Management Strategy, in fact, has identified these lands for significant employment growth as well as residential uses. Until it can be relocated to make way for development, the Turf Grass Institute would be compatible with cluster related uses and in the interim has the potential to evolve as a model for testing not only turf but other growing medium, such as species for green roofs, urban agriculture, and sustainable landscapes. The rail line offers potential for goods or people movement. The Eramosa River creates a remarkable setting and edge condition for R&D and office development related to the larger cluster. Given the current land commitments, and planning and land procurement processes, the development of these lands could realistically be achieved in a 10-20 year timeframe. In the mean time, the South Guelph Industrial area lands are now available for development, and the Hanlon Creek Business Park is soon to be made available.

The lands east of the River may also play a supporting role for long term cluster growth, but this potential is more limited and tied to proactive actions with government partners. The former Guelph Correctional facility has the potential to accommodate a post secondary educational institution. Alternatively, opportunities to capture and synergize outputs from the Waste

Resource Innovation Centre or the Better Beef facility for use in production of Agri-Innovation businesses or other industrial uses along the eco-industrial park model are worthy of consideration given the Community Energy Plan and other sustainable practices.

Figure 8: Existing Uses of the GID



4.3 Cluster Governance

This section examines the state of local governance in the Guelph region in the context of all three levels of government departments and agencies, and relevant support organizations. The

analysis brings into focus their respective roles in supporting and coordinating strategic initiatives aimed at developing the Guelph cluster and its economic prosperity more generally.

To better situate the issues, the section begins with an overview of why local governance is increasingly important, not only for improving the prosperity of localities, but also for improving outcomes of federal and provincial program and policies, many of which can be enhanced through strategic governance at the local level.

4.3.1 Background on local governance and knowledge-based economic development

The City of Guelph is one of many cities across North America looking to knowledge-based forms of economic development as a means to diversify their economy and secure their future prosperity. A critical factor to the success of such transitions is the system of local governance that helps align the required institutional support, resources, and strategic action needed to support knowledge intensive economic activity. Compared to older forms of industrial development, knowledge-based economic development depends on a much greater set of stakeholders - many of whom are now local - to deliver on a broader mix of support and to resolve a broader set of issues. Civic leaders, the municipal government, the local university and college, and local research and innovation support organizations are all key players in supporting the collaborative structures of decision-making and resource mobilization that make for competitive localities.

The growing importance of effective local governance stems in part from the recognition that innovation performance can be influenced by local conditions and support, which in turn can provide an advantage to local firms competing in a global economy. Talent attraction, retention and development, clustering networks that foster learning among related firms, industry-university collaborations that support innovation, and firm creation, growth and acceleration, all can be influenced through local action and decision-making.

Moreover, these actions are increasingly undertaken as part of local strategic plans that are focused on those local industry sectors or clusters that demonstrate strength and potential. Indeed, in Canada, it is more and more the local level that provides strategic direction for economic development, with the provincial and federal governments acting as supportive partners. In this role, localities draw down the appropriate resources from the various provincial and federal programs in accordance with a strategy for developing a particular knowledge based cluster.

In any given locality, there are often a range of support organizations that assist in delivering on strategic initiatives. Local governance therefore is, at base, typically more a network of organizations rather than any one organization in particular. And it is a network with flexible membership that includes whomever's authority or expertise is needed to resolve a particular public problem related to cluster development, be it local or regional.

However, it is also a network that requires a strong centre of local leadership in the form of an organization that is committed to improving the prosperity of a specific locality. This centre must be able to address both the economic and social development of the locality, due to the reality that a number of issues related to cluster development and innovation are situated at the intersection of the economic and social spheres. Making improvements to the vitality of the downtown core and to the transportation system can, for example, be essential to successfully drawing in highly skilled people and innovative firms to the region.

4.3.2 Overview of Key Roles that Local Governance Plays in Supporting Knowledge-Based Economic Development

Local governance serves many important functions in supporting knowledge-based economic development. Above all it can provide leadership and strategic direction with a degree of continuity that is necessary to realize long-term priorities, and which local, provincial or federal governments can generally not provide owing to the election cycle and the nature of the political process.

Also important is its role in forging cross-jurisdictional collaborations to resolve ‘bottleneck’ issues (e.g. the division between business and green communities) or to take advantage of opportunities that could accelerate local cluster development, such as pan-regional marketing efforts. In so doing, local governance can provide a degree of strategic attention to local needs that are too far removed from the basic responsibilities of either municipal or provincial governments.

Not least, local governance is also critical for drawing down resources from upper levels of government to support local strategic priorities. Resources for infrastructure may, in fact, be available from upper levels of government, but without local individuals and organizations committed to implementing strategic initiatives that can advance the cluster and accessing these funds, they go unused.

Figure 9: Key Functions of Local Governance

Governance Functions	Specifics
Leadership	Strong and respected leadership that can: <ul style="list-style-type: none"> ▪ Mobilize capable individuals and organizations to take on projects; ▪ Be an ‘agitator’ that brings the community together to respond to economic challenges.
Strategic direction	Establish strategy directions through community deliberations and lead on strategic initiatives and planning
Investment attraction & recruitment	Attract and recruit firms and research organizations to the region that can strengthen existing clusters
Business retention & expansion	Develop and sustain relationships with local companies so as to able to respond to their concerns and needs.
Project collaborations	Develop collaborations to deliver on strategic initiatives
Initiative Alignment	Ensure alignment between local initiatives affecting cluster
Regional coordination	Ensure regional alignment of strategic direction and initiatives through regional coordination and collaboration
Mobilization of resources for strategic priorities	Seek out, and apply for, funding opportunities that benefit the cluster Engage appropriate actors to apply for government funding, offering support by identifying and introducing partners, and helping with proposal writing
Resolution of ‘bottleneck’ issues	Leverage independence and leadership to resolve local and regional disputes affecting local prosperity by engaging appropriate decision makers and stakeholders in the public and private sector
Education & training alignment	Initiate alignment between cluster skill needs and local educational program offerings
Regional marketing & branding	Proactively market the cluster
Cluster linkages	Promote inter-firm partnerships, and peer to peer networks
Facilitation of industry-university partnerships	Bring together prospective industry and university partners interested in collaboration
Commercialization support	Coordinate and facilitate services required for commercialization within the locality
Information sharing and opportunity updates	Share information and discuss opportunities and challenges with partners and collaborators

4.3.3 Assessment of Current Guelph Governance system

Structure of local cluster governance

Local cluster governance in Guelph is characterized by fragmented leadership distributed across five core organizations: the City of Guelph, the University of Guelph, Guelph Partnership for Innovation (GPI), Guelph Chamber of Commerce and the Agri-Technology Commercialization Centre (comprising BioEnterprise, OAFT and Soy 20/20). Each of these organizations interacts for decision-making purposes related to cluster development, which they subsequently support further through their respective organizational activities.

The City of Guelph, through its Economic Development and Tourism Services, undertakes the widest range of activities related to developing the cluster. These include marketing, investment attraction, business retention/expansion, trade shows, advertising, networking and strategic initiatives. Supporting commercialization activities is GPI, which offers mentorship programs and entrepreneurial training, and supports cluster linkages through networking breakfasts and events, and connecting UofG research to industry. The city's efforts are also supported by an advisory committee for economic development (GEDAC) which informs broader strategy development.

For its part, the Guelph Chamber of Commerce is playing an increasingly important role as it undertakes activities aimed at supporting SMEs, conferring awards, and in fostering linkages among the community and organizing networking events.

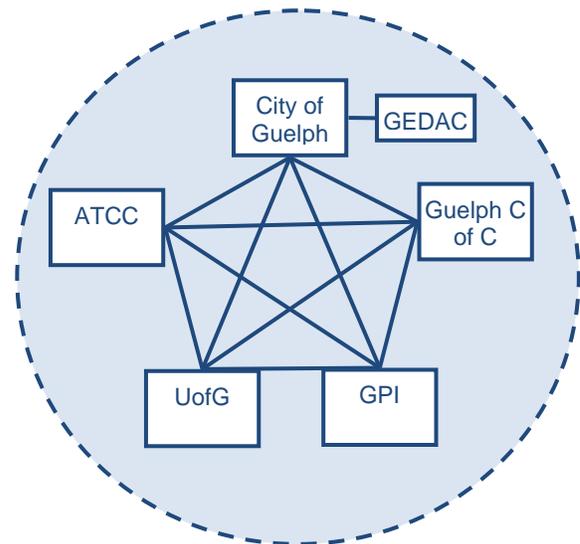
Fourth is the ATCC, whose sub organizations, notably BioEnterprise, are seen as central to supporting the creation of new firms in the province, some of which are located in Guelph, and to providing input on cluster decision-making.

The University of Guelph is also a core contributor to the strategic decision-making of the region. It plays an important role in facilitating research collaborations between the university and companies, and through its oversight of the research park, it plays a role in attracting companies to the region.

Figure 10 depicts a simplified schematic of the existing local governance network supporting knowledge based economic development, and in particular the Agri-Innovation Cluster.

These five core organizations are also supported by a number of partners, which are typically engaged on specific issues that

Figure 10: Basic local governance structure supporting cluster development: primary strategic partners



pertain to the wider region. Canada's Technology Triangle (CTT) and TRRA, for example, have recently been collaborating with the Guelph region in support of cluster related issues and initiatives that implicate Guelph and the surrounding city regions. Though long a key player in the region, the University of Guelph has recently become more engaged in local economic development and cluster governance, mainly as a result of having established a fully serviced business development office that includes an industry outreach liaison position. Last year, for example, the University entered into partnership with the City to launch the 'Grow Guelph' initiative.

Current Challenges

The local governance structure currently faces a number of challenges affecting its capacity to foster the development of the cluster, and knowledge-based economic development more generally. Five primary challenges are discussed below.

Shifting organizational landscape: Recently, the Ministry of Research and Innovation, which is the main funder of GPI, has taken steps to revamp its regional innovation network program as part of broader changes to its innovation programming that will make for a more generic approach to innovation that is not targeted to any one sector. These changes will have an important impact on how specific regions across the province interface with MRI, which is now looking to strong organizations to help deliver its new programming.

Another shift in the local governance landscape has come with the re-organization of the entities that now make up the ATCC. In addition to having come together under a single roof, the organizations have been working to clarify and enhance their respective roles as they relate to supporting agri-technology.

The changes bring to the fore the need to re-examine respective roles of the core organizations that have, up until now, been relied upon to support the Guelph cluster.

Jurisdictional tensions: Though based in Guelph, the organizations that make up ATCC have provincial mandates, and as such, have no explicit commitment to the Guelph region. This competing responsibility limits the role that ATCC can play in making strategic decisions in support of the region's Agri-Innovation Cluster.

There is also a potential for jurisdictional tension as the economic development aspirations of the City of Guelph overlap with those of the surrounding region. To resolve these prospective tensions, collaborating with organizations such as TRRA and CTT will be important.

A crowded field of agri-related organizations: A large number of agri-support organizations and agri-related government departments are based in Guelph, each of whom speak with their own voice, and on different issues, and to different levels of government. The result is a crowded landscape of agri-related organizations, very few of whom actually speak for the Guelph region. These none the less impart a false impression that Guelph is the centre of agri-

business in Ontario, when in fact it is simply home to a critical mass of support organizations and government bodies, many of whom have a direct mandate in supporting the agri-innovation sector in the province, but do not have direct responsibilities aimed at the local Guelph cluster.

Leadership & strategic direction: Because of the distributed and fragmented leadership structure, no single organization has the independence and credibility among all stakeholders to lead the governance network that supports the Agri-Innovation Cluster. Moreover, the region has not fostered the development of leaders who could assume the important role of champion for the region. This has left a leadership gap in the region, negatively impacting on the capacity to support cluster development. Further to this is a lack of strategic direction and planning for cluster development, and a commitment to securing available funding from various public sources.

Scope of governance functions: There are a number of important governance functions (as listed in Figure 9) that are underdeveloped in the Guelph region. This too is due in part to the distributed nature of the current governance arrangement, as well as to the fact that there has not yet been a strategy to necessitate some of these functions. As Guelph takes steps to implement its cluster strategy, however, these functions will be important to the long term success of its efforts.

5. Cluster Development Strategy

By undertaking the development of an Agri-Innovation Strategy, the City of Guelph and local governance partners recognize that it can play an important role in strategically supporting agri-innovation capacity, which in turn, supports its broader commitments to economic diversification and sustainability. Guiding the strategy to success are the following vision and mission statements.

VISION: A prosperous and globally significant Agri-Innovation Cluster that reflects the community goal of sustainability and which harnesses local research and industry expertise in food and wellness and agri-business for the social, environmental and economic benefit of local companies, the Guelph region, Ontario and Canada.

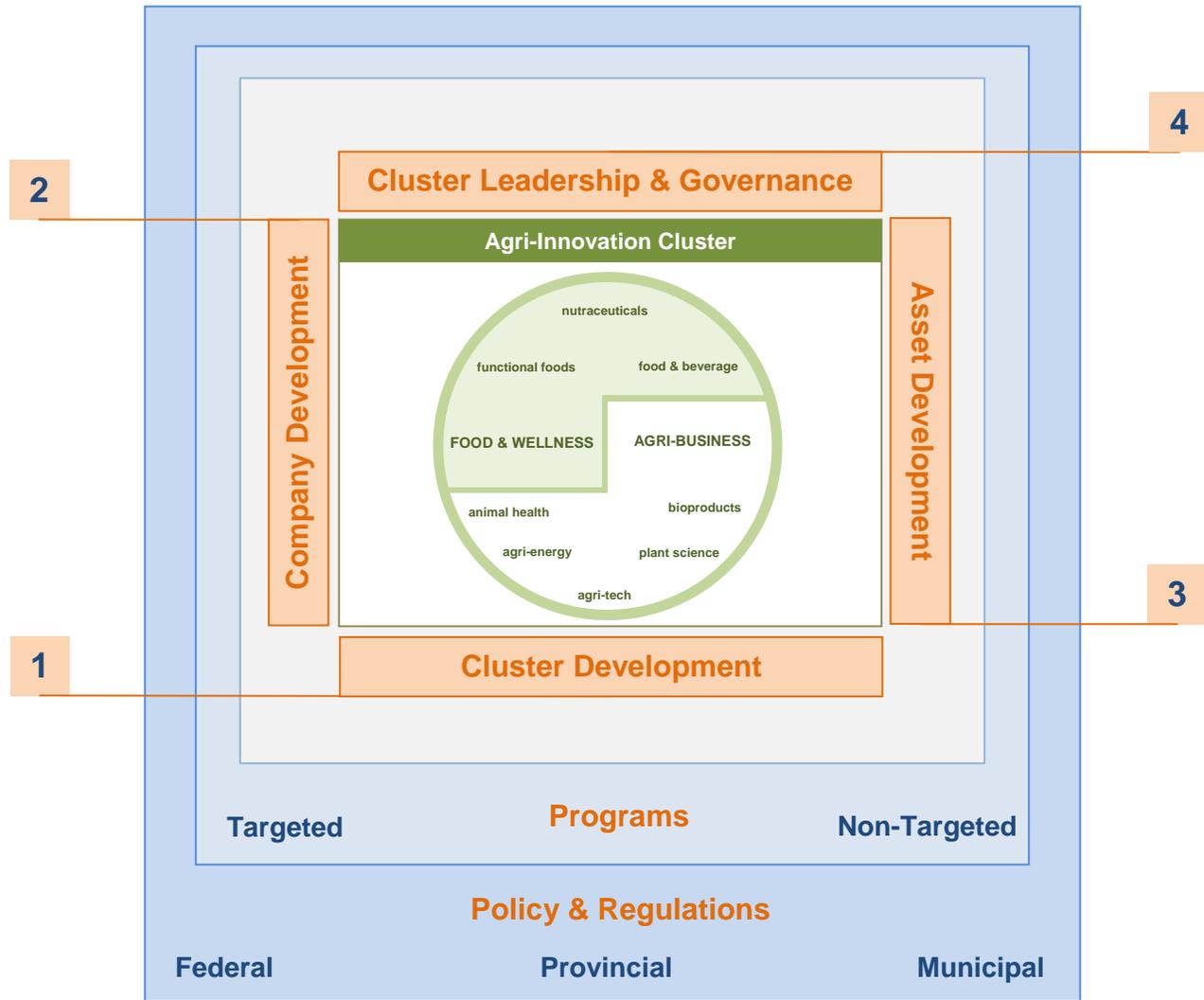
MISSION: To create an environment that attracts investment, supports industry development, and fosters cluster interactions by mobilizing stakeholders and leveraging local, regional, and national resources and assets towards building agri-innovation prosperity in Guelph.

5.1 Strategic Framework

Developing cluster initiatives favours an approach that simultaneously builds on regional strengths and unique assets, while removing barriers to development. Getting the factors right for cluster development requires action and co-ordination among government departments, regional economic development agencies, universities, companies and others. Clusters must be business driven and they usually evolve somewhat spontaneously over decades. However, well-designed cluster initiatives can expedite the process and provide a much-needed initial platform. Central, regional and local government can play a leading role in stimulating networks and partnerships that create the conditions that encourage cluster formation and growth.

A Strategic Framework has been developed to guide the development of actions for strengthening the Guelph Agri-Innovation cluster. The Framework identifies four key dimensions of cluster development, while taking into account the broader multi-level policy and regulatory environment (Figure 11).

Figure 11: Strategic Framework



The first dimension corresponds to **Cluster development** (1), which includes those strategic actions aimed at supporting cluster conditions and interactions. It considers four areas for strategic actions: business climate; cluster linkages; cluster identity; and innovation.

Company development (2) covers the four main strategic approaches for expanding company activity in the region. The first is helping existing companies with the *expansion* of their activities within the regional economy. The second is the *creation* of new firms within the region. Third is helping established and mature industries with the *conversion* of existing products with cluster technologies so as to enhance their competitiveness by transitioning to a green economy. Fourth is the *attraction* of firms from outside the region through re-location to Guelph on the basis of the region’s competitiveness and research infrastructure;

Asset development (3) gives focus to land use, existing buildings, facilities and planning zones that can be leveraged through appropriate planning to support the Agri-Innovation Cluster. In particular it examines strategies for employment lands, existing built up sites and the Guelph Innovation District.

The last dimension of the Framework is that of **cluster governance and leadership** (4), which captures the actions necessary to bring together the appropriate leadership and stakeholder groups who can be tasked with not only implementing the strategy but also providing continuity in strategic direction and support that is necessary for the long term viability of the cluster.

Note that the following strategic actions have been identified in the context of public programs that support the cluster specifically (targeted programs) and innovation and entrepreneurship more generally (non-targeted programs) as well as the policies and regulations that shape market opportunities for the cluster at each level of government.

5.2 Strategic Actions

5.2.1 Cluster Development

GOAL: A cohesive and visible cluster maintained by a supportive business environment and made vibrant by functional cluster interactions that promote localized learning and innovation.

Business Climate

An environment that is supportive of firm formation and growth, conducive to innovation, and which can attract and retain skilled labour is very important to the vitality and dynamism of the cluster as a whole. On this factor, the Guelph region's performance is mixed due in part to perceptions among cluster firms that the city is not as supportive of business as it could be, and confusion over which organizations provide what support in the region.

OBJECTIVE: To make Guelph a nationally recognized leading locale for sustainable business that welcomes and supports new and existing companies related to agri-innovation.

Action 1. *Develop a 'welcome kit' for cluster businesses*

A welcome kit should identify at a minimum the following:

- 'Who does what' in the region,
- Local and regional planning and regulatory issues relevant to cluster businesses,

- Key contacts responsible for planning and regulatory approvals; and
- Innovation support programs and organizations relevant to the cluster.

Action 2. *Establish a municipal approval process and single window access for business services that is adequately resourced and promoted and which provides a portal for information exchange and business approval processes for city services relevant to business development.*

The service would be a coordinating node for information and decision making for the following municipal services:

- Planning, land acquisition, building, site plan, engineering, and zoning approvals;
- Water, waste water needs; and
- Roads/transportation needs.

Action 3. *Build community support by engaging collectively both the pro- and anti-growth groups as well as news reporters throughout the Guelph region to bring alignment, understanding and consensus around community goals and cluster vision and related initiatives.*

The different agendas of segments of the population within Guelph region have created an anti-business narrative that has amplified negative perceptions of Guelph's business climate. This engagement, which will require strong and credible leadership, can transpire through a number of initiatives: bi-annual events; 'joined-up' participation in special decision-making forums.

Linkages

An important dimension of cluster dynamics is the network itself as shaped by functional linkages between firms collaborating with each other or between firms and public research organizations. In strong clusters, these relationships generate a localized dynamic process of collective learning and ultimately improved innovation performance. Overall there are weak horizontal linkages between cluster firms in Guelph. This is an indication that there is little in the way of collaborative research and product development occurring among firms. Moreover, there is no one firm in the cluster that stands out as an anchor firm, driving interconnectivity within the cluster.

OBJECTIVE: To strengthen the quality, extent and usefulness of linkages among firms and research organizations so as to improve local learning and product development capabilities.

Action 4. *Leverage funding programs to create multi-firm R&D and proof-of-concept projects that showcase cluster opportunities.*

These funds can help build local and functional linkages not only among cluster firms, but also between cluster firms and critical sectors such as advanced manufacturing and IT. The projects can also offer strong support for investment attraction efforts. The University of Guelph, through its laboratories, pre-commercialization facilities, and faculty, whose access to special pools of funding for proof of principal projects can be leveraged, could be engaged to support this action.

Action 5. *Develop a capital network in the region that taps into angel investors. Host information sessions on how interested participants can become accredited investors and on how to invest.*

Capital that is accessible to early stage companies is currently lacking in the region, but there is untapped potential, particularly in the agricultural community for investment in agri-bio products.

Action 6. *Develop a mentoring network that connects senior and experienced local business leaders and entrepreneurs with new firms.*

Start-ups need advice from local business leaders with experience to help them move beyond the R&D stage to product sales. This network could be supported further by engaging faculty from the University of Guelph's College of Management and Economics to participate in business learning, entrepreneurship, marketing and business planning.

Action 7. *Develop, support and promote peer-to-peer learning networks among senior management of cluster companies to promote local learning and economic opportunities.*

Peer-to-peer networks could address the following challenge areas:

- Positioning of companies within global value chains related to agri-innovation;
- Exporting to new markets and countries and export logistics;
- Innovation challenges and opportunities; and
- Talent attraction, retention and training.

Action 8. *Establish a capability to identify and facilitate innovation and business opportunities with advanced manufacturing and environment and energy firms.*

These linkages can be supported through existing networking initiatives within the region.

Action 9. *Establish a forum with regional colleges and cluster companies to identify local skill needs and to propose new programs that can address these needs.*

The tailoring of local college programs to meet the skill requirements of local companies can be an effective way of deepening the local pool of qualified labour and providing an incentive for cluster related firms to locate and expand in the region.

Identity

Cluster identity reflects the extent to which firms - in and outside the cluster - recognize that there is an Agri-Innovation Cluster in Guelph. It has implications for the visibility of the cluster, and for investment and talent attraction.

OBJECTIVE: To have the Agri-Innovation Cluster recognized locally by the Guelph business community and public, and nationally and internationally by relevant industry clusters and investment attraction practitioners.

Action 10. *Launch a major marketing initiative that positions Guelph's cluster expertise and success stories on the local, national, and world stage.*

Efforts are required to develop a strong brand/identity of Guelph as an innovation centre; existing marketing efforts are too diffuse to attract new businesses and investment. The marketing initiative should also:

- Promote Guelph's comparative advantages (e.g., access to innovation, clean and green city, affordable housing, local workforce, transportation links, etc.);
- Brand the cluster core as an innovation triangle that is defined by the downtown, the university, and Guelph innovation district.
- Subsume the "Grow Guelph" brand within the cluster vision.

Action 11. *Engage university professors and prominent business leaders in helping tell the story of Guelph in Canada and abroad at conferences and other speaking events.*

University professors and company CEOs bring credibility and global exposure to Guelph expertise that can support investment attraction efforts.

Innovation

Overall innovation performance in the Guelph cluster is relatively low for a knowledge intensive cluster. Several explanations have been given for this modest performance, including the fact that though Guelph has a number of multinational subsidiaries, they generally have no R&D capabilities and are instead regional suppliers.

OBJECTIVE: To increase R&D activity among all cluster firms through innovation support structures and awareness.

Action 12. *Promote the University of Guelph's new Business Development Office, IP licensing policy, and technology transfer opportunities to local firms.*

The University of Guelph has undertaken a number of significant changes in how it manages its intellectual property as well as its relationship with industry. Very few in the business community are aware of these changes, the result of which is the perpetuation of the view that the University is part of the innovation problem.

Action 13. *Work with the province and industry stakeholders to establish leading edge strategic infrastructure for prototyping related to agri-bio in Guelph that can support innovation and growth of the cluster as a whole and build visibility.*

This infrastructure, which may include a demonstration seed crusher or bio-fermentation plant, is critical if Guelph is to capture the economic activity associated with the agri-bio industry. While production versions of such infrastructure should be located closer to feedstocks, infrastructure for prototyping new processes is best located near the research assets in Guelph.

5.2.2 Company Development

GOAL: A critical mass of industry expertise and capabilities that transforms the Agri-Innovation Cluster in to a sustainable generator of regional wealth.

Expansion / Retention

A major source of new job growth will come from existing companies. As cluster firms look to expand, it is important for the city to help ensure that their expansion needs can be met within the region. This engagement can also help foster a business friendly culture throughout the region.

OBJECTIVE: To establish active relationships with all cluster companies for the purposes of information exchange and support related to business needs and expansion plans.

Action 14. *Develop a rapid action group that can be called upon to support and influence business expansion, retention and attraction opportunities, which includes representatives from OMAFRA, ATCC, the City of Guelph, the University of Guelph, industry and venture capitalists.*

Successful industry development within a locality typically requires effective and rapid responses to company concerns and issues so that necessary investment decisions can be made in a timely manner. Such a group demonstrates strong commitment to prospective firms and signals that the region is supportive of business and can also help align economic development efforts between the city and different levels of government.

Action 15. *Maintain strong and active relationships between the City of Guelph and cluster firms so as to be able to respond and support expansion and growth needs as they arise.*

Action 16. *In collaboration with the University, engage multinational firms located in Guelph to make them more aware of research opportunities and accessible funding within the region.*

Guelph is home to a number of multinational subsidiaries whose only activities are related to sales. This is a missed opportunity for the region to expand its research base. This is also an opportunity for the University of Guelph to identify local projects for industry-university collaboration.

Creation

Though start-ups present the highest risk for the cluster's growth (i.e., high failure rate), they are more likely to remain in the region once established. Start-ups also act as an important mechanism for transferring IP from research institutes and can have a greater local economic impact than if this same technology is simply licensing to firms outside the region. For this reason, initiatives to improve the rate of new firm formation are critical to the success of the cluster.

OBJECTIVE: To establish high-value business and specialized infrastructure support to assist in new company creation.

Action 17. *Establish low-cost wet lab space that can be accessed by start-ups for research and development, and prototype scale-up activities.*

Wet laboratories are spaces where chemicals, biological matter or other material are tested and analyzed with processes that require water, direct ventilation, and specialized piped utilities. Wet labs are generally located within a building specifically designed to house them in accordance with regulatory requirements. The Guelph region currently has very little such space available, which is a significant deterrent to those firms that require wet labs for product development.

Action 18. *Identify vacant or underutilized industrial properties and heritage buildings as strategic locations for business start-ups, particularly east of Downtown within the "Innovation Triangle".*

Guelph already maintains many excellent support services for new firms, which diminishes the value and urgency of establishing an incubator in the city. Having low cost office space in proximity to the research base of the cluster is, however, valuable to new firms and can be achieved without the expense of a new incubator.

The current economic downturn may result in vacant properties in the older industrial areas, particularly east of Downtown, creating opportunities for Agri-Innovation businesses to move in within the GID-UG-Downtown triangle. Brownfield redevelopment incentives exist, but other incentives may be needed to encourage this. Old commercial and industrial buildings should also be conserved and marketed as low-rent space for business start-ups.

Action 19. *Promote entrepreneur education through a new MBA stream at the University of Guelph that is dedicated to technology entrepreneurship and which requires students to develop business plans on commercializing technology from the University's business development office.*

These programs will help develop crucial entrepreneurial and managerial skills in the cluster.

Conversion

There are a number of examples of agri-bio products (e.g. agri-based plastics, lubricants, etc.) that have been successfully integrated into the auto and food processing industries, helping to not only modernize the industrial base, but also expand market share and employment. However, awareness of agri-bio opportunities is generally low, and without sufficient awareness and active outreach, the potential of agri-bio as a source of new products and industry solutions will not be fully realized.

OBJECTIVE: To facilitate the adoption of agri-bio technology into production processes and product lines of local advanced manufacturing companies.

Action 20. *Engage the advanced manufacturing and food processing sectors to promote opportunities where companies can take advantage of agri-bio and agri-energy technologies.*

These efforts can help Guelph realize the goals of the Community Energy Plan and support the image of Guelph as a centre for environmentally sustainable and innovative companies. Key collaborators include the Ontario BioAuto Council, University of Guelph, and Conestoga College.

Attraction

If Guelph is to build critical mass in the cluster and achieve employment objectives, recruitment of firms to the region will be essential. To this end, a concerted effort must be made to attract foreign direct investment to the region. Guelph is best suited for innovative small to mid-sized firms that are looking to leverage the cost of their innovation activities with public support. While these firms may not have the international recognition of a multinational firm, they have strong growth potential that could readily be supported by Guelph's key cluster assets such as the GID.

OBJECTIVE: To increase levels of investment that enhances cluster capabilities in research and innovation.

Action 21. *Develop business / research partnership incentives and programs for attracting companies to the cluster.*

These partnerships provide an innovative way to enhance the comparative advantage that the region has to offer. This can include, for example:

- Strategic research projects carried out in collaboration with universities and local firms; and
- District energy agreements that offer competitive utility pricing.
- Regional partnerships that leverage the strengths of relevant research institutions and organizations in the wider region of Guelph, including the GTA, Waterloo and London, for the benefit of Guelph-based companies.

Action 22. *Engage international collaborative research networks to identify prospective target firms.*

Action 23. *Establish a group that can identify prospective small and mid-sized firms from outside the Guelph region and outside of Canada that complement the expertise in the Guelph cluster and pursue leads of relevant companies that have made the decision to locate in Canada and Ontario.*

This group should comprise individuals actively involved in business attraction who are in frequent contact with prospective firms (e.g., OAFT, BioEnterprise, Toronto Region Research Alliance, Department of Foreign Affairs and International Trade). Identified targets should be engaged by the lead cluster organization and presented with a strong business case for locating in Guelph.

Action 24. *Establish in-coming and out-going trade missions with target countries that bring together companies, research groups and other stakeholders to respective clusters with the goal of identifying, exchanging information and acting on investment opportunities and collaborative research opportunities.*

Given the global nature of the opportunities both in terms of markets and production chains, it is critical for the cluster to be open to, and instigators of, foreign direct investment (FDI). Such an emphasis is important to access the economic opportunities in global value chains and acquire new knowledge and capabilities within the cluster.

The Agri-Innovation Cluster has a number of valuable assets with which to attract firms from abroad. Its comprehensive research base, its niche capabilities in food and wellness and agri-business, together with a highly qualified labour market, can differentiate the region in the global market place and help draw investment, provided that these assets are effectively communicated. The Netherlands and Israel, both of which have similar agri-related interests to Guelph and prominent innovation clusters (e.g. Food Valley in the Netherlands) have good potential for FDI links.

Action 25. *Develop a rapid response process within the municipal government for arranging initial meetings with prospective firms.*

Establishing a process that ensures a quick response (e.g. 48 hours) by city officials to prospective investment opportunities demonstrates a commitment by the city and can help positively influence private sector investment decisions. This process complements the rapid action group (Action 13), the latter of which would convene as necessary to address cross-jurisdictional issues that would affect a particular investment decision.

5.2.3 Asset Development

GOAL: A competitive advantage derived from the optimum use and development of land and facility assets for the benefit of the Agri-Innovation Cluster.

The City of Guelph has a number of assets - land, facilities, and others - which can be leveraged to strengthen the Agri-Innovation Cluster. To take advantage of these opportunities, efforts are required to align land use and urban design strategies with cluster goals and objectives.

Employment Lands

OBJECTIVE: To provide accessible, attractive, flexible employment lands across the city.

Action 26. *Continue to ensure Guelph's employment lands can accommodate a wide range of employment uses.*

Maintaining a range of general employment areas, commercial corridors, and tech-oriented business parks will be important for the growth of the Cluster. The diverse nature of the Guelph cluster means a range of businesses—office-based, light industrial and heavy industrial—in a range of sizes will need to be accommodated, so a degree of flexibility regarding land use and built form policies in most employment areas will be needed. All of the city's existing and planned employment areas, therefore, have a role to play in accommodating cluster-related businesses. There is an ample supply of employment lands for at least the next 20 years.

Action 27. *Apply high design and environmental standards in developing and planned employment areas, particularly along the Hanlon Expressway, in the Gordon-Maltby area and in the Guelph Innovation District.*

While flexibility is needed within most employment areas, maintaining a consistent and high-quality image for industrial areas will be important to attracting new, innovative businesses, particularly those from the United States and Europe, where “prestige” business parks are more the norm. Generally, consistent and higher standards for streetscaping and landscaping are needed. This strategy may be targeted to portions of employment areas or to specific

employment areas, notably the undeveloped lands of the Hanlon Creek Business Park that is ready for new development and where a high standard of environmental stewardship is expected.

It is particularly important to demonstrate high standards of sustainability and urban design along the Hanlon Expressway and in the Gordon-Maltby area, since these are the primary southern gateways to the city. Most potential investors and employees in the cluster will first experience Guelph from the Hanlon or Gordon Road. These are key places for memorable architecture and best practices in sustainability, as well as landscape design that celebrates Guelph’s urban and rural aspects.

Guelph has a green image, but this is not yet widely reflected in how buildings are built and operated. Implementing the CEP, providing incentives for green buildings, and partnering with large employers and developers on demonstration projects, will all complement the Agri-Innovation cluster. In time, visitors and potential investors should be able to go anywhere in Guelph and see a green building or green infrastructure.

Action 28. *Design and promote the Hanlon Creek Business Park as a destination for agri-innovation businesses seeking highly accessible and attractive sites in the short-term.*

The Hanlon Creek Business Park (HCBP) located west of the Hanlon Expressway is being planned and designed as Guelph’s next new “prestige” corporate business park, one that will be held to high green standards. Since the Guelph Innovation District is not yet “prepped” for significant growth and only limited development is expected there in the next ten years, the HBP provides a strategic opportunity to focus short-term private development within the cluster. The goal should be to create the sense of a technology park with a unified image defined as much by the natural features in the area as by the businesses that locate there and their buildings. Since a mix of industrial and commercial uses of varying scales can be expected to be accommodated in the park - including office, laboratory, R&D and light industrial uses- the public streets also will play an important role in giving the park a consistent and attractive identity.

Downtown

OBJECTIVE: To align downtown planning and development with cluster development.

Action 29. *Locate cluster infrastructure and focus other supportive investments in the GID-University-Downtown “triangle”.*

The University is the heart of the Guelph cluster; Downtown is the heart of the city and a key to attracting knowledge workers; and the GID is expected to be another vital asset supporting economic growth. The triangle created by these three “points” is the natural place to focus cluster businesses and infrastructure—it is a short drive or transit ride between each of these points. Cluster-related investments in this zone can support other important planning objectives,

including intensification, brownfield redevelopment, adaptive re-use of heritage buildings and downtown revitalization.

Key corridors connecting these destinations, Gordon, Stone, Victoria and York streets, should be considered for cluster infrastructure investments (e.g., land redevelopment, information technology and streetscape improvements).

Action 30. *Continue to distinguish Downtown Guelph through cultural programming, food destinations and sustainable development.*

Downtown Guelph contains many of the city's most attractive features—riverfront parkland, heritage buildings, cultural and entertainment destinations. It has a distinct quality of place inherent to historic cores and can give the cluster a marketing edge. A unique food destination downtown that celebrates the local food industry will only reinforce the image and identity of the cluster. There is potential to leverage food-related successes, such as the Guelph Farmers Market, to promote the local agri-bio business cluster.

Incentives to attract small and mid-size office-based businesses as well as residential developers will indirectly help grow the cluster. Examples include a district energy system, green buildings and other CEP initiatives.

University Research Park

OBJECTIVE: To have the University of Guelph's Research Park North be an integral element of the Guelph Agri-Innovation Cluster.

Action 31. *Develop the University of Guelph's Research Park North for use by the Guelph Agri-Innovation Cluster.*

The University's Research Park is a critical anchor for the cluster that will only grow in importance as the north portion of the park is developed. While there may be strategic short-term opportunities to locate research and development facilities in the Guelph Innovation District, Research Park North should continue to be a prime target for small, mid-size and even larger agri-innovation businesses seeking high-quality space and a location next door to the university and community amenities. As with the South Park, development should accommodate local branches of national and multi-national firms, public entities involved in agri-innovation and space for business start-ups. This is an ideal location for a number of Actions, including that of establishing wet lab space and proof-of-concept projects.

The architectural and public realm qualities of the North Research Park should match or exceed those of the South Park to further distinguish it from other university research parks. Indeed, the Community Energy Plan and other sustainability initiatives by the City and the University should be used to promote denser development, greener buildings and lower parking ratios.

Guelph Innovation District

OBJECTIVE: To establish the GID as a multi-faceted technology park.

Action 32. *Complete the Secondary Plan for the GID to establish the framework for development of institutional, research and development, and industrial uses that support the cluster and other uses complementary to these.*

The City's Draft Employment Lands Strategy (ELS) identifies the potential to use up to approximately 300 acres of the GID for employment. As acknowledged in the Draft ELS, the GID is highly attractive for knowledge-based uses such as R&D (offices and labs). The Draft ELS further recommends that the GID lands west of the Eramosa River be available for development within the next 10 years, to ensure the City has sufficient lands for "innovation-based" uses in the medium term. The size and existing features of the GID create the potential for it to become a unique technology park where education, research and industry come together. The natural and cultural heritage features will help to give it a distinct identity.

Action 33. *Plan, promote and facilitate development of an office/research campus on the former Wellington Detention Centre site as the first phase of a larger research and technology park in the south west quadrant of the GID.*

The University of Guelph Research Park, with approximately 12 acres of undeveloped land remaining, is expected to be fully built out in the short to medium term. The GID lands south and west of the Eramosa River are well-positioned to succeed as a research/office park—they are close to the UofG campus and downtown, enjoy an attractive natural setting and can accommodate development of varying sizes.

Approximately 100-120 acres west of the river, which may include land south of Stone Road, should be reserved for the research/office park. This is comparable to the sizes of the University of Waterloo Research and Technology Park (120 acres), Saskatoon's Innovation Place (80 acres) and the University of Western Ontario's Research Park (130 acres).

Much of these lands is currently being used by the Turf Grass Institute and agri-forestry researchers at the university. However, with more than two dozen acres of land not currently being used on the north side of Stone Road, and 45 acres private land on the south side, the initial phases of a research/office park could be implemented without relocating these research uses. Although it is the City's intention to see these uses phased out to make way for development, their presence in the meantime is not incompatible with the desired image of the GID.

The fact that Stone Road is a gateway to the GID also supports a south-to-north phasing strategy. Indeed, the Stone Road/Victoria Road node, within the former detention centre lands, provides a strategic opportunity for shorter-term, prestige development that sets the tone for the larger

research and technology park and broadens the identity of the cluster. The node should have a development density, built form and landscape design befitting a gateway.

Action 34. *Prepare a long-term strategy for development of a “green” live-work community on lands occupied by, and adjacent to, the Turf Grass Institute, with the TGI potentially remaining in the short to medium term.*

Given the size of the GID and the goal to establish a contemporary “innovation park”, the inclusion of residential uses on a portion of the lands is appropriate. Housing will ensure there is activity on the lands 24/7 and will help the City achieve its intensification goals. It will be important, however, to ensure that the type of residential development and employment uses are compatible so that they complement one another.

Residential development should support uses within the cluster and the overall image of the GID by demonstrating the highest environmental standards and local innovation. There may be an opportunity for a residential community to function as a living laboratory where environmental and other innovations are tested and demonstrated.

Any residential community in the GID should include a significant number of live-work units that provide space for cluster-related home businesses. In later phases, office buildings may be integrated with housing, effectively blurring the boundary between the community and the research/office park.

The TGI site and the lands immediately to the north of it are the most appropriate location within the GID for housing. However, the TGI may not need to be entirely relocated to make room for residential development. Its research plots could be reconfigured to allow development close to Victoria Road. By shifting the TGI southward, it could act as a buffer between the residential community and employment uses, potentially using development on both sides for applied research.

Action 35. *Plan the east quadrant of the GID, between Dunlop Drive and Stone Road, for eco-industrial uses in the agri/food/energy/environment sectors.*

Although the Draft Employment Lands Strategy does not envisage the lands east of the river being needed for employment in the short and medium term, 32 acres are currently occupied by Cargill, and the City’s new organic waste processing facility will be located there.

The existing and proposed uses, including a bio-gas energy plant, fit within the cluster and indeed should be leveraged to attract complementary uses. This area would be appropriate for common Cluster infrastructure or a demonstration facility that may be more industrial in nature but could benefit from proximity to other uses in the broader GID. Noxious and unpleasant emissions and truck traffic from existing and future uses will need to be carefully managed to ensure adverse impacts on the surrounding uses are minimized.

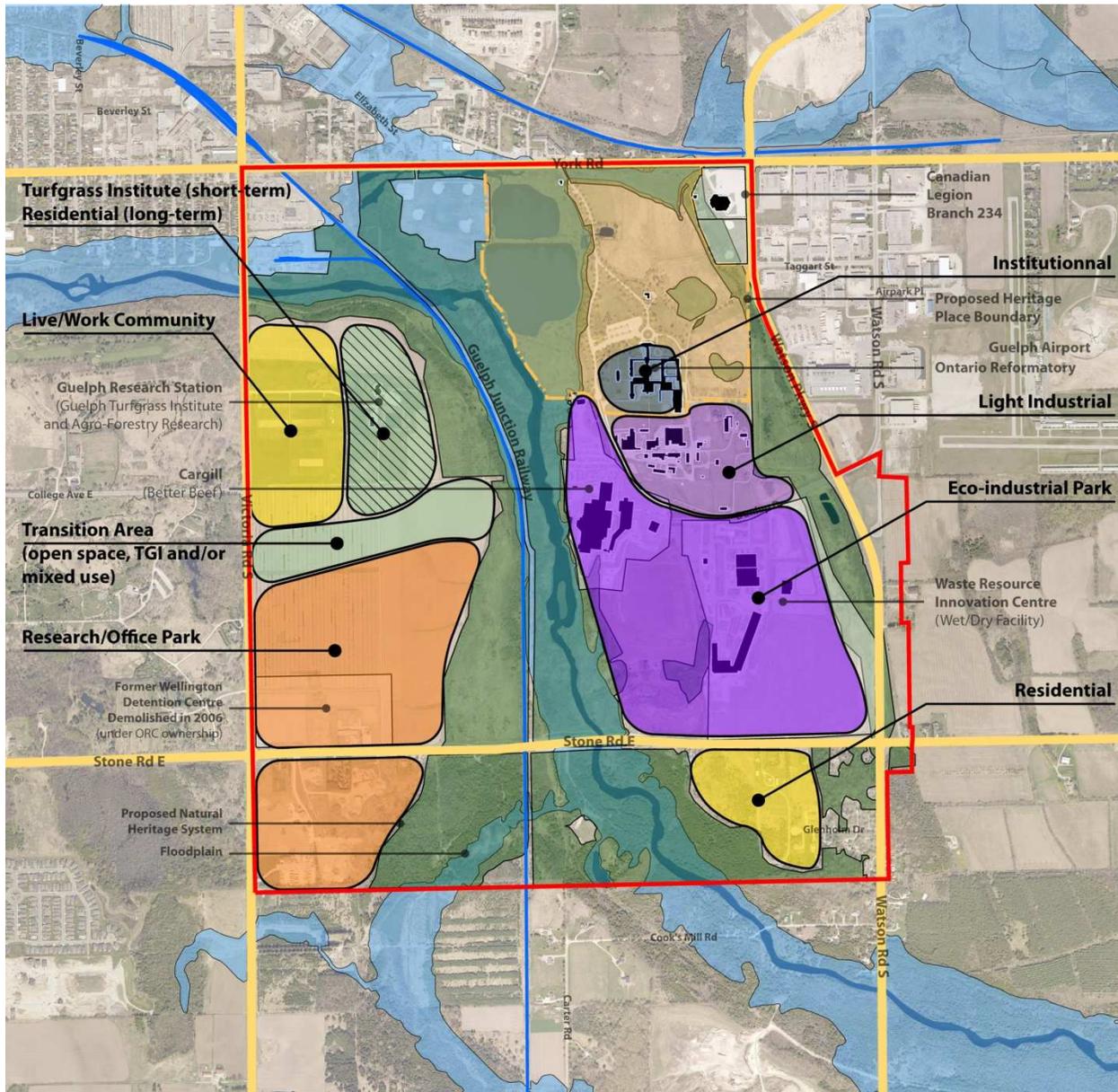
Future development along Stone Road should be designed to a high standard to reflect a positive image of the GID as a whole.

Action 36. *Pursue retro-fitting of the historic reformatory buildings for one or more institutions while using the larger site as a demonstration/exhibition park for various green initiatives.*

The former Provincial reformatory (Figure 12) presents an opportunity and an enormous challenge. Its historic buildings and landscape could help to give the GID a distinct identity. While the feasibility and cost of reusing the buildings has not been studied in detail, it appears there are a limited number of suitable new uses and adapting the buildings will likely be costly.

Adapting the buildings for one or more educational and/or research institutions or an agri-eco-enviro education centre may be the most viable option and could catalyze cluster-related development in the broader GID. Potential occupants could include Conestoga College, a UofG department and/or a private research institute (e.g., a Fraunhofer Centre). Models such as Evergreen at the Brickworks or Wychwood Barns, both in Toronto, or Eden in the UK, provide precedents for the demonstration and education potential of the site.

Figure 12: Existing and Potential Use of the GID



The administrative components of the complex provide more flexibility and may attract traditional office or even residential uses. The entire reformatory site has the potential to evolve as an exhibition place for green building and green energy initiatives. To complement future uses in the reformatory buildings and provide a transition to the industrial uses to the south (Cargill and the Waste Innovation Centre), future employment and institutional uses north of Dunlop Drive should be “clean and green” and create a campus-like environment.

5.2.4 Cluster Leadership and Governance

It is recommended that the city initiate changes that would improve the local cluster governance network so as to provide a strong node of leadership that can mobilize the support of public officials, citizens, business leaders, and, or local groups, and access the necessary resources and decision-making to implement strategic actions that foster cluster development.

GOAL: Effective local leadership and governance that can mobilize and excite stakeholders to work together towards achieving a dynamic cluster.

OBJECTIVE: A strong and respected leadership that can lead capable individuals and organizations to take on projects and who brings the community together to respond to economic challenges; and a cohesive and effective local governance structure that provides leadership decision making support for socio-economic development in Guelph.

Action 37. *Identify and support the development of a lead organization that is capable of mobilizing stakeholders to take on strategic projects, providing cluster direction and resolving local and regional impediments to cluster development.*

The resulting new lead entity would act as the central node of the network and consolidate leadership for the Guelph region. Though further data collection and analysis is planned to give greater specificity to this preliminary recommendation, such a new lead entity would require a realignment of existing roles and responsibilities among current governance stakeholders. It would also ideally be at the centre of a network of potential partners and collaborators that can effectively mobilize the full resources and capacities of all levels of government and relevant support organizations towards strategic initiatives aimed at achieving economic and social prosperity in Guelph.

This new lead entity (NLE) would be more comprehensive in its activities than GPI and GEDAC, and have a Guelph-focused proactive mandate that allows it to carry out a range of key functions. Key functions would include: coordinating access to cluster relevant funding made available by government partners; providing a forum for exchanging information among key stakeholders related to cluster development and agri-innovation; promoting alignment between cluster skill needs and local educational program offerings; leading on a proactive marketing campaign of cluster; promoting regional alignment of strategic direction and initiatives through regional coordination and collaboration; and attracting and recruiting firms to the region that can strengthen the critical mass of the cluster. It is also envisioned as having the flexibility to allow it to respond effectively to issues affecting Guelph's broader economic and social prosperity which underpin the viability of its cluster.

Figure 13: Cluster Strategic Plan – Summary

VISION		MISSION	
<p>A prosperous and globally significant Agri-Innovation Cluster that reflects the community goal of sustainability and which harnesses local research and industry expertise in food and wellness and agri-business for the social, environmental and economic benefit of local companies, the Guelph region, Ontario and Canada.</p>		<p>To create an environment that attracts investment, supports industry development and cluster interactions by mobilizing stakeholders and leveraging local, regional, and national resources and assets towards building agri-innovation prosperity in Guelph.</p>	
GOALS	OBJECTIVES	ACTIONS	
<p>CLUSTER DEVELOPMENT</p> <p>A cohesive and visible cluster maintained by a supportive business environment and made vibrant by functional cluster interactions that promote localized learning and innovation.</p>	<p>Business Climate: To make Guelph a nationally recognized leading local for sustainable business that welcomes and supports new and existing companies related to agri-innovation.</p> <p>Linkages: To strengthen the quality, reach and usefulness of linkages between firms and research organizations so as to improve local learning and product development capabilities.</p> <p>Identity: To have the Agri-Innovation Cluster recognized locally by the Guelph business community and public, as well as nationally and internationally.</p> <p>Innovation: To increase R&D activity among all cluster firms through innovation support structures and awareness.</p>	<p>Action 1. Develop a ‘welcome kit’ for cluster businesses</p> <p>Action 2. Establish a single window access for business services</p> <p>Action 3. Build community support</p> <p>Action 4. Leverage funding R&D programs</p> <p>Action 5. Develop a capital network in the region that taps into angel investors</p> <p>Action 6. Develop a business mentoring network</p> <p>Action 7. Develop peer-to-peer networks to promote local learning and economic opportunities</p> <p>Action 8. Establish a capability to identify and facilitate innovation and business opportunities with supporting sectors.</p> <p>Action 9. Establish a forum with regional colleges and cluster companies to identify local skill needs and new training programs</p> <p>Action 10. Launch a major marketing initiative</p> <p>Action 11. Engage university professors and prominent business leaders in helping tell the story of Guelph.</p> <p>Action 12. Promote UofG’s new Business Development Office, IP licensing policy, and tech transfer opportunities to local firms</p> <p>Action 13. Work with the province and industry stakeholders to establish leading edge strategic infrastructure related to agri-bio</p>	
<p>COMPANY DEVELOPMENT</p> <p>A critical mass of industry expertise and capabilities that transforms the Agri-Innovation Cluster in to a sustainable generator of regional wealth.</p>	<p>Expansion & Retention: To establish active relationships with all cluster companies for the purposes of information exchange and support related to business needs and expansion plans.</p> <p>Creation: To establish high-value business and specialized infrastructure supports to assist in new company creation.</p> <p>Conversion: To facilitate the adoption of agri-bio technology into production processes and product lines of local advanced manufacturing companies.</p> <p>Attraction: To increase levels of investment that enhances cluster capabilities in research and innovation.</p>	<p>Action 14. Develop rapid action group to company development opportunities</p> <p>Action 15. Maintain strong and active relationships with cluster firms</p> <p>Action 16. Engage multinational firms in Guelph to make them more aware of research and funding opportunities</p> <p>Action 17. Establish low-cost wet lab space</p> <p>Action 18. Identify existing low-cost office space suitable for start-ups</p> <p>Action 19. Promote technology entrepreneurship education through a new MBA stream at University of Guelph</p> <p>Action 20. Engage companies to promote opportunities where they can take advantage of agri-bio and agri-energy tech</p> <p>Action 21. Develop business / research partnership incentives & programs for attracting companies to the cluster</p> <p>Action 22. Engage international collaborative research networks to identify prospective target firms</p> <p>Action 23. Establish a group that can identify prospective small and mid-sized firms for as investment attraction targets</p> <p>Action 24. Establish in-coming and out-going trade missions</p> <p>Action 25. Develop a rapid response process for arranging initial meetings with prospective firms</p>	
<p>LAND DEVELOPMENT</p> <p>A competitive advantage derived from the optimum use and development of land and facility assets for the benefit of the Agri-Innovation Cluster.</p>	<p>Employment areas: To provide accessible, attractive, flexible employment lands across the city.</p> <p>Downtown: To align downtown planning and development with cluster development.</p> <p>University Research Park: To have the University of Guelph’s Research Park North be an integral element of the Agri-Innovation Cluster</p> <p>Guelph Innovation District: To establish the GID as a multi-faceted technology park.</p>	<p>Action 26. Continue to ensure Guelph’s employment lands can accommodate a wide range of employment uses</p> <p>Action 27. Apply high design and environmental standards in developing and planned employment areas</p> <p>Action 28. Design & promote Hanlon Creek Business Park for agri-innovation in the short-term</p> <p>Action 29. Locate cluster infrastructure and other supportive investments in the innovation “triangle”</p> <p>Action 30. Continue to distinguish Downtown Guelph through cultural programming, food destinations and sustainable devpmt.</p> <p>Action 31. Develop the University of Guelph’s Research Park North for use by the Guelph Agri-Innovation Cluster.</p> <p>Action 32. Plan GID to accommodate primarily institutional, research and development, and industrial uses that support cluster.</p> <p>Action 33. Plan, promote and facilitate development of an office/research campus on the former Wellington Detention Centre site</p> <p>Action 34. Prepare long-term strategy for development of a “green” live-work community on lands occupied by and adjacent to TGI</p> <p>Action 35. Plan the east quadrant of the GID for eco-industrial uses in the agri/food/energy/environment sectors</p> <p>Action 36. Pursue retro-fitting of historic reformatory buildings for one or more institutions</p>	
<p>CLUSTER LEADERSHIP AND GOVERNANCE</p> <p>Effective local leadership and governance that can mobilize and excite stakeholders to work together towards achieving a dynamic cluster.</p>	<p>Leadership: A strong and respected leadership that can lead capable individuals and organizations to take on projects and who brings the community together to respond to economic challenges.</p> <p>Governance: A cohesive and effective local governance structure that provides leadership decision making support for socio-economic development in Guelph.</p>	<p>Action 37. Identify and support the development of a supporting organization that is capable of mobilizing stakeholders to take on strategic projects, providing cluster direction and resolving local and regional impediments to cluster development.</p>	

6. Strategy Implementation

This chapter sets out a plan for implementing actions that takes into account priorities, allocation of responsibilities, cost and timelines, governance, and performance monitoring.

6.1 Priorities

Figure 14 provides an initial indication of the importance, urgency and cost of each action. These criteria have then been used to determine the priority of the actions.

The **importance** criteria is a measure of the impact the action is expected to have on the success of cluster. It is judged on a three-point scale of high, medium and low.

The **timeframe** criteria is a measure of how quickly the action should or can be implemented. It is judged on a two-point scale of short timeframe (within a year) or medium timeframe (a year to five years).

The cost **criteria** is a measure of the new public investment that will be required to implement the action. It is judged on a three-point scale of low cost (under \$100,000), medium cost (\$100,000 to \$1 million), and high cost (over \$1 million).

The priority is then based on these criteria such that important, urgent, and low-cost actions are judged to have a high priority. These priorities should be re-visited by cluster stakeholders as a first step in implementing this strategic plan.

Also indicated in Figure 14 are the organizations suggested to have the lead role and partnering roles in implementing the actions. In all cases, lead organizations have had an ongoing involvement with the sector and have participated in the development of this strategy. The following organizations have been suggested for a lead role in one or more actions:

- A New Lead Entity (NLE) (as per Action 37)
- Guelph Partnership for Innovation (GPI)
- Guelph Chamber of Commerce (GCC)
- City of Guelph (City)
- Agri-Technology Commercialization Centre (ATCC) – consisting of BioEnterprise, Ontario Agri-Food Technologies, and Soy 20/20 working in concert.

- University of Guelph (UoG)

In addition to the above, the following organizations have been suggested for a partnering role in one or more actions:

- ATCC
- BioAuto Council (BAC)
- Connestoga College (CC)
- Ministry of International Trade and Investment (MITI)
- Ministry of Economic Development (MED)
- Ministry of Research and Innovation (MRI)
- Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)
- Agriculture and Agri-Food Canada (AAFC)
- Ministry of Energy and Infrastructure (MEI)
- Ontario Realty Corporation (ORC)
- Federal Economic Development Agency for Southern Ontario (FedDev)
- National Research Council – Industrial Research Assistance Program (IRAP)
- Golden Triangle Angel Network (GTAN)

Figure 14: Priorities and Responsibilities

	Priority	Importance	Timeframe	Cost	Lead	Partners	Funders
Action 37. Identify and support the development of a lead organization that is capable of mobilizing stakeholders to take on strategic projects. ¹³	1	1 High	1 Short	1 Low	City	GCC, GPI, UofG, CC, ATCC, OMAFRA, AAFC	To be determined
Action 1. Develop a 'welcome kit' for cluster businesses	1	1 High	1 Short	1 Low	City - EDT	UofG, GCC, OMAFRA, AAFC	City
Action 2. Establish a single window access for business services	1	1 High	1 Short	1 Low	City		City
Action 11. Engage university professors and prominent business leaders in helping tell the story of Guelph.	1	1 High	1 Short	1 Low	NLE	UofG, City	NLE
Action 12. Promote UofG's new Business Development Office, IP licensing policy, and technology transfer opportunities to local firms	1	1 High	1 Short	1 Low	NLE	UofG, GPI	UofG
Action 15. Maintain strong and active relationships with cluster firms	1	1 High	1 Short	1 Low	NLE	GPI, ATCC, City	NLE
Action 18. Identify existing low-cost office space suitable for start-ups	1	1 High	1 Short	1 Low	GPI	City	NLE, GPI, MRI, AAFC
Action 10. Launch a major marketing initiative	2	1 High	1 Short	2 Medium	City, UofG	NLE, GCC	City, FedDev, UofG
Action 25. Develop a rapid response process for arranging initial meetings with prospective firms.	2	1 High	1 Short	2 Medium	City	NLE	City
Action 28. Design and promote the Hanlon Business Park as a destination for agri-innovation businesses seeking highly accessible and attractive sites in the short-term	2	1 High	1 Short	2 Medium	City		City
Action 3. Build community support	3	1 High	2 Medium	1 Low	NLE		NLE
Action 14. Develop rapid action group to company development opportunities	3	1 High	2 Medium	1 Low	NLE	City, UofG, GPI, GCC, ATCC, OMAFRA	NLE, City
Action 23. Establish a group that can identify prospective small and mid-sized firms as investment attraction targets	3	1 High	2 Medium	1 Low	NLE	ATCC, TRRA, DFAIT, MITI, City, UofG, CTT, OMAFRA	FedDev
Action 29. Locate cluster infrastructure and other supportive investments in the innovation "triangle".	3	1 High	2 Medium	1 Low	City		N/A

¹³ Further data collection and analysis is planned to give greater specificity to this preliminary recommendation.

	Priority	Importance	Timeframe	Cost	Lead	Partners	Funders
Action 20. Engage companies to promote opportunities where they can take advantage of agri-bio and agri-energy technologies	4	1 High	2 Medium	2 Medium	NLE	BAC, GPI, UofG, NRC-IRAP	NLE
Action 30. Continue to distinguish Downtown Guelph through cultural programming, food destinations and sustainable development.	4	1 High	2 Medium	2 Medium	City		City
Action 32. Complete the Secondary Plan for the GID to establish the framework for development of institutional, research and development, and industrial uses that support the cluster and other uses complementary to these.	4	1 High	2 Medium	2 Medium	City		City
Action 27. Apply high design and environmental standards in developing and planned employment areas, particular along the Hanlon Expressway and in the GID.	5	1 High	2 Medium	3 High	City	GCC	City
Action 33. Plan, promote and facilitate development of an office/research campus on the former Wellington Detention Centre site.	6	2 Medium	1 Short	3 High	City	MEI, ORC	City, ORC
Action 4. Leverage funding R&D programs	7	2 Medium	2 Medium	1 Low	NLE	City, UofG, GPI, ATCC	NLE, AAFC, NRCan, MRI
Action 5. Develop a capital network in the region that taps into angel investors	7	2 Medium	2 Medium	1 Low	NLE	ATCC, GCC, TRRA, CTT, GTAN	MRI
Action 6. Develop a business mentoring network	7	2 Medium	2 Medium	1 Low	NLE	ATCC, CTT, TRRA, GPI	MRI
Action 7. Develop peer-to-peer networks to promote local learning and economic opportunities	7	2 Medium	2 Medium	1 Low	GCC	NLE, GPI, TRRA, CTT	MRI
Action 8. Establish a capability to identify and facilitate innovation and business opportunities with supporting sectors.	7	2 Medium	2 Medium	1 Low	NLE	GCC, BAC, ATCC, GPI	MRI
Action 9. Establish a forum with regional colleges and cluster companies to identify local skill needs and to propose new programs that can address these needs.	7	2 Medium	2 Medium	1 Low	NLE	City, Colleges, Companies, GCC	NLE
Action 16. Engage multinational firms in Guelph to make them more aware of research and funding opportunities	7	2 Medium	2 Medium	1 Low	NLE	GCC, GPI	NLE
Action 26. Continue to ensure Guelph's employment lands can accommodate a wide range of employment uses.	7	2 Medium	2 Medium	1 Low	City		City

	Priority	Importance	Timeframe	Cost	Lead	Partners	Funders
Action 24. Establish in-coming and out-going trade missions with target countries with the goal of identifying, exchanging information and acting on investment opportunities and research collaborations	8	2 Medium	2 Medium	2 Medium	City	NLE, DFAIT, UofG	DFAIT
Action 34. Prepare a long-term strategy for development of a “green” live-work community on lands occupied by and adjacent to the Turf Grass Institute	8	2 Medium	2 Medium	2 Medium	City		City
Action 35. Plan the east quadrant of the GID, north of Stone Road, for eco-industrial uses in the agri/food/energy/environment sectors.	8	2 Medium	2 Medium	2 Medium	City		City
Action 13. Work with the province and industry stakeholders to establish leading edge strategic infrastructure related to agri-bio	9	2 Medium	2 Medium	3 High	NLE	ATCC, GPI, UofG	MRI, OMAFRA, FedDev, AAFC
Action 17. Establish low-cost wet lab space	9	2 Medium	2 Medium	3 High	NLE	City, UofG , GPI	MRI, FedDev
Action 19. Promote technology entrepreneurship education through a new MBA stream at University of Guelph	9	2 Medium	2 Medium	3 High	UofG		UofG
Action 21. Develop business / research partnership incentives & programs for attracting companies to the cluster	9	2 Medium	2 Medium	3 High	UofG	NLE, GPI, NRC-IRAP	City, AAFC, MRI
Action 31. Develop the University of Guelph’s Research Park North for use by the Guelph Agri-Innovation Cluster.	9	2 Medium	2 Medium	1 High	UofG	City	UofG
Action 36. Pursue retro-fitting of historic reformatory buildings for one or more institutions.	9	2 Medium	2 Medium	3 High	ORC	City	ORC, FedDev
Action 22. Engage international collaborative research networks to identify prospective target firms	10	3 Low	2 Medium	1 Low	NLE	UofG, ATTC, GPI	NLE

*See text above for definitions

6.2 Governance

Action 37 recommends that a new lead entity be established that would have an overarching responsibility to govern the implementation and evolution of the Agri-Innovation Cluster strategy. Such a body is vital to take responsibility for a number of duties related to the strategy:

Coordination: Implementation of current and future actions should be coordinated.

Planning: The Agri-Innovation Cluster Strategy should not be a static document and will need to evolve along with the cluster.

Monitoring: The evolution of the Agri-Innovation Cluster Strategy should be informed by a performance monitoring strategy (see Figure 15) that measures success and indicates the need for change.

Representation: The views of the various stakeholder groups should be represented in the implementation and evolution of the plan.

As part of a network of stakeholders, the NLE will engage the appropriate stakeholders and partners as needed to deliver on its mandate. It is anticipated that the NLE will have strongest strategic links with stakeholder partner organizations within Guelph, consisting of the City of Guelph, the University of Guelph, and the Guelph Chamber of Commerce, all of whom are well positioned to support decision making and collaborations.

Outside the core partner organizations, there are however, a significant number of equally important organizations, who because of their broader responsibilities, cannot act specifically for Guelph. Organizations such as ATCC and the Ontario BioAuto Council, though vital to Guelph's commercialization capacity, are therefore viewed as collaborators rather than partners due to their competing responsibilities. Similarly, it is expected that organizations such as CTT, TRRA and MaRS will interface with the NLE as collaborators, and be engaged as necessary for support on important projects.

6.3 Performance Monitoring

Monitoring and measuring the results of the Guelph Agri-Innovation Cluster Strategy is important because it will enable Guelph to determine: the types and extent of incremental benefits that are associated with the initiative; whether the planned results are being achieved; the cost-effectiveness of the strategic actions; and whether alternative steps should be taken to improve success.

In devising the Performance Management Strategy, it is important to consider the following:

- What needs to be measured in managing the results of the strategy;
- What results can realistically be measured – are the measures specific and attainable?; and
- Who will be using the performance data and how will it support improved decision-making.

Figure 15 below outlines the goals, the objectives; and possible performance indicators, that is the quantitative or qualitative parameters to be used to ascertain the degree of performance.

Figure 15: Performance Monitoring Indicators

Goals	Objectives	Performance Indicators
Cluster Development	Business Climate	Time to access services Business opinion Community opinion
	Linkages	Number of inter-firm linkages Number of university-firm linkages
	Identity	Local business opinion External stakeholder opinion
	Innovation	Tech transfer value R&D spending Number of new products and services
Company Development	Expansion / Retention	Employment levels Exports Number of expansions Number of companies in cluster
	Creation	Number of start-ups Number of spin-offs
	Conversion	Agri-innovation revenue ratio
	Attraction	Foreign direct investment Number of new firms
Asset Development	Employment Lands	Infrastructure spending Accommodation levels Common asset levels
	Downtown	
	Guelph Innovation District	
	University of Guelph Research Park	
Cluster Leadership and Governance		Business opinion Funding leverage Company involvement Community support Reduction in overlap/gaps in services Number of local investments, start-ups, and expansions Number of skills development and education programs created

A. Performance Assessment of the Guelph Cluster

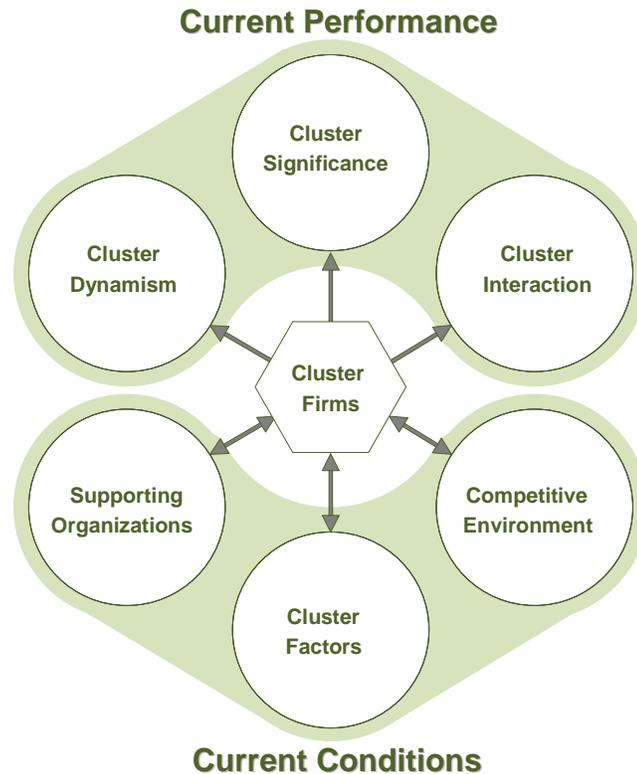
A.1 The Assessment Framework

The HAL Cluster Measurement Framework was developed to evaluate the impact of the cluster promotion initiatives adopted by different government agencies and has been applied to numerous other clusters. The framework builds on, but expands in significant ways, several strands of current thinking in cluster theory. It has been developed to integrate key elements of cluster theory with quantitative indicators of cluster strength, especially in sectors where statistical data is relatively weak. The purpose of the framework is to provide a conceptually grounded and easily replicable set of indicators for gauging the current state and future prospects for cluster development as an aid for both policy makers and cluster advocates.¹⁴

The framework is illustrated in Figure 16. At the centre are the cluster firms. They are influenced by the cluster's current conditions and collectively they determine the cluster's current performance. Current Conditions consists of supporting organizations (including Guelph Partnerships for Innovation, the Guelph Food Technology Centre, and other associations), the competitive environment of customers and competitors, and the factors in the environment of the cluster that influence firms (e.g. availability of high quality personnel, business climate, etc.). Current Performance consists of the concepts that indicate how well the cluster is doing – its significance in terms of critical mass, breadth of responsibilities, and reach; its interactions internally and externally to the rest of the world; and its dynamism in terms of innovativeness and growth. The cluster conditions today will impact cluster performance tomorrow, and the cluster performance of today was impacted by the cluster conditions of yesterday.

¹⁴ David Arthurs, Erin Cassidy, Charles Davis and David Wolfe, (2009), "Indicators to Support Cluster Innovation Policy," *International Journal of Technology Management*.

Figure 16: Cluster Framework



These concepts are operationalized by breaking down cluster conditions and cluster performance into a hierarchy of constructs, sub-constructs, and indicators. These have been drawn from the broad range of characteristics considered important to clustering in the literature. The measures include the cluster’s business characteristics, internal and external linkages, use of public infrastructure, creative behaviour, and market orientation.

The indicators are combined to produce quantitative measures of performance at the sub-construct and construct levels. Indicator data has been obtained primarily through a survey of cluster firms. This information is transformed into a measure on a scale from 1 to 5. Indicators are combined using algorithms that weight their relative importance to the current conditions and performance of the cluster.

A.2 The Guelph Agri-Innovation Cluster Results

Figure 17 provides an overview of the quantitative assessment of the cluster using the framework introduced above. The colour coding shows the relative performance of the cluster on each indicator, sub-construct, and construct. The intent of this exposition is to provide an overall indication of a cluster’s strengths and weaknesses.

However it must be understood that a cluster is the sum of its parts and that any indicator must be assessed in the context of the other elements of that cluster. For this reason, care must be taken when comparing the performances of different clusters on any indicator. A low indicator may or may not indicate a concern, depending on the circumstances of the cluster.

Another caveat is that the numbers reported here are based on self-assessments by cluster firms. In some cases, these assessments may be optimistic, particularly with respect to firm capabilities and growth opportunities.

In terms of current conditions, the cluster performs well. In particular, factors related to human resources – qualified local personnel and quality of the local lifestyle – are regarded as excellent; as are factors related to infrastructure. There are two areas of weakness. First is the business climate as a result of the perceived relative disadvantage of the Ontario regulatory regime and the perceived relative disadvantage of costs in Guelph compared to the cluster’s competitors. Second is community support as a result of the perceived state of government policies and programs. There is also a lack of local competition, but this is due to the relatively small number of Guelph firms in any particular aspect of the cluster and is not atypical of most Canadian clusters.

In terms of current performance, however, there are a number of concerns. First is the critical mass of firms in the cluster as it has been defined, although this small size is typical of nascent Canadian technology-based clusters for which cluster strategies are being developed.

Second is the low degree of cluster interaction. There is both a lack of internal awareness of the sector as a cluster and a perception that the external world does not recognize the region as a cluster. The linkages among firms and other stakeholders are also not strong, although there is reasonable involvement of firms in local economic development.

Third is the low projection for growth of firms within the cluster, although this is undoubtedly a result of the current economic times. The number of new firms in the cluster is, however, excellent and does indicate cluster vitality. The fact that few of these firms are spinoffs from other cluster firms stems from the lack of large and strong anchor firms that act to generate talent and companies.

Fourth is the low percentage of firm revenues from exports. While having demanding local customers contributes to innovation, it is exports that provide significant growth opportunities and establish the cluster on the world stage.

Figure 17: Guelph Cluster Indicators

	Construct	Value	Sub Construct	Value	Indicator	Value
Current Conditions	Factors	3.7	Human Resources	4.1	Access to qualified personnel	3.8
					Local sources of personnel	4.5
					Quality of local lifestyle	4.3
			Infrastructure	4.0	Digital Communications	3.9
					National and International Transportation	4.1
					Business Climate	2.7
	Business Climate	2.7	Relative costs	2.9		
			Relative regulations and barriers	2.5		
	Supporting Organizations	3.3	Government Support	3.2	Company support (Gov R&D, Gov funding, Gov facilities, Gov info dissemination)	3.2
					Other research & education organizations	3.3
					Community Support	3.0
			Community Support	3.0	Government policies and programs	2.9
					Community support organizations	3.1
			Community champions	3.0		
			Suppliers	3.5	Local availability of materials and equipment	3.7
					Local availability of business services	4.1
					Local availability of investment capital	3.1
	Competitive Environment	3.5	Local Activity	3.2	Distance of most important competitors	2.8
Distance of most important customers					3.4	
Firm Capabilities					3.6	
Firm Capabilities			3.6	Business development capabilities	3.5	
				Product development capabilities	3.7	
Current Performance			Significance	2.6	Critical Mass	2.8
	Number of spinoff firms	2.5				
	Size of cluster firms	5.0				
	Responsibility	3.0			Firm structure	3.0
	Reach	2.1			Export orientation	2.1
	Interaction	2.2	Identity	2.2	Internal Awareness	2.2
					External recognition	2.2
			Linkages	2.2	Local Involvement	3.1
					Internal Linkages	1.7
	Dynamism	3.0	Innovation	3.5	R&D spending	4.0
					Relative creativeness	3.3
					New product revenue	3.3
			Growth	2.8	Number of new firms	4.3
					Firm growth	1.2

Legend	 <2
	 2-3
	 3-4
	 >4

Figure 18 provides a summary of the sub-constructs and constructs of the Guelph cluster compared to Agri-Bio in Ontario generally and to the average of technology-based clusters across Canada that have been examined by HAL in previous studies.

Figure 18: Cluster Comparison Summary

Summary	Current Conditions			Current Performance		
	Factors	Supporting Organizations	Competitive Environment	Significance	Interaction	Dynamism
Technology Average	3.5	3.1	3.4	2.9	3.1	3.2
Ontario Agri-Bio	3.7	3.2	3.8	3.4	2.7	3.5
Guelph Agri-Innovation	3.7	3.3	3.5	2.6	2.2	3.0
Difference from Tech Avg	0.2	0.2	0.1	-0.3	-0.9	-0.2
Difference from Agri-Bio	0.0	0.1	-0.3	-0.8	-0.5	-0.5

Sub Constructs	Human Resources	Infrastructure	Business Climate	Government Support	Community Support	Suppliers	Local Activity	Firm Capabilities	Critical Mass	Responsibility	Reach	Identity	Linkages	Innovation	Growth
	Technology Average	3.7	3.4	3.2	3.0	3.1	3.1	2.8	3.6	2.5	2.6	3.5	2.9	3.4	3.6
Ontario Agri-Bio	4.1	3.9	2.9	3.6	2.8	3.2	3.0	4.0	3.8	2.7	3.0	2.7	2.7	3.7	3.3
Guelph Agri-Innovation	4.1	4.0	2.7	3.2	3.0	3.5	3.2	3.6	2.8	3.0	2.1	2.2	2.2	3.5	2.8
Difference from Tech Avg	0.4	0.7	-0.4	0.2	-0.1	0.4	0.4	0.0	0.3	0.4	-1.4	-0.8	-1.1	-0.1	-0.2
Difference from Agri-Bio	0.0	0.1	-0.2	-0.4	0.1	0.4	0.2	-0.4	-1.0	0.3	-1.0	-0.5	-0.4	-0.2	-0.6

Legend

	<2
	2-3
	3-4
	>4

In general, the Guelph cluster compares favourably with Ontario Agri-Bio and other Canadian technology-based clusters. Areas of relative weakness are:

Business Climate – there is a negative perception of Ontario’s regulatory regime and Guelph’s relative costs.

Reach – Guelph cluster firms are not as export oriented as other clusters.

Identity – Guelph’s cluster firms do not perceive themselves, nor think that others perceive them, as a cluster.

- Linkages – Guelph’s cluster firms do not tend to interact widely with other stakeholders.
- Growth – Guelph’s cluster firms have low growth expectations, although this difference is likely due to differences in the timing of studies and changes in economic conditions.
- Innovation – Guelph’s cluster firms are less innovative than other clusters.

B. The GID Opportunity

B.1 The Role and Opportunity for Dedicated Innovation and Research Districts

A central pillar of the Agri-Innovation Cluster opportunity is the existing and future employment lands that are available for supporting the cluster. This Chapter looks at the role of these lands in the context of innovation and research districts and in attracting investment. It finds that a new breed of research parks, now more commonly referred to as communities of innovation, knowledge zones or science cities, is emerging around the world to provide a concentration of research activities, creative individuals and the infrastructure needed to support innovation and provide a competitive advantage to firms. Creative talent is being paired with technical expertise and the ‘live-work’ community is being expanded to include a ‘live-work-play-learn’ mix of uses. These new parks are becoming key drivers of technology-based regional development.

Dubbed “New Century Cities” by urban planner Michael Joroff of the Massachusetts Institute of Technology, “*The vision is to kick-start high-priority industries with new spaces where companies and universities can work together and develop the next generation of workers, they are about inventing the future, so they want to be the future*” says Joroff.¹⁵

This section presents a brief overview of the evolution of research parks over the last 50 years, as well as a summary of emerging trends, including a review of new innovation districts that are being launched in Asia, Europe and South America. Research Parks are also reviewed from a Canadian perspective. The final section presents a summary of the best practices for developing successful communities of innovation along with examples of how and where they are being implemented.

B.2 Evolution of the Research Park

Battelle Technology Partnership, in cooperation with the Association of University Research Parks, recently undertook an extensive review of the characteristics and trends in research parks over the last 50 years.¹⁶ The report notes that today’s research parks differ significantly from their predecessors, which were primarily viewed as standalone real-estate development projects. The original research parks of the 1960’s focused on recruiting firms as tenants, but those firms did not generally interact to a great degree with researchers at the nearby universities or federal

¹⁵ Business Week Special Report - *The Global Economy’s Latest Weapon: The Mega Research Park*; June 1, 2009 (Lead reporter: Pete Engardio)

¹⁶ Battelle Technology Partnership Practice, in cooperation with Association of University Research Parks, *Characteristics and Trends in North American Research Parks: 21st Centre Directions*; October 2007.

laboratories. There was also little support provided in terms of business assistance or services. They were primarily land-driven strategies aimed at attracting branch plants of large manufacturing companies.

During this period, two ground breaking research parks were launched in the US that continue to be viewed as world leaders today - Research Triangle Park, North Carolina and Stanford Research Park, California. Research Triangle Park, opened in January 1959, was conceived and planned by a committee of government, university, and business leaders as a model for research, innovation, and economic development. Its early success was founded on its ability to attract both the US National Environmental Health Science Centre and a key IBM research facility, which had previously been located in New York. It is now the largest and arguably best-known research park in the United States. At more than 2,800 hectares in total size, it currently includes 145 organizations employing more than 39,000 people with annual salaries nearly 45 percent higher than the regional and national average. At least 80 percent of its organizations engage in R&D¹⁷. Similar success has been achieved at Stanford Research Park, located in Palo Alto California on land owned by Stanford University. It was built in 1951 as the first university owned industrial park and played a key role in the creation of Silicon Valley. It is now home to some of the largest and most respected technology based companies in the world.¹⁸

One of Europe's early research parks, the Sophia Antipolis International Science Park, (located west of Nice, on the French Riviera) tells a similar success story. It was developed and conceived in the late sixties, promoted as an ideal location to live and work and was championed by the visionary French Senator Pierre Laffitte. Sophia Antipolis is now one of Europe's largest and most highly regarded science parks and is known as the "Silicon Valley" of Europe. It currently has 1.2 million square meters of office space, lab facilities and residential buildings spread over 2,300 hectares of green space¹⁹ with a work and student force of 35,000 in more than 1,300 companies. Research intense organizations include Intel, Cisco, SAP, Hewlett Packard, Toyota and the National Centre for Scientific Research²⁰.

Research parks continued to evolve in the 1980 and 90's to include anchor R&D facilities that were aligned with the particular industry or niche focus of the parks. Innovation centres and technology incubators became more common, as did support for entrepreneurs and start-up companies. A primary strategy involved lowering real estate costs and providing seed capital, management expertise and intellectual property management needed to grow small companies. Some multitenant facilities were also constructed to accommodate these smaller firms and house both researchers and companies. Investing in the creation of master planned research parks became a widely used method for technology-based regional development, in many cases with limited success. In their 1991 study of US research parks²¹, Luger and Goldstein found that more than half of all research parks fail or shift their focus, citing poor planning, ineffective

¹⁷ Research Triangle Park, <http://www.rtp.org/main/index.php>

¹⁸ Stanford Research Park, http://lbre.stanford.edu/realestate/research_park

¹⁹ Team Cote D'Azur Economic Development Agency <http://investincotedazur.com/en/sites-actives/site-sophia-antipolis.php>

²⁰ <http://www.nordic-link.org/modules.php?op=modload&name=News&file=article&sid=61>

²¹ Luger and Goldstein, *Technology in the Garden: Research Parks & Regional Economic Development*, 1991.

leadership and bad luck as the main reason for the lack of success. They noted that although the longer lasting parks have met their original goals, the newer ones have only enjoyed limited success.

Within the last five years, research parks have evolved further to address the changing nature of innovation and address the fact that science is becoming a more interdisciplinary, multi-institutional and inter-global process. The Battelle report *Characteristics and Trends in North American Research Parks: 21st Century Directions* concluded that a new model for the research park is emerging. Among the key study findings:

- Research parks are placing greater emphasis on supporting incubation and entrepreneurship to grow their future tenant base and less on direct recruiting.
- Research parks are more likely to be targeted to a particular niche area. To compete in technology development, a region or state must differentiate itself and cultivate and sustain a specialized area of expertise where it can be a world leader. As a result, it has become more common for research parks to focus on key technology areas or industry clusters.
- Strategically planned mixed-use campus expansion is emerging as a key trend that includes space for academic and industrial uses. These mixed-use campus developments are designed to create an innovative environment with free and frequent exchange for information between academic research and their industry counterparts.
- Amenities will be an important offering of future research parks. On-site services, such as restaurants, art centres and retail stores, are considered important in attracting employees and tenants.
- Research parks are being developed in urban areas as a component of neighborhood revitalization plans,
- Research parks are now being developed to leverage the assets of non-university R&D organizations such as federal laboratories. In addition to universities, major medical research centres and public and private research organizations can be key drivers in technology-based economic development.
- More emphasis is being placed on sustainability as a design principle. Use of renewable energy sources and green building practices are becoming more prevalent.
- International partnerships are becoming more important in university research parks. Parks directors expect to see parks attracting more international tenants and have more of a global focus in the future.

B.3 Emerging Mega-Parks in Asia, Europe and South America

The emerging trends discussed above are very much aligned with the new mega-parks that are being constructed in key regions across Europe, Asia and North and South America. According to a recent Special Report in Business Week, *Research Parks for the Knowledge Economy*, June 1, 2009, extravagant research parks, some incorporating leading edge architectural design, are being built inside old cities across Europe, Asia and South America, and include housing, city amenities and recreational activities with the intention of creating new and vibrant communities. Rising energy prices also makes clustering researchers where they can both live and work an innovative and timely solution.

These new “innovation zones” incorporate cafes, green space, entertainment, affordable housing and social centers where entrepreneurs, engineers, and designers from different disciplines are able to meet and network. State-of-the-art telecommunication, IT infrastructure, data storage, GPS-enable devices and high performance computing are also being made widely available. The focus is on investment in people and innovation, not just real estate development.

To stay competitive in the international market, established science parks are also undergoing makeovers. Besides making itself more liveable by adding thousands of housing units, Research Triangle Park in North Carolina (celebrating its 50th anniversary in 2009), is trying to broaden its tenant base and establish professional training resources by adding an MBA program and a humanities center for public law and social science.

These new innovation parks demonstrate the importance of consolidating research, industry, education, investment and liveable space in a single zone. Measures of their impact and success to date include their ability to recruit both major industry players and R&D organizations, employment growth, number of business start-ups, employment opportunities in new sectors, renewed occupational mix and increased research capacity of local universities. A brief review of several international innovation parks and their impacts to date are presented in Appendix A.

B.4 A Canadian Perspective

As noted in the inaugural issue of the Canadian Association of University Research Parks (AURP) magazine, *Canada Now*²², Canada is home to approximately 26 research parks with over 950 high-tech companies, federal and provincial research facilities and university based research centres. Located coast to coast, with the majority in Ontario and Quebec, the president of AURP notes that “*these parks play an integral role in helping government meet its economic objects and provides a national focal point for technological innovation.*” In a survey

²² *Canada NOW – the national magazine of university research parks*, launched June 2009.

undertaken by AURP in 2007, Canadian research parks employed in excess of 39,000 people and contributed over \$3.8 billion annually to the economy of Canada.²³

Two Parks of note in Ontario are the University of Waterloo Research and Technology Park in Waterloo and the Sheridan Science and Technology Park in Mississauga.

The University of Waterloo Research and Technology Park is one of the newest research parks in Canada and is located on the University's North Campus. At 120-acres, the University of Waterloo Research and Technology Park is one of the largest research parks in Canada. Some key features include²⁴:

- The Accelerator Centre has been developed to house and help growing businesses as they bring new technology and products to market;
- Designed to accommodate 1.2 million square feet of office space;
- Advanced connectivity featuring a state-of-the-art fibre optic network is available to all Research Park tenants; and
- Access to Canada's Technology Triangle of Waterloo, Kitchener, and Cambridge, with more than 150 research institutions, more than 400 high tech and 500 technology service enterprises.

In contrast, the Sheridan Research and Technology community represents one of the first efforts by the provincial government to stimulate a more R&D intense manufacturing sector. Established in the early sixties with support from the now defunct Ontario Development Corporation, Sheridan Park provides facilities for private companies engaged in industrial research work, including energy, electronics, chemicals, petroleum, pharmaceuticals, engineering and movie making. Over 2,700 scientists, technicians, engineers and administrative staff are employed within the Park. The 340-acre Park is anchored by the Xerox Canada Research Centre.²⁵

Also of interest are two parks positioning themselves in the niche areas of biotech and agri-tech. One is AgriTECH Park in Nova Scotia, the other Biotech City in Montreal, Quebec.

AgriTECH Park, marketed as Atlantic Canada's "Bio-economy Village", opened in 1998 on 65 hectares of rural property in the vicinity of Nova Scotia Agricultural College.²⁶ It boasts a cost-competitive location, access to rail, international airports and Halifax harbour as well as close proximity to several research centres including the Bio-Environmental Engineering Centre and the Organic Agriculture Centre of Canada. The Bio-Environmental Engineering Centre, called by its acronym 'BEEC', is a research and demonstration site operated jointly by Nova Scotia Agricultural College's Agricultural Engineering Department and Dalhousie University's

²³ Canadian Association of University Research Parks, <http://www.aurp.ca/members.htm>

²⁴ University of Waterloo Research and Technology Park <http://www.uwrtpark.uwaterloo.ca/about/about.html>

²⁵ Sheridan Research and Technology Park, <http://www.sheridanpark.ca/>

²⁶ AgriTECH Park, www.agritechpark.com

Department of Biological Engineering. The Centre was established in 1992 and includes manure storage structures, a compost facility, constructed wetlands, wastewater treatment systems and tile drainage water monitoring sites. The Organic Agriculture Centre of Canada facilitates research and education for organic producers and consumers to build more sustainable communities. It provides technology and knowledge transfer and is partnered with numerous universities and provincial agricultural ministry across Canada.²⁷

Biotech City is located in Laval on 1.3 million square meters of green space with access to highways, bus lines and direct links to Montreal and it offers a range of service providers to support the commercialization of bio-tech research activities²⁸. In particular, it promotes a business incubator (Quebec Biotechnology Innovation Centre), a dedicated facility offering funding support, (Laval Technology Development Centre), and the National Experimental Biology Centre.

B.5 Attracting Investment

Research parks are often at the centre of local efforts to attract investment either from elsewhere in the country or internationally. The factors that influence locational decisions of firms, however, are generally more complex than being able to access a supportive innovation and research environment. Indeed, locational decisions can depend on a number of factors, each of which are more or less important depending of the type of company (consulting versus product developer), its size (start-up versus MNC subsidiary) and the industry in which it operates in. These include:

- Access to a specialized and educated workforce
- Proximity to suppliers
- Access to specialized or high use inputs
- Proximity to strategic production infrastructure (e.g. seed crushers)
- Proximity to major markets and/or customers
- Proximity to research
- Cost of doing business
- Supportive policy environment
- Quality of life / historical connection to a region

²⁷ Organic Agriculture Centre of Canada <http://www.organicagcentre.ca/>

²⁸ The Biotech City www.citebiotech.com

For example, most Ontario bio-product producers do not consider close proximity to research facilities to be critical, nor do they consider the availability of qualified plant operations people, who can be found in most regions or relocated without too much difficulty. And while operational costs are important, they appear not to be a differentiator in the selection of plant locations. Instead a key factor, especially for those that depend on agricultural feedstock as an input to their production process, is proximity to feedstock sources which lowers transportation, and by extension, production costs.

Another example is food companies. According to one experienced business recruitment practitioner in Ontario, for food companies looking to expand or relocate, the research environment does offer some preliminary advantage but it is not central to their value creation. For a large multinational food company, research and knowledge can be readily acquired at conferences and channeled back to their research facilities in their home country. Instead location preference among food companies is increasingly determined by market access and, in particular, distribution channels.

One of the more promising segments where research and related parks are valued is among knowledge intensive mid-sized firms looking to expand and growth. For this segment, access to research is valuable, provided there are cost effective partnerships to be taken advantage of.

B.6 The Development Characteristics of Agri-Innovation Parks

The land base and development characteristics of Agri-Innovation related business parks and employment districts were reviewed. These included Innovation Place Research Park, Saskatoon, Cornell Agriculture and Food Technology Park in Geneva, NY, Federal Agriculture Research Centre, Braunschweig, Germany and Food Processing Development Centre and Agrivalue Processing Business Incubator in Leduc Alberta. Eco-industrial models in Alberta, Ontario and Germany were also examined for their potential as sustainable development precedents. While the characteristics varied greatly between precedents, a few observations provide some insight:

- Many of the precedents relied on a combination of building development adjacent to large tracts of test land plots.
- While site size varied, generally the parks occupied large parcels of land - 80 acres or more.
- Smaller incubator spaces such as the Leduc, Alberta facility operates on smaller sites or within existing buildings.
- Given the nature of related manufacturing or testing for agricultural purposes, compatibility with residential uses was not optimal. This is in contrast to trends observed

with Technology parks with R&D functions where integrated urban village models are emerging as distinguishing features of success

- Partnerships and programmatic integration with post secondary institutions and/or senior governmental ministries are important anchors in most of the precedents
- Many offer incubator spaces/programs in flex space
- Employee densities range widely: 1 employee/acre – 34 employees/acre
- Buildings are typically clustered and concentrated in campus format, 1 to 3 storeyed, and typically offering surface parking.

B.7 Reflecting on Future Scenarios

In a recent report, the Institute for the Future²⁹ put forward several scenarios for the future of research parks that are based on the current evolving trends. One scenario suggests that research parks evolve as an upgraded version of their predecessors: faster, more efficient and with more features. Universities change significantly and their limited commercial and entrepreneurial functions of the past are broadened, enhanced and seamlessly integrated into campuses and curricula. Parks bring conventional tenants together with new kinds of collaborative networks and lever the intellectual resources of universities more effectively than today. It is interesting to note that the Institute for the Future report indicates that *“the most successful parks will almost exclusively house or incubate biotechnology and biomedical R&D and invest significant resources in bridging some of the industry’s structural obstacles to innovations.”*

The second scenario puts forward a model where research is taking place in small independent incubators and pop-up labs around the world. These spaces are distributed, agile and lightweight. They pop-up overnight as needs change and disappear when their usefulness has run out. This model combines the scale efficiencies of traditional research parks with the diversity and dynamism of small, social collaborate research places.

The third scenario sees the decline of the research park model. Virtual R&D networks make gains due to the pending energy crisis, allowing companies to maintain innovative pipelines while gaining greater flexibility and lower fixed costs. Only in the last stage does any real face-to-face collaboration happen.

Although it is impossible to predict which scenario will prevail, and most likely it will be some hybrid combination of all three, envisioning potential future patterns and trends is important for effective decision making in regards to current research park development activities.

²⁹ Townsend, Pan, Weddle, *Future Knowledge Ecosystems: The next Twenty Years of Technology-led Economic Development*, The Institute for the Future and the Research Triangle Foundation, April 2009.

B.8 Best Practices for Success

Technology-based regional development is by nature a complex undertaking. Global technology competition, intellectual property challenges, “off-shoring” of domestic R&D, availability of private equity, and the requirement to bridge cultural barriers between academic and business communities are all challenges that must be addressed. Drivers for successful communities of innovation focus on:

- Need for flexibility (in both planning and managing development) and mixed use land development (including recreational, cultural and residential facilities);
- Access to training for knowledge workers;
- Availability of advanced infrastructure;
- Linkages with the region’s universities’ and federal/state labs R&D strengths;
- Central location with access to transportation systems; and
- Development of a critical mass of technology companies in different sectors.

The following presents examples of some of the best practices for success for fostering communities of innovation:

- Support flexible zoning and different technology sub-sectors. This allows for new urban patterns and a “fine grain” of mixed uses. In this regard, there is an opportunity for interaction to take place, providing an environment conducive to exchanges between groups that might not otherwise meet. Singapore One-North’s mix of users have been carefully selected, clustered, and interconnected. Singapore One-North is being intentionally developed around separate yet interconnected hubs, as opposed to one central core. The aim is to create a ‘cluster of clusters,’ where professionals in emerging tech and service sectors (including life sciences, IT and media) can co-mingle and serendipitously dream up hybrid industries. As noted by Anthony Townsend of the Institute for the Future, “*the notion of planning for chance encounters is counter intuitive, but that is exactly why it is important and why it works. Creating spaces where firms, individuals and small groups can develop new trusted relationships, will be an enormous source of value creations*”.³⁰
- Understand each of the site selection factors and know how they impact the target industry. Selection factors include - labour, real estate, utilities, transportation, supply chain impacts, educational system, operating costs, governmental taxation and regulatory

³⁰³⁰³⁰ Townsend, Pang, and Weddle, *Future Knowledge Ecosystems, The Next Twenty Years of Technology-Led Economic Development*, Institute for the Future and Research Triangle Foundation, April 2009

issues, environmental considerations, business interruption risks, political stability, quality of life and incentives.³¹

- In this regard, it is important to have a clear understanding of competitive strengths and weaknesses of the region, what it has to offer and ensure that a community is able to focus on realistic outcomes. A community can then more effectively identify a list of desirable targeted industries and companies that are a good match. In this regard, the city of Montreal has had success in devising a targeted strategy to build “Cite Multimedia” – located between old Montreal, Griffins and Downtown Montreal. The area has undergone a gentrification and urban renewal with the goal of turning it into a desired location for IT and multimedia companies. Tax assistance programs and other incentives have been offered to encourage relocation. In the area of life sciences and biotech, bringing together different disciplinary skill sets in the same place is particularly important.
- Develop an effective business outreach plan. Organizations such as Creativesheffield of the northern town of Sheffield in England, a development agency sponsored by the municipal government, is working to revitalize its downtown core and is actively promoting the advantage of what their city has to offer, including rents and salaries that are 30% to 40% cheaper than in London, located 170 miles to the south. Building a brand for the region, to communicate its unique attributes and value is important for attracting mobile talent and earning a global reputation. Medicon Valley, in the greater Copenhagen area in Denmark, has been particularly successful at achieving this brand awareness. Since 1997, Copenhagen Capacity and its Swedish counterpart Invest in Skåne have jointly branded the region as Medicon Valley’ to reflect the region’s life science stronghold, and it is now viewed as one of the leading life science regions in Europe.
- Offer incentives and low-cost state-of-the-art-lab facilities to lower the entry barrier for new companies. As part of the creation of the Digital Media City project, the Seoul Metropolitan Government has developed low cost rental office buildings and modular office space, offering flexible leasing arrangements, to attract small- and medium-sized firms. They have also created a Mobilization and Operation of Fund that offers diverse incentives in the form of tax reductions, direct financial support and other benefits for locating firms. 22 @ Barcelona offers an incentive system for activities that consider creative talent as their main resource, are urban, non-polluting and provide dense employment of highly qualified personnel.
- Provide seamless connectivity. This can be achieved in the form of advanced communications systems, social and business networks as well as physical connectivity that attach the research park to the central urban centre. The Piedmont Triad Research

³¹ AngelouEconomics, *The Attributes of Successful Business Attraction*, Jim Colson, COO and President of Site Selection; August 2008.

Park of North Carolina actively promotes its access to two major highways, the downtown road network and the city's historic street grid. There are also plans underway to develop a new network of roads and a pedestrian promenade that will link the park with the surrounding urban area and provide continuous connections between the North, Central, and South districts of the park.

- Urge companies to use the innovation park as a “living lab” where they can test-market products before attempting to sell them more broadly. In the 22@ Barcelona innovation district, one street is lit with lamps powered by light-emitting diodes, supplied by a consortium led by Spanish electric utility Endessa and engineering design firm Santa & Cole. Police plan to try out new low-energy motorcycles made by Barcelona's SunRed, which recently unveiled models of a solar-powered motorcycle shaped like a large snail.
- Support the development of a long-term stream of local talent. In the Monterrey region in Mexico, where they are developing the Research & Innovation Technology Park, the state has redesigned the curriculum at local high schools and colleges so it is aligned with the technology niches being develop in innovation zones at the research parks.
- Ensure central government support. The current economic crisis makes it particularly difficult to bring together public-private partnerships by accessing the budgets of provinces, universities, and private industry. With all of these stakeholders working under the constraints of the current recession, government will need to be at the forefront of funding basic science and technology research and the related infrastructure development. *“In leading nations, governments recruit scientists and fund a park's infrastructure and operations,”* says Eileen Walker, chief executive of the 350-member Association of University Research Parks. *“so they are able to get from Point A to Point B much faster.”*³²
- Incorporate cultural, recreational, leisure and green spaces to ensure an enriched quality of life. Many innovation zones incorporate golf courses, jogging/biking trails, restaurants, shopping and entertainment centres into their master plan. Research Triangle Park itself, one of the original North American research parks, is getting revamped. It has been adding thousands of housing units, shopping centers, as well as miles of bike and jogging trails. *“This is about making this place consistently more attractive to the brightest minds in the world,”* says Rick L. Weddle, Research Triangle Park chief executive.³³
- Incorporate leading edge energy efficiency and effective resource management strategies. A select group of parks have pioneered their own performance standards that go far

³² Business Week Special Report - *The Global Economy's Latest Weapon: The Mega Research Park- Research Parks for the Knowledge Economy*; June 1, 2009.

³³ *ibid*

beyond LEED³⁴ – they are carbon negative and are global centres for innovation in the business of managing carbon³⁵. In particular, Biopolis, Singapore’s life science hub, has produced a comprehensive green building guide that provides information to the tenants, visitors and developers about Biopolis’ environmentally friendly features including energy and water conservation and recycling programs. All tenants are encouraged to actively implement green practices in their offices and laboratories.

³⁴ Leadership in Energy and Environmental Design Green Building Rating system; developed by the US Green Building Council.

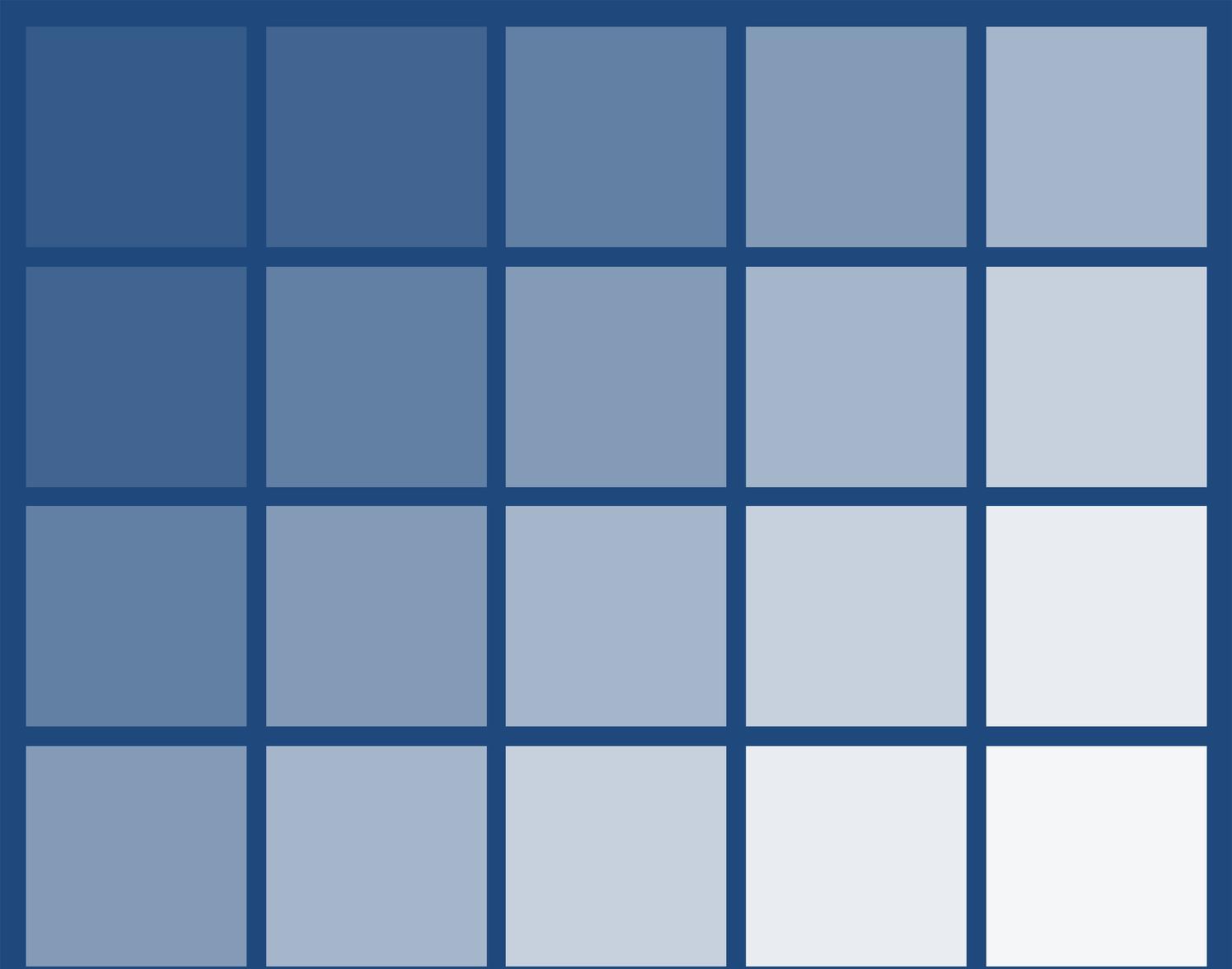
³⁵ Townsend, Pang, and Weddle, *Future Knowledge Ecosystems, The Next Twenty Years of Technology-Led Economic Development*, Institute for the Future and Research Triangle Foundation, April 2009

C. Cluster Stakeholders

Companies		
Ag Energy Co-operative Ltd.	Agriculex Inc.	Agri-Food Laboratories
Agviro, Inc.	Alltech Canada	AMS Canada
AOC Canada Inc.	Asta Tech Canada	Bayer CropScience Canada
Better Beef Ltd. - Cargill	Bioherbalai	BioRem
Can West DHI	Candies of Merritt Ltd.	Can-Vet Animal Health Supplies Ltd.
Chemisar Laboratories Inc.	Chiron Compounding Pharmacy Inc.	Coasun (Fractec/CoaGel) Corporation
Compusense Inc.	Crown Dairy Ltd.	Elanco Animal Health
Engage Agro	Evergreen Bio-ceuticals Inc.	F&M Brewery
Fresh Ginseng International Inc.	Gay Lea Foods Co-operative Limited	Gencor
GlobalTox	Intrinsik	Italia Salami Company
KicX Nutrition Inc.	Klops Meat & Deli	Lipid Analytical Laboratories
Mandel Scientific Company Inc.	Maple Leaf Consumer Foods	Maxxam Analytics Inc.
McNeil Consumer Healthcare	Microgy, Inc.	Mirexus Biotechnologies Inc.
Monsanto Canada Inc.	Nestle Water Canada	Nutrasource Diagnostics Inc.
Nutreco Canada	Organic Meadow Co-operative Inc.	Oven Ready Products
Plantform	PlantForm Corporation	Puresource Natural Products
Rowe Farm Meats Ltd.	Royal Canin	Sanimax
Selected Bioproducts Inc.	Semex Alliance	Sharp Ingrained Functional Foods
Sleeman Breweries Ltd.	Spectradigital Corporation	Syngenta Crop Protection Canada, Inc.
Tamming Foods	Terako Industries Inc.	Traxxside
Vetech Laboratories Inc.	Wellington Brewery	Woodrill Ltd
Wyeth Animal Health		
Research Centres & Initiatives		
Advanced Analysis Centre	Advanced Food and Materials Network	Advanced Robotics and Intelligent Systems Lab
AfMNet	Agricultural Plant Biotechnology Centre - UofG	Agri-Food Laboratories
Animal Technology and Health's Genome Manipulation Laboratory - UofG	Aquasantias - A Centre for Water Safety and Security	Arboretum Gene Bank

Biodiversity Institute of Ontario	Bioproducts Discovery and Development Centre - UofG	Campbell Centre for the Study of Animal Welfare
Canadian Agricultural Trade Policy Research Network	Canadian Bacterial Diseases Network	Canadian Centre for DNA Barcoding
Canadian Co-operative Wildlife Health Centre	Canadian Network of Toxicology Centre	Canadian Research Institute for Food Safety - UofG
Centre for Agricultural Renewable Energy and Sustainability (CARES), Ridgetown - UofG	Centre for Food and Soft Materials Science (UofG)	Centre for Land and Water Stewardship
Centre for Materials Research	Centre for Nutrition Modeling	Centre for Public Health and Zoonoses
Centre for the Genetic Improvement of Livestock	Conestoga College	Controlled Environment Systems Research Facility
Department of Plant and Agriculture (Ontario Agricultural College) - UofG	Equine Guelph	Fish Nutrition Research Laboratory – UofG/OMNR
Food Safety Network	Guelph Food Research Centre - Agriculture and Agri-foods Canada	Guelph Transgenic Plant Research Complex
Guelph Turfgrass Institute – UofG	Hagen Aqualab	Human Nutraceutical Research Unit - UofG
Laboratory Services – UofG	Laboratory of Foodborne Zoonoses	Lipid Analytical Laboratories
Ontario Rural Wastewater Centre	Ontario Veterinary College - UofG	Protein Engineering Network
Starch Biology Laboratory - UofG		
Commercialization Support Organizations		
BioAuto Council	BioEnterprise (Agri-Technology Commercialization Centre)	Guelph Business Enterprise Centre
Guelph Chamber of Commerce (GCC)	Guelph Food Technology Centre (GFTC)	Guelph Partnership for Innovation (GPI)
Ontario Agri-Food Technologies (OAFT) (Agri-Technology Commercialization Centre)	UofG Business Development Office	
Associations		
AGCare	Agricultural Adaptation Council	Association of Ontario Chicken Processors
Beef Improvement Ontario (BIO)	Canadian Animal Health Institute	Canadian Diabetes Association
Canadian Livestock Genetics Association	Canadian Mushroom Growers Association	Erin Agricultural Society
Grain Farmers of Ontario (created from the merger of Ontario Soybean Growers, Ontario Corn Producers, and Ontario	North America AgriFood Market Integration Consortium	Ontario Agri-Business Association

Wheat Producers)		
Ontario Agricultural Research Coalition	Ontario Association Of Veterinary Technicians	Ontario Broiler Chicken Hatching Egg Producers Association
Ontario Cattlemen's Association	Ontario Co-operative Association	Ontario Farm Animal Council
Ontario Farm Environmental Coalition	Ontario Farm Products Marketing Commission	Ontario Federation of Agriculture
Ontario Food Processors Association	Ontario Fruit and Vegetable Growers' Association	Ontario Hatcheries Association
Ontario Veal Association	Ontario Independent Meat Processors Association	Ontario Institute of Agrologists
Ontario Milk Transport Association	Ontario Pork	Ontario Sheep Marketing Agency
Ontario Soil and Crop Improvement Association	Organic Meadow Co-operative Inc.	Poultry Industry Council
Soyfoods Canada	The Natural Health Products Technology Cluster	The Ontario Rural Council
The Organic Council Of Ontario	The Organic Council of Ontario	



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