

**ONTARIO MINISTRY OF AGRICULTURE,
FOOD AND RURAL AFFAIRS
AND
UNIVERSITY OF GUELPH**

AGREEMENT

**CONSOLIDATED ANNUAL REPORT
2011/2012**

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EXECUTIVE SUMMARY

This Annual Report is being submitted to the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) in accordance with the terms and commitments under the OMAFRA-University of Guelph (U of G) Agreement. This is the fourth Annual Report under the current Agreement between the University of Guelph and OMAFRA, which was signed April 1st, 2008, for the period April 1, 2008 to March 31, 2018.

The University has complied with all material provisions of the Agreement and is managing the transfer payment funds provided under the Agreement effectively and efficiently and with due regard to obtaining appropriate value for money expended.

The period covered by this Annual Report is the U of G's 2011/12 fiscal year (May 1, 2011 – April 30, 2012). This report covers the activities, budgets, expenditures and performance measures for each of the four program areas encompassed by the Agreement – Research, Veterinary Clinical Education Program (VCEP), Animal Health Laboratory (AHL) and the Agriculture and Food Laboratory (AFL).

Governance

During negotiations for the current Agreement, OMAFRA and the U of G agreed that effective governance is important to achieve the objectives of the Agreement. An independent consultant reviewed governance from the previous Agreements and made recommendations for improvements, and a new, joint governance model was developed. This model is collaborative, accountable and transparent.

The structure is comprised of a series of committees; the Agreement Leadership Committee (ALC), is responsible for chief oversight of the Agreement; the Executive Committee (EC), is responsible for the parties working together effectively to ensure the Agreement is fully carried out; and four program management committees (PMC) as well as a Joint Intellectual Property (IP) committee, are responsible for delivery of program level responsibilities. The program management committees are: AFL, AHL, VCEP, and Research.

All committees operate under their own terms of reference, membership, and specific responsibilities. These responsibilities and requirements are outlined in the Master Agreement and in the Committees' respective schedules of the Agreement. These documents have been provided to committee members in a program management handbook. As well, all governance documents are posted on a password protected website created for U of G and OMAFRA staff who sit on these committees.

A partnership secretariat was also created to provide administrative oversight for successful partnership implementation. The secretariat works collaboratively with committee co-chairs to address responsibilities and ensure relevance of the performance indicators (PIs). This

responsibility lies with OMAFRA, but U of G staff collaborates, where possible, to help ensure all targets and deadlines are met.

Overall Agreement

In order to ensure accountability and direction for the Agreement, a series of 39 Performance Indicators (PIs) were developed, some for the overall Agreement and several for each of the four programs operated under the Agreement – Research, Agriculture and Food Laboratory (AFL), Animal Health Laboratory (AHL), and the Veterinary Clinical Education Program (VCEP). In 2011/12 there was one change to an AFL performance indicator (#7) See Appendix B for details.

Accomplishments

New Programs

Knowledge Translation and Transfer (KTT) and Highly Qualified Personnel (HQP) continued to be successful during the 2011/12 fiscal year. Both programs had overwhelming responses to the Calls for applications. Further details on these new programs are provided in the New Initiatives section of this report.

Research

The Research Program has seven research themes – Agricultural and Rural Policy, Bioeconomy – Industrial Uses, Emergency Management, Environmental Sustainability, Food for Health, Product Development and Enhancement through the Value Chains, and Production Systems. Each research theme is led by a Research Program Director (RPD) from the University of Guelph and a Director Champion (DC) from OMAFRA.

Highlights and case studies from each research theme follow later in this report. Achievements from the 2011/12 research program include the nano-enhanced biopolyurethane for green manufacturing, developing a new vaccine platform for Avian Influenza Virus (AIV), a treatment system for farm milkhouse wastewater, better understanding of gastrointestinal responses to functional foods, more cost-effective food processing technologies, and optimized biological control strategies in greenhouse floriculture.

A Call for Letters of Intent (LOIs) was issued on October 17, 2011 due on November 21, 2011. 141 LOIs were received – 29 of them applying across two or more themes. These LOIs were reviewed by research theme committees, chaired by the Research Program Director and consisting of representatives of the research and academic community (U of G, other research institutions and universities), OMAFRA and other government ministries/departments, and industry or sector representatives. Of the LOIs reviewed, 80 (16 applied across themes) full proposals were requested for submission, and 52 (7 across themes) were funded with starting dates as of May 1, 2012 or later. They will be reported on in next year's annual report.

In 2008, (the first year of the current OMAFRA - U of G Agreement), communications were identified as key to the initiative's success. This included outreach to the public and consumers, to increase understanding of the valuable outcomes of the agreement, and internal communications to similarly inform OMAFRA and U of G employees. Working with the private sector in getting new knowledge from the lab to the field and factory was seen as crucial, and numerous strategic communications activities continued through 2011/12, dedicated to building the information pipeline. These projects covered print and broadcast media, as well as internal and external communications.

For example, in 2008/09, an *Agri-Food Yearbook* was developed as a special edition of the University of Guelph's long-established *Research* magazine. Based on its enthusiastic reception, in 2009/10, the yearbook became a regular part of the *Research* magazine's annual publication schedule. In 2010/11 and 2011/12 the *Yearbook* was distributed as an insert in *Ontario Farmer* newspaper. This effective, economical distribution method saw the publication delivered directly to more than 30,000 farmers, the *Ontario Farmer* subscription base, at a fraction of the cost of mailing it directly. The caché of being an insert into one of the leading commercial agricultural publications in Ontario added significant credibility and relevance to the publication. Communications have now been updated to include social media and internet information sources.

The Buzz is an electronic newsletter for and about the Partnership. Launched in 2008, during 2009/10 the format was enhanced by adding photos and including a broader collection of contributors. As well as having news about research, research stations and events, each issue now also includes regular contributions from the Catalyst Centre (formerly the Business Development Office) and the KTT program.

Similarly, News@ (Close to) Noon, the 11:00am to noon hour bimonthly speaker series which features programs and research about the Partnership, is now reaching a broader audience. Invites to the events have been extended to industry and it is now also being offered 'live' over the internet for people who can't attend in person.

Commercialization and licensing of research outcomes from the OMAFRA - U of G Agreement is reported by the Catalyst Centre (CC) – formerly the Business Development Office. For 2011/12 they reported 78 disclosures, 8 patents filed, 32 licenses granted and 1 patent issued – with total license revenue for OMAFRA supported research of \$1,455,935.

The germplasm portfolio hit a major milestone this year, reaching over **\$10M in royalties** generated from plant technologies since the inception of the technology transfer program in 1977. The wider economic impact of these discoveries is striking with **billions of dollars of seed and crop sales** that have followed.

The Catalyst Centre has actively participated in Knowledge Translation and Transfer (KTT) initiatives, participating on the review committee, taking part in Research Days, and finally having created the 'Guelph IP Academy', which will deliver a 12-session program focused on enhancing knowledge and understanding of issues related to commercializing university generated Intellectual Properties (IP).

The CC initiated an Industry Liaison Program (ILP), which began in January 2010, with the goal of increasing the interaction between U of G researchers and external companies. This program has been very successful with two dedicated Industry Liaison Officers joining the team in the past year. The ILP contributed significantly to new academic-industry partnerships, and impacting more than \$1.75M in leveraged industry sponsored research. The outcomes of this research will help to generate a strong pipeline for technology transfer.

The Proof of Principle (POP) funding to the U of G (managed by the CC, but outside of the Partnership) has generated success as well. The Catalyst Centre has entered into a license agreement for mint high in rosmarinic acid with the company Ceapro, who is actively developing the commercial scale agronomics of the mint.

The updates to the Proof-of-Principle program can be found on page 166.

Veterinary Clinical Education Program

The Veterinary Clinical Education Program (VCEP) continued to provide funding for the operation of the Veterinary Teaching Hospital, advanced clinical training, an externship for DVM students and a one-year Veterinary Internship Program through the Ontario Veterinary College (OVC). Highlights from the program include OVC achieving continued full accreditation from the AVMA/CVMA at its annual review.

OVC's veterinary students continued the long-standing tradition of achieving a very high success rate on the North American licensing exam resulting in a high rate of post-graduate employment and very high employer satisfaction with new graduates.

The Bovine Education Trust provided financial support for veterinary students to obtain further hands-on clinical practice experience in the dairy and beef industries. Support funding for the trust was provided by the Partnership, through the VCEP program.

The Centre for Public Health and Zoonoses (CPHAZ) completed renovations to the space being vacated by the Pathobiology Department and the Animal Health Laboratory creating much needed new research laboratory facilities. The CPHAZ Research Laboratories worked towards creating a community of practice, where zoonotic disease researchers with diverse disciplinary backgrounds can work together. In June 2012, Dr. Jan Sargeant was re-appointed as Director of the Centre for another five year term. She also served as a member of the expert panel for the Council of Canadian Academies that released a report on Approaches to Animal Health Risk Assessment: *Healthy Animals, Healthy Canada*.

In 2011/12 the Masters in Public Health (MPH) enrolled its fourth class, again increasing enrollment to 20 students due to the very high number of applicants. Projects that the students are required to complete during their practicum placement were presented during a Public Health Forum, where public health partners are invited to attend. Last year, 90 delegates attended this Forum.

Agencies that have hosted the MPH students include, among others the Public Health Agency of Canada, the Ontario Ministry of Health and Long-Term Care, Public Health Ontario, Cancer Care Ontario, Wellington-Dufferin-Guelph Public Health, Peel Health, Halton Regional Health

Department, Chicken Farmers of Ontario, Veterinarians Without Borders and the AIDS Committee of Guelph

In support of preparing students for rural veterinary practice the program also continued to provide funding for the delivery of final year elective rotations in bovine clinical skills and equine primary care.

In partnership with the Ontario Veterinary Medical Association, the Ontario Cattleman's Association, the Dairy Farmers of Ontario and OMAFRA, a study on the future demand for large animal practitioners in Ontario was completed. Results indicate there is not a current, nor foreseen, overall shortage of large animal veterinary practitioners in Ontario; however there are regional disparities in access to veterinary services in areas where there is a low density of farms and farm animals.

Laboratory Services

Laboratory Services continues to optimize the leveraging of services offered within the Partnership to other government, commercial and academic clients, while developing new areas of service to maintain its status as a self-sustaining division of the U of G.

The Animal Health Laboratory (AHL) and the Agriculture and Food Laboratory (AFL) report separately in the annual report under the new Agreement.

Vision:

We will be a laboratory partner of choice for government and universities in Canada, for agriculture, food safety, and animal health testing. We will also be a leader in providing high-value laboratory services to the private sector in selected niche markets.

Mission:

Working together toward a healthier future ... we provide high-value analytical and diagnostic services for the agricultural, food and veterinary sectors.

Agriculture and Food Laboratory

The LSD 2008-2011 Strategic Plan was updated and revised as part of the three-year strategic planning cycle agreed to by the senior management team. Key learnings were incorporated into the current Strategic Plan 2011-2014.

The Agriculture and Food Lab (AFL) continues to strengthen its position as a fee for service laboratory based on strong business processes and targeted marketing activities. As always, the goal is to continue to build external revenues for reinvestment and sustainability (per Schedules "E" and "F" of the Agreement). One avenue to successfully meet this goal is to leverage the services that AFL provides to other public organizations and the private sector. The ability of AFL to leverage its expertise and capacity to non-OMAFRA clients has resulted in

the LSD's ability to remain self-sustaining in both of its laboratory units, the AFL and the AHL, after 15 years as a not-for-profit business enterprise.

AFL continues to offer a high level of service to clients in agriculture, food and beverage, corporate and research sectors. LSD services are based upon technology and infrastructure that is capital intensive and rapidly changing. LSD must be able to reinvest in large capital investments on an ongoing basis, while accommodating fluctuations in the marketplace, government regulations, the university environment and the world economy. LSD must be able to generate these reinvestment funds on its own, given the lack of opportunity for outside investment capital. OMAFRA does however, provide \$500,000 annually for equipment purchase by LSD.

In 2011/12 the AFL continued the implementation of innovative test approaches and other initiatives:

1. AFL has emerged as an industry leader in multiple-residue (multi-residue) technology using Liquid Chromatography-Mass spectrometry instrumentation. The AFL multi-residue methods have been expanded to include regulatory testing of drug, pesticide and mycotoxin residues in various matrices: animal tissues and milk across several species: beef (diary, heifer, steer, and veal), pork (market and BBQ hogs), lamb, sheep, goat, chicken, and turkey; as well as pesticide residues in fruits and vegetables and mycotoxin residues in grains/feeds. OMAFRA's meat inspection program now includes this advanced technology testing across all of the above slaughter classes and an extensive list of chemical compounds. Unique product classes (e.g. emu) can also be tested using this same high level technology following a special protocol for non-routine testing. The AFL is the only non-government lab in Canada to hold the accreditation that permits the application of non-routine testing to client samples under defined conditions.
2. The previously expanded scope of residues that support the annual Canadian Chemical Residue Determination in Fresh and Processed Fruits and Vegetables was successfully applied to pesticide residue programs this year.
3. AFL completed the second year of a five year contract for milk testing. The lab tested over 800,000 samples and worked closely with the Dairy Farmers of Ontario (DFO), the Ontario Dairy Council (ODC) and OMAFRA to manage issues and bring to fruition opportunities for efficiency throughout the value chain. For example, in 2011/12, working collaboratively, all parties implemented significant protocol changes to the inhibitor testing program in the interest of cost effectiveness and timely response for the members of the DFO and the ODC, and in keeping with the recently updated Ontario Milk Act regulations.
4. Implementation of the FOSS BactoScan™ for bacterial enumeration in goat milk was accomplished after full validation of the equipment. Several meetings and presentations occurred in collaboration with our OMAFRA partners for presenting the advantages of this technology to the goat milk industry. This work is well documented through a previous Partnership Year-Book story, published master's thesis (L. Ramsahoi), peer-reviewed publication, and recently in the Goat Digest. This initiative clearly demonstrates improvements in efficiency, turn-around time and report consistency to goat milk producers in Ontario.

5. Working collaboratively with OMAFRA, Ontario Public Health, Health Canada, the Public Health Agency of Canada, the Canadian Food Inspection Agency and the Ontario Ministry of the Environment, the AFL's molecular biology laboratory, under the leadership of Dr. Shu Chen, continues to develop a Multi-Locus Variable Number Tandem Repeat Analysis (MLVA) methodology and database using a combined culture bank of 2500 *Listeria* isolates. For example, if the strain of *Listeria* identified in a human case matches the MLVA of food products in the historical database, an investigator can further explore possible linkages of the present case to those types of food product, or to specific food producers or processors.

This research is funded through the OMAFRA Food Safety Research Program and is now used for OMAFRA Food Inspection programs to assist in identification of *Listeria* strains.

6. AFL will continue to look for niche sector opportunities to expand and build important relationships and revenue with the private sector including the bundling of complementary services for the purpose of food contaminant investigations. These niche market opportunities are an important element in the leveraging strategy needed to obtain sufficient revenue to sustain both the AFL and the AHL.

Animal Health Laboratory

Since October 2010, the AHL has occupied the new Pathobiology-Animal Health Laboratory building on the corner of Gordon and McGilvray Streets of the Guelph campus.

The AHL Animal Health Strategic Investment (AHSI), new initiative funding for 2008-2013, continued to support the three key pillars of the initiative, which are developing new tests for emerging diseases, enhancing baseline surveillance for the early detection of emerging hazards, and the development and testing of emergency and business continuity plans for the AHL. As well, AHSI provided funding for the purchase of new testing equipment needed by the AHL.

Yearly, the AHL surveys its clients to determine their satisfaction, by commodity, with key elements of AHL service (as described in performance indicators #4, 7 and 9). In 2011/12 the LimeSurvey (an open-source on-line survey system) was expanded to over 500 clients, both large and small. Survey results showed very high client satisfaction in all categories, and identified several areas where further improvement could be made.

The annual update to the American Association of Veterinary Laboratory Diagnosticians (AAVLD) in January 2012 resulted in continued accreditation within the five-year accreditation granted in April 2009.

Program Highlights and Case Studies

Agriculture and Food Laboratory

Multi- Residue Methodology

Development of the Multiple Residue Methodology for Detection and Quantitation of Veterinary Drugs

In 2011/12 the multi-residue approach in drug residue determinations was expanded to include poultry (broilers, spent hens) and turkey samples. This concludes development of the major method to include all of the major slaughter classes addressed in the OMAFRA Meat Inspection monitoring and surveillance testing programs.

The multi-residue approach continues to be applied to other smaller scope methods such as the expansion of a multi-residue method to determine beta-agonist residues in meat. The number of compounds in this method is being expanded from four to thirteen for use in the second quarter of 2012/13.

The AFL continues to work closely with members of OMAFRA's Meat Inspection Program and Food Safety Science Unit to ensure that the on-going development of this scientific approach targets the appropriate program priorities in a timely fashion.

Pesticide testing

The first year of the expanded scope of compounds provided through the multi-residue and targeted residue testing program for OMAFRA's Foods of Plant Origin program was very successful. OMAFRA continues to add compounds of interest to their surveillance/monitoring testing with the confidence that they are closely aligned with their national cohorts at the CFIA.

AFL is looking to expand its scope of testing for the honey and syrups in keeping with the interests of OMAFRA's Foods of Plant Origin program. Again, alignment with the national program is paramount.

Advancements in Molecular Biology and Microbiology

AFL has been leading a concerted effort to develop a simple, rapid, accurate and standardized DNA fingerprinting methodology (MLVA) and database that facilitates tracking contamination sources of *Listeria monocytogenes* in the farm to fork continuum. The initial work has been published in *International Journal of Food Microbiology*. This collaborative initiative has allowed some preliminary application of the methodology in order to provide a better understanding of the genetic composition of some of the isolates derived from OMAFRA regulatory samples. It is anticipated that this method will continue to be applied for future programs, further enhancing Ontario's food safety.

AFL has also been awarded research funds from Ontario Centre of Excellence (OCE) and Mathematics of Information Technology and Complex Systems (MITACS), with an overall funding of \$300,000, to develop nanoparticle-based technology for pathogen detection.

These projects allocated significant efforts to the hardware/reader development. The MITACS project (part of the OCE project) has been completed with the following outcome: an assay targeting *Listeria monocytogenes* nucleic acid was developed and fluorescence instruments (imaging and non-imaging) prototypes were assembled and tested. Before the instrument/assay platform can be used for cost-effective food safety testing, however, further development is required so that robust detection of the target can be performed in complex food or environmental samples.

The OCE project is very dynamic reflecting the industry partner's (market-driven) desires. The focus has been changed to develop an automated microarray system for the detection of the top 7 Shiga toxin-producing *Escherichia coli* (STEC) O serogroup organisms. The STEC array has been successfully developed, and is currently being optimized.

Progress and final reports for each of seven research grant projects (listed in the AFL fourth quarter report) have been delivered to the corresponding funding agencies by the Project Investigators. Additional activities (such as project meetings) in addition to publications and presentations as listed above for Knowledge Translation and Transfer (KTT) took place as proposed in the KTT plans for each of the projects.

Raw Milk Testing Contract

The Agriculture and Food Laboratory has completed the second of a five year, renewable contract to provide both analytical and program management support for the collection, testing and reporting of results for raw milk composition and quality program samples in Ontario.

Analytical testing information and quality testing for regulatory purposes are delivered through the relationship that has been in place for decades between the AFL and the Dairy Farmers of Ontario, the Ontario Dairy Council and OMAFRA.

A proposal to change the veterinary drug residue detection in fluid milk was developed with the participation of all parties. Savings in the regulatory testing program for OMAFRA created by implementing more efficient workflows will be targeted to address additional risk management initiatives in the Dairy Food Safety Program at OMAFRA.

The enumeration of bacteria in fluid goat milk was successfully transitioned from the Standard Plate Count method to the use of the BactoScan™ FC for the enumeration of total bacteria in raw goat milk (accepted for publication in the *Journal of Dairy Science* in 2011). The use of this flow-cell technology further reduced costs to the province's regulatory programs with the savings again targeted to other risk management initiatives in the Dairy Food Safety Program at OMAFRA.

Leveraging for Reinvestment and Sustainability

Various large on-going and one-time projects have provided significant reinvestment funds over the years. These sources of external revenue, such as the Plum Pox Virus testing program,

have finite life-spans and as such need to be replaced in order to sustain sufficient revenue to support the AFL and the AHL activities. Laboratory Services continues to modify and improve its approach to securing new business opportunities and increasing external revenues for reinvestment (per Schedules “E” and “F” of the Agreement). The Division requires a reinvestment of approximately \$1.5M to \$2.0M into equipment, building infrastructure and new capabilities each and every year.

While typically the focus has been on replacing instrumentation, in 2011/12, the AFL faced challenges with one of two uninterrupted power supply (UPS) units in place in the facility. Much of the AFL’s advanced instrumentation can be thrown off-line and/or damaged by surges and disruptions to the power supply. This makes ongoing use of UPS across the facility of utmost importance. One unit has been replaced and plans are being developed to replace the second older unit.

Changes in health and safety requirements will also add to the AFL’s capital costs this year as it faces the replacement of eyewash stations and safety showers to ensure they are sourced with potable, tepid water. And finally, also in the realm of “program specific” infrastructure, the AFL will be looking to replace an older Environmental Management system.

Balancing the laboratory capability and capacity of the division with the need for new and/or improved methods, thereby expanding the scope of testing, must also continue to be one of the AFL’s top priorities.

AFL is committed to providing timely support for urgent/emergency response initiatives as required, as well as ongoing scheduled testing programs for OMAFRA.

Animal Health Laboratory

Infrastructure

- The AHL moved into the new Pathobiology-Animal Health Laboratory (formerly referred to as ‘building 89’) on the corner of Gordon and McGilvray Streets in October November, 2010 – official opening October 7, 2010.
- Corrections of building deficiencies and building commissioning continued through fiscal 2010/11 and 2011/12. The two higher containment laboratories (CL2+) – TSE (transmissible spongiform encephalopathies) lab 1822 and FAD (foreign animal disease) lab 2811 – await final commissioning.
- In August/September 2011, PRI (Progressive Recovery Inc.) installed an alkaline tissue digester to provide on-site disposal of animal anatomical waste for the necropsy suite. The digester is functional but awaits final government approvals and commissioning.
- The pneumatic tube system between the AHL and the OVC Health Sciences Center to expedite delivery of specimens from the HSC to the AHL was completed and operational in the fall of 2011.
- Significant new testing equipment was added to the inventory of the AHL, through funding from the Animal Health Strategic Investment (AHSI) (~\$1.2M) and the OMAFRA vaccine project (\$400K).

Operations

- AHL continued to offer a wide spectrum of tests, with addition/replacement of improved tests over time as enhanced through the AHSI, e.g., continue to replace gel-based PCR with real-time polymerase chain reaction (PCR). Following is a list of new tests offered by the AHL in 2011/12:

Test Name
Avian adeno-associated virus rt-RT-PCR
Avian bornavirus rt-RT-PCR
Avian reovirus rt-RT-PCR
Bartonella spp PCR
Bovine papillomavirus PCR (fresh)
Bovine papillomavirus PCR (paraffin)
Brucella canis RSAT
Campylobacter, MIC
Chicken anemia virus rt-RT-PCR
Duck adenovirus-1 rt-RT-PCR
Fowl adenovirus rt-RT-PCR
Geomyces destructans rt-PCR
IHC, caprine arthritis-encephalitis virus/maedi-visna virus (CAEV/MVV)
IHC, Eastern equine encephalitis virus (EEEV)
IHC, Helicobacter spp
Infectious bursal disease virus rt-RT-PCR
Infectious bronchitis virus rt-RT-PCR
Infectious laryngotracheitis virus rt-RT-PCR
Influenza A virus pandemic N1 rt-RT-PCR
Influenza A virus MultiS-screen-antibody ELISA
Maedi-visna ab ELISA ID-Vet
MVV ab indirect ELISA Pourquoi
MVV ab indirect ELISA IDEXX
MVV ab competitive ELISA VMRD
MVV/CAEV ab ELISA Hyphen
Mycoplasma hyopneumoniae - IDEXX ELISA
Porcine coronavirus (TGEV/PRCV) - differentiating antibody ELISA
Poxvirus rt-Rt-PCR
PRRSV, North American strain - IgG/IgM indirect FA

- The AHL accessioned 60,297 cases and performed 812,859 procedures in 2011/12 in support of disease surveillance. Individual procedures are often comprised of multiple tests, e.g., biochemistry profiles of 20 tests each, hence total tests approximate 1,000,000 annually.
- The annual AHL client satisfaction survey was conducted electronically in November 2011, via LimeSurvey (an open-source, on-line survey system), with input on questions from OMAFRA, and results demonstrated an excellent overall client satisfaction rating of 95%.
- The AHL published 41 scientific articles in the AHL quarterly newsletters in 2011/12. As well, AHL veterinarians were involved in 18 oral or poster presentations and 17 peer-reviewed publications in calendar year 2011.
- The AHL informed OMAFRA of 38 reportable or notifiable disease events that were suspected and /or confirmed by the AHL in Ontario in 2011/12, ranging from Eastern equine encephalitis through bovine tuberculosis and West Nile virus, and participated in the subsequent investigation of these outbreaks. The AHL also forwarded samples from 88 cases to CFIA laboratories for rule-out of reportable diseases, primarily rabies, but also including classical swine fever, foot-and-mouth disease, scrapie, and other significant foreign animal and zoonotic diseases.
- The American Association of Veterinary Laboratory Diagnosticians (AAVLD) audited the AHL in April 2009; as a result of this audit, the AHL received full AAVLD accreditation for 5 years. The annual update provided in January 2012 was acceptable to the Accreditation Committee. The next AAVLD audit site visit will occur in 2014.
- The Animal Health Strategic Investment (\$1.5M/yr for 5 yrs) has funded 53 projects targeted to support the three key pillars of this new initiative:
 - new tests for emerging diseases;
 - baseline surveillance for the early detection of emerging hazards; and
 - development and testing of emergency and business continuity plans for the Animal Health Laboratory.

For details of these, see 'New Initiatives' section of this report.

- The AHL completed a notifiable avian influenza simulation and surge-capacity exercise in June 2011, and pathologists in both AHL-Guelph and AHL-Kemptville labs participated in a necropsy-based swine foreign animal disease simulation ("standard swine disease") in September 2011. Planning began in winter 2012 for a small ruminant FAD simulation in fall 2012, contracted to Ontario Livestock and Poultry Council.
- The AHL contributed to discussions on development of Regulations and the list of reportable and notifiable health hazards for the new Ontario Animal Health Act.

Research

Agricultural and Rural Policy

The OMAFRA-University of Guelph Partnership funds research in this theme in order that government can provide support to Ontario's agri-food industry and rural communities. Agricultural policy research encompasses many issues related to farming, including agricultural trade and marketing, business and finance, and innovation in economic development. Rural policy research focuses on the challenges and opportunities facing rural Ontario, including current government policies and programs, the impact of climate change, regional development, rural infrastructure, transportation and rural labour markets. Together, agricultural and rural policy research provides up-to-date, factual information on which to base sound policy decisions.

Highlights from the program this year include:

- Researchers in the Department of Food, Agricultural and Resource Economics are continuing to look into the effect of climate change on crop yields in Ontario's agri-food sector. To date, researchers and graduate students in collaboration with OMAFRA have identified crops and regions within and outside of Ontario and current crop insurance programs and ratings methodologies that might be affected by climate change. The next step will be to test the model that was built with the data collected in order to determine the effect of changing climate on yields for the identified crop-region combinations. (Ker, #200287)
- Employers in rural Ontario are in a difficult position when it comes to attracting and retaining younger skilled workers. How can rural employers attract and keep younger workers who have pursued higher levels of education and training in a globally competitive environment? Researchers in the Department of Business, College of Management and Economics are exploring job quality, training skills, requirements and choices for young workers in Ontario's rural labour market. They are trying to understand the employment situation for young workers from both the perspectives of the workers themselves and their employers. This study will help inform policy decisions and assist owners and operators of firms and wider society within rural Ontario in developing better practices for employment decisions and practices. (Mann, #200304)
- The market for organic and locally produced food products continues to grow across Ontario. Researchers in the Department of Food, Agricultural and Resource Economics are working to overcome barriers to the establishment of successful local and organic food value chains. Results from this study will improve the understanding of the market for and size of organic food products in Ontario, as well as identify opportunities for agricultural producers to better meet the demands of consumers. (Cranfield, #200195).

Case Study

Alfons Weersink, Department of Food, Agricultural and Resource Economics

*#200289: Land use, climate change and policy impacts of the transition to a green economy
(Also funded under Environmental Sustainability)*

April 1, 2010 – March 13, 2014

(up to and including 11/12)

OMAFRA / UofG Research Project Operating	\$109,000
Faculty/CARG FTE	\$39,726
Research Station Use	N/A
Tech/Admin Support & Indirect Costs	\$36,312
Total OMAFRA-U of G Project Value (up to and including 11/12)	\$185,038
Partner/In Kind Contributions	\$46,000 in-kind
Collaborators	De Laporte, A. , Depart. of Food, Agricultural and Resource Economics McKenney, D. , National Resources Canada, Canadian Forest Services Yemshanov, D. , National Resources Canada, Canadian Forest Services Rosenberg, A. , OMAFRA Tondeveld, T. , OMAFRA

Green policies, such as Ontario's Green Energy Act, are intended to expand renewable energy generation, encourage energy conservation and promote the creation of clean energy jobs. Such policies attempt to stimulate the transition to a green economy. Ontario's agricultural development is critically important to the creation of this new green economy as it supplies feedstocks and agricultural biomass critical for biofuel production and energy generation.

While it is clear that Ontario is on a path towards increasing both production and usage of green energy, what is less clear is how economic, environmental and land use factors will impact this transition. Although the intent of green policy initiatives may be to enhance both profitability and environmental quality, there are likely to be trade-offs.

University of Guelph researcher Alfons Weersink, Department of Food, Agricultural and Resource Economics, is looking into whether these trade-offs exist in order to better understand and more effectively evaluate green policies. Using data collected from geographic information systems (GIS), Weersink's research team has constructed a land use allocation model for Ontario that has estimated the potential supply of agricultural biomass from either crop stover

(i.e. corn stalks) or dedicated biomass crops (e.g. switch grass) across the province. Additionally, they have built a model of the global corn and soybean markets.

Prof. Weersink hopes that his work will address two major questions that Ontario's green economy of the future will face. Firstly, in an era of higher temperatures due to global warming, which crop is best for Ontario's biomass production? There is an interest in using dedicated biomass crops such as miscanthus and switchgrass to replace coal in Ontario's electrical generation plants. Miscanthus yields are higher but the break-even price for switchgrass is lower. There is potentially sufficient supply of biomass from these two crops for Ontario's electrical needs but the amount that will be grown depends on the prices of other crops like corn and soybeans. While both crops show promise as biomass sources for bio-energy production, a changing global climate along with cultivar and planting technology could affect the choice of superior crop in the Ontario context.

Secondly, Weersink's group is considering the effects of biofuel production mandates on global markets and what these mandates might mean for the average consumer. "Whatever the reason for the expansion of biofuels," says Weersink, "there will likely be important effects on global agricultural markets." The increase in biofuel production to meet mandates will provide support to the major feedstocks like corn and soybeans. This outcome could potentially arise even without the mandates if the price of energy is high. Since a significant proportion of biofuel crops could be used for domestic energy production, less will feed into world markets; meaning consumers may pay higher prices for many consumables. The net effect on consumers globally depends on the share of income used to buy food and the share of the consumer dollar going to the farmer.

Ontario's agricultural landscape will undoubtedly be changed and shaped by the many new environmental policies that have recently been put into place. By looking at the effects of green policies on the area planted and prices of crops that are grown in Ontario, Weersink's research will help Ontarians understand agricultural policies and markets of the future.

Bioeconomy – Industrial Uses

Plant and animal products in agriculture have long been used primarily for food and feed. The terms "bioeconomy" and "industrial uses" refer to the incorporation of renewable biomass resources – in whole or in part – into non-food and non-feed manufactured products, or energy systems. Often biomass is used to replace petrochemicals, with the benefit of making production more environmentally sustainable. This research theme focuses on three major product categories – biomaterials (e.g., textiles, carpets and panels), biochemicals (e.g., lubricants, sealants and oil) and bioenergy (e.g., ethanol, methanol and biodiesel) – all of which involve the use of agriculturally derived biomass to reduce dependency on petroleum-based materials.

Highlights from the program this year include:

- The production of biogas, a type of renewable fuel, is increasing across Ontario. There is a growing interest in methods to optimize the degradation of yard and kitchen wastes in a way that will enhance biogas production. Researchers at the Campus d'Alfred are investigating ways to enhance the digestion of solid manures (poultry, dairy and horse) by co-digesting with yard waste and some household kitchen waste. This study will aid in the development of a dry fermentation process that optimizes biogas production. Dry

fermentation will decrease reactor sizes required for this digestion which will, in turn, decrease costs for farmers and benefit Ontario's growing bioeconomy. (Crolla, #200374)

- Researchers in the School of Environmental Sciences at the University of Guelph Kemptville Campus are trying to better understand how to optimize biomass production for bioenergy in Ontario. Results from this project will allow for the recommendation of specific seeding rates with regard to different grass cultivars, as well as highlight the production potential for these grasses on marginal lands in Eastern Ontario. This study will be used as a reference for farms across Ontario considering planting biofuel crops, while also helping Ontario move toward sustainable energy development. (Rennie, #200007)
- The use of biomass for energy production could potentially mitigate environmental concerns related to greenhouse gas emissions, air contaminants and non-renewable energy use. In this project, researchers have successfully built a state-of-the-art model that determines the carbon footprint of corn grain and stover production. The results from the modeling will allow the Grain Farmers of Ontario to better understand the greenhouse gas implications of corn and corn stover production, and identify management practices for reducing greenhouse gases from this sector. Results from this model will also allow policy makers to ensure that bioenergy development in Ontario is environmentally sound, and based on the best available data and science. (Wagner-Riddle, #200013)

Case Study

Manju Misra, School of Engineering / Department of Plant Agriculture

#200001: Design and engineering of nano-enhanced biopolyurethane for green manufacturing

July 1, 2009 – June 30, 2012

(up to and including 11/12)

OMAFRA / UofG Research Project Operating	\$365,000
Faculty/CARG FTE	\$60,784
Research Station Use	N/A
Tech/Admin Support & Indirect Costs	\$58,534
Total OMAFRA/U of G Project Value (up to and including 11/12)	\$484,318
Partner/In Kind Contributions	\$562,500 cash, \$352,500 in-kind
Collaborators	Mohanty, A. , Depart. of Plant Agriculture Rajcan, I. , Depart. of Plant Agriculture Khalil, H. , Woodbridge Group Mielewski, D. , Ford Motor Company

	Devitt, C. , Grain Farmers of Ontario Schmatz, J. , Soy 20/20 Lewko, R. , Manitoba Pulse Growers Association
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The last decade has seen a growing interest in the use of biobased products that combine materials derived from fossil fuels with biological materials grown on farms and in forests. Professor Manju Misra and her research team including Professors Istvan Rajcan and Amar Mohanty, Department of Plant Agriculture are interested in using biobased products to develop novel alternatives to petroleum-based synthetic polymers like polyurethane, a highly adaptive polymer that is used in many different applications including coatings, adhesives, foams and composites.

Traditionally prepared from petrochemicals, the forecasted depletion of petroleum resources has prompted researchers to find new ways of producing polymers from renewable resources. Working out of the University of Guelph's Bioproducts Discovery and Development Centre – a hub for University research on using agricultural crops to develop novel industrial products – Professor Misra has focused her research on ways to make use of biobased products that provide novel alternatives to petroleum-based synthetic polymers. As Prof. Misra says, "Sustainability is the mantra for the years ahead and our nano-enhanced multifunctional bioproducts research can bring breakthroughs in value-added applications of renewable feedstock and residue uses in the coming decades."

One major potential source of chemicals that Misra has tapped into are abundant and cheap plant oils. Her research group has chosen to look at soybean oil for its use in creating a biopolyurethane which – in addition to its desirable chemical properties – can be easily and cheaply mass produced in Ontario.

Professor Misra's project aims to create a method of developing a novel biopolyurethane material from agricultural resources intended for industrial applications. So far, Misra and her team are well on their way to achieving a stronger, more economically and environmentally friendly biomaterial from soy plants. Using soy plants to create biopolyurethane boasts both economic and practical advantages over petroleum-based chemicals. Biopolyurethanes made with soy oil can reduce carbon dioxide and volatile organic compound (VOC) emissions in order to make "greener" cars. In the words of Prof. Misra, "The auto industry has taken a holistic approach to make environmentally friendly vehicles and this embraces an increasing focus on bio-based products that add value to agriculture whilst at the same time create a local bio-economy. These are big steps towards leaving a small footprint."

The overall goal of Misra's research is to create biomaterials that will help facilitate a rapid transition to a biobased economy by providing a foundation of economic and environmental sustainability for the material industries. By investigating new soybean lines as potential sources for polyurethane, Misra's research could open doors for Ontario farmers in the automotive market as Ontario soybean growers are well-positioned to fill the needs of many automotive manufacturers interested in ways to reduce their carbon footprint and utilize renewable resources.

Emergency Management

The goal of Emergency Management research under the OMAFRA-UofG Partnership is to provide a proactive, co-ordinated and comprehensive approach to managing agri-food

emergencies in Ontario. Events such as SARS, BSE, swine and avian influenza and invasive plant pests have shown Canadians the profound impact that outbreaks can have on agriculture, the environment, human health and the economy. Emergency Management research encompasses issues related to zoonoses and public health, foreign animal disease, plant pests, and food safety. The focus is on disease agents and pests whose sudden emergence or re-emergence in Ontario requires an immediate and comprehensive response.

Highlights from the program this year include:

- Researchers at the Centre for Public Health and Zoonoses in the Department of Population Medicine are developing a functional prioritization tool for OMAFRA and other decision-makers that will allow them to prioritize zoonotic diseases in Ontario. This tool will allow stakeholders across the agri-food, rural, veterinary and public health sectors by providing a shared platform for discussion and effectively and efficiently allocating limited resources in zoonotic disease management across Ontario. (Sargeant, #200455)
- Johne's Disease has a negative economic impact on the dairy industries throughout Ontario. Researchers from the Department of Population Medicine propose to determine the prevalence and distribution of Johne's Disease in Ontario dairy goat herds and dairy sheep flocks. Results from this study will contribute to the understanding and management of Johne's Disease in Ontario dairy goats and sheep, and help inform future Johne's Disease management and control programs in these growing industries. (Jones Bitton / Menzies, #200272)
- Researchers in the Department of Pathobiology are developing rapid diagnostic techniques that will allow them to assess the susceptibility of commercially important fish species to the spring viremia of carp (SVC). This virus is a contagious viral disease mainly seen in carp and related species. Professor Lumsden and his colleagues have so far discovered that, in addition to carp, fathead minnows seem to be very susceptible to SVC. Results from this study will allow for the development of better management practices in the commercial and feed-fish industries. (Lumsden, #200159)

Case Study

Shayan Sharif, Department of Pathobiology

#200117: Immunity against avian influenza virus (AIV) in chickens and development of rational vaccines for control of avian influenza (Also funded under Production Systems – Animal)

May 1, 2010 – April 30, 2013

(up to and including 11/12)

OMAFRA - UofG Research Project Operating	\$152,000
Faculty/CARG FTE	\$63,560
Research Station Use	Arnell Poultry and Isolation \$34,776
Tech/Admin Support & Indirect Costs	\$70,328

Total OMAFRA-UofG Project Value (up to and including 11/12)	\$320,664
Partner/In Kind Contributions	\$350,000 cash
Collaborators	Nagy, E. , Depart. of Pathobiology Pasick, J. , National Centre for Foreign Animal Disease Sanei, B. , OMAFRA

Avian influenza virus (AIV) is an infection caused by avian influenza A viruses. While these viruses occur naturally among birds, Avian influenza is very contagious and can make domesticated bird species like chickens, ducks, and turkeys very sick. AIV is transmitted through direct contact with infected waterfowl or other infected poultry or through contact with contaminated surfaces or materials.

The effects of AIV vary from ruffled feathers and a drop in egg production to catastrophic effects on multiple internal organs, resulting in a 90-100% mortality rate. Because of its high mortality rate, AIV poses a significant risk to the viability of the poultry industry in Canada and worldwide.

Currently, there is a shortage of efficacious methods for containing AIV in chickens. Existent vaccines for AIV make use of a killed virus to induce an immune response in domesticated birds. In these types of vaccines, the virus is not present in its entirety but rather in bits and pieces. The problem with these types of vaccines is that they do not fully activate the immune system. Instead of activating the two arms of the immune system (antibody-mediated responses and cell-mediated responses), killed viruses mostly activate one arm (antibody-mediated response). Full immunity to AIV requires a cell-mediated response as well. Despite these disadvantages, killed viruses are traditionally used in influenza vaccines because there is a danger that live attenuated viruses may mutate and gain virulence - the ability to cause disease.

Faced with this dilemma, Prof. Shayan Sharif, Department of Pathobiology, is working on developing a new vaccine platform for AIV. This platform will make use of a novel – and inactive – form of the AIV virus that will stimulate both antibody- and cell-mediated immune responses, thereby proffering greater virus immunity on chickens.

“We’re creating virus-like particles that look like a virus but don’t replicate so you don’t have a problem of these virus-like particles ever gaining virulence” says Sharif.

In addition to this high-level immunological work, Sharif is also looking at how to adapt his vaccine to current *in ovo* technology that would allow commercial poultry farmers to deliver the vaccine to chicks three days before they hatch. *In ovo* vaccinations are more cost effective and faster than intramuscular injections of vaccine in hatched animals. Additionally, because the delivery system of the vaccine will be automatic (machine-delivered vaccinations), the percentage of error is very low, which allows for a high degree of confidence that all chicks will be uniformly vaccinated.

Ultimately, Sharif hopes that his vaccine formulation will, “provide a safe and effective method for control of this virus in poultry flocks, hence reducing the risk of transmission to humans.”

Results from this research are expected to improve food safety in Ontario. “Introducing vaccination as an efficacious and cost-effective strategy will enhance consumer confidence in Ontario poultry products,” says Sharif. “We expect that at the end of this project, we will have obtained results that will improve food safety in Ontario.”

Environmental Sustainability

OMAFRA and the University of Guelph’s Environmental Sustainability research theme focuses on maintaining the ability of natural resources – soil, air, water and biodiversity – to support and strengthen the agriculture, food and bioproduct sectors, and rural communities. To protect Ontario’s diverse environment, researchers provide science-based direction for government policies and legislation. Population growth presents opportunities for new markets and challenges for agriculture and the environment.

The OMAFRA-UofG Partnership aims to balance the needs of people and the agri-food industry with environmental priorities in order to achieve sustainable agriculture and food production.

Highlights from the program this year include:

- School of Environmental Sciences researchers are conducting the first study in Ontario that evaluates the environmental and economic sustainability of short rotation willow for bioenergy. This research will assess energy efficiency and greenhouse gas emissions for heat generation and ethanol production from short rotation willow in Ontario, and will ultimately help growers develop more effective management strategies for short rotation willow production for bioenergy. (Gordon, #200165)
- During the last decade, there has been increased interest in using membrane bioreactors to treat wastewaters because of concerns about energy, greenhouse gas emissions, and resource recovery. In keeping with this, researchers in the School of Engineering are aiming to develop an advanced anaerobic membrane bioreactor (AnMBR) technology that will allow food processing industries to treat, reuse and recover energy from wastewater. This project will help Ontario food industries to reduce wastewater treatment and associated discharge costs, recover useful resources from wastewater and optimize water management through water reuse. (Chang, #200389)
- Net greenhouse gas emissions and energy balance associated with corn production are heavily dependent on how nitrogen is used by microbial communities in soil. Researchers from the School of Environmental Science are trying to gain a better understanding of microbial communities driving ammonia oxidation processes. This knowledge will assist in the development of best management practices that ensure optimal nitrogen use efficiency, reducing per unit production costs and environmental degradation. (Dunfield, #200148)

Case Study

Chris Kinsley, Campus d’Alfred

#200385: Development of a hybrid constructed wetland technology to treat dairy farm wastewaters

May 1, 2011 – April 30, 2014

(up to and including 11/12)

OMAFRA / UofG Research Project Operating	\$34,500
Faculty/CARG FTE	\$49,622
Research Station Use	N/A
Tech/Admin Support	\$8,791
Total OMAFRA-UofG Project Value (up to and including 11/12)	\$ 92,913
Partner/In Kind Contributions	\$40,000 cash, \$30,000 in-kind
Collaborators	Crolla, A. , Campus d'Alfred, UofG Gordon, R. , School of Environmental Sciences Roche, F. , Campus d'Alfred, UofG Courschesnse, S. , Campus d'Alfred, UofG Davidson, T. , Rideau Valley Conservation Authority Sauve, T. , OMAFRA

The treatment of milking centre washwaters, a waste stream from dairy farms, is now a priority for Ontario dairy farmers. This is due in large part to new legislation that requires farms to properly manage this waste stream by 2016. The issue affects small dairy farms with solid manure as the washwaters are managed separately from the manure. Current practices range from direct discharge to the use of septic systems; which often clog and fail because they are not designed to deal with high-strength farm waste.

Chris Kinsley, Professor at Campus d'Alfred, University of Guelph and Manager of the Ontario Rural Wastewater Centre, along with his colleagues are working to develop a technology that will filter solids, organics and eventually phosphorous from dairy wastewater in cold climates. Ideally, the technology will work for both conventional and organic farming methods.

A positive sign of the University's widespread reputation for research capability, Kinsley's project began with a request from farmers themselves for better wastewater technology. Initially, says Kinsley, the project, "started with a call from a dairy farmer saying, can you help us?"

Since receiving the call, Kinsley and his team have been working hard to develop a treatment system for farm wastewater. As Kinsley notes of farm wastewater, "It's a challenging waste stream because there's a lot of organic matter to deal with along with high concentrations of phosphorus." Taking these challenges into account, the system that Kinsley and his colleagues are working on is both cost effective and low maintenance for farmers.

To date, two full-scale systems have been built, one at Hill Dairy Farm in Manotick and the other at Lawrence-Holmes Dairy Farm in Spencerville. A third full-scale system is currently under construction at the Campus d'Alfred's dairy barn.

"I think we're fairly unique in what we're doing," says Kinsley, "Our goal is to develop a low cost technology which can be easily maintained by the farmer. Not only do we want to effectively treat the wastewater but we are designing the system to be able to recycle the treated effluent back to the barn and hope to capture the phosphorous in a filter media which can ultimately be

reused as a source of fertilizer”. Such a technology will be of significant importance to the creation of a cleaner, greener Ontario.

Food for Health

Today’s consumers are more interested in food and nutrition than ever before. OMAFRA and the University of Guelph’s research into consumer trends, and food production and formulation have the potential to improve the health of Ontarians. It also provides competitive opportunities for producers and agri-food companies. The OMAFRA-UofG Partnership is committed to supporting research to provide consumers with functional foods – foods that have been shown to have health benefits, such as reducing heart disease and the incidence of diabetes. The scope of this research theme is large and complex, but the social and economic benefits can be enormous. Consumers’ purchasing decisions, dietary patterns and increased knowledge about the relationship between food and health will drive this research theme forward.

Highlights from the program this year include:

- Researchers are developing a golden prune that offers distinct advantages over regular prunes on the market today. The new prune, which will be developed from the Yellow European Plums, will still be among the richest sources of antioxidants and fibre, but it will not leave consumers with a bitter aftertaste. Furthermore, it will be both bred and developed in Ontario. A new product developed completely in Ontario will help strengthen the local food industry and make a strong impact in both local and global markets. (Subramanian, #200133)
- A project in the Plant Agriculture department is focused on increasing profitability of asparagus production through the development of improved cultivars and management techniques and the characterization of human health benefits for the crop. Breeding to improve asparagus for Ontario’s harsh weather patterns will improve crop returns that could lead to an improvement in human health. A new hybrid asparagus pioneered by researchers in this project offers double the yield over the standard variety. Additionally, preliminary results from this research suggest that asparagus might reduce colonic inflammation, leading to significant improvements in human health. (Wolyn, #200175)
- It is well known that omega-3 fatty acids are beneficial for maintaining overall health and are useful in the prevention of cardiovascular and other diseases. In order to help Canadians increase their dietary intake of omega-3 fatty acids, it would be helpful to fortify foods that are common in consumers’ daily diet. Researchers in this study are discovering ways to encapsulate omega-3 fatty acids within submicron fibers and/or beads by electrostatic force. This method of omega-3 encapsulation is a novel vehicle for food fortification and enrichment. (Lim, #200193)

Case Study

Peter Purslow, Food Science

#200124: Role of mechanostimulation of gut epithelial cells and gut content viscosity in human health and gastrointestinal responses to functional foods

May 1, 2010 – April 30, 2013

(up to and including 11/12)

OMAFRA / UofG Research Project Operating	\$85,000
Faculty/CARG FTE	\$31,780
Research Station Use	N/A
Tech/Admin Support & Indirect Costs	\$27,522
Total OMAFRA-UofG Project Value (up to and including 9/11)	\$144,302
Partner/In Kind Contributions	\$10,455 cash, \$1,600 in-kind
Collaborators	Cha, M. , Depart. of Food Science Tosh, S. , AAFC Bakovic, M. , Depart. of Human Health and Nutritional Sciences

Many studies show that a high fibre diet can be good for your health. Dietary fibre – found mainly in fruits, vegetables, whole grains and legumes – helps the digestive tract function properly and may lower a person’s risk of contracting diabetes and heart disease.

One type of dietary fibre that proffers specific health benefits is oat β -glucan, a type of dietary fibre found in oats that is known to decrease cholesterol levels and glucose uptake in the bloodstream. Interestingly, the physical properties of the β -glucan molecule have been strongly correlated to its health benefits. A β -glucan molecule with a higher molecular weight – a “longer” molecule – is more effective than a shorter chain, lower weight molecule at lowering cholesterol and glucose in the blood stream.

Prof. Peter Purslow, Department of Food Science, and his research team are looking at how β -glucan might modulate nutrient uptake in both a healthy and stressed digestive tract. Purslow’s team is seeking the basic knowledge that underpins the health benefits of dietary fibre. He hopes this research will gain a better understanding of the mechanism behind observed health benefits for compounds like β -glucan, which would allow for the design of better functional foods.

Unlike other food components such as fats, proteins or simple carbohydrates, fibre passes relatively intact through the stomach, small intestine and colon. Along these lines, Purslow reasoned that β -glucan increases the viscosity of the fluid that the epithelial cells lining the gut are exposed to, and would therefore change cell signaling patterns in the gut so that individual cells would not absorb as much glucose and cholesterol.

In addition to investigating healthy digestive systems, Purslow’s research group has recently turned their attention to the opposite extreme. Instead of investigating why fibre can be good for health in a normal digestion, he is interested in understanding why people with Irritable Bowel Syndrome or Crohn’s disease are advised to eat little- to no-fibre diets. Unlike instances of healthy digestion, in an unhealthy digestive tract, β -glucan can induce an inflammation reaction in gut epithelial cells that can lead, in some instances, to cell death.

In short, Purslow characterizes dietary fibre as part of a, “health food for healthy people,” something that is in fact contra-indicated for people with Irritable Bowel Syndrome or who are susceptible to bowel cancer.

Product Development and Enhancement through the Value Chains

This research theme focuses on strengthening agri-food value chains in Ontario, through research to provide innovation in product development and enhancement. Businesses operating along a value chain can combine their resources and capabilities to achieve commercial success that might not otherwise have been possible. Agri-food value chains are not limited to primary production and processing. The OMAFRA-UofG Partnership supports research into other important components, including market analysis, consumer behaviour, commercialization and quality assurance. By improving any or all aspects of product development, overall productivity, profitability and sustainability can be increased.

Highlights from the program this year include:

- There is a widespread belief that whole grain baked products made with flour from white wheat are more appealing to the senses than products made with flour from red wheat. Researchers in the Department of Food Science have shown the opposite to be true. They have found that whole grain crackers and breads made from commercial red wheat flour show higher consumer acceptability – despite their different sensory properties. This research is important to food processors and millers of wheat as it has shown that they no longer need to avoid red wheat based flours. (Duizer, #200064)
- *Campylobacter jejuni* is a major food-borne pathogen and a common cause of food poisoning in humans. To reduce the risk of infection from this pathogen, it is essential to reduce the *Campylobacter* burden in poultry products. Researchers in the Ontario Veterinary College, Dept. of Pathobiology are developing a vaccine to control this pathogen. Results from this study will help ensure a higher quality and safer food supply. (Sharif, #200118)
- Icewine production is of major importance to Ontario's farm gate value. Researchers in the U of G's Marketing and Consumer Studies Dept. are working to improve Ontario's icewine industry by sharing best practices developed by larger, more established wineries with smaller wineries. By communicating with all groups within the icewine channel, the researchers hope to better meet the needs of all members and increase efficiency within the industry. Ultimately, results from this study will be used to contribute to increases in Ontario's icewine revenue generation both locally and internationally. (Teng, #200261)

Case Study

Dominique P. Bureau, Animal and Poultry Science

#200144: Cost-Effective processing technologies to improve the value of products and by-products from the agricultural and food sectors in Ontario to aquaculture species (Also funded under Bioecomony)

May 1, 2010 – April 30, 2013

(up to and including 11/12)

OMAFRA / UofG Research Project Operating	\$33,600
Faculty/CARG FTE	\$143,012
Research Station Use	None
Tech/Admin Support & Indirect Costs	\$123,846
Total OMAFRA-UofG Project Value (up to and including 11/12)	\$ 300,458
Partner/In Kind Contributions	\$60,000 cash, \$134,000 in-kind
Collaborators	Hua, K. , Depart. of Animal and Poultry Science Castillo, J. , Industry Consultant Rahman, H. , Depart. of Animal and Poultry Science Yan, Y. , North East Agricultural University of China Lopez, L. , Universidad Autonoma de Baja California Mexico Weltzien, E. , Rothsay Nates, S. , Fats and Proteins Research Foundation Lamanna, A. , Amaizeingly Green Products Meeker, D. , Fats and Proteins Research Foundation Cai, C. , Soochow University Wagner, M. , Martin Mills

The Ontario agriculture and food industry is producing numerous products that are used as base ingredients in animal and fish feed. Improving the economic value of many of these products could contribute to improving the competitiveness of the Ontario agri-food industry.

Professor Dominique Bureau, Department of Animal and Poultry Science, and a team of researchers have been working on the characterization and improvement of the nutritive value of different products from the Ontario meat and corn processing industries. Prof. Bureau characterizes his research as having, two objectives – (1) characterize the chemical composition of the products in order to allow the feed industry to know, in great detail, the actual nutritional value of nutrients in Ontario products and – (2) work toward improving the nutritive value and addressing some of shortcomings of some of these co-products in order to improve their feeding value.

Prof. Bureau and his team are mainly looking at co-products from the meat and corn processing industries which are commonly used in the aquaculture industry worldwide. In the past, assessment of the nutritive value of feed ingredients by feed manufacturers has been based solely on imperfect analytical methods. Bureau's team is trying to develop more accurate approaches for determining the chemical composition of ingredients and determine the amount of digestible nutrients in different ingredients.

Working in close cooperation with the rendering industry, Bureau's research team is also trying to improve the digestibility of minerals, like phosphorus, in by-products from the meat and poultry processing industry. "Right now," he says, "we're exploring how to introduce simple steps within the existing manufacturing processes in order to obtain co-products that better fit the needs of the animal feed industry."

Ultimately, Bureau's research will add value to Ontario products. Prof. Bureau sees interesting market opportunities for many Ontario food industry co-products for export to major centres of

aquaculture across Asia and Latin America. “We’re developing something that will hopefully increase the economic value of the products of the Ontario agri-food and capture market opportunities worldwide” says Bureau.

Production Systems

This research theme seeks to enhance the profitability of agricultural production. It encompasses other areas of the OMAFRA-UofG Partnership research program that may play a significant role in productivity or profitability, including environmental sustainability, consumer demand, bioproduct opportunities, and agricultural and rural policy. Government support of Production Systems research is critical for a number of reasons. Animal and plant health and the impact of agriculture on the environment are closely tied to important priorities like safe food and clean water. Legislative requirements, Ontario’s changing demographics and market opportunities, and the enormous significance of agricultural production to the Ontario economy all point to the importance of this research theme.

Highlights from the program this year include:

Livestock:

- Researchers from the Department of Animal and Poultry Science are investigating the effect of early life feeding and management strategies on weaning success and development of feeding behaviour patterns in dairy calves. Results from this study will help identify best management practices for dairy calves that result in improved health, welfare and growth efficiency. This research will allow Ontario dairy farmers to be more profitable, while promoting the health and welfare of dairy calves, further improving efficiency and consumer confidence in this agricultural sector. (Devries, #200406)
- Reproductive disease is a major reason for treating milking cows with antibiotics. Right now, there is a lack of practical methods to support immune function in transition cows and prevent reproductive disease. Researchers from the Department of Population Medicine are interested to find out if reducing social stress improves overall immune function in dairy cows. Their research is the first to examine the link between dairy cows’ access to feed and lying space before calving and its effect on immune function and reproductive health. Results from this study could decrease the need for antibiotic usage in dairy cows. (LeBlanc, #200404)
- The routine use of preventive antibiotics to control necrotic enteritis, a common and widespread infection of broiler chickens, is coming under increasing scrutiny in the world of animal production. Researchers from the Department of Pathobiology are working to create a non-antibiotic means to control this infection in broiler chickens. Currently, they are working to identify the best vaccine vector with which to immunize chickens against this common infection. It is hoped that results from this research will change management practices in the poultry industry and provide poultry, with a smaller antibiotic load, to Ontario consumers. (Prescott, #200069)

Plants:

- When grown concurrently with winter wheat, red clover results in improvements in soil quality and provides nitrogen fertilizer to subsequent crops. Ontario wheat farmers have had difficulty in establishing uniform stands of underseeded red clover because of its

poor drought tolerance. This research aims to enhance the drought tolerance of red clover in order to increase its establishment and persistence when it is underseeded to wheat. Once improved populations of red clover have been developed and tested, they will be made available for use by Ontario's agri-food sector. (Bowley, #200132)

- The bean leaf beetle, an invasive insect, poses a great threat to Ontario's soybean agroecosystems. Researchers from the School of Environmental Sciences are engaged in research that will offer a realistic assessment of the risk posed by the bean leaf beetle under current and future climates, and develop appropriate management recommendations for field crop producers. This research will offer Ontario soybean growers with advanced insight into the potential impacts of these pests on soybean production in both present and future climates. (Hallett, #200076)
- New research from the Department of Plant Agriculture is showing the best way that Ontario farmers can make use of recently-developed environmentally friendly herbicides. This work will improve weed management in perennial grasses that are grown for biomass in Ontario. While weed populations and communities constantly evolve and adapt, this research is providing the industry with efficacious, environmentally sound methods of weed management in both established and novel crops. (Tardif, #200268)

Case Study (Livestock)

Dale Smith, Department of Pathobiology

#200330: Susceptibility of domestic poultry to infection with Avian Bornavirus (Tier II)

June 1, 2010 – June 30, 2012

(up to and including 11/12)

OMAFRA / UofG Research Project Operating	N/A
Faculty/CARG FTE	\$92,164
Research Station Use	OVC Isolation (Poultry) \$9,554
Tech/Admin Support & Indirect Costs	\$79,320
Total OMAFRA-UofG Project Value (up to and including 11/12)	\$ 181,038
Partner/In Kind Contributions	\$48,000 cash, \$11,000 in-kind
Collaborators	Nagy, E. , Depart. of Pathobiology Delay J. , Laboratory Services, UofG Ojkic, D. , Laboratory Services, UofG Brash, M. , Depart. of Laboratory Services Dam, A. , OMAFRA

In 2008, a novel bornavirus (Avian bornavirus - ABV) was discovered by researchers at the University of California, San Francisco. This virus was responsible for a mysterious and generally fatal infectious disease that had been recognized in parrots for over thirty years. Prior to this, the only known bornavirus was a disease of domestic livestock in Europe. ABV was found to be responsible for proventricular dilation disease (PDD) of parrots, a disease that affects the autonomic and central nervous systems, causing gastrointestinal malfunction and

wasting as well as nervous signs. Because PDD is both fatal and transmissible, many researchers were concerned with ABV's potential to spread within and across species. In 2009, Professor Dale Smith, Department of Pathobiology, and her colleagues identified ABV in tissues from free-ranging Canada geese and trumpeter swans. Because these birds are wild and migratory, Smith was necessarily concerned for the possibility of transmission of ABV between wild Canada geese and trumpeter swans and domestic poultry housed outdoors. With Ontario's domestic poultry industry valued in 2011 at just under \$900 million, the risk of infection and transmission of a fatal wasting disease could have devastating economic ramifications for Ontario's poultry industry.

In her current research, Smith is directly addressing the question of whether or not domestic poultry – specifically domestic chicken, geese and ducks – are susceptible to infection with ABV.

Smith concludes that, "We have no idea about the prevalence of the ABV or of ABV-related disease in poultry," mostly because, "nobody knew the virus was around until recently and our group is just starting [to work on it]." As she says, "This is tip-of-the-iceberg research."

Case Study (Plants)

Cynthia Scott-Dupree, School of Environmental Sciences

#200246: Optimizing biological control strategies in greenhouse floriculture: interaction, integration and implementation

June 1, 2010- May 31, 2013
(up to and including 11/12)

OMAFRA-U of G Research Project Operating	\$79,000
Faculty/ CARG FTE	\$31,780
Research Station Use	None
Tech/ Admin Support and Indirect Costs	\$27,522
Total OMAFRA- U of G Project Value (up to and including 11/12)	\$109,702
Partner/ In Kind Contributions	\$66,000 cash, \$26,000 in-kind
Collaborators	Brownbridge, M. , VRIC Buitenhuis, R. , VRIC Perez-Valdes, I. , VRIC Murphy, G. , OMAFRA Short, M. , Eco Habitat Agri Services McFarlane, A. , School of Environmental Sciences Schenk, P. , McMaster University

Canadian floriculture is one of the largest sectors of the horticulture industry, generating over \$1.4 billion in revenue per year. The industry continues to invest in technology, product quality,

diversity, specialization and volume to ensure continued success. Plants must be blemish-free and export markets demand that shipments are pest-free.

Despite industry advancements, Western flower thrips (WFT) pose a major threat. WFT are a significant pest in the floriculture industry and are very difficult to control. The pest is resistant to many classes of insecticide and there are few effective products registered in Canada for its control. Commercial and export standards make it very important to improve management of WFT in order to meet industry standards.

In order to do so, Prof. Scott-Dupree and her research team aim to develop reliable and cost-effective integrated pest management (IPM) strategies. The results will allow growers to use different natural enemies together in a defined, integrated control strategy.

New strategies and technologies were examined to enable the biological control agent - *Orius insidiosus*, the insidious flower bug, to be used as a reliable and efficient pest management tool. Banker plants and pollen supplements were identified that enhance *Orius* longevity, reproduction and persistence in an effort to improve their predation of WFT.

The compatibility and beneficial interactions from using one or more natural enemies were also assessed. Opportunities were identified that will enhance the reliability and cost-effectiveness of a WFT biocontrol program.

The use of superior banker plants for *Orius*, and integrated use of biocontrol agents can enhance IPM programs that will help to mitigate the risk WFT pose to the Canadian floricultural greenhouse industry.

Catalyst Centre (formerly the Business Development Office)

University of Guelph research is recognized as producing solutions to regional, national and global challenges, and a source of training and developing highly qualified personnel. This activity leads to new technological developments, commercial activity and societal advances based on the spectrum of U of G traditional and emerging research strengths. The Catalyst Centre (CC) oversees all aspects of the University's intellectual property (IP) management and technology commercialization activities. Through the OMAFRA-U of G Partnership, the CC is responsible for managing IP and commercialization activities related to OMAFRA funded research projects.

The CC is a service-oriented, revenue-focused center organized for the purpose of helping U of G faculty, staff, and students identify, manage, protect, and commercialize the University's intellectual property assets to maximize the benefit to society and the environment, and spur economic growth. In addition, the CC is committed to developing and fostering long-term university-industry relationships. Through the Industrial Liaison Program (ILP), the CC helps businesses access the University's intellectual capital, and state-of-the-art labs and research facilities to create strategic partnerships that drive innovation.

The five primary objectives of the Catalyst Centre are:

1. To effectively exploit University-owned intellectual properties (IP) in response to the needs of industry, the University, its faculty, Ontario, and Canada. This includes

managing all OMAFRA-funded technology disclosures and IP as per Schedule N of the OMAFRA-UofG Partnership.

2. To foster relationships with industrial partners that broaden the opportunities for faculty to engage in collaborative or sponsored research with the goal of increasing the competitiveness of Ontario and Canada's industry sector;
3. To encourage and support increased entrepreneurialism by UofG faculty, staff and students;
4. To support the dissemination of new knowledge and ideas from the University of Guelph for societal use through Knowledge Translation and Transfer;
5. To provide the University with thoughtful and up-to-date counsel concerning its intellectual property policies and their effectiveness in stimulating faculty participation in the technology transfer process.

The Catalyst Centre markets and licenses technologies developed at the University of Guelph, encourages broad utilization of the results of University research, and supports the transfer of new technology and ideas from the University to the community-at-large. In addition to patentable inventions, the CC also handles copyright, trademark licensing, Plant Breeders Rights (PBR), Confidentiality Agreements (CA, NDA and CDA), and inbound and outbound Material Transfer Agreements (MTA).

The CC's activities contribute to the financial vitality, and the economic, environmental and social impact of the OMAFRA - UofG Partnership.

- The Agreement's Joint IP Management Committee is responsible for coordination between OMAFRA and U of G. Regular, increased communication by the CC with OMAFRA has kept OMAFRA apprised of new disclosures regarding Agreement-funded research, and progress with existing files.
- A process to simplify royalty splits between OMAFRA and UofG is under development by the Joint IP Committee to achieve simplicity, efficiency and overall fairness. The new process will be based on standard splits between the parties (consistent with a review of the past 5 years). It is intended to be more efficient for both teams, maintains fair recognition of the inventor and funder contributions, and encourages use of the disclosure process.
- The position of Industry Liaison Officer (ILO) is currently funded through the OMAFRA KTT program. Its primary role is to seek industry sponsored research partners for food, agriculture, and human and animal health scientists at UofG. Industry funds will often be leveraged with OMAFRA funding, helping to create a strong pipeline of future commercializable technologies from the OMAFRA-UofG Partnership. In addition, the OMAFRA portfolio filled by Dr. Tyler Whale will be supported by Dr. Haridoss Sarma and Richard Puntis, the CC's two other ILOs.
- The Catalyst Centre has received funding for several KTT programs, including the initiation of the 'Guelph IP Academy', a series of 12 workshops designed to enhance the knowledge and understanding of issues related to commercializing university-created IP and technologies.
- The Technology Transfer team is currently managing over 235 active technology licenses, 76% of which are associated with OMAFRA-funded technologies. Of the 103 disclosures received in 2011/12, 78 were partly funded by OMAFRA. Royalty revenues from OMAFRA

funded technologies topped \$1.46M with over \$850K returned to OMAFRA. Note that there was an exceptional one-time interest payment from Pfizer to settle matters with the Shipping Fever Vaccine totaling over \$270K. This will not be repeated in future years and should be taken into account when considering the increase in royalty revenues in 2011/12.

A significant milestone in the OMAFRA-UofG Partnership was reached in 2011/12 with the germplasm portfolio reaching **over \$10M** in royalties returned to the program since its inception in 1977. This royalty return extrapolates to over \$170M in seed sales, and more than \$2B in on-farm crop sales in this period resulting from plant varieties developed through the OMAFRA-UofG Partnership. The substantial impact to agricultural, environment and economy in Canada resulting from these technologies highlights the importance of the role of technology transfer in ensuring maximum value is netted from research developments funded through the OMAFRA-UofG Partnership

- The Catalyst Centre has supported the Partnership's 'Highly Qualified Personnel' (HQP) program by delivering lectures to the class about IP, technology transfer, licensing technology and commercialization. Two HQP interns have also worked with the Catalyst Centre during the Winter & Summer semesters.
- Representatives from U of G's Catalyst Centre attended both the BIO International Convention for Biotechnology and the Institute of Food Technologists (IFT) conference to promote University of Guelph & OMAFRA innovations and research collaboration opportunities. The conferences brought together leading innovators and companies in bio- and food technology and were an excellent venue to market U of G- OMAFRA inventions and research innovations. Notable connections were made with leaders from [Monsanto](#), [Mendel Biotechnology](#), [Boehringer Ingelheim](#), [Novartis](#), [Merck](#), [Baxter](#) and [GlaxoSmithKline](#) (at BIO) and Bunge, [Tate & Lyle](#), Thomas, [DSM](#) and [Richardson Oilseed Ltd](#) (at IFT). Interest was high regarding the work that is being done at the University of Guelph and the Technology Transfer and Industry Liaison teams at the Catalyst Centre are working hard to foster partnerships and initiate collaborative research to benefit society.
- Dr. David Hobson, Technology Transfer Manager for the Ontario Veterinary College at the Catalyst Centre, was invited to participate in a panel discussion while at BIO focused on industry-academic collaborations and lessons learned with the U of G's Enviropig technology.

The Catalyst Centre staff continues to manage the Proof of Principle (POP) Fund. Details of POP technologies are found on page 166.

Case Study #1

Technology: Laima Kott, project #20060221

Title: *Mentha spicata* (spearmint) clones with ultra-high levels of rosmarinic acid (a powerful plant antioxidant) useful for reducing effects of various human inflammatory ailments including asthma

Disclosure Date: February 21, 2006

OMAFRA split: 25.43%

Theme: Food for Health

Technology Summary: Dr. Laima Kott has developed a variety of mint that contains high levels of rosmarinic acid, and compound that is described in the literature has having strong anti-oxidant and anti-inflammatory properties.

Intellectual Property: Patent applications have been abandoned, as it was determined that the likelihood of patentable success was low and that the mint variety itself contained more value.

OMAFRA Support: This project has been heavily supported by OMAFRA programs designed to improve the commercial potential of new inventions. This has included an LAIF grant to explore efficacy of mint tea for patients suffering from nasal polyps and a Proof-of-Principle award to examine anti-inflammatory properties in horses. Further studies on campus include an ongoing study on the efficacy of mint tea in treating inflammation. This is expected to be completed in October 2012.

License: The Catalyst Centre completed an exclusive license for all commercial uses of the mint with the company Ceapro, which is a specialty ingredient company located in Alberta with research operations across the country. Ceapro is currently experimenting with fields of mint in Thunder Bay and in Prince Edward Island in order to optimize both growing conditions and drying conditions. 2012 has been a very difficult growing year, with crop destruction in Thunder Bay and drought in Prince Edward Island. The company expects to receive delivery of a commercial dryer in August 2012 in order to advance their development work. The CBC had a story on the mint crop in September 2011: <http://www.cbc.ca/news/canada/prince-edward-island/story/2011/09/20/pei-mint-ceapro-584.html>

Expectations: While poor growing conditions have hampered efforts in 2012, it is expected that the first sale of mint extracts by Ceapro will occur in late 2012 or 2013, with long term sales in the millions of dollars.

Case Study #2

Technology: Michael Emes, project #200395

Title: The impact of resistant starches in healthy baked products on mitigation of risk for type-2 diabetes and colorectal cancer

Project Start Date: 2011-09-01

Project End Date: 2014-08-31

OMAFRA split: 33.3%

Theme: Food for Health

Technology Summary: A team of researchers at the U of G is taking an earlier OMAFRA funded project aimed at breeding Ontario corn varieties with elevated levels of Resistant Starch (RS) in the direction of commercial application. Researchers Michael Emes, Terry Graham, Emma Allen-Vercoe, Ian Tetlow and Elizabeth Lee are collaborating to better understand RS functionality, to create a platform from which its beneficial properties can be incorporated into other processed foods including wheat-based products. By determining the mechanisms by which RS enhances baked products to offer health benefits to the consumer, it's possible use

other common foods may be determined. Identifying the metabolic responses to consumption of these products by people at risk for type 2 diabetes is also an important part of the project.

OMAFRA Support:

As highlighted above, this project is the continuation of a previously successful OMAFRA supported plant breeding project. The lines of corn that were developed in the earlier project, which are ideal for growing in Ontario's climate, will have much more commercial potential at the conclusion of the project. In order to create the commercial interest however, the current project aims to do the research that was needed to demonstrate the benefits RS, mechanisms of benefit as well as the actual creation of saleable consumer products containing RS. For the current project, OMAFRA has leveraged a small amount of industry cash and industry in-kind contribution.

License:

While no license is in place at present, Canada Bread has secured the first option to negotiate a license to any IP that may arise from this research project.

Expectations:

There is a firm expectation from all parties that Canada Bread will be able to use this IP to expand and enhance its product lines and include healthier options for Canadian consumers, and potentially open new international markets

Case Study #3:

Technology: Improved plant germplasm

Title: Return on investment: University of Guelph germplasm portfolio – 1977-2012

Theme: Production, Plant Systems

Summary:

The University of Guelph was recognized in the fall of 2012 as Canada's most inventive academic institution in a new Impact Group study (to be reported in more detail in the 2012/13 annual report). Central to this acclaim is Guelph's high number of disclosures per faculty and the lower-than-average cost per disclosure. Much of this success is attributed to Guelph's - supported germplasm research portfolio.

The expertise of Guelph researchers and long-term investment from OMAFRA has enabled the University to create an industry-leading plant breeding program and germplasm bank that is enhancing farming productivity and efficiency in Canada, and created multi-billion dollar markets.

OMAFRA Support:

OMAFRA funding supports 100 per cent of the germplasm portfolio that is disclosed through the university. According to Plant Agriculture department faculty and field crop breeder Prof. Steve Bowley, the close linkages and partnerships between the University and OMAFRA have "allowed [the University] to have a strategic long-term vision and grow research into something that creates new opportunities and addresses industry demands."

Licence:

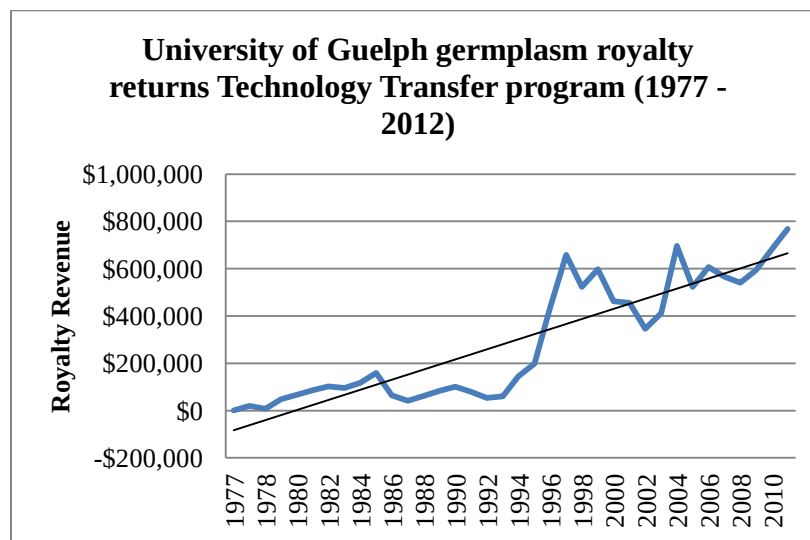
The Catalyst Centre has established strong working relationships through active marketing and licensing activity with many large seed and crop companies, marketing boards, Vineland Research and Innovation Centre, and smaller producer groups. In many cases the breeding programs at the University work directly with these commercial entities to develop new varieties to meet market demand. In such cases new varieties are readily adopted by industry for further development and testing, and introduced to the market efficiently.

Results:

This is a hallmark year for the OMAFRA – UofG Partnership. Since the germplasm portfolio's inception in 1977 to 2012, there has been **\$10 million in royalty revenues** returned. In terms of the wider world markets, this \$10 million in returned royalty revenues translates to an estimated \$170 to 200 million in seed sales and over \$2 billion in crop sales.

OMAFRA's share of returns on its investments into the germplasm breeding program has been sustainably reinvested in University of Guelph research each year, creating further opportunities for development of new varieties and technologies.

Over the last five years, from 2007 to 2012, there has been an average 13 per cent increase in royalty revenues in the germplasm portfolio year over year. During that same period, there has been an average of just over 200 seed disclosures per year. Such a healthy volume of disclosures enables strong license agreements to be created for future revenues and market impact.



Expectations:

As a result of Guelph's consistent returns on research investment, Department of Plant Agriculture Chair Prof. Peter Pauls says "industry has confidence that [the University] can produce new varieties that make a difference and they're willing to invest long term in new research to keep the innovation pipeline flowing."

This long term support is crucial, as the germplasm portfolio is based on incremental improvements. Today's germplasm material will form the base for higher yielding, more efficient and disease resistant plant varieties produced in five to ten years.

"Every year, we put the bar up one notch," Pauls says. "We are always working to find material and breed traits that are even better than the year before."

Veterinary Clinical Education Program

Vision

A veterinary clinical educational program that is fundamental to supporting the health and well-being of the province and its citizens.

Mission

To support the economy of Ontario by training professionals skilled in maintaining the health and welfare of animals and their interrelationships with people and the environment.

Capacity and Outreach

The Ontario Veterinary College (OVC) and its VCEP program aim to be internationally renowned, accredited and respected as a leader in training veterinarians who are skilled in maintaining the health and welfare of animals and knowledgeable about their interrelationship with people and the environment.

Over the past year, OVC has been celebrating its 150th anniversary as the oldest continuously operated veterinary school in Canada and the United States. OVC continues to advance towards the goal of being a defining voice that integrates animal, human and environmental health.

Although OVC was granted renewal of full accreditation in March 2009, based on a formal site visit, an annual update report is required to the AVMA/CVMA Council on Education (COE). On March 12, 2012 a letter was received from the COE indicating continued full accreditation. These two organizations represent the highest standard of achievement for veterinary medical education in the world. In the accreditation process, a veterinary college is reviewed to determine whether it meets 11 accepted standards of quality. The accreditation process focuses on the Doctor of Veterinary Medicine program and the institutional resources, infrastructure and personnel that support it. Graduation from a fully accredited institution permits graduates to take the national licensure examination for professional practice in Canada and the USA.

Clinical Training Programs

- Graduate competent veterinary professionals with skills in maintaining the health and welfare of animals who will meet the needs of Ontario's animal populations at the people-animal-environmental interface.

OVC's veterinary students continued the long-standing tradition of achieving a very high success rate on the licensing exam resulting in a high rate of post-graduate employment and very high employer satisfaction with our new graduates. The North American Veterinary Licensing Exam (NAVLE) is a requirement for obtaining licensure in order to practice veterinary medicine. Successful completion ensures portability of licensure to essentially anywhere in the world. Graduates are highly sought after by employers and virtually all of those seeking positions found jobs within a few months of graduation. Annual employer surveys of new graduates showed a continued trend of high satisfaction with these new veterinarians. This is due in part to the externship program that OVC students complete, which is funded by VCEP.

The Bovine Education Trust, a charitable endowment fund established by the Ontario Association of Bovine Practitioners (OABP) and the Ontario Veterinary College (OVC), provided funding to several final year DVM students. The objective is to provide financial support for veterinary students to obtain more real-life learning opportunities and on-the-job experiences that they need to develop successful careers serving the dairy and beef industries. Support funds are being provided by the Ontario Ministry of Agriculture, Food and Rural Affairs through the Veterinary Clinical Education Program.

Post-Graduate Training Programs

- Highly respected post-graduate training and continuing education programs raising the standard of veterinary health care and related public health in Ontario.

VCEP funds interns in the Veterinary Teaching Hospital, and approximately 12 DVSc students annually. In addition, VCEP supports: The Master of Public Health (MPH) program is a 5-semester professional degree with concentration in epidemiology, environmental public health, infectious diseases, and zoonotic, foodborne and waterborne diseases. The MPH program prepares public health students and professionals for careers in which they will address the present and future needs of public health in Ontario, Canada, and internationally. Graduates will emerge as influential local, national, and international leaders committed to improving quality of life by protecting and promoting the health of their communities and by anticipating and preventing disease from both a policy and a science perspective.

This graduate program has been developed to expand the pool of highly-educated personnel in this field - the first class started in September 2008. The fall 2010 cohort was comprised of 19 full-time and 1 part-time students of which 2 were veterinarians. The fall 2011 cohort was comprised of 20 full-time and 1 part-time students, of which 3 were veterinarians. To date, the program has graduated 46 students.

The Centre for Public Health and Zoonoses, supported by VCEP, celebrated the official opening of their new research laboratories in December 2011. This facility is the product of a one million dollar grant from Canada Foundation for Innovation, with matching funds from the Ontario Research Fund under the Ministry of Economic Development and Innovation. The CPHAZ Research Laboratories work towards creating a community of practice, where zoonotic disease researchers with diverse disciplinary backgrounds can work together.

THE OMAFRA - U OF G PARTNERSHIP FINANCIAL REPORT

The financial reporting included in this Annual Report 2011/12 for the OMAFRA / U of G Partnership consists of two sections, as follows:

1. The “Audited Statement of Revenues and Expenses for the fiscal year May 1, 2011 to April 30, 2012”, as submitted to OMAFRA on September 28, 2012 and included here in its entirety. (Appendix C)
2. Summary of Revenues and Expenses (Fully Allocated)

This summary shows the **actual revenues and expenses (fully allocated) for fiscal 2011/12 (May 1, 2011 to April 30, 2012) for each of the four programs** (Research, VCEP, AFL and AHL) as well as for the Agriculture Research Institute of Ontario (ARIO) Minor Capital Fund (see note *) funded, as applicable, through:

- the renewed Agreement,
- the New Initiatives fund (the special one-time funding of \$56 million received in March 2008, which the University will spend over five years in support of specific new initiatives in the overall partnership), and
- the Total Partnership (Agreement + New Initiatives).

“Fully allocated” refers to the fact that ‘**indirect costs**’ (such as providing program support services, administrative services such as budget management and human resources functions, and physical plant infrastructure) have been allocated to each individual program using a consistent methodology. This ‘fully allocated’ presentation of costs has been utilized beginning in the 2004/05 Annual Report, at the request of OMAFRA. This format provides a much more informative arrangement of the financial data, and is not subject to the same problems in interpretation of program costs as presented in the years previous to 2004/05. Nevertheless, it is not advisable to use these data for making decisions about incremental allocations/reductions in budget, since such decisions may have variable impact on the direct versus indirect cost bases. For example, reducing ‘Production Systems (PS) Research Theme’ expenditures may have less impact than intended, unless the continuing cost of operating the research stations on which the PS program is built is also part of the decision process.

The second page of this summary shows the **revenues and expenses for the Research Program** itemized for each of seven Themes, as well as for the Research Stations (broken down by “Operations” and “Utilities, Repairs and Maintenance” see note *) and the HQP (Highly Qualified Personnel) and KTT (Knowledge Translation and Transfer) programs. This summary also shows the Research Stations costs allocated across the seven Research Themes, thus providing fully allocated totals for expenses by theme.

Note *: Financial support for upkeep and maintenance of the ARIO-owned lands and facilities (referred to in the Agreement as ARIO-Locations, and consisting of the three regional campuses and 14 other research stations, all 17 of which are managed and operated by the University) is provided for the “Utilities, Repairs and Maintenance” program (generally referred to as O&M, funded within the Agreement) and the “ARIO Capital Fund” (funded outside of the Agreement). This O&M and Capital funding is in addition to the normal day-to-day operation of the livestock and crops

research stations (station staffing, inputs such as feed, bedding, fertilizer, seed, etc.) at these 17 locations, which is termed Research Station “Operations” (funded within the Agreement, as shown in the broken out costs within the Research Program summary).

The OMAFRA - U of G Partnership Financial Report - Row Definitions	
Revenue	
OMAFRA Agreement	That portion of the total Agreement funding recognized for eligible expenses in the reported fiscal year (May 1, 2011 - April 30, 2012).
OMAFRA – Other	Theses revenues include OMAFRA funding designated for specific activities as well as the “ARIO Minor Capital” funds received.
Sales of Goods and Services	Sales of services or goods from the Agreement operations and provided to external organizations and clients. This category records revenues for testing services provided to external clients by the two Lab Services divisions, as well as sales of milk, eggs, crops and other farm products from the research stations.
Other Revenue and Interest	Includes interest earned on the net cash flow in accordance with section 14.6 of the Agreement as well as miscellaneous revenues generated within the Agreement operations. The major component of this category is facility rental income for space managed within the O and M budget. Other Revenue may also include sponsorship revenues, recoveries from the disposal of surplus equipment or other miscellaneous program revenues.
Expenses	
Personnel	All salary and employee benefit costs excluding transfers for Research and VCEP faculty costs. (refer to Faculty Pool Costs definition)
Faculty Pool Costs	Agreement funds transferred to the University in support of the salary and benefits costs of University faculty effort toward Agreement priorities. Two “pools” have been established for the Research and VCEP Programs.
Operating	Expenses for all costs other than salary and benefit costs.
Internal Sales & Recoveries	Sales of goods and services or recovery of costs between units <u>within the University</u> , such as Lab Testing performed by Lab Services or research station recoveries for researchers or departments. In addition, the agreement recovers costs where OMAFRA funded operations provide shared support for other activities such as MTCU-funded Diploma Teaching. The charges for these recoveries are normally approved as ‘invoices’ for services between the specific unit requisitioners and providers within the University. Internal Charges are recorded under “Operating”.
Indirect Costs	Includes costs of program support services, administrative services such as budget management and human resources functions, and physical plant infrastructure, which support the overall Agreement or New Initiatives programs, but cannot be attributed as direct costs to specific programs.

Summary 11/12 Actuals - Revenue & Expenses of Entire Agreement by Program (in thousands of dollars)

Renewed Agreement: All Programs							
	Object Category	Research	Vet Clinical Education	Agri-Food Lab	Animal Health Lab	ARIO Minor Capital	Total Agreement
Revenue	OMAFRA Agreement	(39,807)	(5,254)	(5,297)	(5,923)	-	(56,281)
	OMAFRA Other	(11)	-	(500)	(500)	(5,596)	(6,607)
	Sales Goods & Services	(4,950)	-	(7,394)	(4,492)	-	(16,836)
	Other Revenue & Interest	(1,809)	-	(10)	(2)	(5)	(1,826)
Total Revenue		(46,577)	(5,254)	(13,201)	(10,917)	(5,601)	(81,550)
Expenses	Personnel	18,161	195	9,100	7,732	22	35,210
	Faculty Pool Costs	9,915	1,900	-	-	-	11,815
	Operating	12,588	3,054	4,421	4,797	5,579	30,439
	Internal Sales & Recoveries	(3,496)	-	(607)	(1,811)	-	(5,914)
	Indirect Costs	9,409	105	287	199	-	10,000
	Total Expense	46,577	5,254	13,201	10,917	5,601	81,550
Net Expense (Revenue)		-	-	-	-	-	-

New Initiatives: All Programs							
	Object Category	Total Research	Vet Clinical Education	Agri-Food Lab	Animal Health Lab	ARIO Minor Capital	Total New Initiatives
Revenue	OMAFRA Agreement	(10,334)	(665)	-	(1,618)	-	(12,617)
	OMAFRA Other	(5)	-	-	-	-	(5)
	Sales Goods & Services	-	-	-	-	-	-
	Other Revenue & Interest	(42)	-	-	-	-	(42)
Total Revenue		(10,381)	(665)	-	(1,618)	-	(12,664)
Expenses	Personnel	5,515	464	-	769	-	6,748
	Faculty Pool Costs	-	-	-	-	-	-
	Operating	4,006	374	-	793	-	5,173
	Internal Sales & Recoveries	(61)	(188)	-	(8)	-	(257)
	Indirect Costs	921	15	-	64	-	1,000
	Total Expense	10,381	665	-	1,618	-	12,664
Net Expense (Revenue)		-	-	-	-	-	-

Con't-SUMMARY 11/12 Actuals-Revenue and Expenses of Entire Agreement by Program*(in thousands of dollars)*

Total Partnership (Renewed Agreement & New Initiatives): All Programs							
	Object Category	Total Research ¹	Vet Clinical Education	Agri-Food Lab	Animal Health Lab	ARIO Minor Capital	Total Partnership
Revenue	OMAFRA Agreement	(50,141)	(5,919)	(5,297)	(7,541)	-	(68,898)
	OMAFRA Other	(16)	-	(500)	(500)	(5,596)	(6,612)
	Sales Goods & Services	(4,950)	-	(7,394)	(4,492)	-	(16,836)
	Other Revenue & Interest	(1,851)	-	(10)	(2)	(5)	(1,868)
Total Revenue		(56,958)	(5,919)	(13,201)	(12,535)	(5,601)	(94,214)
Expenses	Personnel	23,676	659	9,100	8,501	22	41,958
	Faculty Pool Costs	9,915	1,900	-	-	-	11,815
	Operating	16,594	3,428	4,421	5,590	5,579	35,612
	Internal Sales & Recoveries	(3,557)	(188)	(607)	(1,819)	-	(6,171)
	Indirect Costs	10,330	120	287	263	-	11,000
	Total Expense	56,958	5,919	13,201	12,535	5,601	94,214
Net Expense (Revenue)		-	-	-	-	-	-

1. See the following pages; 43 and 44, for the breakout of Research Program by Theme / Sub-program.

Summary 11/12 Actuals – Revenue and Expenses by Research Sub- Program (in thousands of dollars)													
Renewed Agreement: Research													
		Research							ARIO Research Stations		Research		Total
	Object Category	Prod Sys	Prod Dev	Food for Health	Env Sust	Bio-economy	Ag Rural Policy	Emg Mgmt	Operations	Utilities / R&M	HQP	KTT	Research
Revenue	OMAFRA Agreement	(17,524)	(601)	(2,052)	(2,334)	(1,602)	(1,352)	(497)	(6,876)	(6,969)	-	-	(39,807)
	OMAFRA Other	(4)	-	-	-	-	-	-	(5)	(2)	-	-	(11)
	Sales Goods & Services	(257)	-	-	-	-	-	-	(4,570)	(123)	-	-	(4,950)
	Other Revenue & Interest	(242)	(3)	(18)	(19)	(12)	(9)	-	(581)	(925)	-	-	(1,809)
Total Revenue		(18,027)	(604)	(2,070)	(2,353)	(1,614)	(1,361)	(497)	(12,032)	(8,019)	-	-	(46,577)
Expense	Personnel	6,569	26	189	303	39	173	7	8,158	2,697	-	-	18,161
	Faculty Pool Costs	4,846	438	,059	1,304	946	866	456	-	-	-	-	9,915
	Operating	658	32	187	85	208	5	2	5,021	6,390	-	-	12,588
	Internal Sales & Recoveries	(611)	(1)	(5)	(7)	(3)	(2)	-	(1,633)	(1,234)	-	-	(3,496)
	Indirect Costs	6,565	109	640	668	424	319	32	486	166	-	-	9,409
	Total Expense	18,027	604	2,070	2,353	1,614	1,361	497	12,032	8,019	-	-	46,577
Net Expense (Revenue)		-	-	-	-	-	-	-	-	-	-	-	-

New Initiatives: Research													
		Research							ARIO Research Stations		Research		Total
	Object Category	Prod Sys	Prod Dev	Food for Health	Env Sust	Bio-economy	Ag Rural Policy	Emg Mgmt	Operations	Utilities / R&M	HQP	KTT	Research
Revenue	OMAFRA Agreement	(2,013)	(860)	(1,321)	(1,036)	(916)	(609)	(612)	-	-	(1,164)	(1,803)	(10,334)
	OMAFRA Other	-	-	-	-	(2)	-	(3)	-	-	-	-	(5)
	Sales Goods & Services	-	-	-	-	-	-	-	-	-	-	-	-
	Other Revenue & Interest	-	-	-	-	(1)	-	(1)	-	-	-	(40)	(42)
Total Revenue		(2,013)	(860)	(1,321)	(1,036)	(919)	(609)	(616)	-	-	(1,164)	(1,843)	(10,381)
Expense	Personnel	1,191	523	748	648	645	452	395	-	-	21	892	5,515
	Faculty Pool Costs	-	-	-	-	-	-	-	-	-	-	-	-
	Operating	678	261	458	322	191	103	165	-	-	1,035	793	4,006
	Internal Sales & Recoveries	(16)	(4)	(7)	(24)	-	-	-	-	-	-	(10)	(61)
	Indirect Costs	160	80	122	90	83	54	56	-	-	108	168	921
	Total Expense	2,013	860	1,321	1,036	919	609	616	-	-	1,164	1,843	10,381
Net Expense (Revenue)		-	-	-	-	-	-	-	-	-	-	-	-

Continued: Summary 11/12 Actuals Revenue and Expenses by Research Sub (in thousands of dollars)

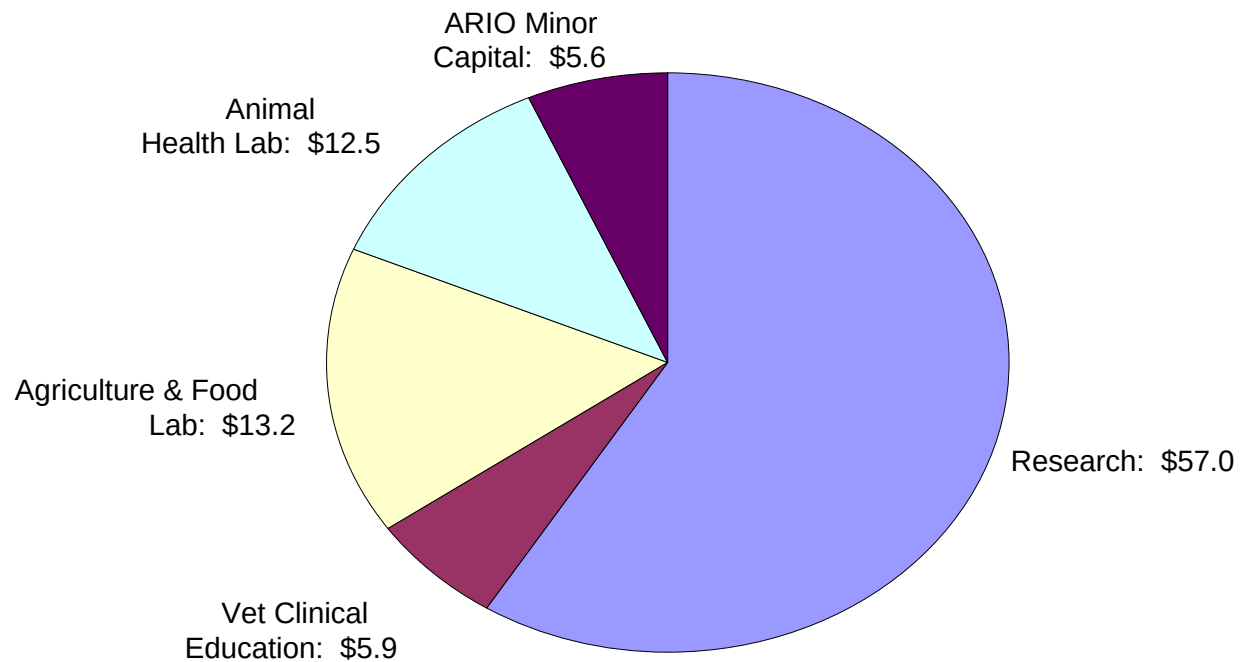
Total Partnership (Renewed Agreement & New Initiatives): Research

		Research							ARIO Research Stations		Research		Total
	Object Category	Prod Sys	Prod Dev	Food for Health	Env Sust	Bio-economy	Ag Rural Policy	Emg Mgmt	Operations	Utilities / R&M	HQP	KTT	Research
Revenue	OMAFRA Agreement	(19,537)	(1,461)	(3,373)	(3,370)	(2,518)	(1,961)	(1,109)	6,876	(6,969)	1,164	(1,803)	(50,141)
	OMAFRA Other	(4)	-	-	-	(2)	-	(3)	(5)	(2)	-	-	(16)
	Sales Goods & Services	(257)	-	-	-	-	-	-	(4,570)	(123)	-	-	(4,950)
	Other Revenue & Interest	(242)	(3)	(18)	(19)	(13)	(9)	(1)	(581)	(925)	-	(40)	(1,851)
Total Revenue		(20,040)	(1,464)	3,391	(3,389)	(2,533)	(1,970)	(1,113)	(12,032)	(8,019)	(1,164)	(1,843)	(56,958)
Expenses	Personnel	7,760	549	937	951	684	625	402	8,158	2,697	21	892	23,676
	Faculty Pool Costs	4,846	438	1,059	1,304	946	866	456	-	-	-	-	9,915
	Operating	1,336	293	645	407	399	108	167	5,021	6,390	1,035	793	16,594
	Internal Sales & Recoveries	(627)	(5)	(12)	(31)	(3)	(2)	-	(1,633)	(1,234)	-	(10)	(3,557)
	Indirect Costs	6,725	189	762	758	507	373	88	486	166	108	168	10,330
	Total Expense	20,040	1,464	3,391	3,389	2,533	1,970	1,113	12,032	8,019	1,164	1,843	56,958
Net Expense (Revenue)		-	-	-	-	-	-	-	-	-	-	-	-

Summary 11/12 Actuals - Fully Allocated Research Program Expenses by Research Sub- Program (in thousands of dollars)

	Research							ARIO Research Stations		Research		Total
	Prod Sys	Prod Dev	Food for Health	Env Sust	Bio-economy	Ag Rural Policy	Emg Mgmt	Operations	Utilities/R&M	HQP	KTT	Research
Total Theme Expenses as above:	20,040	1,464	3,391	3,389	2,533	1,970	1,113	12,032	8,019	1,164	1,843	56,958
Allocation of ARIO Research Station Costs	18,395	-	-	1,587	35	-	35	(12,032)	(8,019)	-	-	0
Fully Allocated Theme Expenses	38,435	1,465	3,391	4,976	2,568	1,970	1,148	-	-	1,164	1,843	56,958

Summary 11/12 Actuals – Revenue and Expenses of Entire Agreement by Program (\$millions)



PERFORMANCE REPORTS

Performance Indicators for the OMAFRA – U of G Agreement (2011/12)

Thirty nine performance indicators (PIs) were jointly developed by OMAFRA and the U of G at the outset of the current Agreement, to provide better accountability and transparency of funding under the new Agreement. The over arching objective of the PIs was to help ensure maximum return on provincial investment according to OMAFRA core business priorities.

PIs were assigned to the overall agreement and to each of the four program areas: agriculture and food laboratory, animal health laboratory, research and veterinary clinical education and two PIs were also later developed for joint management of intellectual properties.

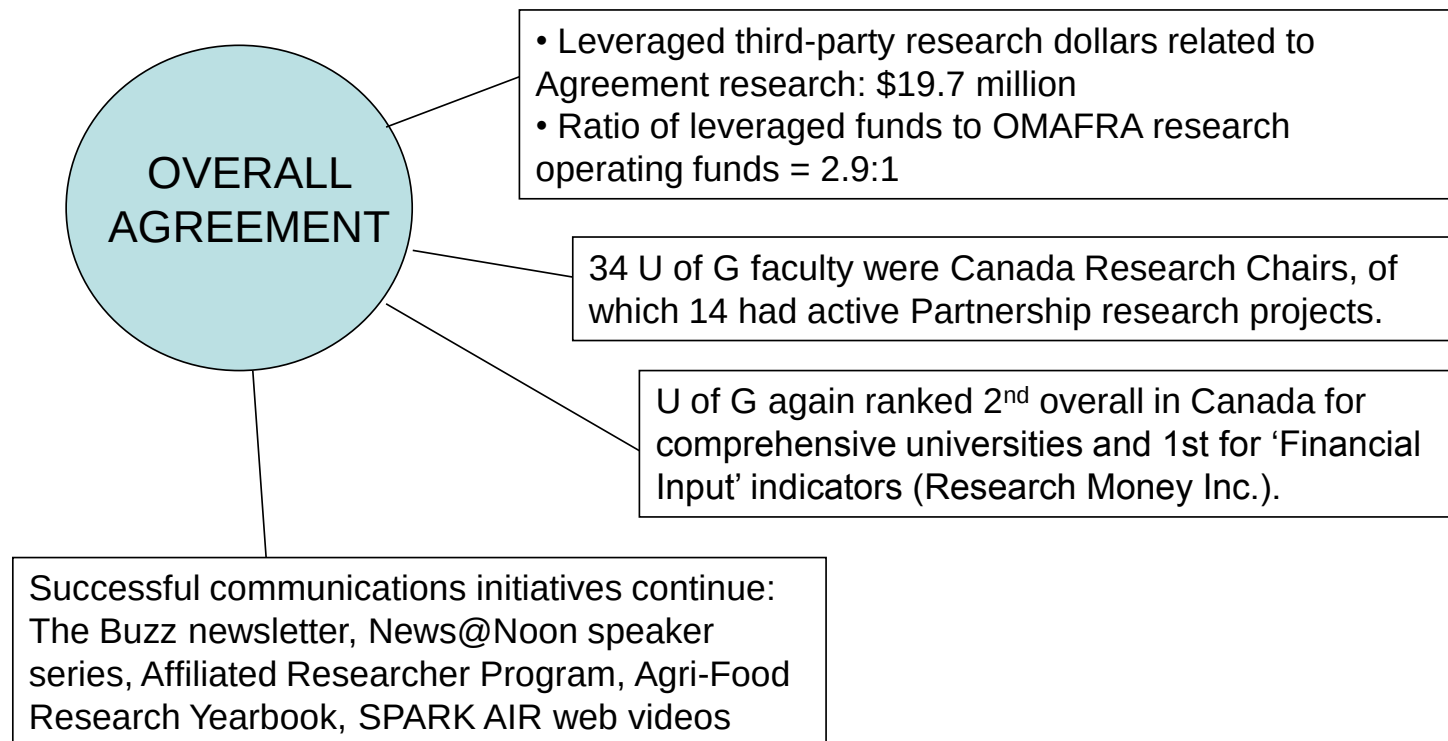
In 2011/12 the AFL program management committee of the Agreement reviewed and made a recommendation to the Executive Committee for revisions to one of their performance indicators. The objective of revisions is to better reflect program outputs that are meaningful in their contribution to the Agreement's overall objectives.

PIs for each of the program management committees are reported on the following pages. PIs for Joint Intellectual Property management are included in Research PI #8 and Proof of Principle Fund under 'Other Reporting' on page 166.

OVERALL AGREEMENT

Selected Performance Indicators and Accomplishments

Overall Objective: A world renowned model of government-university collaboration that is instrumental to the success of Ontario's agriculture, food and bioproducts sectors, to the vibrancy of its rural communities, and to the health and well-being of the province, its environment and its citizens.



Overall Agreement Performance Report

Performance Indicators

Data collection for each Performance Indicator (PI) was completed with the assistance of OMAFRA. The table below summarizes the Overall Agreement performance according to the six PIs in the Agreement.

Key Outcome	A world class cluster of agriculture, food, bioproduct and rural community resources including academic, government, industry and supplier organizations.	
Performance Indicator OA1	Recognition of the University as a world leader in agri-food, veterinary and associated sciences.	
	Metric (a)	Overall University ranking. Same as R3, metric (b)
	Baseline:	Ranking as per 2008 results. U of G ranked 2 nd in the 'comprehensive university category.
	Target:	2010-13: Maintenance or improvement of university standing according to the Research Money Inc. ranking of Canadian universities.
	Results (2011/12):	The most current (2011) Research Money Inc. report of Canadian universities' standings ranks U of G 2 nd in the 'comprehensive university category.
	Metric (b)	Total number of scientific and technical FTEs, and faculty supported or leveraged by the Partnership.
	Baseline:	Scientific and technical FTEs as per 2008/09 results. Research: 171.9 VCEP: 45.9 AFL: 53.0 AHL: 71.0

	Target:	2010-13: Maintain total number of scientific and technical FTEs and faculty supported or leveraged by the Partnership at 2008/09 levels. May decline due to inflation.
	Results (2011/12):	Number of faculty, scientific and technical FTEs supported or leveraged by the Partnership research projects: Research: 286.9 Number of faculty FTEs engaged in projects supportive of OMAFRA priorities (but not allocated to approved OMAFRA Partnership projects) is estimated at 210 'Research' FTEs. When these 'Research FTEs' are 'converted' to full faculty FTEs, it is clear that this represents over 100 full faculty FTEs devoted to research related to theme priorities VCEP: 45.9 AFL: 53.0 AHL: 71.0
	Metric (c)	Number of faculty/researchers/staff related to the research theme areas, recognized by their peers, for example through research chairs, awards of recognition, appointment to prestigious positions (international panels) and leadership of national and international research initiatives etc.. (Same as R3, metric (a)).
	Baseline:	2008/09 results are the baseline. 25 faculty members were Canada Research Chairs, of which 10 had active Partnership research projects.
	Target:	2010-13: Number of faculty/researchers/staff recognized by their peers, and significance of awards, appointments etc. to be $\geq$ baseline.
	Results (2011/12):	34 faculty members in 2011/12 were Canada Research Chairs, of which 14 had active Partnership research projects.

Key Outcome	Broader stakeholder community contributing research funding to building capacity for developing solutions to relevant issues and opportunities	
Performance Indicator OA2	Contribution of the Partnership towards leveraging industry and other government funding and collaboration for building capacity to address sector needs, opportunities and issues.	
	Metric (a)	Total dollars invested/generated from third-party sources, by program
	Baseline:	For 2008/09, total dollars invested from third-party sources were reported below as: • Research (operating): 9.2 million (excluding all Provincial government funding). This is funding secured for research projects from third-party sources. • AHL: 3.6 million • AFL: 9.8 million • VCEP: no revenue generation
	Target:	2010-13: total dollars invested/generated from third-party sources ≥ 2008/09 baselines.
	Results (2011/12):	Research (operating): 19.7 million – see R1(b) AHL: 4.5 million – see Financial Table on page 41 AFL: 7.4 million – see Financial Table on page 41 VCEP: no revenue generation
	Metric (b)	Total non-OMAFRA program revenue
	Baseline:	2008/09, total non-OMAFRA program revenue Research: 6.4 million AHL: 3.7 million AFL: 9.5 million, 0.3 million from OMAFRA, not related to Agreement VCEP: no revenue generation
	Target:	2010-13: total non-OMAFRA revenue ≥ 2008/09 baselines.

	Results (2011/12):	Research: 5.0 million AHL: 4.5 million AFL: 7.4 million VCEP: no revenue generation (Sales of services or goods from the Agreement operations and provided to external organizations and clients. This category records revenues for testing services provided to external clients by the two Lab Services divisions, as well as sales of milk, eggs, crops and other farm products from the research stations.)
Key Outcome	Partnership seen as integrative and collaborative	
Performance Indicator OA3	OMAFRA and University staff engagement with OMAFRA/University partnership	
	Metric	Level of overall OMAFRA - U of G staff engagement/satisfaction with overall Partnership
	Baseline:	Joint staff engagement survey distributed to all OMAFRA and U of G personnel involved with the partnership.
	Target:	2010-13: maintenance or improvement of 2008/09 survey results.
	Results (2011/12):	This survey was last conducted in 2010. It will be again conducted in 2013.
Key Outcome	Leading edge solutions to agriculture, food, bioproduct, animal health and rural community issues and opportunities	
Performance Indicator OA4	Revenue generated from solutions, products and services developed through the Partnership	
	Metric	Outcomes and PIs outlined for OA4, 5 and 6 will be assessed as part of the overall 5-year evaluation of the Partnership, to be conducted by an external third party.
	Baseline:	PIs OA4, 5 and 6 will be achieved through a study similar to the Deloitte report of 2007 (U of G /

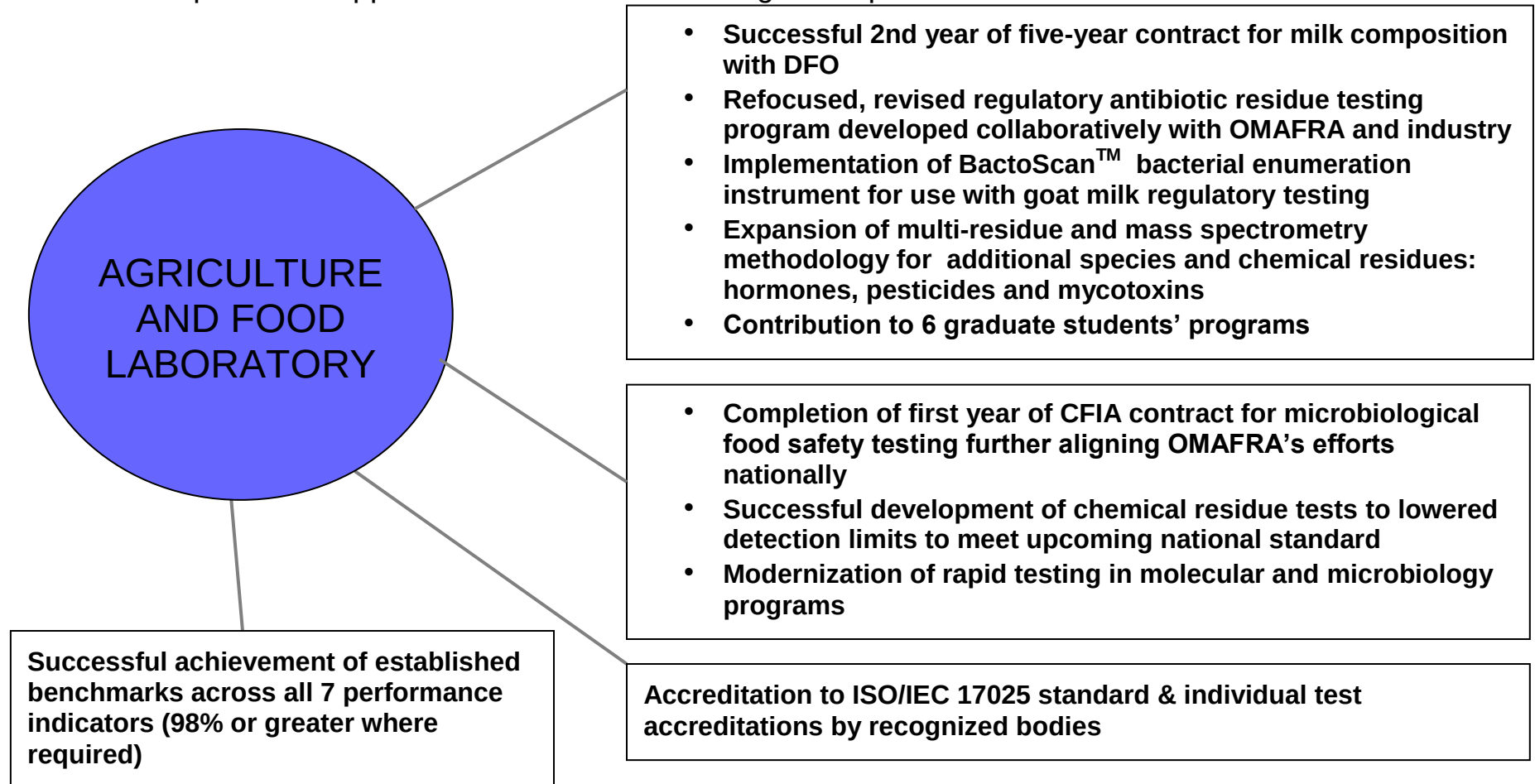
		OMAFRA Impact Study), to be conducted in 2012. In the interim, the Deloitte study serves as the baseline.
	Target:	2010-13: Evaluation plan for year five to be undertaken and approved in 2009-10, describing content and format of 2012-13 report
	Results (2011/12):	Plans for the 2012 five year evaluation were developed during 2011/12. Examples of 2011/12 results that will contribute to OA4 and the five year evaluation are • R8data reports on the revenue, innovation and commercial benefits generated shown in 'Research Performance Reports' of this annual report. • Proof of Principal fund case studies shown in 'Other Reporting' section of this annual report.
Key Outcome	Economic and health benefits generated from adoption, utilization and commercialization of knowledge and capacity	
Performance Indicator OA5	Economic and health benefits from solutions, products and services developed through the Partnership	
	Metric	Outcomes and PIs outlined for OA4, 5 and 6, will be assessed as part of the overall 5-year evaluation of the Partnership, to be conducted by an external third party.
	Baseline:	PIs OA4, 5 and 6 will be achieved through a study similar to the Deloitte Study – 2007 (U of G / OMAFRA Impact Study), to be conducted in 2012. In the interim, the Deloitte study serves as the baseline.
	Target:	2010-13: Evaluation plan for year five to be undertaken and approved in 2009/10, describing content and format of 2012-13 report. Note: OMAFRA-U of G evaluation plan was developed in 2010-11.
	Results (2011/12):	Plans for the 2012 five year evaluation were developed during 2011/12. Examples of 2011/12 results that will contribute to OA5 and the five year evaluation are: • R5 case studies - one from each of the seven research theme areas - concerning benefits to the economy, environment and health ...generated from the research program • AHL5 case studies: effective and timely diagnosis and reporting of diagnostic results to

		OMAFRA, in the investigation and response to suspected foreign animal and other serious human/animal diseases. AFL 3 data: track and review incident reports (LabTrack, 2011 or CAPA, 2012) and report all non-conformances, resolution and continuous improvement initiatives. See 'Performance Reports' section of this annual report for case studies &/or data of each of the program performance indicators referenced above.
Key Outcome	Key stakeholders aware of economic and social benefits of solutions led by the Partnership	
Performance Indicator OA6	External stakeholder satisfaction with benefits and accomplishments of the OMAFRA - U of G Partnership	
	Metric	Outcomes and PIs outlined for OA4, 5 and 6 will be assessed as part of the overall 5-year evaluation of the Partnership, to be conducted by an external third party.
	Baseline:	PIs OA4, 5 and 6 will be achieved through a study similar to the Deloitte Study – 2007 (U of G / OMAFRA Impact Study), to be conducted in 2012. In the interim, the Deloitte study serves as the baseline.
	Target:	2010-13: Evaluation plan for year five to be undertaken and approved in 2009/10, describing content and format of 2012-13 report. Note: OMAFRA-U of G evaluation plan was developed in 2010-11.
	Results (2011/12):	Examples of 2011/12 results that will contribute to OA6: - R10 data: number of media clippings and key stakeholder communications - R9 (same as OA6): stakeholder assessment of research outcomes on the industry (to be assessed in 2012-13 as part of the year five evaluation) - R7a & b data: number of knowledge transfer events and examples of utilization of new knowledge by stakeholders - AHL 7: Client Satisfaction Survey results - AFL2: Proportion of completed tests that meet quality, sample integrity and service level standards. (AFL program no longer reports on AFL 3(b), the results of external client survey, as it was not considered relevant to Partnership-funded reporting.) - See 'Performance Reports' section of this annual report for case studies &/or data of each of the program performance indicators referenced above.

AGRICULTURE AND FOOD LABORATORY

Selected Performance Indicators and Accomplishments

Program Objective: Scientific, diagnostic and analytical capacity to detect risks and enable effective response to support the health and well being of the province and its citizens.



Program Performance Reports

Agriculture and Food Laboratory

Performance Indicators

Data collection for each Performance Indicator (PI) was completed with the assistance of OMAFRA. The table below summarizes AFL's performance according to the seven PIs in the Agreement.

Key Outcome	Highly qualified & skilled lab personnel & equipment supported by required accreditation. Improved lab and food safety technology & practices.	
Performance Indicator AFL1	Maintain required accreditations, proficiency testing and ISO registration to ensure a continuous quality improvement program is applied to laboratory operations.	
	Metric	Summary reports of accreditation and proficiency reports
	Baseline:	Accreditation to by the ISO/IEC 17025 standard. Individual test method accreditation by recognized bodies e.g. Standards Council of Canada (SCC), Canadian Association for Laboratory Accreditation (CALA). Maintenance of proficiency for individual test methods per program availability.
	Target:	2010 – 2013: Maintenance of accreditation
	Results (2011/12):	LS, including AFL, is accredited by both of Canada's internationally recognized accrediting bodies, Standards Council of Canada (SCC) and the Canadian Association for Laboratory Accreditation (CALA) to the ISO/IEC 17025 standard. Under Schedule F, LS/AFL provides testing service for 3 programs within the Food Inspection Branch. The majority of these tests (73%) are accredited to the ISO/IEC 17025 quality standard. Note: the following results of early 2012/13 (as well as 2011/12), have been included for continuity. A joint biennial assessment, SCC and CALA, occurred September 2011 to review the AFL's quality

	management system, new tests and testing activities listed on the SCC and CALA scopes of accreditation. LS/AFL completed the required responses and the revised scopes of testing were posted on the SCC and CALA websites May 2012 and April 2012, respectively. SCC LS/AFL is accredited by SCC in two program specialty areas: (i) Agriculture Inputs, Food, Animal Health and Plant Protection (AFAP) and (ii) Test Method Development, Evaluation and Non-routine Testing (TMDENRT). In June 2012, LS has 122 scope listings including 119 tests in AFAP and 3 procedures in TMDENRT. In the 2011/12 fiscal year, LS/AFL reviewed our scope of accreditation and testing activities and significantly revised our SCC scope of accreditation. In total, we added 14 tests and withdrew accreditation from 25 inactive tests. In June 2012, we withdrew accreditation from 11 additional inactive tests. 1. May 2011, LS/AFL submitted a minor scope extension request to add 7 microbiology tests. They were officially accredited and added to the SCC scope of accreditation May 2012 2. As part of the SCC biennial assessment (September 2011), AFL/LS submitted a scope extension for 7 tests. They were officially accredited and added to the SCC scope of accreditation May 2012. 3. In 2011/12 fiscal year, LS/AFL withdrew accreditation from 25 inactive tests from the SCC scope of changes. These changes are reflected in the SCC scope of accreditation posted May 2012. June 2012, LS/AFL requested the following 11 inactive tests be removed from the SCC scope of accreditation. These changes are reflected on the June 2012 SCC scope of accreditation. (Please refer to posted scope of accreditation for laboratory number 100 on the SCC website for full details) CALA In April 2012, LS/AFL is accredited by CALA for 14 tests, including 4 licensed tests under the Ontario Safe Drinking Water Act. 1. In the 2011/12 fiscal year, LS withdrew accreditation from two inactive environmental tests.
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		The SCC and CALA accrediting bodies require a biennial assessment of the quality system and tests listed on the scope of accreditation. The next SCC and CALA biennial assessment is scheduled for September 2013. Proficiency Testing In the Food Safety Testing program at the AFL, 46 Proficiency Test (PT) panels were performed. A total of 398 PT results were reported, 93% of which were satisfactory. In the Horticultural and Agricultural Land Use and Environmental Management programs, 6 PT panels were performed. A total of 124 PT results were reported, 98% of which were satisfactory.
Key Outcome	Scientific & statistical integrity of routine analytical test data to ensure quality, reliable results.	
Performance Indicator AFL2	Proportion of completed tests that meet quality, sample integrity and service level standards.	
	Metric	Percentage / Level of compliance with service level standards, reported by program, related to: • Turnaround times for screenings and confirmation • Corrected reports • Non conforming samples
	Baseline:	98% compliance met.
	Target:	2010 – 2013: maintain 98% compliance with service level standard
	Results (2011/12):	The Agriculture and Food Laboratory has met or exceeded the requirement: • Turnaround time for test results 99% of the time over the full fiscal year 2011/12. • Correct reports – 99% compliance met (99.76%) • Non-conforming samples – 99% compliance met (99.38%)
Key Outcome	Strong linkages built to ensure effective, timely sharing of information and to communicate violative / actionable test results to stakeholders in a timely manner.	
Performance	Track and review incident reports (LabTrack [2011] or CAPA [2012]) and report all non-conformances,	

Indicator AFL3	resolution and continuous improvement initiatives.	
	Metric	a) LabTrack (2011) or CAPA (2012) reporting of all non-conformances (b) Level of customer satisfaction with services provided by AFL. Given that this survey is aimed at all external AFL clients, and is not relevant information to report to OMAFRA, it was therefore agreed by the AFL PMC that 3b) should be deleted from the AFL performance indicators.
	Baseline:	Service level standard is to continually improve through the process of documenting and reviewing incident report (LabTrack or CAPA) and associated follow-up and resolution initiatives
	Target:	2010 – 2013: To manage the incidents every year with demonstration of continuous improvements.
	Results (2011/12):	147 non-conformance reports were filed during the processing/testing/reporting of 23,326 OMAFRA Schedule F samples, excluding the raw milk testing program. 115/147 incidents resulted from AFL non-conformance thereby affecting 0.6% of samples submitted, 19/147 incidents resulted from OMAFRA non-conformance, 10/147 incidents resulted from shared AFL/OMAFRA non-conformance and 3/147 incidents resulted from third party non-conformances. A total of 75,380 tests (excluding raw milk testing program) were performed for OMAFRA in the Schedule F programs. Over 99% of these tests reported, met the performance standards of the agreement. Improvements installed over the past year are aimed at eliminating recurrence of specific non-conformances and preventing future ones. Specifically: ▪ The implementation of a new IT solution to streamline the manual process of logging in samples for project OD0002. The new e-form prevents many transcription errors. In conjunction with the validation of character length of input fields, overall, there has been a reduction of errors incurred during the login process. • Implementation of new processes for reporting adverse results. See AFL4.
Key Outcome	Ability and capacity to detect and confirm positive test results to provide effective response to food contamination incidents and other serious plant and environmental hazards with severe human health or	

	economic consequence.	
Performance Indicator AFL4	Level of compliance with communication requirements in the lab testing and sampling protocols.	
	Metric	LabTrack reporting of all non-conformances.
	Baseline:	Baseline is service level standard of 98%.
	Target:	2010 – 2013: maintain 98% compliance with service level standard
	Results (2011/12):	Over 98% compliance target: Ten (10) incidents of non-compliance with the communication requirements established in the lab testing and sampling protocols affecting 15 of the 23,326 (excluding raw milk testing program) sample sets for the 2011/12 fiscal year(0.06% of samples). It is critical for the laboratory to communicate adverse test results immediately to the Ministry. A number of instances whereby the communication protocol was not followed as written were investigated. Hence a series of Continuous Improvement Activities were implemented. The AFL implemented information system measures to provide internal checks and balances ensuring consistent and immediate reporting of adverse results. Automated follow-up communications are also being developed. This situation continues to be monitored by the AFL - Regulatory Partnerships Unit to ensure the implementation of safeguard measures as well as compliance with these reporting requirements occurs.
Key Outcome	Capacity and capability to support coordinated and effective emergency management, and the ability and capacity to detect and confirm positive test results to provide effective response to unanticipated / urgent testing requirements and food safety, environmental health and plant health / pest emergencies.	
Performance Indicator AFL5	Effective response to food safety, environmental health and plant health/pest emergencies & unanticipated urgent incidents / requirements in a reasonable timeframe using existing or new methodologies / tests.	
	Metric	Evaluation / case study of AFL's response to, and management of significant / unanticipated / urgent situations / events of environmental, health and plant / pest emergencies including any

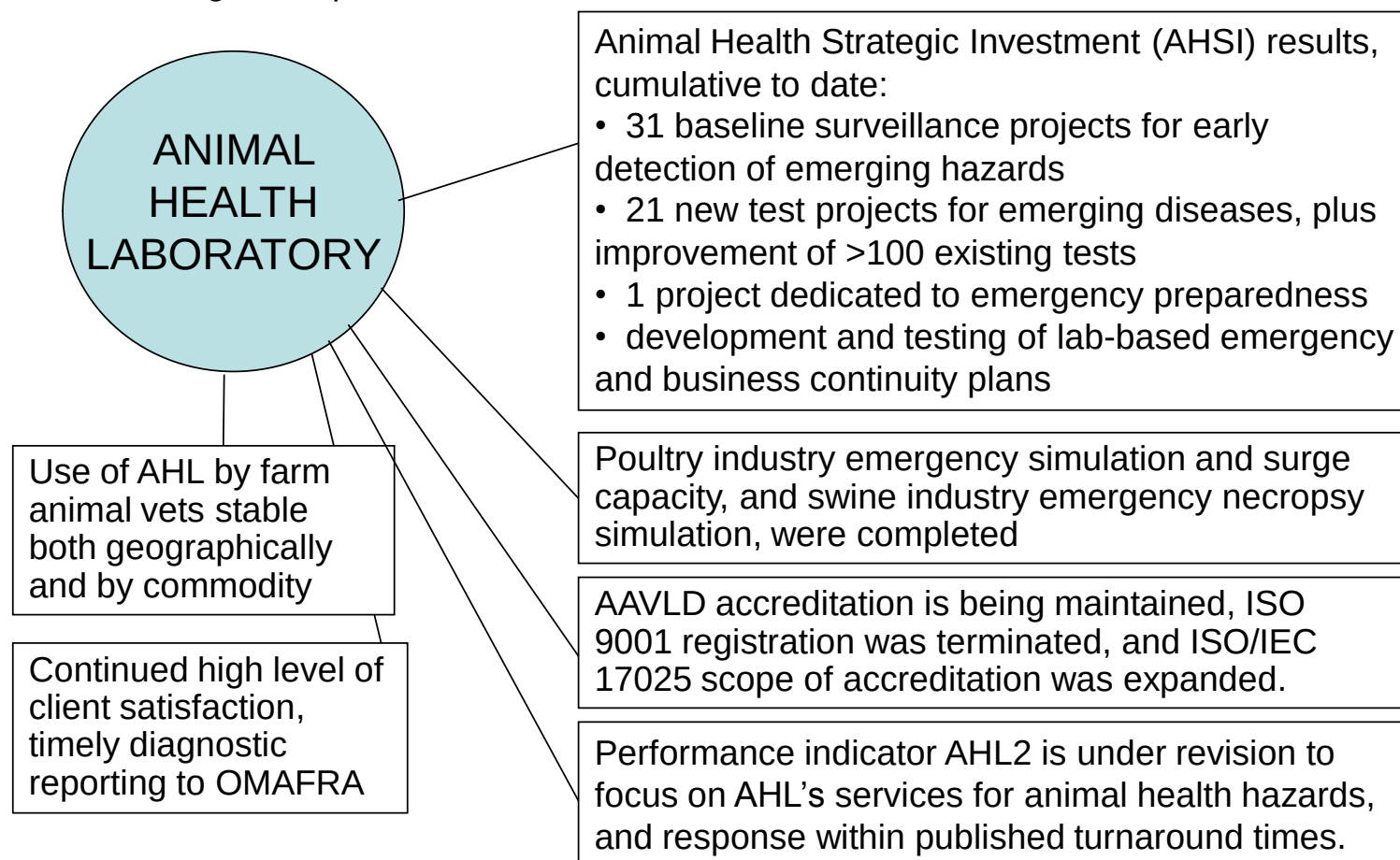
		requirement for the development of new AFL tests / methodologies.
	Baseline:	Case study approach.
	Target:	Completion of case study.
	Results (2011/12):	There has been no incident in 2011/12 requiring a case study documenting the development of new AFL test / methodologies.
Key Outcome	Ability to detect contamination of the food supply and other testing projects through the implementation of statistically valid sampling plans and ensure the cost effective use of available resources.	
Performance Indicator AFL6	Level of compliance with sampling schedule as described in the annual sampling and testing plan agreements and documented in year changes.	
	Metric	Percentage compliance with annual Testing and Sampling plans, by program (Schedule F).
	Baseline:	Baseline is service level standard of 98%.
	Target:	2010 – 2013: maintain 98% compliance with service level standard
	Results (2011/12):	The AFL met and exceeded the 98% service level standard, achieving the testing requirements as specified in the annual testing and sampling plans for the full list of requested parameters. OMAFRA Sampling Plan Request: 22,760 individual test samples AFL Tested: 23,326 individual test samples (per OMAFRA Sample Reconciliation Report for 2011/12) The total sampling plan for Schedule F (excluding raw milk testing program contract) requested testing of 22,760 individual test samples: Meat Inspection Program – 12,912 individual analytical samples Foods of Plant Origin – 3,230 individual analytical samples Dairy Food Safety Program – 4,498 individual analytical samples excluding raw milk testing program contract samples Agriculture Development and Environment Management Programs – 2,120 individual analytical samples. Across all programs, the AFL received approximately 561 more individual test samples than expected, the majority received from the Meat Inspection Program.

Key Outcome	Improved U of G research through laboratory-based expertise.	
Performance Indicator AFL7	Scientific merit and relevance of research conducted by the AFL or University personnel or students to articles, presentations, final project reports, and peer reviewed journals*.	
	Metric (a)	Total number of publications in peer reviewed journals and / or final project reports presented, related to OMAFRA strategic research themes.
	Baseline:	There is no existing baseline. Producing more publications year over year does not provide an accurate measure of performance. Continuous improvement and measuring beneficial impacts of contributions is more in line with the intent of this measure
	Target:	Demonstration of continued contribution by the AFL; year-to-year fluctuation expected.
	Results (2011/12):	Five (5) publications in peer reviewed journals/book chapters and six (6) research grant awards. Post Doctoral Fellows trained under OMAFRA, OCE, MITACS and MOE research grants: 4 Masters students trained under FSQA program of Department of Food Science, University of Guelph: 3 PhD candidates hosted under the Department of Food Science, University of Guelph: 1
	Metric (b)	Summary of knowledge transfer events re new practices, including number of attendees.
	Baseline:	There is no existing baseline. Conducting more events year over year does not provide an accurate measure of performance. Continuous improvement and measuring beneficial impacts of contributions is more in line with the intent of this measure.
	Target:	Demonstration of continued contribution by the AFL to knowledge transfer.
	Results (2011/12):	Nineteen (19) knowledge transfer events: eleven (11) oral presentations (50 – 150 attendees); and eight (8) poster presentations at scientific conferences (100-1000 attendees)
		*New wording for this performance indicator developed and approved in 2011/12.

ANIMAL HEALTH LABORATORY

Selected Performance Indicators and Accomplishments

Program Objective: Surveillance, method development and emergency response and surge capacity in place to support Ontario's animal health system and the health and well-being of the province and its citizens



Animal Health Laboratory

Performance Indicators

Data collection for each Performance Indicator (PI) was completed with the assistance of OMAFRA. The table below summarizes AHL's 2011/12 performance according to the 9 PIs in the Agreement. To the extent possible, data collection and analysis was used to develop numeric performance metrics. While most of these PIs have supporting documentation, some include narratives, which provide additional information and perspective on the PI results. This supporting documentation is available upon request.

Key Outcome	Contributes effectively to developing and implementing an animal health strategy for Ontario/Canada	
Performance Indicator AHL1	Participation in and contribution of surveillance information to relevant national and provincial bodies or committees that inform Federal/Provincial animal health strategies	
	Metric:	a) The number of faculty and/or staff participating on federal/provincial animal health strategy committees (report only – no target.) b) Percentage of available working time spent participating on federal/provincial animal health strategy committees
	Baseline:	All 17 AHL vets/supervisors participated on federal and/or provincial animal health strategy committees and 13 attended meetings or conferences for these committees in 2008/09. Average per staff member = 2.9% of available working time
	Target:	2010-2013: 1.5% – 3.0 % of available working time
	Results (2011/12):	11 of 17 AHL vets/supervisors participated in 83 meetings of 15 international and national organizations (total 460 hrs). 12 of 17 AHL vets/supervisors participated in 114 meetings of 19 provincial organizations (total 538 hrs). In total, all 17 AHL vets/supervisors participated on federal and/or provincial animal health strategy committees and 14 attended meetings or conferences for these committees in 2011/2012.

		Average per staff member: 56 meeting hours per year spent on relevant committees, equivalent to 2.9% of available working time. *The baseline value presented this year is 2.9% vs. 2.8% as in previous years. This is a result of revising the total possible working hours to include 50 weeks/year vs. 52 weeks/year, to account for at least 2 week vacation.
		This PI is supported by a table of AHL staff participation in national and provincial committees and scientific meetings. The table also includes information regarding AHL staff holding officer roles in these organizations. Two international organizations are included (AAVLD and ACVP), as participating in this capacity contributes to international and thus national policy. As requested, this tabulation has otherwise been limited to national and provincial bodies or committees to which AHL veterinary staff members belong. Many AHL staff are also ordinary members of various international organizations and local organizations, which have not been included. Participation in the large number of provincial and national veterinary organizations provides an opportunity to interact with both private practitioner colleagues as well as industry, and brings a laboratory perspective on issues of the day that impact or inform policy development. Participation in the Canadian Animal Health Surveillance Network (CAHSN) has been most useful in helping to train and equip the AHL staff to deal with a foreign animal disease at an enhanced level of preparedness – also a key feature of the new OMAFRA - UofG Agreement. As core members of the Ontario Animal Health Surveillance Network (OAHSN), the AHL and OMAFRA exchange and integrate information from many sources such that OAHSN serves as a cornerstone of the larger Ontario Animal Health System and related public health. The U of G (AHL and Pathobiology) hosted the 10th annual meeting of the Canadian Animal Health Laboratorians Network (CAHLN) June 5-8, 2011 in Guelph. Cross-Canada representation included provincial, university and federal laboratories – 2011-12 CAHLN President Grant Maxie was in attendance. Other annual meetings held concurrently were the Canadian Association of Veterinary Pathologists (CAVP), the Canadian Animal Health Surveillance Network (CAHSN), the TSE Lab Network, and Canadian Association of Poultry Veterinarians (CAPV).

Key Outcome	Acts as a critical resource effectively contributing to animal health policy development and in ongoing program delivery for OMAFRA	
Performance Indicator AHL2	Case mix reflects the diversity of endemic disease by animal species and geographic distribution of farms across the province	
	Metric:	a) Occurrence of specific endemic diseases identified through laboratory testing, reported by geographic area & commodity b) Occurrence of specific endemic diseases (by geographic area & commodity) identified through laboratory testing compared to targeted studies.
	Baseline:	Establishment of baseline is dependent on new capabilities potentially supported under the Animal Health Act, 2009
	Target:	Establishment of target dependent on Animal Health Act, 2009
	Results (2011/12):	N/A The Animal Health Act is now in effect and regulations pertaining to this PI have been developed during 2011/12. They will be implemented Jan. 1, 2013 and reported in the 2012/13 annual report.
Key Outcome	Acts as a critical resource effectively contributing to animal health policy development and in ongoing program delivery for OMAFRA	
Performance Indicator AHL3	Proportion of farm animal veterinary practices using AHL services by geographic area across the province	
	Metric:	Percentage of veterinarians accessing/utilizing laboratory services, by commodity and geographic area.
	Baseline:	<u>For 2008/09,</u> <u>By Commodity:</u> Equine (EQ): 70% Food Animal (FA): 73%

		<u>By Geographic Area:</u> North = 64% East = 78%
		Central = 58% West = 65%
	Target:	2011-2013: ≥ 65% for each commodity; ≥ 60% for each region
	Results (2011/12):	<u>By Commodity</u> Equine: Proportion of EQ accredited facilities submitting EQ samples to the AHL = 187/266 (70%) Numerator: total number of accredited facilities with EQ submissions (whether or not they are identified as EQ accredited facilities in the CVO database) Denominator: total number of Ontario accredited facilities identified as EQ in the CVO database + all other accredited facilities which have submitted EQ samples to the AHL Food Animal (FA): Proportion of FA accredited facilities submitting FA samples to the AHL = 205/318 (67%) Numerator: total number of accredited facilities with FA submissions (whether or not they are identified as FA accredited facilities in the CVO database) Denominator: total number of Ontario accredited facilities identified as FA in the CVO database + all other accredited facilities which have submitted FA samples to the AHL <u>By Geographic Area (Area Code)</u> Proportion of EQ & FA accredited facilities in each area submitting EQ and/or FA samples to the AHL:

		Numerator: total number of accredited facilities with EQ and/or FA submissions (whether or not they are identified as EQ or FA accredited facilities in the CVO database). Denominator: total number of Ontario accredited facilities identified as EQ or FA in the CVO database + all other accredited facilities which have submitted EQ and/or FA samples to the AHL. North Area Code 705 = 41/55 (75%) } Area Code 807 = 1/6 (17%) } (Average: 69%) East Area Code 613 = 48/60 (80%) Central Area Code 416 = 3/10 (30%) } Area Code 905 = 57/90 (63%) } (Average: 60%) West Area Code 519 = 138/187 (74%)
		Commodity (Equine and Food Animal) analysis is based on all Ontario accredited facilities identified as EQ or FA (respectively) in the CVO database, plus all other clinics which have submitted EQ or FA samples (respectively) to the AHL. Note: On the surface, the commodity analysis is misleading, as in fact, the AHL serves a much higher percentage of FA practices in Ontario than is reported here, i.e., should be close to 100%. The difference between the reported percentage and the actual percentage is a result of the fact that some companion animal clinics hold food animal certifications for the purposes of dispensing medication but do little to no actual diagnostic work with food animals. As a result, the denominator is artificially large with a resulting lower percentage. The fact remains that all Ontario food animal and equine practitioners are aware of the availability of AHL services, and are able to access AHL resources on an as-needed basis. Geographic analysis is based on all Ontario accredited facilities identified as EQ and/or FA in the CVO database, plus all other clinics which have submitted EQ or FA samples to the AHL, and is presented by region, using telephone area code.

Key Outcome	A key node within a formal network of animal health professionals, providing a critical link to the North American flow of diagnostic information for surveillance and risk assessment	
Performance Indicator AHL4	Timely communication of relevant changes in the patterns of existing disease or the appearance of new disease to veterinary practices, producers and industry groups	
	Metric:	Level of customer satisfaction with services provided by AHL program, by commodity.
	Baseline:	Client Satisfaction: 93% satisfaction rating (2008/09)
	Target:	2011-2013: ≥ 90 % satisfaction rating
	Results (2011/12):	<i>Question 12: Communication of relevant changes in disease occurrences is timely.</i> 92% of clients responding to this survey question were satisfied with the timeliness of communication of relevant changes in disease occurrences. Analysis of results from yearly AHL client satisfaction survey question 12. Based on the above question, clients were asked to rate the AHL numerically between 5 (for Always) to 1 (for Never). Satisfaction rating compares the favourable responses (3, 4, and 5) to the total number of clients responding. According to the November 2011 AHL Client Survey responses it is evident that most clients are satisfied.

Key Outcome	Early detection and effective response to foreign animal diseases and other serious diseases with human/animal health or economic consequences	
Performance Indicator AHL5	Effective and timely diagnosis, support and reporting of diagnostic results to OMAFRA, in the investigation and response to suspected foreign animal and other serious human/animal diseases	
	Metric:	a) Evaluation/case study of AHL response to “*significant animal health events” such as suspected foreign animal and other serious human/animal disease (*) as defined by OMAFRA b) Utilization of AHL lab by third-party sources (Note: reporting on this metric will be very general to ensure client confidentiality and market competitiveness and no target will be set.)
	Baseline:	OMAFRA satisfaction of AHL detection and response in case studies.
	Target:	2011-2013: satisfactory handling of all cases by AHL
	Results (2011/12):	a) The AHL selected three cases from their 2011/12 case work, with potential significance to animal health. The three cases were: 1) West Nile virus (WNV) in domestic ducks 2) Cache Valley virus (CVV) in sheep 3) Copper toxicosis in two sheep flocks. b) Evaluation of the three AHL case studies found that each had been handled effectively according to the established criteria. The AHL was used by approximately 77 third-party sources (excluding OMAFRA and Ontario veterinary clinics), including 1 federal ministry, 3 Ontario ministry, and approximately 73 other private organizations including other diagnostic laboratories, large FA producers, genetic and cell line companies, feed companies, shipping companies, Canadian universities, Canadian hospitals and more. Excerpts from the OMAFRA evaluation, completed in July 2012, are as follows:

	<u>Case 1 – West Nile virus in domestic ducks:</u> “In OMAFRA’s opinion the Animal Health Laboratory (AHL) of the University of Guelph responded efficiently to diagnose and report West Nile virus (WNV) in farmed domestic ducks. To the diagnosticians’ credit, they considered WNV as a differential diagnosis despite the fact that WNV infection had not been reported in domestic ducks in Ontario before.” Recommendation: “There is a need to shorten the time period between consulting with the veterinarian and receiving the sample for testing. In a highly contagious poultry disease (i.e. avian influenza, ILT) situation timely sample collection and submission is very important.” <u>Case 2 – Cache Valley virus in sheep:</u> For the presumptive Cache Valley virus case, the OMAFRA reviewer had the following specific comments: “The AHL’s laboratory work-up and reporting of results to the veterinarian (verbal, fax and by mail) were thorough and timely given the situation. Common differentials were ruled out at the AHL and further testing at an outside laboratory (National Microbiology Laboratory, Winnipeg) was used to confirm the final diagnosis of Cache Valley virus. The Veterinary Science & Policy Unit of OMAFRA is completely satisfied with the way AHL handled this case.” <u>Case 3 - Copper toxicosis in two sheep flocks:</u> “The testing done, the diagnosis and discussions with the pathologists allowed the veterinarian to investigate the issue, identify the problem and implement management changes to help the producer and prevent further problems in the flock. The Veterinary Science & Policy Unit of OMAFRA is completely satisfied with the way AHL handled this case.” <i>Each complete case description and narrative prepared by the AHL (along with the case evaluations prepared by OMAFRA staff) is available upon request.</i>
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Key Outcome	Diagnostics/tests meet best practice standards	
Performance Indicator AHL6	The University maintains appropriate accreditations at the Animal Health Laboratory, but not limited to AAVLD, CFIA and ISO registration	
	Metric:	a) Review of accreditation reports in order to assess performance and maintenance of accreditation b) Review of client satisfaction survey in order to assess performance c) Review of actual adherence to published turnaround times (TATs) d) Review of proficiency testing results to assess performance
	Baseline(a):	2008-2009 AHL accreditations & certifications
	Target:	2010-2013: Maintenance of accreditations & certifications
	Results (2011/12):	The University maintains appropriate accreditations at the Animal Health Laboratory (AHL), including the American Association of Veterinary Laboratory Diagnosticians (AAVLD), CFIA, and ISO/IEC 17025. ISO 9001 registration After careful consideration and discussions with clients, University of Guelph - Laboratory Services Division (LSD), decided not to seek renewal of the ISO 9001 registration. LSD is an ISO/IEC 17025 accredited laboratory by both Standards Council of Canada (SCC) and the Canadian Association for Laboratory Accreditation (CALA) for specific tests listed on our scopes of accreditation. AHL's quality management system is thoroughly audited every 2 years by these Canadian laboratory accrediting bodies. The standard, <i>ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories</i>, consists of a strong quality management system component (section 4) and is the standard of choice in laboratory testing. The ISO/IEC 17025 introduction states: "Testing and calibration laboratories that comply with this International Standard will therefore also operate in accordance to ISO 9001."

	Our ISO 9001 registration was allowed to expire on April 12, 2012. American Association of Veterinary Laboratory Diagnosticians (AAVLD) accreditation The AHL is accredited by AAVLD, meeting AAVLD accreditation requirements for full accreditation, all species. For 2011/12 the AHL maintained AAVLD accreditation, which follows a 5-year cycle. The last AAVLD accreditation audit was in 2009 and the next AAVLD site visit will be in 2014. In 2007, AAVLD upgraded to using the OIE version of the ISO/IEC 17025 standard as the AAVLD quality standard, and the AHL was audited to this standard in 2009. ISO/IEC 17025 accreditation LSD, including AHL, is accredited by both of Canada's internationally recognized accrediting bodies, the Standards Council of Canada (SCC) and the Canadian Association for Laboratory Accreditation (CALA) to the ISO/IEC 17025 standard, for specific tests listed on our scopes of accreditation. LSD/AHL is accredited by SCC in the program specialty area (PSA): Agriculture Inputs, Food, Animal Health and Plant Protection (AFAP). In June 2012, LSD had 119 tests in AFAP PSA including 18 tests performed by AHL. On July 27, 2011, the following seven virology tests were officially added to Laboratory Services' SCC scope of accreditation: 1. MOL-196 PRRSV Tetracore NA-EU real-time RT-PCR 2. MOL-206 Swine influenza virus matrix real-time RT-PCR 3. MMV-214 <i>Bovine viral diarrhea virus</i> antigen ELISA 4. MMV-310 TGEV-Ab and & PRCV-Ab ELISA differentiating test kit 5. MMV-334 Indirect fluorescent antibody assay (IFA) for the detection of IgM or IgG antibodies against <i>Porcine reproductive and respiratory syndrome virus</i> (PRRSV) 6. MMV-342 General procedure for hemagglutination inhibition (nested method – appendix 16.3, 16.4, 16.8 and 16.10) a) MMV-342 A16.8 Swine influenza virus – A/H3N2/swine/Texas/4199-2/98 HI (si3t) b) MMV-342 A16.10 Swine influenza virus – A/H1N1/swine/Ontario/81 HI (sif) or A/H3N2/human/Colorado/77/HI (si3)
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		7. MMV-345 PRRSV X3 & SIV (H1N1 and H3N2) antibody ELISA test kit. In the 2011/12 fiscal year, the SCC biennial assessment occurred. From September 26-29, 2011, seven SCC assessors thoroughly reviewed our quality management system, new tests and testing activities listed on the SCC scope of accreditation to ensure LSD/AHL meets the requirements of ISO/IEC 17025. The SCC assessors issued a reassessment / scope extension report summarizing the observations, required responses and commendations. The laboratory response was due within 90 days. On December 20, 2011, LSD/AHL submitted the required responses to the SCC biennial assessment. On April 15, 2012, the SCC approved all corrective actions from the September 2009 biennial assessment. On May 25, 2012 the revised scope of testing was posted on the SCC website. LSD/AHL withdrew accreditation from one inactive food test, <i>TOXI-032 Lead determination in maple syrup products, honey and apple cider/juice</i> LSD/AHL is accredited by the Canadian Association for Laboratory Accreditation (CALA) for environmental tests. In September 2011, CALA joined SCC in a joint biennial assessment of our quality management system. The CALA assessors audited the environmental tests posted on the CALA scope of accreditation. CALA issued an assessment report and the required responses were due within 45 days. On November 8, LSD/AFL submitted the required responses to the CALA biennial assessment. On March 13, 2012, CALA approved all corrective actions from the September 2011 biennial assessment. On April 30, 2012 the revised scope of testing was posted on the CALA website. LSD/AHL withdrew accreditation from one inactive environmental test, <i>SNL-044 Silver in soils by atomic absorption spectrophotometry (AAS).</i> Canadian Food Inspection Agency (CFIA) accreditation AHL is accredited by the CFIA – Retrovirology Centre for Expertise for Equine Infectious Anemia (EIA). In 2010/11, AHL maintained EIA accreditation; the next EIA assessment will be in 2012/13.

	Baseline / Target / Results(b/c)	<table><tr><th>Target 2011-2013</th><th>Baseline 2008/09</th><th>Results 2011/12</th></tr><tr><td>≥ 90% satisfaction rating</td><td>96% satisfaction rating</td><td>88.5% satisfaction rating 93% AHL TAT rating</td></tr></table>	Target 2011-2013	Baseline 2008/09	Results 2011/12	≥ 90% satisfaction rating	96% satisfaction rating	88.5% satisfaction rating 93% AHL TAT rating
Target 2011-2013	Baseline 2008/09	Results 2011/12						
≥ 90% satisfaction rating	96% satisfaction rating	88.5% satisfaction rating 93% AHL TAT rating						
	Results (2011/12):	<i>Question 1:</i> Employees respond in a timely manner <i>Question 4:</i> Published turnaround times are met Of clients responding to the 2011 survey, 113 of 123 (92%) were satisfied with the timeliness of employee response, and 104 of 123 (85%) were satisfied that published turnaround times were met. The average satisfaction rating was 88.5%. The actual adherence to published turnaround times from the AHL Laboratory Information Management Systems (LIMS) was 93%, excluding the Avian Immunology and Virology (AIV) lab section (including the AIV Lab, the result drops to 57.9%). Turnaround time is one of the most critical measures of a laboratory's effectiveness and efficiency. Customer loyalty is often based on this one aspect of service. Given that there are a large number of tests and services provided, it is often a challenge to maintain TAT and manage clients' expectations. The AHL has done this by proactively measuring and analyzing their TAT performance to identify areas needing continuous improvement. A component of the AHL's AAVLD accreditation is an analysis of the adherence to quoted TAT expectations as published in the AHL User's Guide and Fee Schedule. Based on reporting of test results, data and TATs, clients were asked to rate the comments above numerically between 5 (for Always) to 1 (for Never). Satisfaction rating compares the favourable responses (3, 4, and 5) to the total number of clients responding to the relevant survey question. Several people indicated overall satisfaction with the AHL in the 2011 AHL Client Survey (e.g., <i>"Very pleased with the service - prompt and very courteous, thank you for the good work and personalized contact and interaction, we appreciate that you provide such a comprehensive service."</i>)						

Some clients did, however, bring forward specific concerns and requests for service improvements, e.g., 1) *Better search capabilities on the AHL website for clinic cases. There are many errors in the owner name search function which makes it difficult to look up old cases.* 2) *EIA test results should be in a PDF format, it would improve speed and turnaround times.* 3) *A road side representative should inform the clinics of updates and all new tests offered at AHL, instead of receiving monthly newsletters.*

The actual adherence to published turnaround times (TAT) for 2011/12 was reported excluding the Avian Immunology and Virology (AIV) lab section. This lab section was excluded as there were several factors causing the TAT statistics to be artificially low (45.6%). Since AIV constitutes the majority of all procedures conducted at AHL, the poor TAT statistics for AIV were causing the overall AHL TAT to be low.

There were 3 main factors causing poor TAT statistics in AIV:

- 1) Avian tests, MG MS ELISAs for chicken and turkeys, have a very high volume causing significant delays in turnaround times because *Salmonella* tube test results were held along with *Mycoplasma* ELISAs as both tests were in the same “fax group” for reporting. *Mycoplasma* ELISAs produce a large number of reactors that need to be further tested to confirm their true, negative status. Since confirmatory testing by hemagglutination inhibition has been routinely carried out once a week this would add additional days to the report release. Although *Salmonella* tube agglutination (Pullorum and Typhoid) tests would have been completed, results wouldn’t go out until MG MS ELISA results were approved. This has been recently corrected by re-assigning “fax groups” for reporting. The frequency of confirmatory testing for *Mycoplasma* ELISA reactors will have to be increased to improve the TATs for *Mycoplasma* ELISAs themselves. Re-evaluation of expectation from clients and published TATs may need to be re-examined, i.e. why is the MG-MS ELISA published TAT 10 days and MM ELISA published TAT 8 days – yet those tests belong to the same reporting “fax group”. Finally, better training and scheduling of human resources will be carried out for more efficiency. This has been initiated by assigning a virology Technical Supervisor position and having morning meetings to evaluate daily workload fluctuations. Further, an SOP has been revised and 5 methods combined into one. Staff are currently being trained and implementation of this change will improve TATs.
- 2) The Avian Virology lab has been working on several AHSI-related projects which have impacted the TAT for this fiscal year. The enhanced surveillance for viral and bacterial pathogens in commercial broiler chicken flocks in Ontario is an example of a project that has delayed sample collection and ordered tests.

		3) For ALV testing on egg albumen samples, the client normally requests that they are not in a hurry for their results and these are done as time permits. Without these 8 procedures, the overall TAT compliance for AIV is 80.8%, and the overall AHL TAT compliance is 93%. A detailed explanation of the AIV TAT statistics is available upon request.
	Baseline (d):	Performance on Proficiency Test (PT) Panels : Biological Panels: 98% pass rate Chemistry Panels: 95% satisfactory 3% questionable 2% unsatisfactory
	Target:	<u>Biological Panels:</u> 2011-2013: ≥ 95% pass rate <u>Chemistry Panels:</u> 2011-2013: ≥ 95% satisfactory rating
	Results (2011/12):	In 2011/12 the biological sections of AHL (Avian Virology and Immunology, Bacteriology, Parasitology, Histology, and Mammalian Virology), participated in 22 PT programs. The AHL reported 199 biological PT results or panels and the results are summarized as: 1. Acceptable – 90.5% 2. Questionable – 5.5% 3. Unacceptable – 4.0% Pass Rate: 96.0% In 2011/12 the chemical sections of AHL, Clinical Pathology and Toxicology/ Soil & Nutrient, participated in 19 PT programs. The AHL reported >1,500 chemical PT results and the results are summarized as: 1. Acceptable – 91.9% 2. Questionable – 3.4% 3. Unacceptable – 4.7% Satisfaction Rating: 95.3%

The AHL participated in 41 proficiency test programs and 1749 individual proficiency tests in 2011/12.

PT programs can be divided into 2 main categories:

1. Biological programs – a panel of samples is tested or identification agrees with consensus ID and results are usually pass/fail.
2. Chemical programs - produce numerical results and the results are usually categorized as satisfactory, questionable, or unsatisfactory.

Satisfaction rating is calculated based on acceptable plus questionable results compared to the total results reported. When a PT result is identified as questionable or unacceptable, the problem is investigated, corrective action applied and documented. Summaries of biological and chemical PT results are available for on-site review.

For biological results, our initial acceptable rate for 2011/12 proficiency tests was 90.5%. This result was low based on one PRRSV indirect fluorescent antibody (IFA) proficiency panel from the NVSL. This NVSL proficiency panel is not the best match for our IFA testing, as Ontario clients need us to use a North American EU-like strain that will match viruses that may be in Ontario, whereas the NVSL proficiency panel requires the use of the Lelystad strain (European origin).

After the 2011-12 proficiency results were sent to OMAFRA, we did another round of proficiency panel testing from NVSL and learned that our IFA test is more sensitive than NVSL's IFA test. In the June 2012 proficiency tests, all of our ELISA results were again satisfactory, but we again had "unsatisfactory" IFA results (CAPA120802-44), even though our IFA results matched the ELISA results for every sample. The ELISA identifies both IgM and IgG antibodies. Investigation showed our lab uses a combined anti-IgM/IgG secondary reagent for the IFA tests, which identifies both IgM and IgG antibody, whereas NVSL looks for only IgG. Our test is more sensitive and is based on what our clients need, i.e., to detect both IgM (appears 3-5 days earlier) and/or IgG antibody in a single assay.

Based on this new information, the 2011/12 and 2012/13 proficiency report now identify the "unsatisfactory" NVSL IFA results as "questionable". This is justified as we found samples that were positive by ELISA were also positive by IFA test, where NVSL had some positive ELISA samples that were negative on the IFA tests. We believe our test to be more sensitive. In the future, we will test these NVSL IFA proficiency samples using the European Lelystad strain and only anti-IgG reagents in order to obtain satisfactory proficiency panel results. However, we will

		continue to test client samples using the North American EU-like strain and combined anti-IgG/IgM secondary reagent in order to meet our clients' needs. We need to continue to participate in this NVSL proficiency panel testing as they are the only source of the panels for both ELISA and IFA. We need to participate in proficiency panels to maintain our ISO 17025 accreditation of both the IFA test and ELISAs.
Key Outcome	Capacity and capability in place to provide coordinated and effective emergency management	
Performance Indicator AHL7	The University maintains an appropriate range of diagnostic specialties, anatomic pathology services and other technologies	
	Metric:	Level of customer satisfaction with services provided by AHL program, by commodity
	Baseline:	AHL Client Satisfaction: 98% satisfaction rating
	Target:	2011-2013: ≥ 90% satisfaction rating
	Results (2011/12):	<i>Question 5: Telephone enquiries are handled well.</i> overall satisfaction rating of 96%, i.e., ratings of 5,4,3.. <i>Question 6: Email enquiries are handled well.</i> overall satisfaction rating of 97% <i>Question 8: Test results assist in problem solving.</i> overall satisfaction rating of 97%. <i>Question 13: The services provided by AHL meet my organization's needs</i> overall satisfaction rating of 97%. <i>Question 15: What has been your average overall level of satisfaction with service from the AHL?</i> overall satisfaction rating of 99%. <i>Question 17: Will you continue to use the services of the AHL?</i> <i>Question 18: Would you recommend the AHL to others?</i> 97% of clients responded YES to the above two questions.

		Overall, the average satisfaction rating for the above questions was 97%. Client responses (as above) show an across-the-board high level of satisfaction with AHL services. There has been significant improvement to the services that AHL provides including, online access and emailing of EIA results. There are additional areas for improvement, some of which were identified by clients. For example, the following comment contains suggestions for improvement: <i>"1) Ensure that information presented on submission forms matched the info on the final reports (often final reports are incorrect). 2) Ensure that the newsletters are emailed to vets and clinics are frequently updated on common endemic diseases (i.e. BVD monitoring, bovine respiratory outbreaks, bovine abortion outbreaks, and annual stats on common disease pathogens in particular bovine)."</i>
Key Outcome	Impacts associated with animal health incidents minimized	
Performance Indicator AHL8	Emergency response plans are effectively implemented in response to emergency animal health incidents	
	Metric:	a) Adherence to the milestones in Schedule G of the OMAFRA - U of G Agreement
	Baseline:	Year 3 Milestone as defined in Schedule G of the Agreement was achieved
	Target:	2011-2013: As defined in Article 4.3 (years 2 to 5 milestones for AHL program) Schedule G of the Agreement
	Results (2011/12):	Several activities involving the AHL occurred in 2011/12 related to emergency preparedness. <u>Notifiable Avian Influenza Simulation Exercise:</u> On June 8th 2011, AHL conducted a lab testing simulation exercise to address a potential avian influenza outbreak. The AHL Virology lab was involved in the sample collection, testing and analysis portion of the simulation with support from OMAFRA and CFIA. The surge capacity portion of this exercise was audited by Dr. Victoria Bowes from the British Columbia Ministry of Agriculture. The lab testing simulation scenario commenced at 9 AM when a single submission of 480 bar-

		coded tubes were received by the accession verification clerk and forwarded to the Avian Virology Lab. Tubes had been seeded with a predetermined quantity of AIV RNA. Individual samples were uncapped and transferred to deep-well plates in the FAD lab requiring two technicians working tandem in a shared biosafety cabinet. Individual plates were walked to the extraction area as they became available. The extraction process took 1 hour to complete all 4 plates. Plates were then loaded into 2 LightCycler 480s and an ABS 7500 for PCR testing. Testing was completed shortly after 12 PM for an approximate 3 hour turnaround time from specimen receipt to test result. Reported results were submitted to veterinarians and OMAFRA staff in a timely manner. Overall the AHL Virology Lab is well positioned to support an NAI outbreak response. According to Dr. Victoria Bowes, "AHL Virology Lab has the capability and surge capacity that exceeds the practical scope of field sampling. Dr. Ojkic has a thorough understanding of the technical requirements and has implemented a number of processes that have enhanced testing efficiency (bar-coded tubes, automated de-cappers, and multi-machine staggering). <u>Foreign Animal Disease Simulation:</u> On Thursday, September 8, 2011, the AHL conducted a foreign animal disease simulation exercise at the Guelph and Kemptville necropsy laboratory sections. The goals of the exercise were: 1) to test and validate the standard operating procedures regarding management of a FAD investigation in the necropsy laboratory, and; 2) to evaluate joint co-ordination and communication among the AHL, University of Guelph, and the Canadian Food Inspection Agency. In both laboratories, the exercise involved necropsy of a feeder pig, collection of appropriate tissue samples, and communication with CFIA staff involved in picking-up samples for confirmatory diagnosis. Protocols for the disposal of the infected carcass, disinfection of contaminated facilities, and decontamination of AHL staff were also tested during the exercise. Independent evaluators at each location (Guelph – Dr. Janet Alsop, OMAFRA; Kemptville – Dr. Gordon McArthur and Ms. Jane Patterson, CFIA) were provided with an evaluation guide that outlined specific objectives, expected actions and desired timelines. Additional qualitative evaluations were elicited from AHL and CFIA staff participating in the exercise. Evaluators provided a detailed summary of their observations and recommendations, which included:
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		<u>Guelph:</u> 1. Participants' strengths - Participants were well-prepared and performed their roles thoroughly and efficiently. All objectives were completed well within the allotted time frame. 2. Participants' weaknesses – None significant. 3. Policies, plans and procedures – Additional training for gowning room procedure is desirable. Need to clarify protocol for sample bag transfer. Truck bay disinfection procedure requires revision and expansion to address CFIA concerns. Advanced training would facilitate self-quarantine procedure. 4. Additional physical resources required – Toilet (shower room); covered shelving and covers for electronic equipment; declutter truck bay. <u>Kemptville:</u> 1. Participants' strengths - Participants were well-prepared and the specific objectives of evaluating the FAD SOP were fully met. All tasks were completed within the suggested time limits. 2. Participants' weaknesses – None significant. 3. Policies, plans and procedures – Need to expand decontamination of facility to include client reception room, trim room and freezer room. Clarification was sought regarding the concurrent processing of routine cases and avoidance of cross-contamination. Disinfection of the disposal barrels was deemed problematic due to the rough, pitted exterior surfaces. 4. Additional physical resources required – Sprayer with increased capacity for disinfection. The FAD exercise was deemed a success in both of the AHL necropsy laboratories. Plans are underway to address the recommendations of evaluators. It is anticipated that the AHL will conduct annual table-top or operational exercises to enhance and maintain its emergency preparedness status. With the conduct of the notifiable exercise and the participation in a full disease outbreak simulation, the Year 4 Milestones as defined in Schedule G of the Agreement were achieved.
Key Outcome	Laboratory expertise and advice on animal health issues available to veterinary and stakeholder	

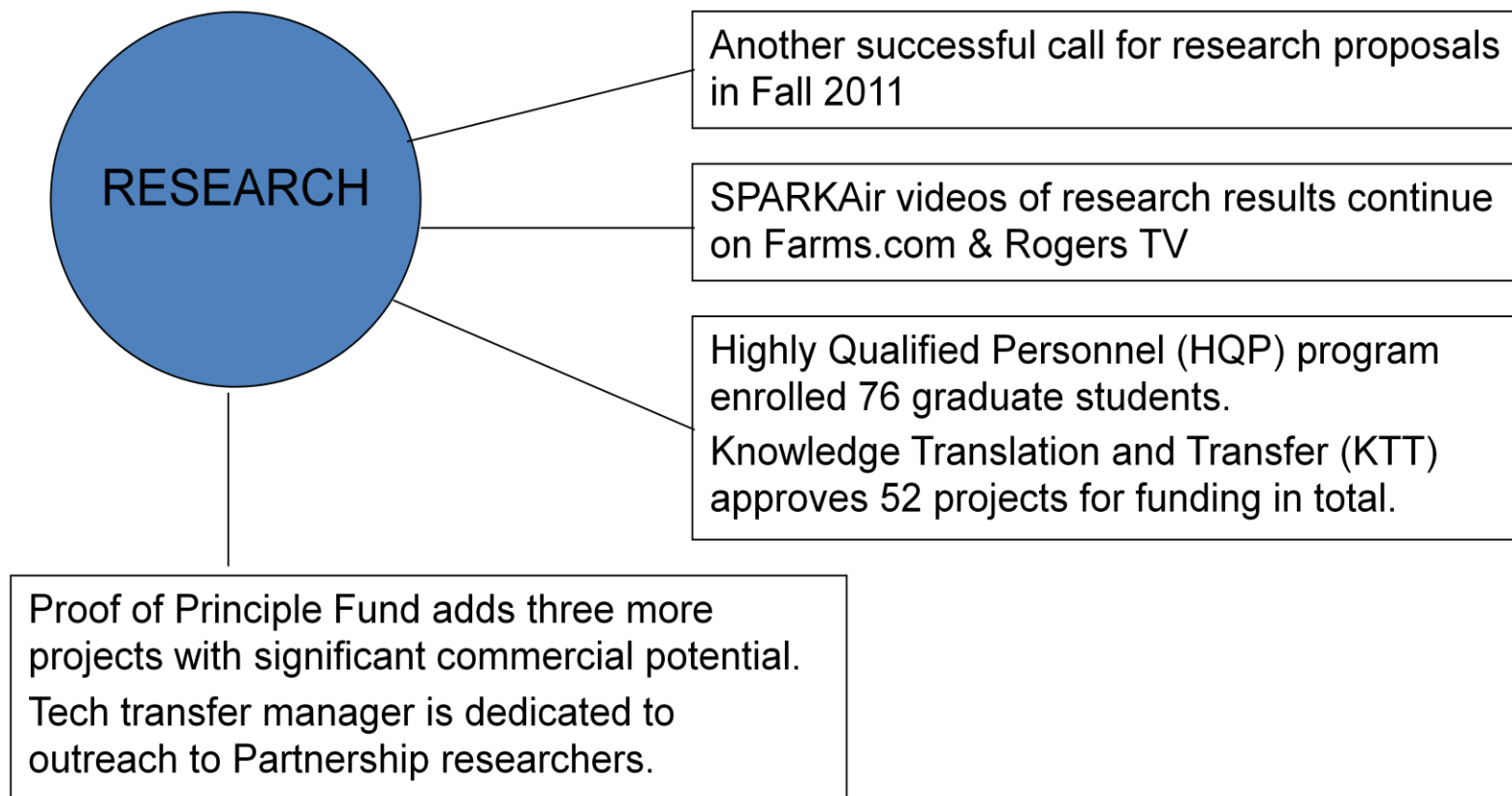
	organizations	
Performance Indicator AHL9	Effectiveness of knowledge transfer and consultations provided to veterinary practices and other stakeholders	
	Metric:	Level of customer satisfaction with services provided by AHL program, by commodity
	Baseline:	AHL Client Satisfaction: 90% satisfaction rating
	Target:	2010-2013: ≥ 85 % satisfaction rating
	Results (2011/12):	<i>Question 14: Animal Health Lab uses AHL Newsletters, LabNotes and the AHL website as well as meeting updates, scientific publications, and personal email and telephone consultation for knowledge transfer to veterinarians.</i> These were ranked in their effectiveness: 5=very effective, 1=not effective. Many clients (52% of survey respondents) are aware of and use the AHL Newsletter, LabNotes and/or the AHL website, with 97% of those respondents finding them effective. Awareness of meeting updates and use of scientific publications was somewhat less (39%), but of those, 96% found them effective. Of all survey respondents, 74% were aware of and make use of personal email and telephone consultation with 98% of those finding these consultations effective. Overall, the satisfaction rating for this question was 97%. <i>Question 20: Do you receive sufficient information on testing services that are available from the AHL?</i> 88% of respondents said YES and 12% said NO. Overall, the satisfaction rating for this PI was 92.5%. Knowledge transfer from the AHL to clients and partners occurs via in-person discussions, newsletters, contributions of scientific articles, and peer-reviewed publications. The 17 veterinarians/supervisors in the AHL are typically involved in numerous conversations with private practitioners daily, concerning individual case details, test selection, test interpretation, and technology updates. AHL staff members also attend practitioner meetings on a regular basis. For example, Dr. Jim Fairles, who is AHL's Client Service Veterinarian, provides frequent updates to the Ontario Association of Swine Veterinarians and the Ontario Association of Bovine

	Practitioners. More broadly, the AHL provides a wealth of information with emphasis on disease trend updates in the quarterly AHL Newsletter, which is distributed widely as well as being posted on the AHL website, and is well regarded. As well, AHL staff occasionally submit contributions to OMAFRA's newsletter, "Ceptor". AHL staff are regular participants at numerous conferences, e.g., the OVMA annual conference, both as exhibitors, and as guest speakers or expert panel members. Dr. Fairles (supported by Ms. Josie Given), actively markets the services of the AHL, and is in regular contact with AHL clients. As a matter of course, the AHL has added many new testing methodologies and tests; such, as porcine HEV real-time polymerase chain reaction (PCR) method, <i>Haemophilus parasuis</i> real-time PCR, and maedi-visna virus (MVV) antibody ELISA, which are presented in the AHL Newsletter. The AHL also produces a series of "LabNotes" for more in-depth analysis of current topics, e.g., concerns surrounding chicken jerky products for dogs. Finally, AHL staff contribute to a number of peer-reviewed scientific publications every year. From the analysis of survey questions related to knowledge transfer effectiveness, there are some areas for potential improvement which should be considered. While, in general, client responses show a good level of satisfaction in the area of AHL knowledge provision, there remains a significant gap in accessing and using this information by a large proportion of clients. Graphed results provided by the AHL point to the significant opportunity to improve access to scientific information and knowledge transfer.
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RESEARCH PROGRAM

Selected Performance Indicators & Accomplishments

Program Objective: High quality, high impact research results that strengthen Ontario's agriculture, food and bioproducts sectors, and rural communities



Research

Performance Indicators

Data collection for each Performance Indicator (PI) was completed with the assistance of OMAFRA. The following table summarizes the Research Program's performance according to the 10 PIs in the Agreement. The majority of the data within this table was collected and summarized from annual and final project reports submitted each year by lead researchers of OMAFRA funded projects. Other information has been provided by OMAFRA, the U of G's Business Development Office and Budget Office.

Key Outcome	Research programs reflect OMAFRA strategic needs, coordinate U of G's capacity and mobilize the province's unique competitive strengths.	
Performance Indicator R1 (a)	Comparison of actual versus planned OMAFRA - U of G Research Program spending, in total, and in each of the research theme areas.	
	Metric (a-i)	Annual actual dollars in the OMAFRA - U of G partnership research program spent on research versus planned, in total by research theme.
	Baseline:	Baseline is the allocation of project planned \$ for 2008/09 by theme.
	Target:	2010-13: Ratio of actual to planned dollars spent of 1:1.
	Results (2011/12):	See table below. The table below outlines the total amount of research funds, by theme, committed to projects and the amount of funds available for the Fall 2011 Call.

Research Program Project Operating Funds

Themes	Total Committed to Projects (April 1/08 - April 30/11)*	Total Committed to Projects Approved for 2011/12)**	Total Commitments	Overall 5-Year Theme Budget	Budget Allocation for Fall/11 Call
Ag & Rural Policy	2,778,675	616,160	3,394,835	4,000,000	605,165
Bioeconomy	3,618,443	942,074	4,560,517	5,000,000	439,483
Emergency Mgmt	1,098,891	580,880	1,679,771	2,500,000	820,229
Environmental Sust.	3,318,425	1,010,473	4,328,898	5,000,000	671,102
Food for Health	3,318,698	1,194,914	4,513,612	5,000,000	486,388
Product Development	2,680,790	456,755	3,137,545	4,500,000	1,362,455
Production Systems	7,946,894	2,035,149	9,982,043	12,000,000	2,017,957
Total	24,760,816	6,836,405	31,597,221	38,000,000	6,402,779
* includes commitments to 2nd & 3rd year projects approved to start in fiscal 2009/10 & 2010/11 ** includes commitments to 2nd & 3rd year projects approved to start in fiscal 2012/13 & 2013/14					

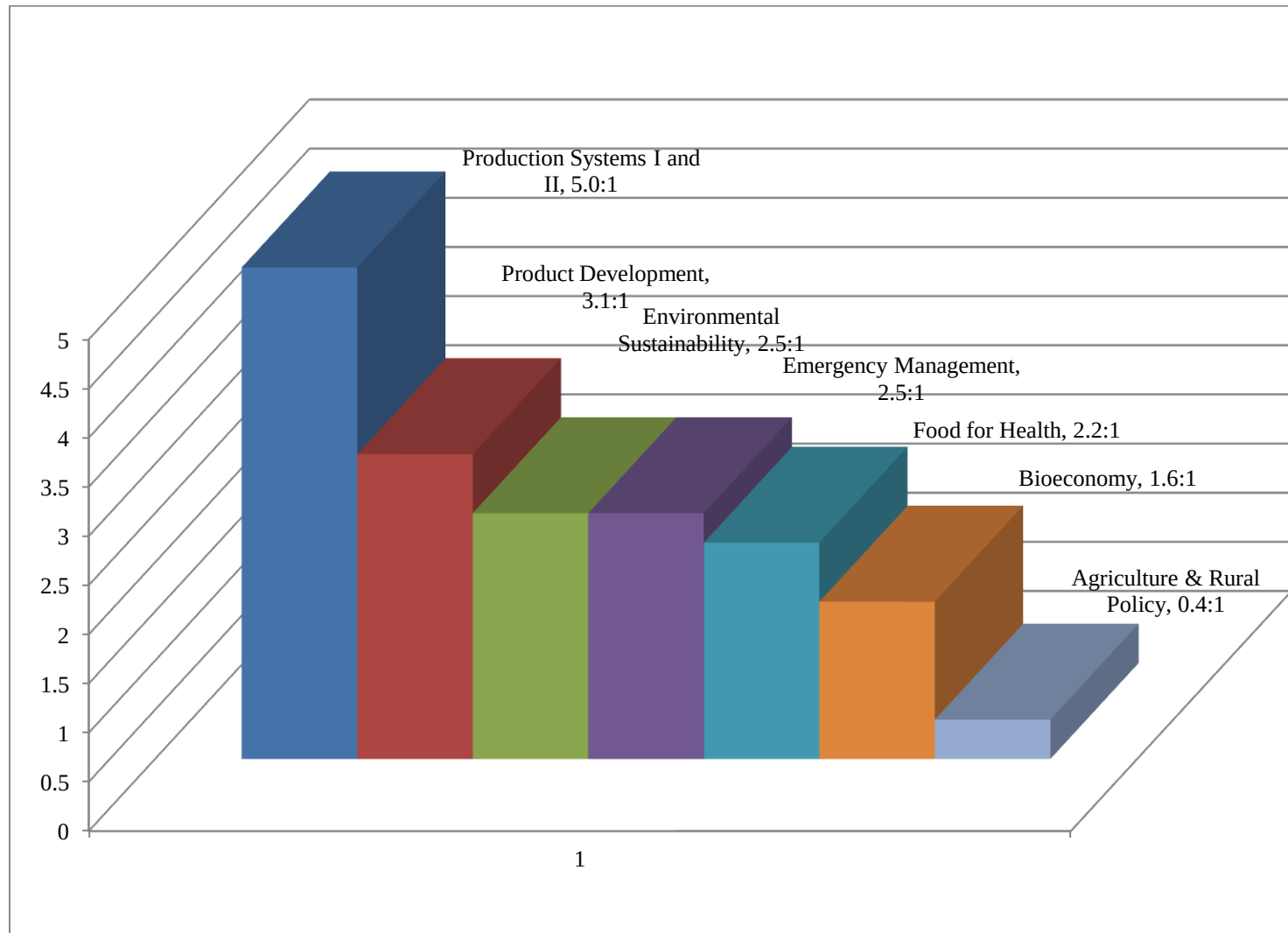
	Metric (a-ii)	Total number of projects funded in each theme area through peer review and advisory committee, compared to the number of letters of intent and proposals received (i.e., level of demand for funding) in each theme area.							
	Baseline:	The number of letters of intent (LOIs) and projects submitted, and projects funded for each of the seven research theme areas in the call of 2008/09.							
	Target:	2010-13: An adequate number of quality research proposals submitted in each research theme area, from which to select projects to be funded in each call for proposals.							
	Results (2011/12):	See table below. In both the 2010 and 2011 calls for LOIs, there were sufficient number of quality proposals submitted in each research theme.							
2011/2012 (Results from Call 2010 for projects to begin May 1, 2011)									
Theme	Ag & Rural Policy	Bioeconomy	Emerg Mgmt	Env Sust	Food	Prod Dev	Prod Syst I	Prod Syst II	Total
Number of active projects	20	15	10	23	20	13	44	60	306**
Number of LOIs*	13	16	20	30	24	18	57	N/A	178*
Number of Proposals*	7	7	14	19	14	6	30	11	108*
Number of proposals funded**	5	7	12	10	9	4	23	11	81**
* Some LOIs and proposals were reviewed under more than one theme									
** Some proposals were funded under more than one theme									
2012/2013 (Results from Call 2011 for projects to begin May 1, 2012)									
Theme	Ag & Rural Policy	Bioeconomy	Emerg Mgmt	Env Sust	Food	Prod Dev	Prod Syst I	Prod Syst II	Total
Number of active projects	28	23	29	29	30	25	76	70	310*
Number of LOIs*	11	13	17	16	21	19	74	N/A	171**
Number of Proposals*	8	6	10	9	7	14	37	41	132**
Number of Proposals funded**	6	4	10	5	4	8	22	38	97***
*Includes recently approved projects									

** Some LOIs and proposals were reviewed under more than one theme *** Some proposals were funded under more than one theme									
2010/2011									
Theme	Ag & Rural Policy	Bioeconomy	Emerg Mgmt	Env Sust	Food	Prod Dev	Prod Syst I	Prod Syst II	Total
Number of active projects	21	17	15	30	24	15	51	78	208**
Number of LOIs*	25	20	14	34	36	29	106	0	203*
Number of Proposals*	16	9	9	17	16	14	56	53	190*
Number of Proposals funded**	13	9	9	12	11	7	23	52	125**
* Some LOIs and proposals were reviewed under more than one theme ** Some proposals were funded under more than one theme									
2009/2010									
Theme	Ag & Rural Policy	Bioeconomy	Emerg Mgmt	Env Sust	Food	Prod Dev	Prod Syst I	Prod Syst Tier II	Total
Number of active projects (incl. continuing from previous Agreement)	19	10	12	19	10	10	38	51	160***
Number of LOIs*	0	0	0	0	0	0	0	0	0
Number of Proposals **	23	13	15	22	18	20	53	17	130**
Number of Proposal funded ***	12	5	11	8	6	6	26	17	65***
* The LOI process was skipped in this call and only full proposals were reviewed ** Some proposals were reviewed under more than one theme *** Some proposals were funded under more than one theme									

2008/2009									
Theme	Ag & Rural Policy	Bioeconomy	Emerg Mgmt	Env Sust	Food	Prod Dev	Prod Syst I	Prod Syst Tier II	Total
Number of active projects (incl. continuing from previous Agreement)	14*	5	2	15	9	5	13	43	92
Number of LOIs** (Last Call)	0	5	Note 1	20	10	Note 1	Note 2		35
Number of Proposals **	10	3		12	6				31
Number of Proposal funded	4	1		10	6				21
* One project was funded by the RPD discretionary fund									
** LOIs and proposals that were not funded were re-mapped as follows: RME to Environmental Sustainability, Food to Food for Health, Bioeconomy to Bioeconomy and SRC to Ag and Rural Policy. Note: for SRC only proposals were submitted ie the LOI process was skipped									
Note 1: Emergency Management & Product Development Themes did not exist at the time of the "Last Call" for LOIs.									
Note 2: No Calls for LOIs were issued under Production Systems in 2008/2009.									
Performance Indicator R1 (b)	Total external research funding to the University related to OMAFRA's Research Program in aggregate.								
	Metric (b)	Ratio of third-party investment (cash and in-kind) operating funds, leveraged by OMAFRA research program, in total and for each theme area.							
	Baseline:	2008/09: Baselines are shown in the table below.							
	Target:	2010-13: leveraged dollars to OMAFRA funding (in total, and by theme) to be ≥ 2008/09 baselines.							
	Results (2011/12):	Ratio of 2.9:1 third party investment to Agreement funding (ranging from 0.4:1 in Ag & Rural Policy to 5.0:1 in Production Systems). Total amount of third party investment - \$19.7m. Ratio is based on total OMAFRA operating funds of \$6,836,405 committed to projects approved for 2011/12 of See table in performance indicator R1(a-i).							

2011/2012 Theme	Ag & Rural Policy	Bioeconomy	Emerg Mgmt	Env Sust	Food	Prod Dev	Prod Syst I and II		Total
Cash and in-kind leveraged	237,301	1,479,933	1,458,036	2,491,600	2,569,587	1,405,427	10,079,382		19,721,266
Ratio of Third Party- Investment to OMAFRA	0.4:1	1.6:1	2.5:1	2.5:1	2.2:1	3.1:1	5.0:1		2.9:1
2010/2011 Theme	Ag & Rural Policy	Bioeconomy	Emerg Mgmt	Env Sust	Food	Prod Dev	Prod Syst I and II		Total
Cash and in-kind leveraged	158,640	2,084,502	785,209	1,529,965	2,604,688	901,011	10,387,414		18,451,429
Ratio of Third Party- Investment to OMAFRA	0.2:1	2.0:1	2.0:1	1.5:1	2.4:1	1.4:1	5.2:1		2.6:1
2009/2010 Theme	Ag & Rural Policy	Bioeconomy	Emerg Mgmt	Env Sust	Food	Prod Dev	Prod Syst I and II		Total
Cash and in-kind leveraged	466,379	1,103,453	406,720	1,304,577	1,217,062	559,929	13,527,734		18,585,854
Ratio of Third Party- Investment to OMAFRA	0.6:1	2.3:1	1.5:1	1.7:1	2.1:1	1:1	5.7:1		3.2:1
2008/2009 Theme	Ag & Rural Policy	Bioeconomy	Emerg Mgmt	Env Sust	Food	Prod Dev	Prod Syst I and II		Total
Cash and in-kind leveraged	283,900	323,626	500	1,037,475	782,324	734,324	5,990,994		9,153,412
Ratio of Third Party- Investment to OMAFRA	1:1	0.7:1	0.1:1	1.8:1	2.2:1	1.1:1	4:1		2.3:1

Ratio of Third Party Investment to OMAFRA Operating Funds, by Research Program Theme in 2011/12



	Metric (c)	Total external research dollars attracted each year by the University related to the research program areas in total.
	Baseline:	The baseline for 2008/09 of leveraged dollars to OMAFRA funding is \$54.6 million of external research dollars relative to \$51.4 million OMAFRA – UofG Agreement Research expenditures, or a ratio of approx. 1.1:1. This was determined by recalculating the actual leverage of “total external research dollars related to the OMAFRA research programs” in 2007/08 relative to the new \$7.6 million base of project operating funding.
	Target:	2010-13: Total external dollars leveraged is to be ≥ 2008/09 baseline of \$54.6 million.
	Results (2011/12):	2011/12 results: \$37.1 million of external funds were leveraged from OMAFRA’s \$56.9M investment. The reduction in total external research dollars attracted has been largely due to a significant drop in other provincial funding each year, as well as that of business and industry (see table below).

Fiscal Year	Total U of G Research Funding (' 000) (Note 1)	Total OMAFRA Partnership Research Funding ('000) see Financial Table pg 44	Funding Leveraged from OMAFRA Agreement					Ratio
			Total Funding from All Sources (Est. ' 000)	Breakdown by Source (Note 2)				
				Federal	OMAFRA	Other Provincial	Business / Industry / Private / Other	
2011/2012	141,748	56,958	37,129	24,740	1,253	418	10,718	(37.1:57.0) 0.7:1
2010/2011 (Note 3)	141,494	52,309	49,525	23,206	1,668	7,783	16,868	(49.5:52.3) 0.9:1
2009/2010	158,954	50,604	59,326	27,765	3,354	10,190	18,018	(59.3:50.6) 1.2:1
2008/2009	159,093	51,388	54,651	35,400	3,428	3,007	12,816	(54.6 : 51.4) 1.1:1

Note 1: "Funding Leveraged from OMAFRA Contract" (thousands of \$) is the total of all individual research project awards from all sources other than the OMAFRA - U of G Agreement for projects (across all U of G Departments/researchers) which support the objectives of OMAFRA's research priorities. **"Total U of G Research Funding"** is the total of all research projects (including OMAFRA - U of G Agreement projects), regardless of whether or not they support OMAFRA's priorities.

Note 2: **"Breakdown by Source"** shows the **"Funding Leveraged from the OMAFRA Agreement"** by the source of the funding (**"Federal"** includes NSERC, SSHRC, CIHR, CFI, all federal departments, etc.; **"OMAFRA"** includes OMAFRA's 'competitive research programs' such as New Directions, etc.; **"Other Provincial"** includes funding from all other provincial ministries or agencies; and **"Business/Industry/Private/Other"** includes all other sources.

Note 3: Values for "Total Research Funding" and "Leverage as % of Total" were adjusted slightly from the values used in the 2010/2011 OMAFRA-UofG Partnership Annual report, to reflect the actual "Total Research Funding" value for 2010/2011 as finalized and published on the UofG Office of Research website.

Explanation of Results: Total funding 'Leveraged from the OMAFRA Partnership' from all sources (including OMAFRA outside the Partnership and other Provincial Ministries, as well as Federal, and Business/Industry/Private/Other sources) dropped by almost \$12.4 Million (25%) from 2010/2011.

	Metric (d)	Number and list of active research projects funded, by program area.																																																						
	Baseline:	Number of active research projects established as per performance indicator 1(a-ii), above.																																																						
	Target:	2010-13: Targets for number of projects funded in each area to be ≥ 2008/09 levels.																																																						
	Results (2011/12):	<table><tr><td><u>Number of Active Projects by Theme</u></td><td><u>2011/12</u></td><td><u>2010/11</u></td><td><u>2009/10</u></td><td><u>2008/09</u></td></tr><tr><td>Agricultural and Rural Policy:</td><td>23</td><td>27</td><td>19</td><td>14*</td></tr><tr><td>Bioeconomy – Industrial Uses:</td><td>22</td><td>17</td><td>10</td><td>5</td></tr><tr><td>Emergency Management:</td><td>22</td><td>16</td><td>12</td><td>2</td></tr><tr><td>Environmental Sustainability:</td><td>33</td><td>30</td><td>19</td><td>15</td></tr><tr><td>Food for Health:</td><td>27</td><td>24</td><td>10</td><td>9</td></tr><tr><td>Product Development:</td><td>18</td><td>16</td><td>10</td><td>5</td></tr><tr><td>Production Systems I:</td><td>67</td><td>51</td><td>38</td><td>13</td></tr><tr><td>Production Systems II:</td><td>75</td><td>77</td><td>51</td><td>43</td></tr><tr><td>Total number of Active Projects:</td><td>287****</td><td>230***</td><td>160**</td><td>92</td></tr></table> * one project funded by Research Program Director discretionary fund **9 projects are funded in more than one theme *** 28 projects are funded in more than one theme ****26 projects are funded in more than one theme See Table in performance indicator R1 (d) for a complete listing of 2011/12 projects					<u>Number of Active Projects by Theme</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	<u>2008/09</u>	Agricultural and Rural Policy:	23	27	19	14*	Bioeconomy – Industrial Uses:	22	17	10	5	Emergency Management:	22	16	12	2	Environmental Sustainability:	33	30	19	15	Food for Health:	27	24	10	9	Product Development:	18	16	10	5	Production Systems I:	67	51	38	13	Production Systems II:	75	77	51	43	Total number of Active Projects:	287****	230***	160**	92
<u>Number of Active Projects by Theme</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	<u>2008/09</u>																																																				
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Total number of Active Projects:	287****	230***	160**	92																																																				
	Metric (e)	Level of utilization of research stations.																																																						
	Baseline:	Established based on 2008/09 data. Utilization to be reported in three ways – i) # of projects using each station, ii) percentage of utilization and iii) \$ value of research station usage																																																						
	Target:	2010-13: Research station utilization to be ≥ 2008/09 levels.																																																						
	Results	Explanatory Note:																																																						

(2011/12):	Although 'Percentage Utilization' rates for most of the livestock stations (including Alma Aquaculture Station) may appear low, this is in large part attributable to the fact that most of these are based on a breeding herd/flock, and thus it is necessary to 'carry' an inventory of animals covering the full age span (neonates to fully mature production animals). As a consequence, a much smaller percentage of the total animal population are utilized in research projects, but those that are may be used relatively intensively/extensively. For the crops-based stations, the percent utilization values can vary from very high (where acreage dedicated to research is relatively small, and the balance of the station acreage is used for feed production for nearby livestock stations, i.e., Arkell, Alfred, NLARS, Kemptville) to much lower by comparison (where 'excess acreage' has limited utility for alternative use, i.e., Vineland, Woodstock.) Most crops sites fall between these extremes, reflecting the relatively efficient use of crop acreage in research (allowing for generally a 3 or 4 year crop rotation), which results in 'utilization rates' of approximately 33% or 25% respectively.
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Animal Research Stations		Number of Projects OMAFRA / U of G Projects		Percentage of utilization- (note this includes all research not just OMAFRA / U of G projects)		\$ value of research station usage for all active OMAFRA - U of G Projects	
		2011/12	Average of 3 years (10/11, 09/10, 08/09)	2011/12	Average of 3 years (10/11, 09/10, 08/09)	2011/12	Average of 3 years (10/11, 09/10, 08/09)
Arkell Poultry		15	12.0	97.9	18.5	453,284	408,204
Arkell Swine		9	9.3	61.0	14.2	348,343	311,101
Arkell Equine		7	5.0	73.3	38.2	214,438	138,100
Elora/Ponsonby Dairy		11	10.0	22.0	9.9	351,288	176,939
Elora Beef		7	3.3	47.0	68.2	919,295	901,461
Ponsonby Sheep		2	3.7	36.0	16.6	133,072	75,311
Ponsonby General *	Sheep	8	6.7	100.0	82.0	84,308	95,565

*Note this research station does not maintain a resident herd/flock so all animals are used for research	Cattle	4	2.3	20.0	69.0	32,031	43,673
	Swine	3	0.0	100.0	33.3	33,265	N/A
Alma Aquaculture							
(in tank days)	Tanks	5	4.7	19.0	19.5	49,908	73,111
Alfred Dairy		0	0.7	0	11.4	0	15,192
Kemptville Dairy		5	2.7		37.4	72,251	95,395
New Liskeard (NLARS) Beef **		3	3.0	8.0	8.0	153,827	Not Available
** NLARS Beef is the source of calves for Elora Beef so nearly all animals are used for research at Elora							
Ridgetown Swine		1	2.3		31.5	0	122,824
Crop Research Stations		Number of OMAFRA - U of G Projects		Percentage of utilization- note this includes all research not just OMAFRA - U of G projects		\$ value of research station usage for all active OMAFRA - U of G Projects	
		2011/12	Average of 3 years (10/11, 09/10, 08/09)	2011/12	Average of 3 years (10/11, 09/10, 08/09)	2011/12	Average of 3 years (10/11, 09/10, 08/09)
Arkeil Crops		2	2.3	100	100.0	1,382	2,507

Elora Crops		24	20.7	70.3	39.4	319,418	251,446
Alfred Crops		0	1.7	0	55.3	0	20,160
NLARS Crops		4	3.0	81.3	100.0	10,384	29,166
Emo Crops		3	2.3	100.0	100.0	1,687	84,856
Ridgetown Crops		12	15.7	39	49.8	81,223	219,764
Kemptville Crops **		2	5.0	1.5	90.9	1,043	120,403
Simcoe		12	9.3	50.0	29.5	288,338	138,445
Vineland		2	6.3	3.1	15.7	2325	75810*
Guelph Turfgrass		13	9.0	79.0	56.3	71,494	57,058
Bradford Muck Crops		4	4.3	100.0	50.4	53,700	77,417
Woodstock Crops		9	6.3	21	12.0	68,213	65,073
Total (all crops and livestock stations)		167	149.7			3,744,514	3,558,040
*Vineland in 2010/2011 was \$0							

** 300 of the 350 acres available are used to produce feed for the equine/dairy programs at Kemptville.

Key Outcome	A critical mass of world class faculty, technical staff and graduate students addressing OMAFRA critical challenges and opportunities.		
Performance Indicator R2	Total faculty and research personnel employed by the University related to OMAFRA research themes, and the proportion funded through the OMAFRA - U of G Research Program.		
	Metric (a)	Total number of faculty full time equivalents (FTEs) and list of faculty and CARG researchers showing area of expertise, employed at the university related to theme areas.	
	Baseline:	Established at 128 Faculty Research FTEs	
	Target:	2010-13: Number of FTEs to be ≥ 2008/09 baseline.	
	Results (2011/12):	2011/12 Results 105 Faculty Research FTEs	
	<u>Research / Researcher Awards supportive of OMAFRA priorities</u>		
	No. of Researchers engaged in research supportive of OMAFRA priorities	"Faculty Research FTEs" focused on OMAFRA-related priorities (Note 1)	No. of OMAFRA-Supportive Research Awards (outside the OMAFRA - U of G Partnership)
2011/12 Total:	236	105	593
2010/11 Total:	224	102	654
2009/10 Total:	265	115	737
2008/09 Total	280	128	852

"Research FTE" (Research Full Time Equivalent) should not be confused with faculty FTE. Each faculty member has a defined "Distribution of Effort (DOE)" apportioning their full FTE to 'research', 'teaching' and 'service'. In some departments (i.e., CA, CSAHS) the majority of faculty may have a relatively low 'Research DOE' (therefore low Research FTE, say 0.25), whereas in some other Colleges/Departments (i.e., OAC, OVC) a greater number of faculty may have a much higher 'Research DOE' (therefore a higher Research FTE, perhaps 0.5 or 0.6).

Note 1: *'Portion of "Research FTE" focused on OMAFRA-related priorities'* is estimated for each researcher based on the value of their OMAFRA-supportive research awards received as a portion of their total research awards received. These individual research FTE portions were averaged across those faculty with some portion of their research time engaged on OMAFRA Supportive Research project(s).

Explanation of Results: (for Research Performance Indicator R#2 a) Total number of UofG Faculty FTEs and list of faculty and CARG researchers showing area of expertise related to Theme areas).

For 2011/12 it is estimated that the "Total number of Faculty FTEs showing expertise related to Theme areas" (i.e., engaged in research supportive of OMAFRA priorities) is approximately 211 'Research FTEs' (compared to 204 in the previous year). This increase in Research FTEs engaged in OMAFRA-supportive research is a combination of an increase in the number of researchers so engaged (236 in 2011/2012, up from 224 in previous year, with the increases primarily in OVC and CME overriding reductions in CBS and CPES) albeit at a slightly reduced portion of their Research FTE, on average (89% in 2011/2012, down from 91% in previous year). These 211 'Research FTEs' would equate to approximately 105 full person FTEs of time devoted to research, if one were to assume, reasonably, that on average (across all UofG faculty) a 'research FTE' represents 0.5 of each faculty member's full FTE (see note above explaining 'Research FTE' and diversity across Colleges).

There was a broad diversity between departments, with 113 out of 133 researchers in OAC receiving funding in 2011/2012 for research related to OMAFRA priorities (for 357 out of 408 OAC research projects), whereas only 4 out of 30 researchers in the College of Management and Economics received funding for research related to OMAFRA priorities (for 6 out of 37 CME research projects). For added context, these 236 researchers across all UofG Colleges that received funding awards for research supportive of OMAFRA priorities were out of total number of 530 researchers receiving awards for any research in 2011/2012 (down from 545 in 2010/2011).

Overall, there was a substantial drop in the number of projects supportive of OMAFRA research priorities which received funding in 2011/2012 (593, down from 654 in 2010/2011). However, this trend was reflective of the broader University trends wherein there was a decrease in the overall number of projects that received research funding outside of the OMAFRA-UofG Partnership (1,253 in 2011/2012, down from 1,290 in the previous year), a trend possible compounded by the reduced number of researchers receiving awards, as noted above.

A listing of faculty engaged in research supportive of OMAFRA priorities, along with their area of expertise and relation to the OMAFRA Themes has been compiled (based on 2008/09 projects) and provided to OMAFRA.

Metric (b-i)	Number of faculty FTEs funded by OMAFRA partnership
Baseline:	65 faculty FTEs as of 2008/09, compared to ~52 faculty FTEs as of 2007/08
Target:	2010-13: to retain the number of faculty FTEs to the 2008/09 level as possible, but may erode due to inflation & other financial pressures.

	Results (2011/12):	Number of faculty FTEs specifically allocated to OMAFRA Partnership research projects: Total: 68.79 plus an HQP Director at 0.30 (this is not included below). <table><tr><th>By Theme</th><th>2011/12</th><th>2010/11</th><th>2009/10</th><th>2008/09</th></tr><tr><td>Agricultural and Rural Policy:</td><td>5.98</td><td>4.31</td><td>3.31</td><td>2.10</td></tr><tr><td>Bioeconomy – Industrial Uses:</td><td>3.31</td><td>2.86</td><td>1.79</td><td>1.20</td></tr><tr><td>Emergency Management:</td><td>3.74</td><td>3.22</td><td>2.32</td><td>0.80</td></tr><tr><td>Environmental Sustainability:</td><td>9.57</td><td>9.37</td><td>5.20</td><td>5.10</td></tr><tr><td>Food for Health:</td><td>8.63</td><td>6.60</td><td>3.69</td><td>2.20</td></tr><tr><td>Product Development:</td><td>2.76</td><td>2.94</td><td>3.37</td><td>2.50</td></tr><tr><td>Production Systems I:</td><td>19.09</td><td>17.87</td><td>22.81</td><td>25.20</td></tr><tr><td>Production Systems II:</td><td>15.71</td><td>15.82</td><td>12.38</td><td>13.00</td></tr><tr><td>Totals</td><td>68.79</td><td>62.99</td><td>54.87</td><td>52.10</td></tr></table>	By Theme	2011/12	2010/11	2009/10	2008/09	Agricultural and Rural Policy:	5.98	4.31	3.31	2.10	Bioeconomy – Industrial Uses:	3.31	2.86	1.79	1.20	Emergency Management:	3.74	3.22	2.32	0.80	Environmental Sustainability:	9.57	9.37	5.20	5.10	Food for Health:	8.63	6.60	3.69	2.20	Product Development:	2.76	2.94	3.37	2.50	Production Systems I:	19.09	17.87	22.81	25.20	Production Systems II:	15.71	15.82	12.38	13.00	Totals	68.79	62.99	54.87	52.10
By Theme	2011/12	2010/11	2009/10	2008/09																																																
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	Metric (b-ii)	Total number of research personnel FTEs (i.e. post-doctoral students, graduate students, research associates), that are funded through the OMAFRA / UG Partnership, in total and by research theme area.																																																		
	Baseline:	2008/09: 113 research personnel (post-doctoral students, graduate students, research associates) funded through OMAFRA approved projects.																																																		
	Target:	2009-13: to retain the number of research personnel FTEs to the 2008/09 level as possible, but may erode due to inflation & other financial pressures.																																																		
	Results (2011/12):	Total number of research personnel FTEs: 215.80 A change in the reporting template has provided a more thorough reporting of research personnel FTE's, thus providing a more accurate account of the FTE's. <table><tr><th>By Theme</th><th>2011/12</th><th>2010/11</th><th>2009/10</th><th>2008/09</th></tr><tr><td>Agricultural and Rural Policy:</td><td>16.50</td><td>14.20</td><td>14.13</td><td>4.00</td></tr><tr><td>Bioeconomy – Industrial Uses:</td><td>14.25</td><td>15.46</td><td>5.00</td><td>0.09</td></tr><tr><td>Emergency Management:</td><td>23.75</td><td>23.06</td><td>7.50</td><td>1.90</td></tr></table>	By Theme	2011/12	2010/11	2009/10	2008/09	Agricultural and Rural Policy:	16.50	14.20	14.13	4.00	Bioeconomy – Industrial Uses:	14.25	15.46	5.00	0.09	Emergency Management:	23.75	23.06	7.50	1.90																														
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Emergency Management:	23.75	23.06	7.50	1.90																																																

		Environmental Sustainability:	15.10	12.85	10.01	11.80
		Food for Health:	34.80	23.46	15.85	5.14
		Product Development:	20.21	13.21	7.38	0.29
		Production Systems I:	56.28	40.87	18.18	57.18
		Production Systems II:	34.91	30.77	42.70	32.44
		Totals	215.80	173.88	120.75	112.84
	Metric(b-iii)	Number of faculty, CARG researchers and research personnel FTEs that are funded through the OMAFRA U of G Partnership in total and by research theme area.				
	Baseline:	2008/09: Established at 172 faculty and CARG researchers funded through the partnership in total.				
	Target:	2010-13: to retain the number of FTEs as close to the 2008/09 level as possible, but may erode due to inflation & other financial pressures.				
	Results (2011/12):	Total number of Faculty, CARG & Research Personnel FTEs: 286.91 A change in the reporting template has provided a more thorough reporting of personnel FTE's, thus providing a more accurate account of the FTE's.				
		Total FTEs by Theme	2011/12	2010/11	2009/10	2008/09
	Agricultural and Rural Policy:	20.78	18.86	20.89	6.24	
	Bioeconomy – Industrial Uses:	18.93	19.04	7.69	2.10	
	Emergency Management:	25.58	26.61	9.82	2.65	
	Environmental Sustainability:	25.42	24.61	19.59	19.59	
	Food for Health:	43.82	30.41	7.34	7.34	
	Product Development:	22.91	16.15	2.79	2.79	
	Production Systems I:	77.15	60.87	84.74	84.74	
	Production Systems II:	52.32	48.19	46.52	46.52	
	Totals	286.91	244.74	181.98	171.97	

Key Outcome		
A critical mass of world class faculty, technical staff and graduate students addressing OMAFRA critical challenges and opportunities		
Performance Indicator R3	Level of recognition of faculty and students by their peers.	
	Metric (a)	Number of Faculty/researchers/staff related to the research theme areas, recognized by their peers through research chairs, awards of recognition, appointment to prestigious positions (international panels) and leadership of national and international research initiatives
	Baseline:	In 2008/09, 25 U of G faculty members were Canada Research Chair holders, of which 10 had active OMAFRA research projects. Same as performance indicator OA1 metric (c).
	Target:	2010-13: Recognition as indicated by awards, appointments etc. to be $\geq$ 2008/09.
	Results (2011/12):	During 2011/12, 34 faculty members at the U of G were Canada Research Chair holders, of which 14 had active OMAFRA research projects.
	Metric (b)	U of G's position compared to other Canadian universities, and their ranking in the previous year in the comprehensive category as published annually by Research Money Inc.
	Baseline:	Research Money Inc.'s 2009 rankings put U of G in second place among Canadian 'comprehensive' universities. Same as performance indicator OA1 metric a).
	Target:	2010-13: U of G's ranking to be second or better among comprehensive universities in Canada.
	Results (2011/12):	Research Money Inc.'s most current (2011) rankings put U of G in second place among Canadian 'comprehensive' universities. The 2012 results will be available October 2012 and will be reported in the 2012/13 Annual Report.
	Metric (c)	Number of faculty who publish in high impact journals.
	Baseline:	91 faculty published in high impact journals in 2008/09. 'High impact' journals were identified by OMAFRA - U of G research program directors.
	Target:	2010-13: Number of faculty publishing in high impact journals to be $\geq$ 2008/09 baseline.

	Results (2011/12):	Total number of faculty published in high impact journals: 85																																																												
		<table><tr><th>No. of Faculty by Theme</th><th>2011/12</th><th>2010/11</th><th>2009/10</th><th>2008/0</th></tr><tr><td>Agricultural and Rural Policy:</td><td>8</td><td>3</td><td>2</td><td>3</td></tr><tr><td>Bioeconomy – Industrial Uses:</td><td>2</td><td>1</td><td>3</td><td>3</td></tr><tr><td>Emergency Management:</td><td>0</td><td>0</td><td>2</td><td>0</td></tr><tr><td>Environmental Sustainability:</td><td>12</td><td>8</td><td>5</td><td>5</td></tr><tr><td>Food for Health:</td><td>13</td><td>2</td><td>1</td><td>7</td></tr><tr><td>Product Development:</td><td>6</td><td>4</td><td>0</td><td>6</td></tr><tr><td>Production Systems I & II:</td><td>44</td><td>44</td><td>75</td><td>67</td></tr><tr><td>Totals</td><td>85</td><td>62</td><td>88</td><td>91</td></tr></table>																No. of Faculty by Theme	2011/12	2010/11	2009/10	2008/0	Agricultural and Rural Policy:	8	3	2	3	Bioeconomy – Industrial Uses:	2	1	3	3	Emergency Management:	0	0	2	0	Environmental Sustainability:	12	8	5	5	Food for Health:	13	2	1	7	Product Development:	6	4	0	6	Production Systems I & II:	44	44	75	67	Totals	85	62	88	91
No. of Faculty by Theme	2011/12	2010/11	2009/10	2008/0																																																										
Agricultural and Rural Policy:	8	3	2	3																																																										
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Totals	85	62	88	91																																																										
Key Outcome	High quality research focused on OMAFRA priorities																																																													
Performance Indicator R4	Scientific merit and relevance of research projects in each research theme area supported through the Agreement.																																																													
	Metric (a)	Report how composition of advisory committee is representative of stakeholders in each theme																																																												
	Baseline:	2008/09 baseline for stakeholder representation is described in ‘Theme Research Proposal Review’.																																																												
	Target:	2010-13: adequate representation of stakeholders on advisory committees, as achieved in 2008/09.																																																												
	Results (2011/12):	See table below that indicates satisfactory representation of stakeholders in 2011/12.																																																												
Theme	Ag & Rural Policy		Bioeconomy		Emerg Mgmt		Env Sust		Food		Prod Dev		Prod Syst - Livestock		Prod Syst - Plants																																															
	LOI	FP	LOI	FP	LOI	FP	LOI	FP	LOI	FP	LOI	FP	LOI	FP	LOI	FP																																														
Research /Scientific	3	3	2*	2*	4	4	3	2	3	3	2	2	4	4	2	2																																														
OMAFRA / Gov’t	6	6	4	4	4	4	4	4	4	4	4	4	3	3	5	5																																														
User Community /	5	3	3	3	1**	1	1	2	1	2	3***	2*	3	2**	3	2																																														

Industry / Non-Gov't																
Total	9	12	9	9	9	9	8	8	9	9	9	8	10	9	10	9
LOI – Letters of Intent FP – Full Proposals * 3 Accepted; however, only 2 participated; **2 Accepted; however, only 1 participated *** 5 Accepted; however, only 3 participated																

	Metric (b)	Total number of publications in peer reviewed journals and % of those appearing in high impact journals (as identified by Research Program Directors).																																																
	Baseline:	2008/09 baseline of 265 publications, 57% of which were in ‘high impact’ journals.																																																
	Target:	2010-13: Number of publications and % in high impact journals to be≥ 2008/09 baselines.																																																
	Results (2011/12):	Total number published in peer reviewed journals: 162. Total percentage in high impact journals: 52% <u>Total number of publications in peer reviewed journals (by theme), & ratio in high impact journals</u> <table><tr><td>Theme</td><td>2011/12</td><td>2010/11</td><td>200 /10</td><td>2008/09</td></tr><tr><td>Agricultural and Rural Policy:</td><td>5 - 63%</td><td>3 - 100%</td><td>3 - 66%</td><td>8 - 50%</td></tr><tr><td>Bioeconomy – Industrial Uses:</td><td>23 - 9%</td><td>6 - 17%</td><td>3 - 66%</td><td>8 - 75%</td></tr><tr><td>Emergency Management:</td><td>3 - 0%</td><td>0 - 0%</td><td>2 - 50%</td><td>0 - 0%</td></tr><tr><td>Environmental Sustainability:</td><td>19 - 63%</td><td>8 - 100%</td><td>9 - 89%</td><td>6 - 67%</td></tr><tr><td>Food for Health:</td><td>17 - 76%</td><td>7 - 29%</td><td>5 - 20%</td><td>17 - 35%</td></tr><tr><td>Product Development:</td><td>13 - 46%</td><td>10 - 40%</td><td>14 - 0%</td><td>10 - 10%</td></tr><tr><td>Production Systems I & II:</td><td>82 - 54%</td><td>62 - 71%</td><td>144 - 59%</td><td>216 - 58%</td></tr><tr><td>Totals</td><td>162 – 52%</td><td>96 - 65%</td><td>180 - 49%</td><td>265 - 57%</td></tr></table>					Theme	2011/12	2010/11	200 /10	2008/09	Agricultural and Rural Policy:	5 - 63%	3 - 100%	3 - 66%	8 - 50%	Bioeconomy – Industrial Uses:	23 - 9%	6 - 17%	3 - 66%	8 - 75%	Emergency Management:	3 - 0%	0 - 0%	2 - 50%	0 - 0%	Environmental Sustainability:	19 - 63%	8 - 100%	9 - 89%	6 - 67%	Food for Health:	17 - 76%	7 - 29%	5 - 20%	17 - 35%	Product Development:	13 - 46%	10 - 40%	14 - 0%	10 - 10%	Production Systems I & II:	82 - 54%	62 - 71%	144 - 59%	216 - 58%	Totals	162 – 52%	96 - 65%	180 - 49%
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Emergency Management:	3 - 0%	0 - 0%	2 - 50%	0 - 0%																																														
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Totals	162 – 52%	96 - 65%	180 - 49%	265 - 57%																																														
	Metric (c)	Number of collaborations and/or partnerships with external institutions.																																																
	Baseline:	Number of collaborators in 2008/09 (265) will be the baseline.																																																
	Target:	2010-13: Number and significance of collaborations and/or partnerships targeted to be ≥ 2008/09 baseline.																																																
	Results (2011/12):	i) Total number of collaborators for continuing projects in 2011/12: 345 ii) Total number of collaborators for new projects approved for 2011/12: 124																																																

	<u>Collaborators by theme: i)</u> Agricultural and Rural Policy: 17 (includes 19 OMAFRA staff) Bioeconomy – Industrial Uses: 53 (includes 10 OMAFRA staff) Emergency Management: 17 (includes 7 OMAFRA staff) Environmental Sustainability: 54 (includes 15 OMAFRA staff) Food for Health: 41 (includes 1 OMAFRA staff) Product Development: 27 (includes 2 OMAFRA staff) Production Systems I & II: 136(includes 50 OMAFRA staff)	<u>Collaborators by theme: ii)</u> 8 13 (includes 6 OMAFRA staff) 14 (includes 3 OMAFRA staff) 13 (includes 9 OMAFRA staff) 18 (includes 2 OMAFRA staff) 12 (includes 1 OMAFRA staff) 46 (includes 18 OMAFRA staff)
Results (2010/11)	i) Total number of collaborators for continuing projects in 2010/11: 168 ii) Total number of collaborators for new projects approved for 2010/11: 269	
Results (2009/10)	i) Total number of collaborators for continuing projects in 2009/10: 203 ii) Total number of collaborators for new projects approved for 2009/10:167	
Results (2008/09)	i) Total number of collaborators for continuing projects in 2008/09: 230 ii) Total number of collaborators for new projects approved for 2008/09: 47	

Key Outcome		High quality research focused on OMAFRA priorities																		
Performance Indicator R5	Benefits to the economy, the environment and the health and well-being of the province, generated from the Research Program.																			
	Metric	One case study completed annually of initiatives undertaken related to each research theme that impacted Ontario This outcome would also be assessed by the Expert Review of each research theme area scheduled at the end of five years.																		
	Baseline:	One case study provided from the 2008/09 research of each research theme.																		
	Target:	2010-13: a case study to be provided annually from each research theme, for use by the Expert Review at year five.																		
	Results (2011/12):	One case study is provided for each theme (two for Production Systems – livestock and crops) and included in the Program Highlight section of this annual report.																		
Key Outcome		Highly skilled U of G graduates meet changing workforce demands																		
Performance Indicator R6	Level of engagement of University graduate students in OMAFRA - U of G research projects.																			
	Metric (a)	Total number of graduate students working on research projects related to each theme areas, under the Partnership.																		
	Baseline:	140 grad students in 2008/09.																		
	Target:	2010-13: Number of grad students to be maintained at 2008/09 level, but may decline due to inflation.																		
	Results (2011/12):	<table><tr><th>Graduate Students by Theme</th><th>2011/12</th><th>2010/11</th><th>2009/10</th><th>2008/09</th></tr><tr><td>Agricultural and Rural Policy:</td><td>15.00</td><td>12.60</td><td>21.00</td><td>4.00</td></tr><tr><td>Bioeconomy – Industrial Uses:</td><td>7.50</td><td>8.45</td><td>0.50</td><td>5.00</td></tr></table>					Graduate Students by Theme	2011/12	2010/11	2009/10	2008/09	Agricultural and Rural Policy:	15.00	12.60	21.00	4.00	Bioeconomy – Industrial Uses:	7.50	8.45	0.50
Graduate Students by Theme	2011/12	2010/11	2009/10	2008/09																
Agricultural and Rural Policy:	15.00	12.60	21.00	4.00																
Bioeconomy – Industrial Uses:	7.50	8.45	0.50	5.00																

		Emergency Management:	15.80	9.00	5.00	3.00
		Environmental Sustainability:	19.55	11.05	4.50	8.00
		Food for Health:	22.85	15.87	8.00	4.00
		Product Development:	14.25	9.50	5.00	4.00
		Production Systems I & II:	65.40	51.20	57.00	112.00
		Totals	160.35	117.67	101.00	140.00
	Metric (b)	Total number of graduate students enrolled in the Highly Qualified Personnel (HQP) program funded under the Partnership.				
	Baseline:	HQP program scheduled to be implemented in summer 2009.				
	Target:	Target to be based on 2009-2010 student enrolment, which was 32.				
	Results (2011/12):	76 graduate students were enrolled in the HQP program during 2011/12. 32 students from the first year (2009/10), 19 from the second year (2010/11) and 25 from the third year (2011/12) of the HQP program.				
	Metric (c)	Percentage of HQP graduates that are employed in sectors or fields related to the theme areas.				
	Baseline:	Results for this PI will not be available until after first HQP program students graduate (likely 2012 for MSc 'HQP' graduate students).				
	Target:	2012-2013 will be baseline year.				
	Results (2011/12):	Not available for 2011/12; first HQP grads in 2012.				

Key Outcome	Industry and other stakeholders adopt state of the art practices and systems	
Performance Indicator R7	Transfer of new knowledge and utilization by industry and other stakeholders, related to OMAFRA research theme areas.	
	Metric (a)	Total number of knowledge transfer events related to new practices and technologies in each theme area.
	Baseline:	See table below for 2008/09 baseline of knowledge transfer events.
	Target:	2010-13: Number of knowledge transfer events $\geq$ 2008/09 baseline.
	Results (2011/12):	The table below shows that in 2011/12, the number of knowledge transfer events exceeded the average number of the past three years, for most of the research themes.

	Ag & Rural Policy		Bioeconomy		Emerg Mgmt		Env Sust		Food		Prod Dev		Prod Syst I & II		Total	Total
	2011/12	Avg of past 3 years	2011 /12	Avg of past 3 years	2011 /12	Avg of past 3 years	2011 /12	Avg of past 3 years	2011/ 12	Avg of past 3 years	2011/ 12	Avg of past 3 years	2011 /12	Avg of past 3 years	2011 /12	Avg of past 3 years
Peer-reviewed journal publications	5	4.00	22	5.67	3	0.67	19	7.67	9	9.67	13	11.33	93	140.33	164	180.33
Presentations at scientific conferences,	20	18.67	30	18.67	15	3.33	31	24.00	21	7.67	13	6.67	176	138.00	306	197.33
Articles published in the public press	21	17.67	24	17.00	15	7.00	23	7.00	10	1.33	7	1.67	122	116.67	222	167

New presentations posted on the internet	11	5.33	10	17.33	0	5.67	17	16.00	6	9.00	10	6.00	10	48.67	64	115.33
Presentations to stakeholder or industry	36	29.00	28	20.33	18	11.33	51	40.67	25	19.00	19	5.00	206	203.00	383	355.67

	Metric (b)	Examples of utilization of new knowledge by stakeholders.
	Baseline:	Anecdotal reports of utilization of new knowledge by stakeholders
	Target:	2010-13: Annual reports of utilization of new knowledge by stakeholders
	Results (2011/12):	Example of 2011/12 research yielding new knowledge being used by stakeholders • Prof. Mohanty's Project: Bio-composite storage bins or "bio-bins" are now being sold in Home Hardware Stores across Ontario and will soon be available in Canadian Tire outlets. • More examples are provided in the Research Program Highlights and Case Studies, The Catalyst Centre and Appendix A (SPARK Research Stories) sections of this report.
	Metric (c)	Total number of licenses and patents and those applied for:
	Baseline:	See R8, metric (b) and (c)
	Target:	See R8, metric (b) and(c)
	Results (2011/12):	See R8, metric (b) and (c)
	Metric (d)	Ratio of third-party investment leveraged by OMAFRA research funding, by each theme area.
	Baseline:	See R1, metric (b)
	Target:	See R1, metric (b)
	Results (2011/12):	See R1, metric (b)

Key Outcome	Research results commercialized																																																					
Performance Indicator R8 Patents, products (<i>technologies, software, germplasm, registered trademarks, copyright</i>), licenses granted to existing or start-up companies, existing businesses spun out and community-based service businesses created, and the economic impact. R8 is also a performance indicator for the Joint Intellectual Property Committee of the Partnership.																																																						
	Metric (a)	Number of disclosures and technology assessments, by theme																																																				
	Baseline:	364 total disclosures and technology assessments in 2008/09																																																				
	Target:	2010-13: number of disclosures and technology assessments ≥ 2008/09 baseline.																																																				
	Results (2011/12):	Total number of OMAFRA related disclosures: 78 <table> <tr> <td><u>Disclosures by theme:</u></td><td><u>2011/12</u></td><td><u>2010/11</u></td><td><u>2009/10</u></td><td><u>2008/09</u></td></tr> <tr> <td>Agricultural and Rural Policy:</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr> <td>Bioeconomy – Industrial Uses</td><td>3</td><td>3</td><td>1</td><td>0</td></tr> <tr> <td>Emergency Management</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr> <td>Environmental Sustainability:</td><td>0</td><td>0</td><td>1</td><td>0</td></tr> <tr> <td>Food for Health:</td><td>1</td><td>0</td><td>2</td><td>0</td></tr> <tr> <td>Product Development:</td><td>5</td><td>2</td><td>1</td><td>2</td></tr> <tr> <td>Production Systems (Animals):</td><td>1</td><td>4</td><td>16</td><td>3</td></tr> <tr> <td>Production Systems (Crops):</td><td>68</td><td>151</td><td>100</td><td>359</td></tr> <tr> <td>Totals:</td><td>78</td><td>160</td><td>121</td><td>364</td></tr> </table> Note: Fluctuation in disclosure numbers is due primarily to fluctuation in the number of seed varieties that have been disclosed in a particular year. For example, in the 2008/09 fiscal year, there was a disclosure of 176 tomato varieties. A similar event did not occur in 2011/12, leading to an apparent large drop in the number of disclosures. Despite fewer disclosures in recent years, royalty revenues on previous disclosures have continued to increase on an annual basis.			<u>Disclosures by theme:</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	<u>2008/09</u>	Agricultural and Rural Policy:	0	0	0	0	Bioeconomy – Industrial Uses	3	3	1	0	Emergency Management	0	0	0	0	Environmental Sustainability:	0	0	1	0	Food for Health:	1	0	2	0	Product Development:	5	2	1	2	Production Systems (Animals):	1	4	16	3	Production Systems (Crops):	68	151	100	359	Totals:	78	160	121	364
<u>Disclosures by theme:</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	<u>2008/09</u>																																																		
Agricultural and Rural Policy:	0	0	0	0																																																		
Bioeconomy – Industrial Uses	3	3	1	0																																																		
Emergency Management	0	0	0	0																																																		
Environmental Sustainability:	0	0	1	0																																																		
Food for Health:	1	0	2	0																																																		
Product Development:	5	2	1	2																																																		
Production Systems (Animals):	1	4	16	3																																																		
Production Systems (Crops):	68	151	100	359																																																		
Totals:	78	160	121	364																																																		

	Metric (b)	Number of patent applications filed, by theme																																																						
	Baseline:	9 patents filed in 2008/09																																																						
	Target:	2010-13: Number of patent applications to be ≥ 2008/09 baseline.																																																						
	Results (2010/11):	Total number of OMAFRA related patents filed: 8 <table><tr><td><u>Patents filed by theme:</u></td><td><u>2011/12</u></td><td><u>2010/11</u></td><td><u>2009/10</u></td><td><u>2008/09</u></td></tr><tr><td>Agricultural and Rural Policy:</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Bioeconomy – Industrial Uses:</td><td>3</td><td>4</td><td>5</td><td>0</td></tr><tr><td>Emergency Management:</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Environmental Sustainability:</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Food for Health:</td><td>1</td><td>2</td><td>1</td><td>0</td></tr><tr><td>Product Development:</td><td>3</td><td>1</td><td>0</td><td>2</td></tr><tr><td>Production Systems (Animals):</td><td>1</td><td>4</td><td>3</td><td>7</td></tr><tr><td>Production Systems (Crops):</td><td>0</td><td>4</td><td>1</td><td>0</td></tr><tr><td>Totals:</td><td>8</td><td>15</td><td>10</td><td>9</td></tr></table> Note: Fluctuation in the number of patent applications is common. Applications are only made for technologies that have been evaluated to have strong patentability. On average most years, the CC has outperformed the baseline of 9 applications.					<u>Patents filed by theme:</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	<u>2008/09</u>	Agricultural and Rural Policy:	0	0	0	0	Bioeconomy – Industrial Uses:	3	4	5	0	Emergency Management:	0	0	0	0	Environmental Sustainability:	0	0	0	0	Food for Health:	1	2	1	0	Product Development:	3	1	0	2	Production Systems (Animals):	1	4	3	7	Production Systems (Crops):	0	4	1	0	Totals:	8	15	10	9
<u>Patents filed by theme:</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	<u>2008/09</u>																																																				
Agricultural and Rural Policy:	0	0	0	0																																																				
Bioeconomy – Industrial Uses:	3	4	5	0																																																				
Emergency Management:	0	0	0	0																																																				
Environmental Sustainability:	0	0	0	0																																																				
Food for Health:	1	2	1	0																																																				
Product Development:	3	1	0	2																																																				
Production Systems (Animals):	1	4	3	7																																																				
Production Systems (Crops):	0	4	1	0																																																				
Totals:	8	15	10	9																																																				
	Metric (c)	Number of licenses granted by theme																																																						
	Baseline:	17 licenses granted in 2008/09																																																						
	Target:	2010-13: Number of licenses granted to be ≥ 2008/09 baseline.																																																						

	Results (2011/12):	Total number of OMAFRA related licenses granted: 32 <table><tr><td><u>License & amending agreements by theme:</u></td><td><u>2011/12</u></td><td><u>2010/11</u></td><td><u>2009/10</u></td><td><u>2008/09</u></td></tr><tr><td>Agricultural and Rural Policy:</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Bioeconomy – Industrial Uses:</td><td>3</td><td>0</td><td>1</td><td>0</td></tr><tr><td>Emergency Management:</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Environmental Sustainability:</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Food for Health:</td><td>1</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Product Development:</td><td>0</td><td>1</td><td>1</td><td>0</td></tr><tr><td>Production Systems (Animals):</td><td>2</td><td>1</td><td>1</td><td>0</td></tr><tr><td>Production Systems (Crops):</td><td>27</td><td>13</td><td>18</td><td>16</td></tr><tr><td>Totals:</td><td>32</td><td>15</td><td>20</td><td>17</td></tr></table> Note: Despite fewer disclosures in 20011/12, there was an increase in the number of new licenses granted this year. These licenses lead to market impact from the technology, and future revenues for the program.	<u>License & amending agreements by theme:</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	<u>2008/09</u>	Agricultural and Rural Policy:	0	0	0	0	Bioeconomy – Industrial Uses:	3	0	1	0	Emergency Management:	0	0	0	0	Environmental Sustainability:	0	0	0	0	Food for Health:	1	0	0	0	Product Development:	0	1	1	0	Production Systems (Animals):	2	1	1	0	Production Systems (Crops):	27	13	18	16	Totals:	32	15	20	17
<u>License & amending agreements by theme:</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	<u>2008/09</u>																																																
Agricultural and Rural Policy:	0	0	0	0																																																
Bioeconomy – Industrial Uses:	3	0	1	0																																																
Emergency Management:	0	0	0	0																																																
Environmental Sustainability:	0	0	0	0																																																
Food for Health:	1	0	0	0																																																
Product Development:	0	1	1	0																																																
Production Systems (Animals):	2	1	1	0																																																
Production Systems (Crops):	27	13	18	16																																																
Totals:	32	15	20	17																																																
	Metric (d)	Number of patents issued																																																		
	Baseline:	Five patents issued, as per 2008/09																																																		
	Target:	2010-13: Number of patents issued to be ≥ 2008/09 baseline.																																																		
	Results (2011/12):	Total number of OMAFRA related patents issued: 0 <table><tr><td><u>Patents issued by theme:</u></td><td><u>2011/12</u></td><td><u>2010/11</u></td><td><u>2009/10</u></td><td><u>2008/09</u></td></tr><tr><td>Agricultural and Rural Policy:</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Bioeconomy – Industrial Uses:</td><td>0</td><td>0</td><td>0</td><td>1</td></tr><tr><td>Emergency Management:</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Environmental Sustainability:</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Food for Health:</td><td>0</td><td>0</td><td>0</td><td>0</td></tr><tr><td>Product Development:</td><td>0</td><td>1</td><td>0</td><td>0</td></tr><tr><td>Production Systems (Animals):</td><td>0</td><td>2</td><td>0</td><td>0</td></tr></table>	<u>Patents issued by theme:</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	<u>2008/09</u>	Agricultural and Rural Policy:	0	0	0	0	Bioeconomy – Industrial Uses:	0	0	0	1	Emergency Management:	0	0	0	0	Environmental Sustainability:	0	0	0	0	Food for Health:	0	0	0	0	Product Development:	0	1	0	0	Production Systems (Animals):	0	2	0	0										
<u>Patents issued by theme:</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	<u>2008/09</u>																																																
Agricultural and Rural Policy:	0	0	0	0																																																
Bioeconomy – Industrial Uses:	0	0	0	1																																																
Emergency Management:	0	0	0	0																																																
Environmental Sustainability:	0	0	0	0																																																
Food for Health:	0	0	0	0																																																
Product Development:	0	1	0	0																																																
Production Systems (Animals):	0	2	0	0																																																

		Production Systems (Crops):0004 Totals: 0305																				
		Note: Patents are evaluated and issued by the patent office. The Catalyst Centre does not have control over the schedule of evaluations/issuances by CIPO or USPTO, or other patent offices around the world.																				
	Metric (e)	Total dollar value of revenue generated from licenses associated with OMAFRA-supported research																				
	Baseline:	\$1.3 million revenue generated as per 2008/09.																				
	Target:	2010-13: Total dollar value to be ≥ 2008/09 baseline.																				
	Results (2011/12):	Total dollar value of revenue generated from licenses associated with OMAFRA-supported research: \$1,455,935.87 Revenue from OMAFRA-supported non-seed research from fiscal year end April 30, 2012: \$666,490.52 Revenue from OMAFRA-supported seed research fiscal year-end March 31, 2012: \$789,445.35 <table><tr><td><u>License revenue generated:</u></td><td><u>2011/12</u></td><td><u>2010/11</u></td><td><u>2009/10</u></td><td><u>2008/09</u></td></tr><tr><td>Non-seed research</td><td>\$666,490</td><td>\$893,551</td><td>\$590,258</td><td>\$778,731</td></tr><tr><td>Seed research</td><td>\$789,445</td><td>\$699,280</td><td>\$610,221</td><td>\$561,851</td></tr><tr><td>TOTAL:</td><td>\$1,455,935</td><td>\$1,592,832</td><td>\$1,200,480</td><td>\$1,340,583</td></tr></table> *Note: A one-time \$270K interest payment was made by Pfizer to finalize payments for the very successful shipping fever vaccine technology, which went off-patent in 2012. Variations in non-seed revenue should be expected in coming years with the loss of this technology. Revenue from seed-based technologies has increased 41% over the past four years (an average of +12% annually). This reflects the growing portfolio of seed varieties that have and continue to be transferred to the market.	<u>License revenue generated:</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	<u>2008/09</u>	Non-seed research	\$666,490	\$893,551	\$590,258	\$778,731	Seed research	\$789,445	\$699,280	\$610,221	\$561,851	TOTAL:	\$1,455,935	\$1,592,832	\$1,200,480	\$1,340,583
<u>License revenue generated:</u>	<u>2011/12</u>	<u>2010/11</u>	<u>2009/10</u>	<u>2008/09</u>																		
Non-seed research	\$666,490	\$893,551	\$590,258	\$778,731																		
Seed research	\$789,445	\$699,280	\$610,221	\$561,851																		
TOTAL:	\$1,455,935	\$1,592,832	\$1,200,480	\$1,340,583																		
	Metric (f)	Three brief case studies of individual files from different themes and initiatives taken to advance commercialization																				

	Baseline:	Three case studies as per 2008/09.
	Target:	2010-13: Three case studies to be presented annually.
	Results (2011/12):	Three case studies are provided in the Program Highlights Section of this report
Key Outcome	Awareness of research outcomes and impacts among decision makers, staff and stakeholders	
Performance Indicator R9	Stakeholder assessment of OMAFRA/ University research outcomes on industry, the economy and the health and well-being of Ontario citizens.	
	Metric	This outcome would also be assessed by the Expert Review of each theme area schedule at the end of five years.
	Baseline:	This performance indicator will be addressed through an assessment similar to the Deloitte Study – 2007 (U of G / OMAFRA Impact Study), to be conducted in 2012/13 In the interim, the Deloitte Study serves as the baseline.
	Target:	A 2012/13expert review of awareness of research outcomes and impacts among decision makers.
	Results (2011/12):	To be reported at the end of five years (in 2012/13). Each year's annual report, . contributes to the information available for expert review of each research theme area at the end of five years.
Key Outcome	Awareness of research outcomes and impacts among decision makers, staff and stakeholders	
Performance Indicator R10	Media citations related to research in OMAFRA research theme areas.	
	Metric (a)	Total number of media citations
	Baseline:	A total of 190 media citations were identified by researchers in their 2009 U of G annual and final reports. Additionally, 135 media articles were picked up by clipping services. This 2008/09 baseline is likely a significant underestimate of media pick-up but it represents the best available measure.

Target:	2010-13: Number of media citations to be $\geq$ 2008/09 baseline.														
Results (2011/12):	From researchers' 2011 annual and final research reports, number of media citations: 64 Note: this number is considered to be a significant underestimate, however it is difficult to access a more reliable source. <table> <tr> <td>Ag and rural policy:</td><td>11</td></tr> <tr> <td>Bioeconomy:</td><td>10</td></tr> <tr> <td>Emergency Management:</td><td>0</td></tr> <tr> <td>Environmental Sustainability:</td><td>17</td></tr> <tr> <td>Food for Health:</td><td>6</td></tr> <tr> <td>Product Development and Enhancement:</td><td>10</td></tr> <tr> <td>Production Systems:</td><td>10</td></tr> </table>	Ag and rural policy:	11	Bioeconomy:	10	Emergency Management:	0	Environmental Sustainability:	17	Food for Health:	6	Product Development and Enhancement:	10	Production Systems:	10
Ag and rural policy:	11														
Bioeconomy:	10														
Emergency Management:	0														
Environmental Sustainability:	17														
Food for Health:	6														
Product Development and Enhancement:	10														
Production Systems:	10														

Research Performance Indicator R1 Metric (d)

Listing of Active Research Projects

OMAFRA - U of G Research Program Projects – 2011/2012

Agricultural and Rural Policy Theme

Project #	Start Date	Approved End Date	Approved Program	Title	Project Leader
026528	01-May-07	31-May-12	Ag & Rural Policy	Evaluating the Effects of National and International Agrifood Policies on Canada	Meilke, K.
026594	1-Sep-08	30-Dec-12	Ag & Rural Policy	Economic and Community Capacity Analysis of the Alternative Land Use Services (ALUS) - Norfolk County Pilot Project	Fox, G.
200047	01-Sep-09	31-Aug-12	Ag & Rural Policy	Environmental Sustainability Policy Compliance Costs, Comparative Advantage, and Competitiveness of Ontario Livestock Industry	Fox, G.
200048	01-Jun-09	30-Jun-13	Ag & Rural Policy	Industrial Composition and Economic Performance in Rural Ontario	Deaton, B.
200050	01-Sep-09	30-Sep-11	Ag & Rural Policy	Local Food Initiatives in Ontario from the Farmer's Perspective	Devlin, J.
200051	01-Jul-09	01-May-12	Ag & Rural Policy	Prospering with a Stable or Declining Population: Best Community Economic Development and Planning Practices for Rural Communities	Caldwell, W.
200112	1-May-10	30-Apr-13	Ag & Rural Policy	Regional Development: Planning for Resiliency In the 21 st Century - A Methodology and Approach for Communities Dealing with Climate Change and Rising Oil Prices	Caldwell, W.
200183	1-Jun-10	31-May-13	Ag & Rural Policy	An Economic Analysis of Profitability, Income Variability and Competitiveness of Farms under Different Size Categories in Ontario	Sarker, R.
200195	1-Apr-10	30-Apr-12	Ag & Rural Policy & Bio	Identifying successful business models, strategies and policies for promoting the Canadian bioeconomy	Cranfield, J.
200221	1-Jun-10	30-Jun-13	Ag & Rural Policy	Innovations in Managing Risk and Stochastic Simulation Modeling for Ontario Farming Sector	Hailu, G.

200222	1-Jun-10	30-Jun-13	Ag & Rural Policy	Productive Efficiency and Competitiveness of Ontario Farms	Hailu, G.
200243	1-Apr-10	30-May-12	Ag & Rural Policy	Examining non-farmer ownership of farmland in southern Ontario: Implications for policy and competitiveness	Deaton, B.
200265	1-Apr-10	31-Mar-13	Ag & Rural Policy	Competitiveness and Profitability of Ontario Swine Farms – Farm Size, and Production Type versus Profitability	McEwan, K.
200287	1-Jun-10	30-Jun-13	Ag & Rural Policy	Investigating the Effect of Climate Change on Crop Yields: Implications for Policy and Programs and Identifying Opportunities for Ontario's Agrifood Sector	Ker, A.
200289	1-Apr-10	31-Mar-13	Ag & Rural Policy & Env Sust	Land Use, Climate Change and Policy Impacts of the Transition to a Green Economy	Weersink, A.
200290	1-Sep-10	30-Aug-13	Ag & Rural Policy	The Agricultural and Rural Policy Implications of a Changing Agricultural Sector	Weersink, A.
200304	1-Jun-10	30-Jun-13	Ag & Rural Policy	Young Workers in Ontario's Rural Labour Market: An exploration of job quality and training/skills requirements & choices	Mann, S.
200357	15-Nov-10	31-Oct-13	Ag & Rural Policy	Economic Models for Policy Analysis in the Ontario Agri-Food Sector	Ker, A.
200364	1-Jun-11	1-Jun-14	Ag & Rural Policy	Innovative Partnerships for Regional Economic Development: Ontario's Colleges Of Applied Arts and Technology in Collaboration with Rural Small/Medium Enterprises	Lauzon, A.
200365	1-May-11	30-Apr-14	Ag & Rural Policy	Identifying opportunities and strategies to enhance Ontario agribusiness' capacity to capture value from emerging marketing channels for organic food.	Cranfield, J.
200366	1-Jun-11	31-May-14	Ag & Rural Policy	A Study of Innovative Best Practices to Foster Place-based Tourism Development in Ontario's Rural Communities.	Joppe, M.
200367	1-May-11	31-Mar-14	Ag & Rural Policy	Evaluating regional economic development initiatives: Understanding the challenges for rural regions in Ontario	Devlin, J.
200368	1-May-11	30-Apr-13	Ag & Rural Policy	An assessment of the potential economic benefits of Environmental Certification for Ontario's Farms	FitzGibbon, J.

Bioeconomy - Industrial Uses Theme

Project #	Start Date	Approved End Date	Approved Program	Title	Project Leader
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026547	1-Jul-07	30-Apr-12	Bio	Economic Effects of Bioproduct Efforts on Ontario Agriculture.	Weersink, A.
200001	1-Jul-09	30-Jun-12	Bio	Design and Engineering of Nano-enhanced Biopolyurethanes for Green Manufacturing	Misra, M.
200004	1-Jun-09	30-May-12	Bio	Renewable, Recyclable and Lightweight Hybrid Green Composites from Lignin, Switch grass, Miscanthus and Bioplastics for Sustainable Manufacturing	Mohanty, A.
200007	1-Jul-09	30-Jun-13	Bio	Evaluation of biomass production, nutrient cycling, harvesting, and end-use of biofuel crops in Eastern and Northern Ontario.	Rennie, T.
200013	1-Sep-09	31-Aug-12	Bio & Env Sust	Life Cycle Analysis Framework and Model for Assessing Life Cycle Impacts and Environmental Sustainability of Ontario Agricultural Feedstocks for Bioenergy	Wagner-Riddle, C.
200094	15-Jun-09	31-Mar-12	Bio & Prod Syst	Evaluation of Perennial Grass Biomass Systems in Ontario	Deen, B.
200114	1-May-10	30-Apr-14	Bio	Acid-, Water-, and High-temperature Stable Homogeneous and Heterogeneous Catalysts for the Deoxygenation of C4-C6 Sugars to Alcohols, Alkenes and Alkanes	Schlaf, M.
200144	1-May-10	30-Apr-13	Bio & Prod Dev	Cost-Effective Processing Technologies to Improve the Value to Aquaculture Species of Products and By-Products from the Agricultural, Food and Bio-Fuel Sectors in Ontario	Bureau, D.
200163	1-May-10	30-Apr-12	Bio	Evaluation of the Feasibility of Integrating SuperStarch™ Technology for the Production of Polysaccharide Nanoparticles with Existing Bioethanol Facilities	Dutcher, J.
200165	15-May-10	15-May-13	Bio & Env Sust	Life Cycle Analysis (LCA) and Economic Assessment of Short Rotation Willow (Salix) Crops for Bioenergy	Gordon, A.
200172	1-May-10	30-Apr-13	Bio	Production of Novel Starches for the Biopolymer Industry	Tetlow, I.
200195	1-Apr-10	31-Mar-13	Bio & Ag & Rural Policy	Identifying successful business models, strategies and policies for promoting the Canadian bioeconomy	Cranfield, J.
200199	1-May-10	30-Apr-13	Bio	New Generation Traits for Field Crops – Defining Genes for Fibre Quality in Crop Residues for Biocomposite Manufacture for the Auto Industry	Pauls, K. P.
200245	1-Jul-10	30-Jun-13	Bio	Light Weight and Recyclable Sustainable Green Composites from Engineered Soy Hull and BioABS for Transportation Applications	Misra, M.
200283	1-Jul-10	31-Jul-13	Bio	Eco-Composites from Corn Cob Derived Thermoset Resin and Biofibre Mats for Housing Panel Applications	Misra, M.
200369	1-Jun-11	1-Jun-14	Bio	Carbon Dioxide based Bioplastics and Their Engineered Biomaterials for Industrial Uses	Mohanty, A.
200370	1-May-11	30-Apr-14	Bio	Study and development of a self-sustained torrefaction process for upgradation of fuel properties of agricultural residues.	Dutta, A.

200371	1-Jul-11	30-Jun-14	Bio	Renewable Resources Based High Conducting Cellulose-Carbon Nanocomposites for Energy Storage Devices	Misra, M.
200372	1-Sep-11	1-Sep-14	Bio	Development of Branching Enzymes as Agents for Modifying Glucan Branching in Industrial Processing	Tetlow, I.
200373	1-Apr-12	31-Mar-14	Bio	Development of the Castor oil plant as a new oil-seed crop for a new industrial bio-economy in Ontario	Van Acker, R.
200374	1-Jun-11	30-Apr-14	Bio	Dry Fermentation of Solid Manures with Yard and Kitchen Wastes for Enhanced Methane Production	Crolla, A.
200425	1-Jun-11	1-Jun-14	Bio	Development of Biocomposites for Plant Pots from Proteinous Co-products and Natural Fibres for Greenhouses in Ontario	Mohanty, A.

Emergency Management Theme

Project #	Start Date	Approved End Date	Approved Program	Title	Project Leader
200016	1-Sep-09	30-Sep-12	E Mgmt	Spatial and Network Individual-level Models of Infectious Disease Spread within a Bayesian Statistical Framework via Markov Chain Monte Carlo (MCMC)	Deardon, R.
200018	1-Sep-09	30-Apr-12	E Mgmt	Extraction and Detection of Human Pathogens using Antibody Modified Electrospun Conducting Polymer Fibers	Warriner, K.
200117	1-May-10	1-May-13	E Mgmt & Prod Syst	Immunity against avian influenza virus (AIV) in chickens and development of rational vaccines for control of avian influenza	Sharif, S.
200154	1-May-10	30-Apr-12	Em Mgmt	On-Site Detection of Viral Pathogens and Chemical Toxic Agents using Novel Sensors Based on Quantum Dot Modified Molecular Imprinted Polymers	Warriner, K.
200159	1-May-10	30-Apr-12	Em Mgmt	Rapid Diagnostic techniques and susceptibility of commercially important fish species for the surveillance of spring viremia	Lumsden, J.
200236	1-May-10	30-Apr-13	Em Mgmt	Enhanced surveillance for viral and bacterial pathogens in commercial broiler chicken flocks in Ontario	Guerin, M.
200270	1-Apr-10	31-Mar-13	E Mgmt & Prod Syst	Western Bean Cutworm Monitoring and Management Strategies for Ontario and the Great Lakes Region. A Proactive and Coordinated Approach to Prepare and Respond to a Newly Emerging Corn and Dry Bean Pest in Ontario	Schaafsma, A.
200272	1-May-10	30-Apr-13	Em Mgmt	Johne's Disease in Ontario's Small Ruminant Dairy Industries: Prevalence, potential risk factors, and performance comparison of serum, milk and fecal diagnostic methods	Jones, A.
200312	1-Apr-10	31-Mar-13	Em Mgmt	Barcode of Life Data System Support for Emergency Management I: OMAFRA and Greenhouse	Hanner, R.

Industry Stakeholders					
200375	1-Sep-11	31-Dec-12	Em Mgmt	Understanding the effect of diagnostic misclassification bias on spatial surveillance methods with emphasize on farm location health data such as swine influenza"	Berke, O.
200376	1-May-11	30-Apr-12	Em Mgmt	Improving the syndromic surveillance of cattle diseases through provincial abattoir data with the joint application of multi-level modeling and space-time scan statistics.	Pearl, D.
200377	1-Jul-11	31-Dec-12	EM Mgmt	Development of a benefit/cost financial management template for veterinary laboratory emergency preparedness.	Spinato, M.
200378	1-May-11	30-Apr-14	Em Mgmt	Emerging and potentially zoonotic viruses in pigs and pork: identifying public health risks	McEwen, S.
200379	1-May-11	30-Apr-14	Em Mgmt	Assessing the emergency preparedness of livestock producers (beef, dairy, swine, sheep) and Large Animal Veterinarians in Ontario	Kelton, D.
200380	1-Sep-11	31-Aug-13	Em Mgmt	A Surveillance Study to Determine the Prevalence of <i>Clostridium difficile</i> in Manure Derived from Animal Production and Dissemination of the Pathogen via Watercourses	Warriner, K.
200381	1-May-11	30-Apr-14	Em Mgmt	Development and applications of an amoeba-based pathogen-capture trap for detection of persisting and emerging microbial pathogens in farm and aquaculture environments	Mutharia, L.
200382	1-Jul-11	30-Jun-14	Em Mgmt	Predictive modeling of the disease dynamics of honeybee – varroa mite – virus complexes	Eberl, H.
200416	1-May-11	30-Apr-13	E Mgmt & Prod Syst	Peri-weaning failure-to-thrive syndrome (PFTS) in pigs in Ontario	Friendship, R.
200417	1-Sep-11	30-Sep-14	E Mgmt & Prod Syst	The epidemiology of inclusion body hepatitis in broiler breeders in Ontario	Guerin, M.
200418	1-Sep-11	31-Aug-14	E Mgmt & Prod Syst	Johne's disease prevention and control on organic dairy farms in Ontario	Kelton, D.
200419	1-May-11	30-Apr-14	E Mgmt & Prod Syst	Emerging plant pathogens: Identification, biology, pathogenicity and integrated management of emerging pathogens infecting asparagus, cucumber and basil.	McDonald, M.R.

Environmental Sustainability Theme

Project #	Start Date	Approved End Date	Approved Program	Title	Project Leader
026545	01-May-07	30-Apr-12	Env Sust	Evaluating the Cost Effectiveness of Multiple Best Management Practices in Agricultural Watersheds.	Yang, W.
026592	1-May-08	31-Aug-11	Env Sust	Developing Environmental, Production and Marketing Best Management Practices for Ontario Agriculture	Bredahl, M.

026599	1-May-08	30-Apr-12	Env Sust	Use of reclaimed wastewater on soil chemical and microbial properties and growth of turfgrass for sod production and maintained turfgrass systems.	Jordan, K.
200013	1-Sep-09	31-Aug-12	Env Sust & Bio	Life Cycle Analysis Framework and Model for Assessing Life Cycle Impacts and Environmental Sustainability of Ontario Agricultural Feedstocks for Bioenergy	Wagner-Riddle, C.
200027	02-Sep-09	31-Aug-12	Env Sust	Abatement of Agricultural Ammonia Emissions via Sequestration and Conversion to Nutrient and Bio-energy Feedstocks	Dixon, M.
200029	01-Jul-09	30-Apr-13	Env Sust	Life-Cycle Assessment of Greenhouse Gas Emissions and Economics of On-Farm Anaerobic Digesters	Wagner-Riddle, C.
200031	1-May-09	30-Apr-12	Env Sust	Toward ecologically sustainable choices for turfgrass applications in Ontario	Newman, J.
200057	1-Jun-09	30-May-12	Env Sust & Prod Dev	Conversion of Poultry Manure into Value-added Products Using Fly Larvae	Zheng, Y.
200081	1-May-09	30-Apr-12	Env Sust & Prod Syst	Long term field trials to examine yield, soil productivity and environmental impacts of Ontario corn, soybean and wheat production systems	Deen, B.
200119	1-May-10	30-Apr-12	Env Sust	Development of a Behavioral Decision Model for adoption of BMPs for Environmental Stewardship: Implications for policy and program design	Fitzgibbon, J.
200128	1-May-10	30-Apr-13	Env Sust & Prod Syst	Development of New Energy Efficient Lighting Systems for Poultry Farming using Light Emitting Diodes (LEDs)	Bedecarrats, G.
200148	1-May-10	30-Apr-13	Env Sust	Impacts of biofuel production systems on soil health, microbial biodiversity and nutrient cycling	Dunfield, K.
200165	15-May-10	15-May-13	Env Sust & Bio	Life Cycle Analysis (LCA) and Economic Assessment of Short Rotation Willow (Salix) Crops for Bioenergy	Gordon, A.
200173	1-May-10	30-Apr-13	Env Sust & Prod Dev	Green Roof Technologies for Northern Climates	Zheng, Y.
200188	1-Apr-10	30-Mar-12	Env Sust	An Evaluation of Manure Nitrogen (N) Credit Calculations Using Data from Ontario Field Research	Lauzon, J.
200227	1-May-10	30-Apr-12	Env Sust	Combining Field Data and Modeling to Improve Groundwater Recharge Estimates at the Watershed Scale in Ontario: The First Step	Parkin, G.
200239	1-May-10	30-Apr-13	Env Sust	Impact of manure application timing on temporal changes in runoff losses of N, P and fecal bacteria as assessed through controlled runoff and microbial source tracking technologies	O'Halloran, I.
200244	1-May-10	30-Apr-13	Env Sust	Municipal Biosolids as a Soil Amendment to Improve Quality and Growth for Sod Production	Habash, M.
200280	1-Sep-10	30-Apr-12	Env Sust	The effect of land use practices and the subsurface environment on the distribution of non-point source pollution at depth	Arnaud, E.
200284	1-May-10	30-Apr-13	Env Sust	Mapping of Variable Source Areas for Nutrient Management and Environmental Sustainability	Rudra, R.

200289	1-Apr-10	31-Mar-13	Env Sust & Ag & Rural Policy	Land Use, Climate Change and Policy Impacts of the Transition to a Green Economy	Weersink, A.
200299	1-May-10	30-Apr-13	Env Sust	Development of a Complimentary Energy Decision Support Tool (CEDST) for Objective Selection of Green Energy Systems in Intensive Farming Operations	Van Heyst, B.
200383	1-Sep-11	31-Aug-14	Env Sust	Reducing the amount of process water needed to wash and peel vegetables by optimizing and implementing wash-water recycling	Zytner, R.
200384	1-Jun-11	31-May-14	Env Sust	Evaluation of Control Strategies to Minimize the Emissions of Particulate Matter, Ammonia and other Gaseous Pollutants from Poultry Operations	Van Heyst, B.
200385	1-May-11	30-Apr-14	Env Sust	Development of a Hybrid Constructed Wetland Technology to Treat Dairy Farm Wastewaters	Kinsley, C.
200386	1-May-11	30-Apr-14	Env Sust	Management Tool for Design and Evaluation of Seasonal performance of Vegetative Filter Strips and Setbacks along the Stream	Rudra, R.
200387	1-Jun-11	31-May-14	Env Sust	Characterizing Risks of Triclosan from Biosolids: Uptake and Distribution in Plants and Effects on Plant-Arbuscular Mycorrhizal Fungi Relationships	Sibley, P.
200388	1-May-11	30-Apr-14	Env Sust	RADAR-derived digital elevation models for improved drainage mapping	Lindsay, J.
200389	1-Sep-11	1-Sep-14	Env Sust	Development of Membrane Anaerobic Baffled Reactor (ABR AnMBR) for Food Processing Wastewater Treatment	Chang, S.
200390	1-May-11	30-Apr-14	Env Sust	Cover crops for sustainability: Evaluating the role of cover crops in low crop residue production systems.	Van Eerd, L.
200391	1-May-11	30-Apr-14	Env Sust	Evaluating the environmental pillar of sustainability for bioenergy crop production	Newman, J.
200420	1-May-11	30-Apr-14	Env Sust & Prod Syst	Novel Tests for Nitrogen and Testing of Inoculants With Potential to Reduce Chemical Inputs for Ontario Crop Production	Raizada, M.

Food for Health Theme

Project #	Start Date	Approved End Date	Approved Program	Title	Project Leader
200032	01-Sep-09	31-Aug-12	Food For Health	The regulation of adipocyte differentiation and insulin signaling by dietary monounsaturated fatty acids	Mutch, D.
200035	1-Jun-09	30-Aug-12	Food For Health	Bio-accessibility, Bio-availability and Anti-inflammatory Action of Nutraceutical Components from Ontario Berry Fruits, Tender Fruits and their Products	Paliyath, G.
200040	01-Jul-09	31-Jul-12	Food For Health	Encapsulation of bioactive peptides using protein based nanostructures	Corredig, M.

200043	01-Jun-09	31-May-13	Food For Health & Prod Syst	Bean (<i>Phaseolus vulgaris</i>) Improvement for Health and Consumer Acceptance	Pauls, K. P.
200064	01-Sep-09	31-Aug-12	Food for Health & Prod Dev	Characterizing the sensory attributes of whole grain wheat-based products and the phenolics associated with these attributes	Duizer, L.
200121	1-May-10	30-Apr-12	Food For Health	Human clinical trial to investigate the effects of high rosmarinic acid spearmint tea on measures of disease activity and cartilage degradation in rheumatoid arthritis	Kott, L.
200124	1-May-10	30-Apr-13	Food For Health	Role of mechanostimulation of gut epithelial cells and gut content viscosity in human health and gastrointestinal responses to functional foods	Purslow, P.
200130	1-May-10	31-Dec-13	Food For Health	Impact of prebiotics on the intestinal microbiome: a multidisciplinary approach based on predictive modeling and experimentation	Eberl, H.
200133	1-Jun-10	31-May-13	Food For Health	Development, sensory evaluation and consumer acceptance of 'Golden Prunes' from novel Yellow European Plum [YEP] selections	Subramanian, J.
200175	1-May-10	30-Apr-13	Food For Health & Prod Syst	Improving profitability in asparagus production through enhanced breeding, management and human health.	Wolyn, D.
200177	1-May-10	30-Apr-13	Food For Health	Consumers' perceptions, purchasing, and consumption of vegetables in Ontario	Yi, S.
200193	01-May-10	30-Apr-12	Food For Health & Prod Dev	Nanoencapsulation of omega-3 fatty acids in edible carriers using electrostatic forming technologies	Lim, L-T.
200201	1-Jul-10	30-Jun-13	Food For Health	Alleviation of the metabolic syndrome through betaine and choline enriched functional food diets	Bakovic, M.
200207	1-Sep-10	30-Aug-13	Food For Health	Matching expectation to reality for modified texture foods: Comparison of in-house to commercial pureed products	Duizer, L.
200216	1-Jun-10	31-May-13	Food For Health	Sticking it to the gut: Steps towards establishing probiotics in the distal colon	Khursigara, C.
200218	1-May-10	30-Apr-13	Food For Health	Exploring the Feasibility and Benefits of Incorporating Local Foods into Ontario's Healthcare System	Padanyi, P.
200293	1-Jun-10	31-May-12	Food For Health	Functionality of Novel Potato Clones Selected for Promoting Human Gut and Heart Health in Studies with a Pig Model	Fan, M.
200333	1-May-10	30-Apr-13	Food For Health & Prod Syst	Development of disease and insect resistant soybean varieties for food grade, functional food and specialty oil markets in Ontario	Rajcan, I.
200342	1-Sep-10	30-Aug-12	Food For Health & Prod Dev	Characterizing starch structure and digestibility of millet flour when incorporated into baked products.	Marcone, M.
200392	1-May-11	30-Apr-13	Food For Health	Soy peptide-based Interventions to Prevent Chronic Inflammation and Oxidative Stress-related Diseases.	Mine, Y.
200393	1-Sep-11	30-Aug-14	Food For Health	Malleability of the mitochondrial proteome and respiratory function in response to polyunsaturated fatty	Holloway, G.

				acids.	
200394	1-Jun-11	31-May-13	Food For Health	CLA content in cow's milk and the potential impact of its consumption on glucose tolerance and insulin resistance.	Dyck, D.
200395	1-Sep-11	31-Aug-14	Food For Health	The impact of Resistant Starches in healthy baked products on mitigation of risk for Type 2 Diabetes and Colorectal Cancer	Emes, M.
200396	1-May-11	30-Apr-13	Food For Health	Does consumption of selenized milk protein improve or exacerbate insulin resistance?	Cant, J.P.
200397	1-Jun-11	31-May-14	Food For Health	Using proteins and protein fragments from meat to enhance human iron uptake from dietary supplements	Purslow, P.
200398	1-May-11	30-Apr-14	Food For Health	Nutraceutical and cosmeceutical components from sea buckthorn fruits, their health benefits, and stabilization in processed products	Paliyath, G.
200421	1-May-11	30-Apr-14	Food For Health & Prod Dev	Purple vegetables for better health: a study of the antioxidant and other beneficial effects of anthocyanin pigments in potatoes and carrots	McDonald, M.R.
200422	1-May-11	30-Apr-14	Food For Health	Selecting Ontario potatoes for improved processing quality, food safety and health: The role of asparagine, reducing sugars, acrylamide and phenolic compounds	Yada, R.

Product Development and Enhancement through Value Chains

Project #	Start Date	Approved End Date	Approved Program	Title	Project Leader
200057	1-Jun-09	30-May-12	Prod Dev & Env Sust	Conversion of Poultry Manure into Value-added Products Using Fly Larvae	Zheng, Y.
200059	01-Sep-09	31-Aug-13	Prod Dev	Development of high performance edible soy protein nanocomposite films and coatings for co-extrusion applications	Lim, L-T.
200062	01-Sep-09	31-Aug-12	Prod Dev	Novel use of organogels to replace traditional animal fat in meat products	Barbut, S.
200064	01-Sep-09	31-Aug-12	Prod Dev & Food For Health	Characterizing the sensory attributes of whole grain wheat-based products and the phenolics associated with these attributes	Duizer, L.
200071	01-Jul-09	30-Jun-12	Prod Dev & Prod Syst	Product enhancement and cost reduction in greenhouses through application of advanced robotics systems	Moussa, M.
200118	01-May-10	01-May-13	Prod Dev	Vaccination of chickens for control of <i>Campylobacter jejuni</i>	Sharif, S.
200144	1-May-10	30-Apr-13	Prod Dev & Bio	Cost-Effective Processing Technologies to Improve the Value to Aquaculture Species of Products and By-Products from the Agricultural, Food and Bio-Fuel Sectors in Ontario	Bureau, D.

200173	1-May-10	30-Apr-13	Prod Dev & Env Sust	Green Roof Technologies for Northern Climates	Zheng, Y.
200190	01-Jun-10	31-May-12	Prod Dev	A Novel Prebiotic for Improving Weanling Pig Gut Health and Growth without Using Antibiotics	Fan, M.
200193	01-May-10	30-Apr-13	Prod Dev & Food For Health	Nanoencapsulation of omega-3 fatty acids in edible carriers using electrostatic forming technologies	Lim, L-T.
200261	02-Jul-10	30-Jun-13	Prod Dev	Improving Icewine Innovation through Evaluating Innovative Clusters and Consumer Trends & Demands in Ontario's Ice wine Industry	Teng, L.
200317	01-Jul-10	30-Apr-12	Prod Dev	Product Development of a Therapeutic Antibody in Tobacco through Production, Purification and Analytical Value Chains in Ontario	Hall, J.C.
200342	1-Sep-10	30-Aug-12	Prod Dev & Food for Health	Characterizing starch structure and digestibility of millet flour when incorporated into baked products.	Marccone, M.
200399	1-Jul-11	30-Jun-14	Prod Dev	Improved Utilization of Biochar for the Production of New Industrials Bioproducts	Mohanty, A.
200400	1-May-11	30-Apr-13	Prod Dev	Utilization of spent coffee grounds in compostable food packaging applications	Lim, L-T.
200423	1-May-11	30-Apr-14	Prod Dev & Prod Syst	New hybridizations for Ontario apple cultivar development.	Somers, D.
200424	1-Jun-11	30-May-14	Prod Dev & Prod Syst	Welfare-Friendly Eggs: Meeting the needs of laying hens, producers and consumers through alternative housing systems	Widowski, T.

Production Systems Theme Tier I

Project #	Start Date	Approved End Date	Approved Program	Title	Project Leader
200043	01-Jun-09	31-May-13	Prod Syst & Food for Health	Bean (<i>Phaseolus vulgaris</i>) Improvement for Health and Consumer Acceptance	Pauls, K.P.
200069	1-Jun-09	30-Jun-12	Prod Syst	The pathogenesis and control of necrotic enteritis in broiler chickens	Prescott, J.
200070	3-Jul-09	3-Jul-12	Prod Syst	Pathogenesis of <i>Clostridium perfringens</i> Type A diarrhea in neonatal pigs and its epidemiology on Ontario swine farms	Prescott, J.
200071	01-Jul-09	30-Jun-12	Prod Syst & Prod Dev	Product enhancement and cost reduction in greenhouses through application of advanced robotics systems	Moussa, M.
200072	1-Jun-09	31-May-12	Prod Syst	Biology and Management of Diseases of Turfgrasses and Woody Plants	Hsiang, T.

200074	1-Sep-09	31-Aug-11	Prod Syst	Limit-feeding dairy heifers: Maintaining health and welfare while improving feed efficiency and reducing feed costs and nutrient excretion	DeVries, T.
200075	1-Jul-09	1-Jul-12	Prod Syst	Biomarkers to relate management of piglets post-weaning to subsequent growth performance, carcass and meat quality	deLange, C.
200076	1-Jul-09	30-Jun-12	Prod Syst	Risk Assessment and Management of Invasive Pests of Field Crops in Current and Future Climates	Hallett, R.
200079	15-May-09	30-Apr-12	Prod Syst	The impact and management of pain in dairy cattle on health, performance and well-being	Duffield, T.
200080	1-Jun-09	30-Apr-12	Prod Syst	The use of behavioural monitoring for the prediction of impending health and welfare problems in dairy cattle	Leslie, K.
200081	1-May-09	30-Apr-12	Prod Syst & Env Sust	Long term field trials to examine yield, soil productivity and environmental impacts of Ontario corn, soybean and wheat production systems	Deen, B.
200083	1-Jun-09	31-May-12	Prod Syst	Understanding the spatial and temporal spread and clinical signs associated with various genotypes of the Porcine Reproductive and Respiratory Syndrome (PRRS) in Ontario	Dewey, C.
200086	1-Sep-09	1-Sep-12	Prod Syst	Nutritional Strategies and monitoring of the peri-parturient sow.	Luimes, P.
200087	1-Jun-09	31-May-12	Prod Syst	Development of an integrated mycotoxin management system in Ontario grains	Schaafsma, A.
200088	1-Jan-10	31-Dec-11	Prod Syst	Mycotoxins and the developing neuroendocrine-immune system	Karrow, N.
200089	1-May-09	30-Apr-12	Prod Syst	Stabilizing Ontario canola yields for enhanced profitability and reduced risk.	Earl, H.
200091	1-Jun-09	30-May-12	Prod Syst	Mutation technology for production of new products and added value for greenhouse ornamental species	Somers, D.
200093	1-Jun-09	30-Jun-12	Prod Syst	Dairy Health and High-Low Immune Responders	Mallard, B.
200094	15-Jun-09	31-Mar-12	Prod Syst & Bio	Evaluation of Perennial Grass Biomass Systems in Ontario	Deen, B.
200100	1-Oct-09	30-Sep-12	Prod Syst	EGF expressing <i>Lactococcus lactis</i> (<i>L. lactis</i>) for enhancing intestine development, health, and productivity of early-weaned pigs	Li, J.
200101	01-Aug-09	31-Dec-12	Prod Syst	Natural enrichment of milk with functional bioactive compounds	Cant, J.
200103	01-Jun-09	31-Dec-12	Prod Syst	Healthy animals produce healthful products; an integration from animal health to human health	McBride, B.
200116	1-Jun-10	31-May-13	Prod Syst	On-farm practical environmental enrichments for mink, to improve welfare and productivity	Mason, G.
200117	1-May-10	1-May-13	Prod Syst & E Mgmt	Immunity against avian influenza virus (AIV) in chickens and development of rational vaccines for control of avian influenza	Sharif, S.
200122	1-May-10	31-Mar-13	Prod Syst	Management of foliar disease and insect pests in vegetable crops and sugar beet	Trueman, C.

200127	1-May-10	30-Apr-13	Prod Syst	Stimulating Host defenses as an alternative to pesticides for controlling plant diseases	Goodwin, P.
200128	1-May-10	30-Apr-13	Prod Syst & Env Sust	Development of New Energy Efficient Lighting Systems for Poultry Farming using Light Emitting Diodes (LEDs)	Bedecarrats, G.
200131	1-May-10	30-Apr-13	Prod Syst	Impact of 1-MCP and controlled atmosphere conditions on physiological injury of apple fruit during storage: a mechanistic study of γ -aminobutyrate and polyamine metabolism	Shelp, B.
200132	1-May-10	30-Apr-13	Prod Syst	Enhancing the persistence of underseeded forage legumes under drought stress	Bowley, S.
200149	1-May-10	30-Apr-13	Prod Syst	New and Innovative Diagnostic, Prevention, and Treatment strategies for Poor Adaptive Responses to Negative Energy Balance in Transition Dairy Cows	Duffield, T.
200155	1-May-10	30-Apr-13	Prod Syst	Healthy Potatoes to Benefit the Ontario Producer and Consumer	Sullivan, A.
200160	1-May-10	30-Apr-13	Prod Syst	Development of a complete solution for boar taint	Squires, E.J.
200175	1-May-10	30-Apr-13	Prod Syst & Food for Health	Improving profitability in asparagus production through enhanced breeding, management and human health.	Wolyn, D.
200181	1-Jun-10	31-May-12	Prod Syst	Modulation of Optimal Dietary True Digestible Calcium (Ca) to True Digestible Phosphorus (P) Ratio for Improving Growth and Nutrient Utilization in Pigs	Fan, M.
200203	1-May-10	30-Apr-12	Prod Syst	Effects of Gender, Season of the Year, and Management Regimen on Determining Saleable Meat Yield in Lamb Carcasses Using Ultrasound and Electronic Probe Technologies	Mandell, I.
200204	1-Sep-10	31-Aug-13	Prod Syst	The Impact of Residual Feed Intake Classification and Management Regimen on Feedlot Growth Performance, Carcass Traits, and Beef Quality	Mandell, I.
200223	1-May-10	30-Apr-13	Prod Syst	Development of Immune Strategies for control of viral diseases of poultry	Nagy, E.
200246	1-Jun-10	31-May-13	Prod Syst	Optimizing Biological Control Strategies in Greenhouse Floriculture: Interactions, Integration and Implementation	Scott-Dupree, C.
200268	1-Apr-10	31-Mar-13	Prod Syst	Maintaining Plant Health with Effective Integrated Weed Management Strategies	Tardif, F.
200270	1-Apr-10	31-Mar-13	Prod Syst & E Mgmt	Western Bean Cutworm Monitoring and Management Strategies for Ontario and the Great Lakes Region. A Proactive and Coordinated Approach to Prepare and Respond to a Newly Emerging Corn and Dry Bean Pest in Ontario	Schaafsma, A.
200275	1-May-10	30-Apr-13	Prod Syst	Integrating new technologies for improved management of soil-borne plant diseases: Biological controls, disease forecasting, and pathogen interactions	McDonald, M.R.
200302	1-May-10	1-May-13	Prod Syst	Swine Liquid Feeding Research II: Increase co-product usage, reduce energy input costs, impact on meat quality, gut health and the environment	de Lange, C.
200313	1-May-10	30-Apr-13	Prod Syst	Genetic evaluation and selection tools for profitability improvement in Canadian sheep production	Miller, S.

200314	1-May-10	30-Apr-13	Prod Syst	Improving feed efficiency and beef quality through genomics and novel selection criteria	Miller, S.P.
200401	1-May-11	31-Dec-13	Prod Syst	The behaviour and welfare of cattle unloaded for feed, water and rest during long-duration transportation	Haley, D.
200402	1-Aug-11	30-Aug-12	Prod Syst	A two-stage method for reducing weaning stress in horses	Merkies, K.
200403	1-Jun-11	31-May-14	Prod Syst	Identification of small regulatory RNAs in gametes and embryos.	LaMarre, J.
200404	1-May-11	30-Apr-14	Prod Syst	Monitoring and managing metabolic health to prevent reproductive disease in postpartum dairy cattle	LeBlanc, S.
200405	1-May-11	30-Apr-13	Prod Syst	Improving the management of bacterial coldwater disease in rainbow trout aquaculture via autogenous vaccination and family susceptibility.	Lumsden, J.
200406	1-Aug-11	31-Jul-14	Prod Syst	Effect of early life feeding and management strategies on weaning success and development of feeding behaviour patterns in dairy calves	DeVries, T.
200407	1-May-11	31-Dec-13	Prod Syst	Effect of peri-parturient housing and calving management practices on the behaviour,	Haley, D.
200408	1-Jul-11	30-Apr-14	Prod Syst	Understanding early-life growth, and the diagnosis and long-term impacts of respiratory disease, on health, performance, and survival of dairy calves	Leslie, K.
200409	1-May-11	30-Apr-13	Prod Syst	Is tilimicosin useful in reducing viremia and the clinical impact of Porcine Reproductive and Respiratory Syndrome (PRRS)?	Friendship, R.
200410	1-May-11	31-Dec-13	Prod Syst	Remediation strategies to suppress vine decline disease complex in processing tomatoes.	Loewen, S.
200411	1-May-11	30-Apr-14	Prod Syst	Adapting cultivars and production systems of dayneutral strawberries to the changing and diverse climate of Ontario.	Dale, A.
200412	1-May-11	30-Apr-14	Prod Syst	Combining Anthracnose Resistance with Resistance to other Major Diseases in Ontario Common Bean (<i>Phaseolus vulgaris</i> L.) Germplasm	Navabi, A.
200413	1-May-11	30-Apr-14	Prod Syst	Native ornamental species for novel applications for greenhouse and landscape culture	Sullivan, A.
200414	1-May-11	30-Apr-14	Prod Syst	Effect of high corn residue levels on soybean production	Deen, B.
200415	1-May-11	30-Apr-14	Prod Syst	Cultivar resistance/tolerance and management of plant-parasitic nematodes on strawberries in southern Ontario	Jordan, K.
200416	1-May-11	30-Apr-13	Prod Syst & E Mgmt	Peri-weaning failure-to-thrive syndrome (PFTS) in pigs in Ontario	Friendship, R.
200417	1-Sep-11	30-Sep-14	Prod Syst & E Mgmt	The epidemiology of inclusion body hepatitis in broiler breeders in Ontario	Guerin, M.
200418	1-Sep-11	31-Aug-14	Prod Syst & E Mgmt	Johne's disease prevention and control on organic dairy farms in Ontario	Kelton, D.

200419	1-May-11	30-Apr-14	Prod Syst & E Mgmt	Emerging plant pathogens: Identification, biology, pathogenicity and integrated management of emerging pathogens infecting asparagus, cucumber and basil.	McDonald, M.R.
200420	1-May-11	30-Apr-14	Prod Syst & Env Sust	Novel Tests for Nitrogen and Testing of Inoculants With Potential to Reduce Chemical Inputs for Ontario Crop Production	Raizada, M.
200421	1-May-11	30-Apr-14	Prod Syst & Food for Health	Purple vegetables for better health: a study of the antioxidant and other beneficial effects of anthocyanin pigments in potatoes and carrots	McDonald, M.R.
200423	1-May-11	30-Apr-14	Prod Syst & Prod Dev	New hybridizations for Ontario apple cultivar development.	Somers, D.
200424	1-Jun-11	30-May-14	Prod Syst & Prod Dev	Welfare-Friendly Eggs: Meeting the needs of laying hens, producers and consumers through alternative housing systems	Widowski, T.

Production Systems Theme Tier II

Project #	Start Date	Approved End Date	Approved Program	Title	Project Leader
26443	1-May-06	30-Apr-12	Tier II	Osteoarthritis and Quality of Life	Hurtig, M.
26621	1-May-08	30-Apr-13	Tier II	Genetics of disease resistance in ruminants: Interaction between the HP-adrenal axis and the immune system.	Karrow, N.
26640	25-Aug-08	31-Mar-13	Tier II	A comparison of the extent of frost tolerance in facultative winter annual weeds	Van Acker, R.
26644	1-Nov-08	31-Oct-11	Tier II	The application of genomic approaches to rainbow trout aquaculture	Danzmann, R.
26645	1-Nov-08	31-Oct-11	Tier II	Hazelnuts, a potential industry for Ontario	Dale, A.
26646	1-May-09	31-Dec-11	Tier II	Evaluation of Two Sedation/Analgesia Protocols to Assist Ventilatory Support in the Critically Ill Equine Neonate	Kerr, C.
26650	13-Feb-09	31-Dec-11	Tier II	Elixir Milk: Evaluation of Mechanisms of Phytochemical Transfer to Milk	Osborne, V.
26787	22-Jun-09	30-Apr-12	Tier II	Improving Outcomes after Microfracture Repair of Cartilage Defects by High Resolution Imaging and Presurgical Planning	Hurtig, M.
26789	1-May-09	30-Apr-12	Tier II	Improving udder health in automatic milking systems through feed bunk management and design	DeVries, T.
26790	1-May-09	31-Aug-11	Tier II	Effect of local anesthetic deposition into structures of the foot on subsequent magnetic resonance images.	Cribb, N.
26791	1-May-09	31-Dec-11	Tier II	Laryngeal Ultrasound as Novel Diagnostic Technique	Chalmers, H.

27032	13-Aug-10	30-Apr-13	Tier II	Tunnel-growing Systems for raspberries	Dale, A.
27035	1-Oct-10	1-Oct-13	Tier II	The impact of nutrition and RFI on tissue and molecular characterization of maintenance energy costs, and fetal growth and programming in wintering pregnant beef cows	Swanson, K.
27036	8-Sep-10	30-Apr-13	Tier II	Vegetable fertility management and new crops development	McKeown, A.
27037	9-Sep-10	31-Aug-12	Tier II	Effect of direct-fed microbials on health and performance of dairy cattle.	McBride, B.
27038	13-Sep-10	30-Apr-13	Tier II	Recruitment biology and ecology of large [<i>Digitaria sanguinalis</i> L. (Scop.)] and small [<i>Digitaria ischaemum</i> (Schreb.) ex Muhl.] crabgrass in turf, with implications for management under municipal pesticide bans	Van Acker, R.
27039	22-Sep-10	28-Feb-12	Tier II	A laboratory challenge study to assess the efficacy and safety of a single dose New formula Porcilis PCV, and compare it to two-dose Circumvent PCV and another 1-dose vaccine against porcine circovirus type 2	Dewey, C.
27044	4-Oct-10	30-Apr-13	Tier II	Improving Dry Bean (<i>Phaseolus vulgaris</i>) Production through Breeding, Genetics, Pest Management and Agronomy	Pauls, K.P.
27045	15-Nov-10	31-May-12	Tier II	Associative Effects of Mixing Whole Barley and Whole Corn for Finishing Lambs in Ontario	Mandell, I.
27046	1-Nov-10	31-Aug-11	Tier II	Insulin resistance, immune function, and uterine health in dairy cows	LeBlanc, S.
27049	1-Sep-09	31-Aug-14	Tier II	Evaluating the substitution of high quality vegetable oils for fish oil in rainbow trout feed.	Moccia, R.
27185	1-Dec-10	31-Oct-13	Tier II	Regulation of Immune Response in Pigs	Wilkie, B.
27186	1-Dec-10	30-Apr-12	Tier II	An evaluation of the effect of Sometribove administered pre-calving for the prevention of subclinical ketosis in dairy cattle.	Duffield, T.
27188	1-May-10	30-Apr-13	Tier II	Cover crops preceding 2nd year soybeans	Deen, B.
27189	1-May-10	30-Apr-13	Tier II	Long-term effect of nitrogen rates on corn	Deen, B.
27190	1-May-10	30-Apr-13	Tier II	Cover crops preceding corn in a corn/soybean rotation where corn silage/residue is harvested for bioenergy biomass	Deen, B.
27191	1-May-10	30-Apr-13	Tier II	Evaluation of Miscanthus and Switchgrass, for bioenergy potential, adaptation and yield under Ontario conditions	Deen, B.
27192	1-Apr-11	1-Dec-11	Tier II	The Effects of Stocking Density on Broiler Growth Performance and Meat Quality	Mandell, I.
27193	1-Apr-11	1-Aug-14	Tier II	Equine Stem Cells – in vivo assessment and in vitro isolation optimization and characterization	Koch, T.
27194	23-Mar-11	23-Mar-12	Tier II	Development of Russian Dandelion as a source of natural rubber.	Wolyn, D.
27195	1-May-11	1-May-13	Tier II	Promotion of litter size in commercial swine using an immune-stimulant	Tayade, C.

27196	25-Mar-11	25-Mar-12	Tier II	Reducing intramammary infection in free-stall housed dairy cows: Interaction of post-milking standing time with cow cleanliness, lameness, and social status	deVries, T.
27197	25-Mar-11	25-Mar-13	Tier II	Improving efficiency of feed use through reduced variability in nutrient consumption in lactating dairy cows	deVries, T.
27198	1-Jun-11	1-Jun-13	Tier II	Sow Housing: risk factors and assessment techniques for lameness, productivity and longevity in group and individually housed gestating sows.	Friendship, R.
27199	2-May-11	1-Aug-13	Tier II	The effect of Fusarium mycotoxins on the frequency and severity of equine gastric ulcer syndrome	Smith, T.K.
27200	1-May-11	30-Apr-13	Tier II	Etiologic agents and their interaction with macrophages in heaves	Bienzie, D.
27201	1-Apr-10	31-Mar-12	Tier II	Developing new, improved cultivars of barley and wheat for Ontario and Eastern Canada	Falk, D.
27202	1-May-11	1-Dec-13	Tier II	Reducing the Impact of Soil Water Deficits on Soybean Yields in Ontario	Earl, H.
27203	1-May-11	31-Oct-12	Tier II	An Investigation of Alternative Methods of Dehydration and Cryoprotectant Addition for Equine Embryos	Chenier, T.
27204	1-May-11	30-Apr-13	Tier III	Development of newly emerging strategies for cartilage and bone repair	Hurtig, M.
27205	6-May-11	30-Apr-14	Tier II	Nitrogen Utilization Efficiency	Rothstein, S.
27206	1-May-10	30-Apr-12	Tier II	Molecular mechanisms of prostaglandin-induced embryonic loss in mares	Betteridge, K.
27207	1-May-10	30-Apr-13	Tier II	Management of foliar diseases of vegetable crops	McDonald, M.R.
27208	1-Jun-11	31-May-12	Tier II	Induction of cervical dilation for transcervical artificial insemination (TCAl) in ewes	Bartlewski, P.
27210	1-May-10	30-Apr-13	Tier II	Prevalence and Characterization of leporid herpesvirus-4 (LHV-4) in Ontario Rabbits, an Emerging Rabbit Pathogen	Turner, P.
27212	1-Dec-11	1-Jan-14	Tier II	Investigations on the practicality and safety of neuroprosthesis induced bronchodilation for the treatment of Recurrent Airway Obstruction in the horse.	Viel, L.
27213	1-Jul-11	31-Aug-15	Tier II	Farm-scale Assessment of GHG Mitigation Strategies in Dairy livestock Cropping Systems	Wagner-Riddle, C.
27214	2-Sep-11	2-Sep-12	Tier II	Nutritional regulation of the rumen epithelium	McBride, B.
27215	1-Jul-11	30-Sep-12	Tier II	An experimental model of duodenitis-proximal jejunitis in horses challenged with <i>Clostridium difficile</i> toxins. A preliminary study.	Arroyo, L.
027216	1-Sep-11	30-Apr-13	Tier II	Intravascular Assessment of the Pulmonary Artery Hemodynamics: A pilot study	Arroyo, L.
27217	15-Sep-11	15-Sep-12	Tier II	Investigation of the role of the systemic effect of Low Level Laser Therapy (LLLT) in healing of distal limb wounds in horses	Koenig, J.

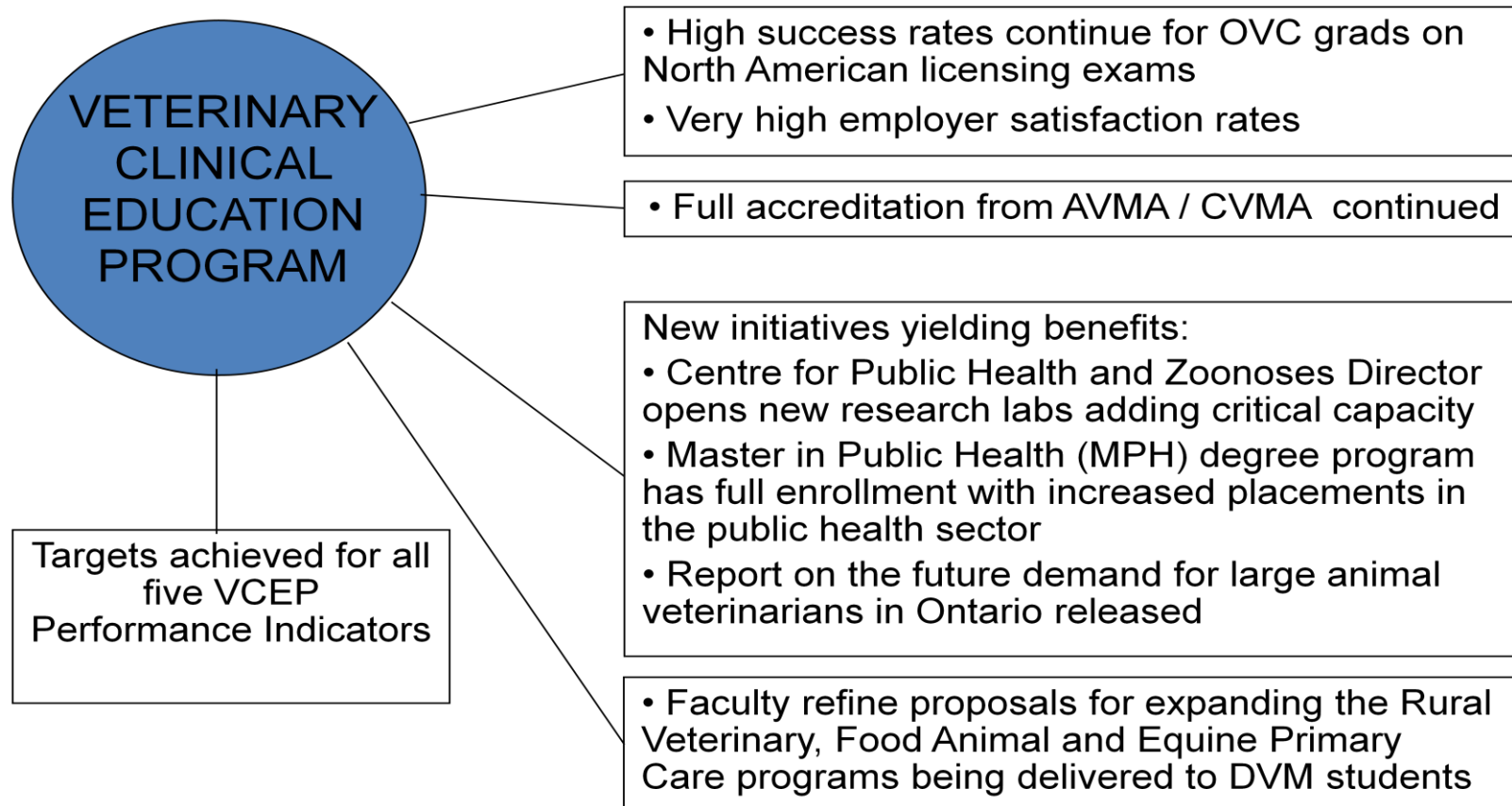
27218	1-Mar-12	28-Feb-15	Tier II	Maximizing immunity to <i>Mannheimia (Pasteurella) haemolytica</i> before feedlot arrival	Hodgins, D.
27219	1-Nov-11	1-Nov-14	Tier II	Evolutionary, Developmental and Physiological Genetics of Salmonid Fishes	Danzmann, R.
200109	1-Sep-09	1-Sep-12	Tier II	Assessing the behaviour and welfare of broiler breeders using alternative feeding strategies	Torrey, S.
200178	1-Jul-10	30-Apr-13	Tier II	Alternative methods to control swine enteric bacterial disease	Friendship, B
200316	15-Feb-10	31-May-12	Tier II	The exploration of the pharmacokinetic/pharmacodynamic properties of Florfenicol-like substance in the bronchoalveolar lavage fluid and pulmonary tissue of calves.	Viel, L.
200318	1-Jun-10	2-Jun-12	Tier II	Maintenance of Enviropigs at Arkell Swine Research for Research to Support Regulatory Submissions in the United States and Canada, and for Commercialization	Forsberg, C.
200319	1-May-10	30-Apr-13	Tier II	Effects of stressor hormones on reproductive success, and early embryo development of rainbow trout	Leatherland, J.
200324	1-May-10	1-May-13	Tier II	Video imaging for real-time performance monitoring of growing-finishing pigs	de Lange, C.
200325	1-Jun-10	31-May-13	Tier II	Effects of Method of Forage Finishing and Cattle Breed on Growth Performance, Carcass Characteristics, Eating Quality, and Nutrient Composition of Forage Finished Beef Relative to a Grain Finished Product	Mandell, I.
200328	1-May-10	30-Apr-13	Tier II	Maize breeding and genetics-field and lab capacity	Lee, E.
200329	1-May-10	30-Apr-13	Tier II	Management and physiology of turfgrass systems with an emphasis on reduced inputs, environmentally sustainable production and human health	Lyons, E.
200330	1-Jun-10	30-Jun-12	Tier II	Susceptibility of domestic poultry to infection with avian bornavirus	Smith, D.
200331	1-May-10	30-Apr-13	Tier II	Development of novel methods for the diagnosis and control of poultry coccidiosis	Barta, J.
200332	1-Jan-10	31-Dec-13	Tier II	Breed-specific gene expression profiles and DNA methylation patterns in calves infected with <i>Mycobacterium avium</i> subsp. <i>paratuberculosis</i> (MAP)	Karrow, N.
200333	1-May-10	30-Apr-13	Tier II	Development of disease and insect resistant soybean varieties for food grade, functional food and specialty oil markets in Ontario	Rajcan, I.
200334	1-May-10	1-May-12	Tier II	The influence of biotic stress on yield potential of corn	Swanton, C.
200335	1-Jul-10	30-Apr-13	Tier II	A longitudinal study of a select group of animals at Arkell Swine in order to produce a data base of accurate production and disease records as a framework for multiple research studies	Friendship, B.
200340	13-Jul-10	22-Feb-12	Tier II	High-carotenoid corn: enriching lutein and zeaxanthin concentrations in eggs produced by laying hens, and evaluating their bioavailability following consumption by humans to establish the potential for prevention of age-related macular degeneration	Shelp, B.
200346	3-Aug-10	30-Apr-13	Tier II	Vegetable crop management strategies and variety development for improved product quality and farm profitability	Zandstra, J.

200347	1-Sep-10	30-Nov-11	Tier II	Controlling Contagious Nasal Cancer in Sheep	Wootton, S.
200349	13-Aug-10	30-Apr-12	Tier II	Optimization of Production and Resource-Use Efficiencies in Greenhouse Vegetable Cropping Systems	Micallef, B.
27209	31-Dec-10	31-Mar-13	Tier II	Is glycerol from biodiesel and ethanol production equivalent to corn grain in its ability to stimulate milk protein yields of dairy cows?	Cant, J.

VETERINARY CLINICAL EDUCATION PROGRAM

Selected Performance Indicators and Accomplishments

Program Objective: Support the Ontario economy by training professionals skilled in maintaining the health and welfare of animals and their interrelationships with people and the environment



Veterinary Clinical Education Program

Performance Indicators

Data collection and establishment of baselines for each Performance Indicator (PI) was completed with the assistance of OMAFRA. The following table summarizes the VCEP Program's performance according to the five (5) PIs in the Agreement.

Key Outcome		Maintain AVMA/CVMA accreditation.
Performance Indicator VCEP1	Level of accreditation achieved - Maintain AVMA/CVMA accreditation	
	Metric	Review of accreditation reports in order to assess performance and maintenance of accreditation.
	Baseline:	AVMA/CVMA Full Accreditation
	Target:	2010-2013: maintain AVMA/CVMA Accreditation
	Results (2011/12):	On March 12, 2012, OVC was granted a continuation of its full accreditation based on a vote by the AVMA/CVMA Council on Education. OVC is required to submit an annual update report documenting any changes the College has made that would impact any of the 11 accreditation standards. These two organizations represent the highest standard of achievement for veterinary medical education in the world. The accreditation process focuses on the Doctor of Veterinary Medicine program and the institutional resources, infrastructure and personnel that support it. Graduation from a fully accredited institution permits graduates to take the national licensure examination for professional practice in Canada and the USA.

Key Outcome	Attracts and retains highly qualified clinical faculty from around the world as a source of new knowledge.	
Performance Indicator VCEP2	An appropriate number of high quality faculty.	
	Metric	Number of faculty provided by U of G OMAFRA Partnership Funding
	Baseline:	Baseline established as the number of faculty positions supported through the Agreement in 2009/10, at 12.4 faculty FTEs.
	Target:	2009-2010: maintain 2008 level 2010-2013: baseline level likely to decline due to flatlined budget.
	Results (2011/12):	VCEP funding of \$1.9M contributed to the support of 12.4 faculty, which is 11% of the total OVC 114 faculty FTE (see table below for details).

OVC Faculty FTE ¹ (Base funded in 2011-2012)

Department	Discipline		Assistant Professor	Associate Professor	Professor	Total
<i>Pathobiology</i>	Anatomic Pathology		3.00	2.00	4.00	9.00
	Avian Pathology		0.00	0.00	0.00	0.00
	Bacteriology		0.00	1.00	2.00	3.00
	Clinical Pathology		0.00	0.00	2.00	2.00
	Comparative Pathology		1.00	0.00	0.00	1.00
	Immunology		1.00	0.00	1.00	2.00
	Laboratory Animal Science		0.00	1.00	0.00	1.00
	Parasitology		0.00	1.00	1.00	2.00
	Public Health (incl CPHAZ)		0.00	0.00	1.00	1.00
	Virology		1.00	0.00	1.00	2.00
	Wildlife/Zoo Pathology		0.00	0.00	1.00	1.00
		Sub-total	7.00	5.00	12.00	24.00
<i>Clinical Studies</i>	Anesthesiology		0.00	2.00	1.00	3.00
	Cardiology		0.00	1.00	0.00	1.00
	Companion Animal Medicine		2.00	1.00	0.00	3.00
	Companion Animal Surgery ²		1.00	3.30	1.00	5.30
	Dermatology		0.00	1.00	0.00	1.00
	Emergency and Critical Care		1.00	1.00	0.00	2.00
	Large Animal Medicine		1.00	2.00	0.00	3.00
	Large Animal Surgery		3.00	2.00	2.00	7.00

	Neurology		1.00	0.00	0.00	1.00
	Nutrition		1.00	0.00	0.00	1.00
	Oncology		1.00	0.70	1.00	2.70
	Ophthalmology		1.00	0.00	0.00	1.00
	Radiology		2.00	1.00	0.00	3.00
		Sub-total	14.00	14.0	6.40	34.40
Population Medicine	Animal Welfare		2.00	0.00	0.00	2.00
	Communications		2.00	0.00	0.00	2.00
	Epidemiology		1.28	2.00	1.00	4.28
	Equine Health Management		0.00	1.00	0.00	1.00
	Farm Health Ethology		0.00	0.00	0.00	0.00
	Public Health (incl. CPHAZ)		1.69	1.00	1.00	3.69
	Ruminant Health Management		1.00	4.00	0.00	5.00
	Swine Health Management		0.00	0.00	2.00	2.00
	Theriogenology		2.00	0.00	1.00	1.00
	Statistician		0.00	0.00	0.00	0.00
	Poultry Health Management		0.00	0.00	0.00	0.00
		Sub-total	8.97	8.00	6.00	22.97
Biomedical Sciences	Anatomy		0.00	0.00	1.00	1.00
	Cellular/Molecular Biology		0.80	3.00	3.00	6.80
	Neurology		0.00	0.00	1.00	1.00

	Oncology		1.00	0.00	1.00	2.00
	Pharmacology/Toxicology		1.00	2.00	2.00	5.00
	Reproductive Biology		1.00	1.00	1.00	3.00
	Physiology		2.00	1.00	0.00	3.00
		Sub-total	5.80	7.00	9.00	21.80
	TOTAL		35.77	34.00	33.40	103.17
Notes						
1. In 2011-12 VCEP funding contributed \$1.9 M which provided support equivalent to 12.40 faculty which is 11% of the total OVC 114 faculty FTE.						
2. Includes position of Dean of the College						
Vacancies:						
Biomedical Sciences (1)						
Clinical Studies (5)						
Pathobiology (2)						
Population Medicine (3)						

Key Outcome	Provide a comprehensive training program for undergraduate veterinary students.	
Performance Indicator VCEP3	Readiness of graduates for employment (Provide a comprehensive training program for undergraduate veterinary students)	
	Metric	% level of students and employers satisfaction regarding readiness for employment.
	Baseline:	Baseline for agreement will be the results for the 2007/08 graduating class (2008/09 data were not used due to technical collection errors.)
	Target:	2010-2013: maintain percentages from 2007/08 annual student and employer surveys
	Results (2011/12):	Of graduates who responded (n = 72), 100% were satisfied (i.e. rated their performance as Superior, Very Good, or Good) with their overall performance/competence to do the job for which they were hired. Of the employers who responded (n = 47), 96% were satisfied (i.e. rated the new graduate as Superior, Very Good, or Good) with their employee's overall performance/competence to do the job for which they were hired. 2010/11 Results: Of graduates who responded 100% were satisfied Of the employers who responded 95% were satisfied 2009/10 Results: Of graduates who responded 98% were satisfied Of the employers who responded 92% were satisfied 2007/08 Results: Of graduates who responded, 97% were satisfied Of the employers who responded 95% were satisfied

Key Outcome	Provide a comprehensive training program for undergraduate veterinary students.									
Performance Indicator VCEP4	Graduating students' performance in the North American Veterinary Licensing Exam (NAVLE).									
	Metric	% of VCEP students who pass the North American Veterinary Licensing Exam (NAVLE), compared to the % average of other North American institutions.								
	Baseline:	Baseline is the 2008/09 pass rate for NAVLE students.								
	Target:	2010-2013: That OVC students continue to meet or exceed the mean pass rate for all students writing the NAVLE exam.								
	Results (2011/12):		Dec 11 & Apr 12		Dec 10 & Apr 11		Dec 09 & Apr 10		Dec 08 & Apr 09	
			OVC	ALL	OVC	ALL	OVC	All	OVC	All
		Number Taking Exam	109	3603	108	3239	114	3061	106	3009
		Number Passing	107	3465	108	3161	114	3002	104	2908
		Percent Passing	98	96	100	98	100	98	98	97
Key Outcome	Graduate individuals highly qualified in relevant post-graduate specialties.									
Performance Indicator VCEP5	Number of students starting and completing post-graduate studies each year by area related to OMAFRA priorities.									
	Metric	Number of VCEP funded and non-VCEP funded students working on projects related to OMAFRA priorities. The metric would include both students beginning and completing post-graduate studies.								
	Baseline:	Baseline is 15.1 DVSc students.								

	Target:	2010-2013: maintain funding for 15.1 DVSc students working in areas of priority to OMAFRA.			
	Results (2011/12):	See DVSc enrolment Table below			
TOTAL ENROLMENT NUMBER OF DVSC STUDENTS					
WITH SUPPORT FROM VCEP FUNDING ¹					
May 1, 2011 to April 30, 2012					
		Total Number of Students Enrolled in 2011-12 (Headcount) ²			
Department	Discipline	Continuing	New	Graduating	Total # Enrolled
Pathobiology	Anatomic Pathology	2	3	3	8
	Clinical Pathology	0	0	2	2
	Avian Exotic	0	0	0	0
	Laboratory Animal Science	0	1	1	2
	Oncology	0	0	0	0
	Sub-total	2	4	6	12
Clinicial Studies	Anesthesiology	2	0	1	3
	Companion Animal Surgery		2	0	0
	Companion Animal Medicine		1	1	1
	Large Animal Medicine	2	1	1	4
	Large Animal Surgery	3	0	0	3
	Emergency and Critical Care		0	0	1
	Neurology	1	0	0	1
	Cardiology	1	0	0	1
	Radiology	0	0	0	0
	Sub-total	12	2	4	18

Population Medicine	Health Management	3	2 ⁴	1	5
	Theriogenology	2	0	0	2
	Sub-total	5	2	1	7
	OVC Total	19	8	11	38

Notes

1. VCEP funding is \$506k, which is 54% of the \$928k base budget which supports the College funded DVSc positions.
2. The enrolment numbers are based on headcount not FTE. "In-program" students are enrolled for the full fiscal year. Students entering and exiting the program are enrolled for part of the year
3. The total number of base funded positions = 29 of which VCEP supports the equivalent of 15.12
4. Funding for one DVSc position was allocated to a PhD student doing bovine research that had already completed a food animal residency program.

NEW INITIATIVES

Knowledge Translation and Transfer (KTT) Program and Partnership Communications

Communications

Through the negotiation of the OMAFRA - U of G Agreement, the Ministry and University agreed that there needed to be a new focus on Knowledge Translation and Transfer (KTT) to improve the dissemination and commercialization of research advances to the broad diversity of client groups (direct users of the research results). It was also agreed that an enhanced emphasis on communications to the other stakeholders and the public at large (general beneficiaries of the application of research results) was needed to help ensure that Ontario taxpayers hear about the value of the research funded by the provincial government under the Partnership.

KTT Program

The KTT initiative established under the OMAFRA - U of G Partnership Agreement in 2008 is designed to accelerate the transformation of knowledge into use. This program includes long-established practices in extension and technology transfer, building and expanding on them. Over the past year, significant progress has been made in the continued development and delivery of the program. Achievements made during the 2011/12 fiscal year are described below.

The **U of G Knowledge Mobilization Program Managers** continued to provide for the delivery of the KTT program throughout the 2011/12 time period through oversight of the KTT funding program including project reporting and program evaluation. The U of G KTT staff also continued to plan and deliver on research and knowledge exchange activities by hosting 'knowledge exchange' events for several research themes.

The '**Agri-Food and Rural Link**' brand name continued to be implemented in terms of branding the KTT program primarily through the use of this logo on materials associated with the KTT funded projects. The **Agri-Food and Rural Link** name and logo continue to be used as a Twitter feed which currently has over 1,050 followers. The Twitter feed allows for rapid dissemination of Partnership funded research stories such as the SPARK videos.

U of G KTT staff led the redevelopment of four Partnership websites including overall Partnership, KTT, Highly Qualified Personnel (HQP) and Research Program. A series of stakeholder consultations, including a website workshop in 2010, a survey and a number of planning meetings, provided stakeholder input into the redevelopment process. The new websites were built to be user-friendly, interactive and incorporate web 2.0 functionality such as a twitter feed, YouTube integration and various social networking share options. Some key features of the websites include:

- Calendar- highlight upcoming events and can also be used to share resources from past events;
- 'What's Happening' news feed of Partnership media and events;
- SPARK produced research videos;

- Clear language research summaries;
- Resources- link to the Research Management System (RMS), information about upcoming calls for LOIs and proposals and KTT resources.

The websites were built on a platform that can be expanded to integrate new technology in the future, such as webcasts and podcasts. The KTT staff have also been working with KTT researchers to integrate project information and resources into the KTT website. The most innovative and useful area of the four websites is the Research Link. The Research Link is a user-friendly search tool that goes into the RMS to get real-time research and KTT project information and results. Records dating back to as early as 1994 have been migrated from the Oasis database to the new RMS. Not only does this provide a strong archival tool, but website users can access projects and their results from 1994 to the present through the Research Link. Overall, the four websites serve as a portal for agri-food information and can expand with changing technology and research outputs.

The Agri-Food and Rural Link **KTT Funding Program** which was launched in May 2010 continued to be active in 2011/12 with more emphasis on project reporting and program evaluation. A final and annual report template was created for the on-line Research Management System (RMS) and all project Principle Investigators (PI's) reported on progress to date in May 2012. A 4th call for proposals was also developed for an early summer 2012 deadline. There are currently 7 completed KTT projects, 44 active projects, and potentially up to 15 new projects to be funded under the 4th call. The projects span across the research themes and priorities of OMAFRA. See page 152 for a complete listing of KTT projects.

Overall administration for the project funding program was provided by the U of G KTT staff. U of G KTT staff have also been sharing the successes learned from this funding program, which is unique in Canada, with broader audiences at conferences such as the ACE-NETC Conference in Denver, Colorado, and at the first Canadian Knowledge Mobilization Conference in Ottawa. U of G KTT staff also participate as KTT experts on the research review committees and as observers at the Theme Advisory Group meetings.

Plain language summaries of these reports are being consolidated into a **KTT Casebook** for further dissemination of the program results and successes. This KTT Casebook will provide an important overview of the lessons learned through the KTT program.

Agri-Food and Rural Link has developed and enhanced **networks and exchange of knowledge** between a variety of internal and external stakeholders through individual networking and by co-hosting and organizing research highlight days and events including:

- **Emergency Management Research Expo (September 2011)**
 - This event had 3 objectives:
 - To increase awareness of the Emergency Management (EM) research theme among U of G researchers and industry stakeholders
 - To showcase selected projects as examples of current EM research
 - To illustrate the full range of research priorities within the EM theme and the importance of industry collaboration
 - This event was very well-received and all three of these objectives were met plus one industry stakeholder, the Poultry Industry Council, made a tangible

connection with researchers in the College of Management Economics and several undergraduate research projects resulted from this connection.

- **Food for Health Plain Language Poster Display at the Royal Winter Fair (November, 2011)**
 - Provide the opportunity for graduate students working on OMAFRA-funded research to learn plain language writing skills through a plain language training and the development of a poster about their research.
 - Provide plain language examples of current 'Food for Health' research being conducted at the U of G to visitors attending the Royal Winter Fair.

- **Bioeconomy Research Highlights and Expo (December 7, 2011)**
 - Provide the opportunity for researchers, industry and government to learn about bioeconomy research in Ontario and how it is being used.
 - Provide a networking opportunity for OMAFRA staff, U of G researchers and industry.
 - Provide an opportunity for nearly 20 graduate students working on Partnership-funded bioeconomy research to display a plain language research poster, as well as network with participants.

- **Knowledge Exchange Day: KTT in Action (February 2012)**
 - Provide the opportunity for principal investigators from multiple KTT projects to present their work to date and to share lessons learned
 - Provide a networking opportunity for OMAFRA staff and researchers from U of G to share knowledge and expertise
 - Provide an opportunity for HQP students to highlight their work through a Poster Competition

- **KTT Community of Practice**
 - Provide an opportunity to interact with researchers and staff from a variety of departments at U of G and agencies around Guelph such as Public Health Agency of Canada, Centre for Public Health and Zoonoses, and the Institute for Community Engaged Scholarship.
 - Group meets monthly (aside from July and August) to discuss KTT research, projects and ideas. Members take turn hosting and planning the monthly meeting.
 - Topics discussed include current graduate research at U of G, the science- policy interface, Canadian Water Network knowledge mobilization program, and member KTT work.

Vineland Research and Innovation Centre – Contributions to the KTT Program

Through the OMAFRA-U of G KTT program, a 0.5 FTE is employed at Vineland Research and Innovation Centre (VRIC) as a **Horticulture Technology Scout**. Michael Kauzlaric has been actively searching for opportunities for the Canadian horticultural Industry through evaluating/assessing Canadian technologies, gaining an understanding of the needs of the

industry, bringing technologies into Canada, and extending technologies to the global marketplace. To date, over 10 separate technologies have been identified as having potential for the Canadian horticultural industry.

The 4 Targeted Areas for Scouting are:

1. **Automation**- Labour Saving Technologies
2. **Marketing and Packaging**- Presentation and Quality Acceptance
3. **Production**- Innovative technologies and practices
4. **Horticultural Cultivars**- New potentials, new markets or utilization of existing cultivars

The Horticulture Technology Scout has been active in pursuing In-licensing Agreements that will ultimately benefit the Canadian horticultural industry.

The Horticulture Technology Scout has also been active in reaching out to the horticulture industry through interaction with growers and associations. The list below outlines the key contacts that have been made as well as activities that have occurred as a result of this position.

- Actively showcasing fruit from U of G program to North American industry
- Offering weekly and annual twilight meetings for growers to view new selections in U of G program

The Horticulture Technology Scout has actively participated in the following events:

- Greenhouse conference – October 3-4, 2012
- Landscape Expo – October 17-18, 2012
- Canadian Produce Marketing Association – April 13-14, 2012
- Ontario Fruit and Vegetable Growers Association – February 20-21, 2012
- Ontario Greenhouse Vegetable Growers Association – September 17-18, 2012
- Member of Niagara Peninsula Fruit and Vegetable Grower's Association – monthly meetings
- Member of the Tender Fruit Evaluation Committee – weekly meetings
- Member of the Innovation Sub-Committee of the Labour Working Group (Horticulture Value Chain) Round Table – monthly meetings

Communications

The communications initiatives undertaken through the communications plan are managed within the overall KTT initiative of the Partnership because the communications contribute directly to the objectives of the KTT program. These objectives include expanding and enhancing stakeholders' awareness of activities, events, accomplishments and outputs of the various Partnership programs (Research, the Veterinary Clinical Education Program, and the Agri-Food and Animal Health Laboratory Programs). This awareness stimulates opportunities for stakeholders to provide informed input into planning and delivery of these programs. For example, stakeholders learning of specific research projects may contact the program managers (U of G Research Program Directors or OMAFRA Director Champions) or may communicate directly with the researchers about how the research findings could assist in addressing their particular needs, or suggest how further research would do so.

Several communications initiatives, outlined below, have continued and grown throughout 2011/2012 in accordance with the plan.

News@ (close to) Noon

News@ (close to) Noon is a speaker series, held approximately every six weeks except during summer months. It alternates venues between 1 Stone Road, and the University of Guelph Campus.

Five presentations were made in 2011/2012

- Topics were:
 - “PHYTOSPHERIX: Ontario crop-based particles for bioproducts discovery.” (presentation by John Dutcher)
 - “Barcode of life data system support for emergency management: OMAFRA and Greenhouse industry stakeholders.” (presentation by Robert Hanner)
 - “Chocolate and other flavourful foods using DAG fats.” (Presentation by Robert Lencki)
 - “Changing the way we think about the environment and health.” (Presentation by Karen Morrison)
 - “Biocontrol of Insects in Greenhouse Ornamentals.” (Presentation by Michael Brownridge)

Up to 60 people attended each event; in some cases attendees included industry representatives.

The Buzz

The Buzz is an electronic community news vehicle for and about the OMAFRA - U of G Partnership. The Buzz contains articles up to 150 words long about research, research stations, news and coming events related directly to any of the programs supported through the Partnership.

- In 2011/12, there were four new issues of the Buzz
- Originally meant primarily as internal communications vehicle within the Ministry and the University, circulation now includes 33 people outside of the U of G or OMAFRA through direct distribution or subscription. This is up from 25 people during the last reporting cycle. It is anticipated that external circulation will continue to be expanded in the coming year.
- It is directly distributed to 476 people including U of G personnel (administrators then forward to their departmental faculty and staff), external stakeholders, and all OMAFRA staff.

SPARK

Between May 2011 and May 2012, the combined efforts of students in Students Promoting Awareness of Research Knowledge (SPARK), and the agricultural communication classes, both based at the U of G, produced an extensive list of published and broadcast news stories about a variety of OMAFRA-sponsored projects. This listing can be found in Appendix A.

These stories have appeared in a number of different publications, and cover the spectrum of the University's many different agricultural research institutions and sites, including the regional campuses and the research stations, as well as the colleges on the main Guelph campus.

The primary vehicles for publication are the Ontario farm media, the U of G *Research* magazine and the University of Guelph main website and research website. Students contribute SPARK*AIR radio pieces which profile agricultural research at the U of G. The SPARK*AIR program continued this year, and more details about this program are below.

In total, 40 print stories were published by SPARK about the Partnership. As well, Director of Research Communications at the U of G, Owen Roberts, writes weekly columns called Urban Cowboy, which are published in both the *Guelph Mercury* and the *Woolwich Observer*. In 2011/12, Owen wrote 12 Urban Cowboy columns relating to the Partnership, and 4 Partnership related stories for *The Grower*.

SPARK*AIR – Partnership sponsored video stories

Building on the success of the first two seasons of Partnership video stories, the Partnership continued funding the SPARK*AIR program including funding for:

- One SPARK student
- Marketing through Farms.com
- Purchase of a new equipment

SPARK*AIR features news-like video stories about research coming out of the OMAFRA - U of G Partnership. The students produce the videos from the beginning to end by setting up the interview, creating the story based on the researcher's information, reporting the story on camera and being the videographer, collecting appropriate shots and finally editing all the clips into an informative three-minute story.

A key to SPARK AIR is a partnership with commercial agricultural information provider www.farms.com. From May 2011 to May 2012, 8 stories were completed and posted to www.farms.com's main page, a popular website for agricultural expertise. Feedback from this initiative, from key OMAFRA and U of G staff as well as farms.com has been encouraging – so much so that organizations are approaching SPARK*AIR to produce stories and informational videos for them. For example, SPARK*AIR produced a video about the first annual KTT 'Knowledge Exchange Day' and was successful in obtaining funding to produce additional stories and videos about specific KTT projects. A total of 24 stories and 8 videos were produced for the KTT program.

The SPARK program continues to raise the profile of agri-food research, the Partnership, the University and the Ministry.

Yearbook

One of the key communications initiatives is to create a 'reader friendly' annual publication, featuring highlights and key accomplishments of the Partnership programs, for a broader and more general audience than would normally view the Agreement Annual Report. This resulted in the third 32-page special issue of *Research* magazine, focusing on the Partnership called the

“2011-2012 Agri-food Yearbook”. The format for this edition is the same as the 2010 Agri-Food Yearbook:

- Presented in sections about AHL, AFL, seven research themes, VCEP and new initiatives HQP and KTT
- Printed and delivered in January 2012, including to readers of Ontario Farmer.
- The Yearbook will also be included as a schedule within this OMAFRA - U of G Partnership “Annual Report”

Affiliated Researcher Program

This program was launched in June 2008. It gives full access to the U of G Library system – including remote access – to OMAFRA staff who work on delivering the OMAFRA - U of G Agreement programs. There are currently 103 affiliated researchers.

Affiliated researcher terms are for two years, which meant starting in July 2010; renewal forms were sent out for people to renew. From this process, 5 accounts were cancelled; most of those due to people leaving the Ministry or changing positions and 15 new accounts were opened in 2011/12.

Knowledge Translation and Transfer (KTT) Projects 2011-2012

Project #	Start Date	End Date	Primary Theme	Project Title	Project Leader
299500	1-Apr-10	31-Dec-12	PS	Undergraduate Student Experiential Learning Pilot Program	Robinson, A.
299501	1-Aug-10	12-Dec-12	EM	Measuring the impact of a participatory approach to accelerating the adoption of practices and procedures to control John's Disease (JD) on Ontario dairy farms	Kelton, D.*
299502	1-Sep-10	30-Jun-12	ARP	Doing Democracy with Circles: Workshops for Public Sector Professionals	Caldwell, W.
299503	1-Sep-10	31-Dec-11	ARP	Best Practices in Rural Economic Development and Planning: A Learning Series for Municipal Councillors and Practitioners	Caldwell, W.
299504	1-Sep-10	30-Apr-13	ES	Application of learning alliances to enhancing economic and environmental sustainability of food processors through efficient use of resources	Farahbakhsh, K.*
299505	1-Sep-10	31-Aug-12	PS	Animal Welfare and Food Animal Production – Training and education for leaders in Ontario's food animal sectors	Widowski, T.
299506	1-Oct-10	1-Oct-11	EM	Increasing poultry biosecurity by developing an instructional DVD with practical on-farm examples and promoting participation in interactive poultry biosecurity seminars	Guerin, M.
299507	1-Oct-10	30-Apr-13	PS	CALF-ETERIA: Using CALF health and productivity as a template for an Evaluation of Translation and Extension of Research Information for Agriculture	Leslie, K.*
299508	1-Sep-10	30-Apr-11	ARP	Policy Education Program (PEP)	Ker, A.
299509	1-Aug-10	1-Aug-13	FFH	Agri-food for Healthy Aging (A-HA): Building connections and advancing knowledge within the agri-food, nutrition and health sectors	Duncan, A.
299510	1-Sep-10	30-Apr-13	Open**	Development and Assessment of Quality Milk Courses for Ontario Dairy Sheep and Dairy Goat Producers	Menzies, P.
299511	7-Sep-10	8-Apr-11	PDEVC	Enhancing BUS*4550/4560, Interdisciplinary Product Development Course	Lang, M.
299512	1-Nov-10	15-Dec-12	PS	Enhancing the KTT of Field Crop Production information to Ontario growers.	Tardif, F.
299513	1-Sep-10	31-Dec-12	PS	Exploring the effectiveness of mobile web browsing, open data, and social media technology to improve communication with clients	LeBoeuf, J.
299514	1-Jan-11	31-Dec-12	EM	Developing capacity for knowledge translation and transfer in agri-food public health in Canada	McEwen, S./Rajic, A.*

299515	1-Sep-10	31-Aug-12	ARP	Young Workers in Ontario's Rural Labour Market: Current Realities and Strategic Options for Employees and Employers	Mann, S.
299516	1-Aug-10	31-Jul-11	ARP	Human Resource Management Practices in the Agri-sector: A Tool for Rural Employers	Mann, S.
299517	1-Sep-10	28-Feb-11	PS	Market survey to enable enhancement of the existing KTT by Equine Guelph to Ontario's extensive equine industry	Ecker, G.
299544	1-Sep-10	31-Mar-11	ES	Understanding knowledge mobilization: Connecting science with policy and industry associations	Allen, E.
299520	1-Jan-11	30-Apr-13	ARP	The Ontario Rural Landowners Stewardship Guide: Extending Its Application Across Rural Ontario - Review, Refinement and Promotion	Caldwell, W.
299521	1-Jan-11	23-Dec-12	FFH	Creating Awareness about the Demand for Locally Produced Ethno-cultural Vegetables: discovering barriers and opportunities to this niche market's entry	Filson, G.
299522	1-Jan-11	30-Apr-13	ES	Cover crop decision-making tools	Van Eerd, L.
299523	1-Jan-11	31-Dec-12	PS	Knowledge Transfer of the High Immune Response Technology to the Dairy Industry and the Dairy Support Industry as a Best Management Practice to Improve Animal Health	Mallard, B.
299524	1-Jan-11	31-Dec-12	EM	Enhancement of the Food Safety Network at the University of Guelph	Hill, A.
299525	1-May-11	31-Dec-12	PS	Developing Educational Resources for Specialty Crop Production in Ontario	McKeown, A.
299526	1-Apr-11	31-Mar-13	Bioecon	Bioeconomy Seminar Series and Innovative Outreach Program for Wider Dissipation of Knowledge	Mohanty, A.
299527	30-Apr-11	30-Apr-13	PS	Enhanced effectiveness of animal research KTT	de Lange, K.
299528	1-Nov-10	14-Mar-11	Open	Celebrating partnership: Delivery of a Community-University Tradeshow	Hawkins, L.
299529	1-Feb-11	31-Sep-2012	PS	Assisting Animal Welfare - Development of a Decision Tree Tool to Assist in Poultry Management	Guerin, M.
299530	1-Dec-10	30-Jun-11	ARP	Delivering High Skills Programs in Agriculture, Horticulture, Food and Environment: Professional Development Workshop Series for secondary school educators.	Schmidt, J.
299531	1-Jan-11	30-Apr-13	PDEVC	Building Regional Food Hubs in Ontario through effective knowledge translation and transfer: Creating resilient Ontario communities	Landman, K.
299532	3-Jan-11	29-Apr-11	Open	Web-based KTT Infrastructure	Remillard, P.
299533	1-Feb-11	31-Aug-11	FFH	Delivery of Functionality International Conference IV: Ontario-Agri-Food Industry Showcase to the World	Marangoni, A.
299534	1-Apr-11	31-Aug-12	ES	Best Management Practices for Pollination & Pollinators: Promoting & Sustaining a Crucial Ecosystem Service	Kevan, P.

299535	1-Apr-11	30-Apr-13	PS	Maintaining sustainable sport opportunities in rural communities by communicating new research in turfgrass management on IPM and pesticide free turfgrass management.	Lyons, E.
299536	1-Apr-11	31-Mar-13	ES	Best Management Practices for Manure and Organic Waste Treatment Technologies: Use of Videos, Workshops and Research Notes to Enhance Adoption of Technologies	Crolla, A.
299537	1-May-11	30-Apr-13	FFH	Development of consolidated and comprehensive 'Food for Health' content for the Agri-Food and Rural Link KTT website	Paliyath, G.
299538	1-May-11	30-Apr-13	ARP	Planning for Agriculture: KTT to Engage Municipalities, Farmers and the Public	Caldwell, W.
299539	7-Jul-11	1-Apr-13	Open	CME KTT Outreach Seminar Series	Lang, M.
299540	1-May-11	31-Dec-12	PS	Development of an Ontario Dairy Cattle Welfare Symposium	Leslie, K.
299541	1-Apr-11	30-Apr-13	PS	Advisory and Outreach for Apiculture in Ontario	Guzman-Novoa, E.
299543	30-Apr-11	30-Apr-13	Open	Establishment of an Ontario site for CgFARAD at the University of Guelph for the translation and transfer of food animal drug residue avoidance and toxicant exposure knowledge	Johnson, R.
299545	1-May-11	30-Apr-13	PS	A dynamic action threshold decision-making tool for soybean growers	Hallet, R.
299546	1-May-11	30-Apr-13	PS	Ontario Agri-Environmental Research Data Repository	Johnston, W.
299547	1-May-11	30-Apr-13	Open	Clear Language Research Summaries: Process, Training, Outputs and Dissemination	Hawkins, L.
299548	1-May-11	30-Apr-13	ES	Application of Participatory Model Building (PMB) to enhance knowledge translation in pollution prevention in the food processing sector	Farahbakhsh, K.
299549	1-Apr-11	30-Apr-13	Open	Bridging the gap between science and policy in the agri-food sector through knowledge synthesis and translation (KST) support tools	McEwen, S ./ Rajic, A.
299550	31-Mar-11	31-Mar-13	ES	Evaluating the Role of Knowledge Translation & Transfer to Enhance Farm Organization Capacity to Participate More Effectively in Collaborative Decision Making	Fitzgibbon, J.*
299553	1-Jul-11	30-Apr-13	PS	"Report on Research" – Implementation of an Extension Program based on Equine Industry Needs and Priorities using a multimedia approach through social media channels	Thomason, J./ Ecker, G.

Highly Qualified Personnel Program (HQP)

The HQP Program provides scholarships to enhance “market-readiness” of graduate students by providing experiential learning opportunities beyond that normally available to students working in the agri-food system.

The scholarships are open to all students that meet the eligibility criteria for entry into graduate programs at the University of Guelph. In 2011/12 there were two competitions for HQP Scholarships, the outcome of which was awards to 14 MSc and 11 PhD students across 11 departments.

There will be one further call for applications for students starting their degree programs in summer 2013. The only academic course requirement for support within the OMAFRA HQP program is enrollment in a new targeted course, UNIV 6050. This HQP-specific course is designed to expose students to various aspects of business practices, commercialization and the impact of agri-food industries on other societal issues. Thirty HQP students were enrolled in 2011/12.

All HQP students must also participate in at least one semester of job shadowing/work experience. In 2012 the HQP website was updated to incorporate all HQP application templates as well as providing access to work semester/job shadowing MoU's, together with exit surveys for both students and mentors. The HQP website is soon to be integrated within the new OMAFRA/U of G website initiative.

Dr. Steve Leeson, the HQP co-coordinator, is working closely with the AVPR Agrifood and Partnerships, Program Directors overseeing the OMAFRA - U of G Research Themes, and OMAFRA staff in order to deliver the goals of the HQP Scholarship program. The budget projections for 2011/12 are within guidelines initially established for this 5yr program.

Animal Health Laboratory:

In 2011/12, no new research projects were approved for funding under the Animal Health Strategic Investment (AHSI).

Two major equipment purchases were made in 2011/12 using AHSI funding that will support the development of new tests both within AHSI projects and in turn within the AHL labs in general. One was a Thermo Scientific Centrifuge CL-2, and the other was an anaerobic bacterial culture chamber.

Eight AHL project staff members are supported directly from AHSI funding: 1 Project Administrator and 7 laboratory technicians. Within projects, various other personnel are supported including 2 post-doctoral fellows, 3 DVSCs, 8 PhDs, 4 MSc students, 20 summer or part time students, and 18 lab support personnel.

Follow up investigations have been conducted in 2011/12. Much of the testing performed has been in the interest of on-going monitoring, and \$36,144 has been spent on this testing.

AHSI concludes on April 30, 2013. A wrap-up presentation of completed projects is planned for November 8, 2012. A publication showcasing all AHSI projects will be produced in winter 2013.

New test development projects:

AHSI Project 09-02 (Completed): Determination of the prevalence of anthelmintic resistance in Ontario sheep flocks with indicators of gastrointestinal parasitism (Project Lead: Dr. Andrew Peregrine)

AHSI Project 09-05 (Completed): Development and assessment of a diagnostic ELISA for *Clostridium perfringens* Cpb2 toxin, with special reference to swine and cattle (Project Lead: Dr. John Prescott)

AHSI Project 09-08 (Completed): Mycoplasma speciation by molecular biology assays (Project Lead: Dr. Hugh Cai)

AHSI Project 09-11 (Completed): Development of molecular typing method for the characterization of *Giardia duodenalis* (Project Lead: Dr. Hugh Cai)

AHSI Project 09-14: DNA bar-coding of coccidial parasites of production animals: Development and field testing of a LightCycler-based quantitative test (Project Lead: Dr. John Barta)

AHSI Project 09-15: Rapid detection and typing of *Haemophilus parasuis* (Project Lead: Dr. Hugh Cai)

AHSI Project 09-17 (Completed): Development of *in-situ* hybridization (ISH) for diagnosis of *Coxiella burnetii* and *Toxoplasma gondii* in small ruminants (Project Lead: Dr. M. Hazlett)

AHSI Project 09-22: Optimization and validation of real-time PCR to determine the prevalence of pathogenic and non-pathogenic *Brachyspira* spp in Ontario layer flocks and to identify risk factors associated with dirty egg syndrome (Project Lead: Dr. D. Slavic)

AHSI Project 09-25 (Completed): Validation of serum amyloid A (SAA) an acute phase protein as marker of inflammation in horses (Project Lead: Dr. B. Hoff)

AHSI Project 10-01 (Project cancelled): Using glycantyping to predict outcome in Ontario sow herds experiencing porcine reproductive and respiratory (PRRSV) outbreaks. (Project Lead: Dr. J. Alsop)

AHSI Project 10-02: Validating and implementing new real time PCR tests and ELISAs for mammalian viruses (Project Lead: Dr. S. Carman)

AHSI Project 10-03 (Completed): Molecular typing of *Coxiella burnetii* identified in Ontario by multiple-locus variable number of tandem repeat analysis (MLVA) (Project Lead: Dr. Shu Chen)

AHSI Project 10-10: LHV-4 in Ontario rabbits (Project Lead: Dr. P. Turner)

AHSI Project 11-02: Avian *Chlamydophila* and *Coxiella* Infection in Ontario: Molecular Diagnosis Method Development (Project Lead: Dr. Hugh Cai)

AHSI Project 11-04 (Completed): Development of immunohistochemical tests for small ruminant lentiviruses (caprine arthritis-encephalitis virus, maedi-visna virus) (Project Lead: Dr. Josepha DeLay)

AHSI Project 11-05: Validation of MALDI-TOF for bacterial speciation (Project Lead: Dr. Durda Slavic)

AHSI Project 11-06: Comparison of four different sample types and three different culture methods for *Salmonella* spp. detection in poultry environmental samples (Project Lead: Dr. Durda Slavic)

AHSI Project 11-07: Evaluation of massively parallel sequencing for detection and characterization of viruses (Project Lead: Dr. Davor Ojkic)

AHSI Project 11-09: Genotyping of fowl adenoviruses and infectious bursal disease viruses from Ontario broiler breeder flocks (Project Lead: Dr. Davor Ojkic)

AHSI Project 11-10: Development of rapid identification assays for veterinary *Mycoplasma* using matrix-assisted laser desorption ionization-time offFlight mass spectrometry (Project Lead: Dr. Hugh Cai)

AHSI Project 11-12: Equivalency for strong positive serum ELISA Johne's Disease test results AND interpretation of repeated testing for Johne's Disease in Ontario dairy herds (Project Lead: Dr. David Kelton)

Surveillance projects:

AHSI Project 09-01 (Completed): Disease surveillance in a selected group of hog producers with minimal exposure to veterinary diagnostic services (Project Lead: Dr. Tim Blackwell)

AHSI Project 09-03: Enhanced surveillance for viral and bacterial pathogens in commercial broiler chicken flocks in Ontario (Project Lead: Dr. Michele Guerin)

AHSI Project 09-04 (Completed): Surveillance of disease agents of public health and agricultural significance in wildlife living on farms in Ontario (Project Lead: Dr. Claire Jardine)

AHSI Project 09-06 (Completed): A survey of risk factors associated with condemnation of sheep carcasses due to *Cysticercus ovis* infection (Project Lead: Dr. Paula Menzies)

AHSI Project 09-07 (Completed): Integrating milk based cow and bulk tank test data, dairy cattle inventory data and GIS location data into the AHL surveillance capacity (Project Lead: Dr. David Kelton)

AHSI Project 09-09 (Completed): Investigation of infectious etiology of small ruminant abortion in Ontario with emphasis on *Chlamydophila* spp. and *Coxiella burnetii* (Project Lead: Dr. Hugh Cai)

AHSI Project 09-10 (Completed): Epidemiological analysis of *Mycoplasma bovis* isolated from Canada in the past 30 years (Project Lead: Dr. Hugh Cai)

AHSI Project 09-13 (Completed): Refining the Ontario swine veterinarian-based Surveillance (OSVS) system for real-time surveillance and integration with laboratory-based surveillance (Project Lead: Dr. Bob Friendship)

AHSI Project 09-16 (Completed): Is the treatment of exudative epidermitis in pigs becoming a problem because of the emergence of antimicrobial resistance? (Project Lead: Dr. R. Friendship)

AHSI Project 09-18 (Completed): Associations between the incidence of *Cryptosporidium parvum* and selenium status in neonatal dairy calves in Ontario (Project Lead: Dr. K. Leslie)

AHSI Project 09-19 (Completed): Surveillance for inclusion body hepatitis in broiler breeders (Project Lead: Dr. D. Ojkic)

AHSI Project 09-20 (Completed): The development and design of a surveillance system for antimicrobial resistance in agricultural animal pathogens in Ontario (Project Lead: Dr. D. Pearl)

AHSI Project 09-21: Developing and implementing techniques to harvest additional surveillance information from existing AHL diagnostic laboratory data (Project Leads: Dr. C. Revie and Dr. J. Sanchez)

AHSI Project 09-23 (Completed): Ear tip necrosis in swine (Project Lead: Dr. R. Friendship)

AHSI Project 09-24: Surveillance of antimicrobial resistant enteric bacteria in antimicrobial-free and conventional broilers in Ontario – a pilot study (Project Lead: Dr. M. Guerin)

AHSI Project 09-26 (Completed): Proposal to determine the prevalence of *Coxiella burnetii* infection in sheep flocks and goat herds in Ontario and their farm workers (Project Lead: Dr. M. Guerin)

AHSI Project 09-27 (Completed): Surveillance for enteric parvoviruses in poultry – a pilot study (Project Lead: Dr. É. Nagy)

AHSI Project 09-28 (Completed): Risk-based surveillance of respiratory infections in growing pigs (Project Lead: Dr. Z. Poljak)

AHSI Project 09-29 (Completed): Identification of novel toxin gene(s) associated with type A *Clostridium perfringens*-associated haemorrhagic abomasitis of calves in Ontario (Project Lead: Dr. J. Prescott)

AHSI Project 09-30: Genotyping and detection of *Leptospira spp.* in wildlife reservoir hosts in Ontario through comparison of immunohistochemical and polymerase chain reaction genotyping methods (Project Lead: Dr. K. Shearer)

AHSI Project 09-31 (Completed): Case series of pandemic H1N1 in Ontario turkey breeder flocks (Project Leads: Dr. M. Guerin and Dr. Z. Poljak).

AHSI Project 10-04: Johne's Disease in Ontario's small ruminant dairy industries: Prevalence, potential risk factors, and performance comparison of serum, milk and fecal diagnostic methods (Project Lead: Dr. A. Jones)

AHSI Project 10-05: Expanded data transfer from AHL to CAHSN: In support of improved notifiable disease reporting to CFIA, emergency preparedness, timely disease detection and data analysis (Project Lead: Dr. H. Kloeze)

AHSI Project 10-06: Comprehensive evaluation of bacterial hazards in the upper respiratory tract of swine by terminal restriction fragment length polymorphism (T-RFLP) analysis (Project Lead: Dr. J. MacInnes)

AHSI Project 10-07: Regional PRRS elimination trial (Project Lead: L. Moser)

AHSI Project 10-08 (Completed): Summer student assistantships, AHL Mammalian Virology and Bacteriology (Project Leads: Dr. D. Slavic and Dr. S. Carman)

AHSI Project 11-01: Salmonella Enteritidis baseline study in Ontario commercial broilers (Project Lead: Dr. Michele Guerin)

AHSI Project 11-03: Detection of *maedi visna* virus infection in sheep (Project Lead: Dr. Paula Menzies)

AHSI Project 11-08: Contact network based disease spread model in Ontario (Project Lead: Dr. Javier Sanchez)

AHSI Project 11-11: Diagnosis and surveillance of *chlamydia*-like organisms in Ontario rainbow trout (Project Lead: Dr. John Lumsden)

Farm-call surveillance project:

AHSI Project 09-12 (Completed): Veterinary farm call syndromic surveillance (Project Lead: Kathy Zurbrigg) is fulfilling the requirement for farm-call surveillance and was initiated in Q4 2008/2009.

Emergency Plans

AHSI Project 10-09: AHL necropsy laboratories emergency preparedness exercises and incident command system training (Project Lead: Dr. M. Spinato)

Emergency Plans

The Canadian/Ontario food animal industry must be constantly vigilant and prepared for an outbreak of a contagious animal disease. Hence all commodity groups have a shared responsibility to develop crisis management plans and exercise effective collaboration and communication strategies to ensure an effective response during a crisis.

On June 8, 2011, AHL conducted a lab testing simulation exercise to address a potential avian influenza outbreak. The AHL Virology lab was involved in the sample collection, testing and analysis portion of the simulation with support from OMAFRA and CFIA. The surge capacity portion of this exercise was audited by Dr. Vicky Bowes from the British Columbia Ministry of Agriculture. Reported results were submitted to veterinarians and OMAFRA staff in a timely manner. In total, 480 samples were collected, submitted and reported within three hours and five minutes. Overall the AHL Virology Lab is well positioned to support an NAI outbreak response and has a thorough understanding of the technical requirements needed to address a commercial poultry outbreak.

On Sept 8, 2011, a Foreign Animal Disease (FAD) simulation was held at the AHL Guelph and Kemptville necropsy laboratories. There were two objectives of the exercise: 1) was to test and validate the standard operating procedures regarding management of an FAD investigation in

the necropsy laboratory; 2) evaluate joint coordination and communication among the AHL, University of Guelph, and the Canadian Food Inspection Agency (CFIA). Both laboratories were involved with necropsy of a feeder pig, collection of tissue samples, and communicating with CFIA staff who were involved with picking-up samples to forward for confirmatory diagnosis. AHL staff conducted appropriate steps for disposing of infected carcasses, disinfection of contaminated facilities and decontamination of AHL staff.

Veterinary Clinical Education Program

VCEP funding supports the following new initiatives which are critical components in the development of the OVC's Integrated Plan and maintenance of full accreditation status. (OVC 2012 – 2017 Integrated Plan: <http://www.ovc.uoguelph.ca/plan/>)

For OVC to remain a fully accredited veterinary college and to attract and to retain qualified food animal veterinarians and graduate students, state-of-the-art equipment and teaching facilities are critical. VCEP strategic funding has been a valuable resource to ensure the success of these efforts.

Veterinary Public Health

Presented below are two initiatives related to the area of veterinary public health that speak directly to the interests of OMAFRA and to OVC's priorities defined in OVC's Integrated Plan.

Centre for Public Health and Zoonoses (CPHAZ) <http://www.ovc.uoguelph.ca/cphaz/>

The Centre for Public Health and Zoonoses celebrated the official opening of their new research laboratories in December 2011. Liz Sandals, MPP; Rich Moccia, AVP Research, Strategic Partnerships; Elizabeth Stone, Dean of OVC; and Jan Sargeant, Director of CPHAZ, as well as close to 40 other UofG faculty, staff and research collaborators gathered for the opening ceremony and tours. This facility is the product of a one million dollar grant from Canada Foundation for Innovation, with matching funds from the Ontario Research Fund under the Ministry of Economic Development and Innovation. The CPHAZ Research Laboratories work towards creating a community of practice, where zoonotic disease researchers with diverse disciplinary backgrounds can work together.

In September 2011, the Council of Canadian Academies released a report of the Expert Panel; on which Dr. Jan Sargeant, Director of CPHAZ was a member, on Approaches to Animal Health Risk Assessment: *Healthy Animals, Healthy Canada*. In November 2011, CPHAZ hosted a panel session that focused on the opportunities arising from this report, particularly as it pertains to assessments with public health implications. CPHAZ hosts multiple small group 'meet and greets' to build collaborations. In May 2012, CPHAZ hosted Dr. Nicholas Ogden, from the Public Health Agency of Canada, as he discussed research and funding opportunities related to the emergence of Lyme disease in Canada. Also in May, the Medical Officer of Health and staff from the Wellington Dufferin Guelph Public Health (WDGPH) unit met with CPHAZ members at the University of Guelph. This was followed by discussions about possible collaborative research opportunities for some of our members as well as potential practicum opportunities for the MPH students in the future. Every month, CPHAZ hosts a location for members to attend webinars and teleconferences from numerous public health organizations including the ADED rounds (Animal Determinants of Emerging Disease), IDEA rounds (Infectious Disease Epidemiology Aficionados'), and CHNET-works public health seminars.

CPHAZ did not host an annual symposium in the spring of 2012. Instead we encouraged our members to attend the OVC Global Development Symposium held in May 2012, (http://ovc150.ca/en/celebrate/Global_Dev_Sym_2012.asp). CPHAZ sponsored the travel of one international speaker (Dr. George Nasagyma), and sponsored 5 graduate and MPH students to attend.

Masters in Public Health

The Master of Public Health (MPH) program is a 5-semester professional degree with concentration in epidemiology, environmental public health, infectious diseases, and zoonotic, foodborne and waterborne diseases. The MPH program prepares public health students and professionals for careers in which they will address the present and future needs of public health in Ontario, Canada, and internationally. Graduates will emerge as influential local, national, and international leaders committed to improving quality of life by protecting and promoting the health of their communities and by anticipating and preventing disease from both a policy and a science perspective.

This graduate program was developed to expand the pool of highly-educated personnel in this field, with the first class having started in September 2008. The fall 2011 cohort was comprised of 20 full-time and 1 part-time students, of which 3 were veterinarians. For the fall 2012 cohort, there were 203 applicants with the same enrollment target of 20 students. There are no veterinarians in this upcoming class. To date, 46 students have graduated in the program.

The main attraction of this program is the practicum placement that the students are required to complete during the summer semester midway through their program. The program coordinator and a faculty member interview each student to determine their desired focus in the public health system. The program then proceeds to place each student, matching them with an appropriate employer. Students are required to complete a project during this 12 to 16 week period and present this information during the Public Health Forum, where public health partners are invited to attend. Last year, 90 delegates attended this Forum giving the students an experience of presenting to peers in a conference-style format.

Agencies that have hosted our students include, among others the Public Health Agency of Canada, the Ontario Ministry of Health and Long-Term Care, Public Health Ontario, Cancer Care Ontario, Wellington-Dufferin-Guelph Public Health, Peel Health, Halton Regional Health Department, Chicken Farmers of Ontario, Veterinarians Without Borders and the AIDS Committee of Guelph.

Rural Veterinary Practitioner Development

Rural Veterinary Practice

The intent is to provide focused experiential learning opportunities for students interested in practicing in rural areas and prepare them to have sustainable careers. These initiatives are very much in the developmental stage and will require stakeholder input to develop them into full proposals and implementation.

A group of faculty continues the development of a proposal to develop a Rural Veterinary Track and a comprehensive Food Animal Track within the final year of the DVM curriculum. This proposal is to include the feasibility and implications of a targeted admissions process for agricultural focused students and a directed experience through the first three years of the program. Currently running is a pilot project where Phase 4 students in the Food Animal Stream were placed in a local food animal practice that has agreed to provide an enriched experiential learning opportunity that extends beyond the current Veterinary Externship course and other external electives currently available to students.

During the 2011/12 academic year OVC continued to deliver an elective equine primary care rotation for final year students. Primary care experiential learning in cattle, small ruminants and swine are currently offered through our existing VCEP supported field service clinics. However, there is no established equine field service, hence the need to develop this experiential learning opportunity in order to ensure graduating students have the necessary primary care skills to be able to deliver veterinary services to rural horse owners. This was a one week hands-on rotation, offered twice during the year. The supervising faculty worked in conjunction with private equine practitioners to provide the students with practical learning opportunities.

The Bovine Education Trust, (<http://www.ovc.uoguelph.ca/bovineeducationtrust/>) a charitable endowment fund established as a partnership between the Ontario Association of Bovine Practitioners (OABP) and the Ontario Veterinary College (OVC), was developed to provide veterinary students with the real-life learning opportunities and on-the-job experience that they need to develop successful careers serving the dairy and beef industries. Initial funding is being provided through the Veterinary Clinical Education Program. In the 2011/12 academic year 4 students received funding to assist them in undertaking food animal related experiential opportunities. The trust will help students build confidence and experience by providing support for summer placements with established rural practitioners, extracurricular learning opportunities such as attending conferences, and external electives.

The OVC partnered with the Dairy Farmers of Ontario, the Ontario Cattlemen's Association, the Ontario Association of Bovine Practitioners, the Ontario Ministry of Agriculture, Food and Rural Affairs to advise and assist the Ontario Veterinary Medical Association in conducting a study of Future Market for Supply of Bovine Veterinary Services. The objectives were: 1) To forecast the demand for bovine and small ruminant veterinary services in the province of Ontario in 2020; 2) To forecast the supply of bovine and small ruminant veterinary services in the province of Ontario in 2020; and 3) To analyze the supply and demand forecasts to determine what (if any) action needs to be taken to address either a province-wide or regional shortage of veterinary services, or an oversupply of veterinary services, for consideration by the parties involved in the study. The final report was completed and results indicate that no overall shortage of large animal veterinary practitioners is expected to occur in Ontario in the foreseeable future; however there exists regional disparities in access to large animal veterinary services. This is expected to increase and be most notable in areas where there is a low density of farms and farm animals.

OTHER REPORTING

Livestock Inventories

U of G regional campus or research station	Opening May 1, 2011	Sold	Died ⁽¹⁾	Transferred		Born or Acquired	Closing April 30, 2012
				in	out		
Alfred							
dairy	53	22	7	0	0	33	57
Kemptville							
dairy	75	35	19	0	0	69	90
New Liskeard							
beef	0	0	0	0	0	0	0
Ridgetown							
dairy	87	40	11	0	0	50	86
beef	33	10	1	0	0	14	36
swine	332	606	17	0	0	291	0
Guelph							
Arkell equine	64	10	10	6	9	26	67
Arkell poultry	6,768	590	8,920	0	839	11,875	8,294
Arkell swine	1,791	4,519	2,295	0	565	6,924	1,336
Alma aqua	51,392	18,448	8,943	0	9,995	33,155	47,161
Elora dairy	307	80	48	42	82	166	305
Elora beef	553	486	17	142	23	391	560
Ponsonby dairy	99	30	14	34	47	59	101
Ponsonby (GAF) ⁽²⁾	84	237	4	494	366	54	25
Ponsonby sheep	300	141	16	0	59	259	343
Clinical Studies							
dairy	27	13	0	19	0	0	33

⁽¹⁾ These figures include animals that are born dead and those which are euthanized for humane, disease and research reasons.

⁽²⁾ General Animal Facility

University of Guelph/ OMAFRA Equipment Inventory & Library Resources

Summary of U of G / OMAFRA Equipment Inventories				
For Fiscal 2011/12				
<u>Location Name</u>	<u>Opening Balance</u> (May 1, 2011)	<u>Acquisitions</u> (during 11/12)	<u>Dispositions</u> (during 11/12)	<u>Ending Balance</u> (April 30, 2012)
Summary (totals of detailed data, below)				
All OMAFRA Program locations	43,305,483	2,926,130	476,266	45,755,277
<u>Individual Locations</u>				
Alfred Campus	954,223	15,500	87,496	882,227
Alma Aquaculture	424,665	0	0	424,665
Arkell Equine	14,000	12,000	0	26,000
Arkell Feedmill	832,000	0	0	832,000
Arkell Poultry	645,255	199,000	0	844,255
Arkell Swine	295,000	103,000	0	398,000
Elora Beef	1,446,314	0	67,500	1,378,814
Elora Dairy	811,226	24,995	0	836,221
Elora Plant Ag.	2,604,505	25,000	0	2,629,505
Emo	70,000	0	0	70,000
Guelph RSO	3,175,948	115,000	71,000	3,219,948
Guelph Turfgrass	110,625	28,044	0	138,669
Kemptville Campus	740,471	122,900	137,175	726,196
Bradford Muck Stn	139,000	0	0	139,000
NLARS	798,395	0	0	798,395
Plant Ag. Dr. Mohanty	1,794,510	143,849	0	1,938,359
Ponsonby Dairy	312,337	0	0	213,337
PGAF	70,500	0	0	70,500
Ponsonby Sheep	41,000	0	0	41,000
Ridgetown Campus	3,449,526	762,366	16,930	4,194,962
Simcoe	505,700	19,210	0	524,910
Thunder Bay	63,000	0	0	63,000
Woodstock	408,389	41,000	45,975	403,414
Vineland	1,797,500	0	0	1,797,500
Lab Services	21,801,324	1,314,266	50,190	23,065,400
<u>Library Resources</u>				
<u>Location</u>		<u>Acquisitions</u> \$ ('000)	<u>Dispositions</u> \$ ('000)	<u>Replacement Value</u> \$ ('000)
Alfred		0	0	1,645
Kemptville		0	0	1,163
Ridgetown		16	0	1,268

Proof of Principle (POP) Program

OMAFRA's Proof-of-Principle (POP) Fund is outside of the OMAFRA-U of G Agreement, however it is directed toward University inventions that fall within OMAFRA's research objectives, most of which have been developed through the Agreement funding. In 2011/12, POP was successful in strengthening the commercial potential of the following technologies.

Researcher: Kott – High rosmarinic acid mint to treat inflammation in horses

Amount: \$18,500

Status: Complete

Result: Success - License

The purpose of the POP funds was to conduct an *in vitro* study using mint high in rosmarinic acid to prove that the mint has anti-inflammatory properties. The results were to be used to support further *in vivo* studies in horses and in humans, with the eventual aim of finding additional licensing partners for the mint. This project was successful, leading to a publication and to great interest among local companies in using the mint for horses.

The Catalyst Centre has entered into a license agreement for all uses with the company Ceapro, who is actively developing the commercial scale agronomics of the mint.

Researcher: Squires – Boar taint

Amount: \$24,000

Status: Complete

Result: Success – Sponsored Research

While the POP funding for this project is over, the industry interest and involvement continues to be strong. The current set of markers explains a large proportion of the genetic variation of both skatole and androstenone in boars. With regard to industrial support, JSR Genetics has entered an agreement to continue funding the project. In Canada, Ontario Swine Improvement Inc. has undertaken a project with the University to sample 900 Canadian pigs from three lines of pigs, extract DNA, validate markers in those lines, develop breeding selection methods and work to create the first line of 'low boar-taint' pigs. This is a \$539,000 project leveraged in part due to the funding received from the POP program.

Researcher: Loewen – Tomatoes with early red colouring

Amount: \$12,225

Status: Complete

Result: Research Continues

The funding from the OMAFRA POP grant was to determine the genetics of an advanced fruit colour trait in tomato, which would be useful in the production of tomato pastes. Based on results in the 2009 growing year, it is thought that the trait is controlled by at least two recessive genes. Further studies in 2010 have shed further light on this conclusion, possibly enabling the breeding of an early colouring line of tomatoes. This study has evolved into a PhD thesis for Steve Loewen, and results are still promising. As of June 2012, the inheritance of the trait has been determined and fully homozygous lines have been developed. The line is also one

generation away from having 'near isogenic' lines suitable to determine the identity of the genes responsible so that a patent application can be filed. This result is expected in 2013. Success is expected to have a strong impact on the processing tomato industry worldwide.

Researcher: Mine - Phosphopeptide-based interventions

Amount: \$25,000

Status: Ongoing

This was a project designed to support further *in vitro* work to prove that phosphoserine molecules derived from egg yolk can have a meaningful effect on oxidative stress. Results so far confirm that short dimer peptides indeed have an effect on oxidative stress, and the mechanism of action has been confirmed and validated. The *in vitro* cell model work was delayed due to staffing issues in the Mine lab, but are expected to be completed in fall 2012. Discussions are also underway with a nutrition company that may help to advance the project further.

Researcher: Corredig – Soy cheese

Amount: \$5,500

Status: Complete

Result: Scientific success – marketing continues

This was a small, \$5500 grant to help provide proof of concept that soy and dairy proteins could be co-fermented to produce viable cheese. This could lead to the development of products that taste like cheese, but are reduced cost and contain less saturated fat. The project was successful, leading to some positive examples of soft cheeses, in addition to the filing of a patent application. A non-confidential marketing summary has been produced and marketing is underway – it is hoped that this technology will find useful application in the fields of soft, processed, and spreadable cheeses.

Researcher: Lencki - 1,3-Diacylglycerols for hard fat applications

Amount: \$45,000

Status: Complete

Result: Scientific success – marketing started

This project aims to produce 1,3-DAG fats that could behave in much the same way as cocoa butter, and perhaps be used as a healthier and less expensive alternative to cocoa butter. Applications include energy/protein supplements and confection products. This project ran into some significant delays, as different production techniques needed to be tried. In June 2012 the lab achieved a positive result, which was used as the basis of a PCT patent application filed in early August 2012. Initial discussions have taken place with Ontario companies to help advance the project further.

Schedule G (Business Continuity, Emergency Response and Surge Capacity Planning)

Agriculture and Food Laboratory

During the 2011/12 fiscal year, the AFL completed the outstanding milestone in the development of the Emergency Surge Capacity process. The requirement was tested through an Immediate and Surge Capacity Exercise involving both organizations. The laboratory and OMAFRA completed the Year 3 Milestone September 2011.

The exercise involved consolidating the testing of milk samples from over a monthly period into two consecutive days for quality parameters. The process involved a negotiated agreement with OMAFRA, that the AFL test approximately 80% of producers for regulatory quality testing within this time frame. Additionally, the lab used this scenario to develop contingency testing plans for all OMAFRA projects based on availability of only 30 staff versus the usual complement of 120 – 150 permanent and contract staff.

Faced with a potential labour disruption scheduled for Sept. 8, 2011, the AFL reviewed and updated contingency plans to meet the requirements of Schedule G for year 4. The potential strike represented approximately two-thirds of AFL's employees. The AFL identified three main challenges in meeting OMAFRA's testing needs in the event of a reduced workforce: sample volume, reporting and turnaround time. In order to ensure business continuity, the AFL focused on contingency planning for areas essential to maintaining testing services. Even though the contingency planning did not need to be implemented (a strike was averted), all of the planning was beneficial for both AFL and OMAFRA in meeting the milestones for Schedule G.

The exercise was deemed successful by both OMAFRA and the AFL. The Essential Level Continuity Plan remains in draft form.

The AFL continues to work in concert with the AHL and OMAFRA to develop the full scope of milestones requested for a comprehensive Emergency Response, Surge Capacity and Business Continuity process.

Moving into the fifth and final year of this exercise, both OMAFRA and Lab Services plan to complete the tasks required as described in Schedule G and continue to improve on the current processes through scenario based exercises.

Animal Health Laboratory

During 2011/12 AHL completed Year 4 Milestone of Schedule G (see below) and in Performance Indicator 'AHL#8'.

Year 4 Milestone:

The University shall provide an enhancement of the plan completed in Year 3 that includes notification, a Critical Infrastructure component and a basic Horizontal Integration component that addresses the dependencies with internal and external service providers. The Parties shall test this enhancement of the plan completed for Year 3 through scenario exercises based on single plan components.

The University shall update the plan for additional Emergency Surge Capacity based on lessons learned from the notification drill. The Parties shall test the updated plan through a Table Top exercise with a scenario to address a single capacity availability issue and will work through the response activities in engaging that capacity.

As part of the five-year review for the Agreement, which begins on April 1, 2012, the Parties shall submit their individual and integrated plans as developed to date to the Executive Committee.

Further details are provided in the 'New Initiatives - Animal Health Laboratory' section of this report.

The Catalyst Centre – Schedule N

The table below is a listing of relevant intellectual properties licensed and patented under the Agreement as of 2011/12.

Technologies by Inventor		
Inventor / Tech ID	Technology Title	Status
AllenVercoe 20110429	Method for treatment of disorders of the gastrointestinal system	Patented
AllenVercoe 20111003	Methods and compounds for diagnosis and treatment of gastrointestinal cancers	Patented
Baird 20011109	JEB diagnostic test for Belgian horses	Licensed
Barta 20100216	Compositions and methods of enhancing immune responses to Eimeria	Patented
Bowley 20080122-2	A method of enhancing gene expression in plants	Patented
Corredig 20110820	Protein precipitate comprising minerals and method for the manufacture thereof	Patented
Corredig 20110821	Stabilized edible emulsions, methods of preparation and beverages	Patented
Corredig 20111026	Stable liposomes with entrapped hydrophobic bioactive compounds	Patented
de Lange 20050221	Pig growth model	Licensed
Dixon 20110516	Growth chamber design	Licensed
EFI 20080331	Dairy product	Patented and Licensed
Erickson 20010524	Novel inducible genes from alfalfa and methods of use thereof	Patented
Forsberg 19990526	Transgenic animals expressing salivary phytase	Patented
Griffiths 20080108	Probiotic bacteria secreted molecule compositions and use in methods to treat/prevent infection by harmful bacteria and to provide nutritional health	Licensed
Golovan 20090212	Aptamers for sex selection of bovine sperm	Licensed
Hall 20090311-2	Materials for the production and purification of plant-produced Trastuzumab	Licensed

Hall 20100611	Production of HER receptor antibodies in plants	Disclosed
Hall 20070306	Auxinic herbicide-tolerant plants	Patented and Licensed
Hall 20090311-1	Anti-cobra toxin anti-body fragments	Patented
Hill 20080825	Novel soymilk cheese or products thereof	Patented
Houmam 20100420	Methods for the synthesis of nano and micro particles and structures of metal, sulfur-doped metal and metal sulfides	Patented
Holub 19960430	Custom feed supplement to maximize omega-3 fatty acids in cow's milk	Patented
Joppe 20120131	Dashboard for destination management organizations	Licensed
Kott 20060221	Production of rosmarinic acid from spearmint and uses thereof (<i>Mentha spicata</i> clones with ultra high levels of rosmarinic acid (a powerful plant antioxidant-useful for reducing effects of various human inflammatory ailments including asthma)	Licensed and Patented
Lam 19861014	Monoclonal antibodies for serotyping of <i>Pseudomonas aeruginosa</i>	Licensed
Lindinger 19970528	Perform'N Win, equine oral electrolyte supplement	Licensed
Lencki 20100430	The development of a functional DAG fat	Disclosed
Mallard 079981	Method of identifying high immune response periparturient animals	Licensed
Marangoni 20110325	Trans fat free beta roll-in shortening	Licensed and Patented
McGurrin 20040402	Pressure and ultrasound-guided cardiac catheter for transvenous electrical cardioversion of equine supra-ventricular cardiac arrhythmias	Licensed
Mckersie 19870324	Process to induce desiccation tolerance in somatic embryos	Licensed
Mckersie 19971215	Enhanced root production in transgenic perennial plants	Licensed
McLean 20090311	Methods of improving the therapeutic efficacy and utility of antibody fragments	Patented
Merrill 20101201	Antivirulence compounds inhibiting bacterial mono ADP ribosyltransferase toxins	Patented

Mine 20090303	Egg yolk protein derived anti-oxidative stress peptides	Patented
Mohanty 20090505	Lignin based blends and composites/Hybrid green composites from lignin and biofiber reinforcement with bioplastics for suitable manufacturing	Patented and Licensed
Mohanty 20090903	Lignin based carbon nanomaterials and uses thereof	Patented
Mohanty 20100117	Biodegradable polymer blends	Patented
Mohanty 20100318	Recycled plastic and biocomposite formulations	Licensed
Mohanty 20100923	Biofiber reinforced recycled plastic composites	Licensed and Patented
Monteiro 20070803	<i>Clostridium difficile</i> cell surface polysaccharides as immunogens to combat <i>C. difficile</i> infections	Licensed and Patented
Nagy 20000817	Porcine adenovirus based vector vaccine	Licensed
Nagy 20090723	Vectored vaccines based on the left end genome region of fowl adenovirus 9	Licensed
Nagy 20110227	A non-pathogenic serotype 4 fowl adenovirus (FAdV-4) for use as an immunogen against inclusion body hydropericardium / hepatitis syndrome	Patented
Nagy 20110721	Avian hepatoma cell line	Licensed
O'Brien 19900111	Diagnosis for Porcine Malignant Hyperthermia	Licensed
Ojkic 20101202	Vaccines for Inclusion Body Hepatitis	Patented
OmegaNutrel 20070713	A feed supplement and use thereof for elevating levels of essential fatty acids in livestock and products there from	Licensed
Paliyath 19980831	Inhibition of phospholipase D activity by C6 aldehydes and alcohols	Licensed
Paliyath 20000517	Development of a novel antioxidant formulation to control superficial scald in apples	Licensed
Plante 20000810	Porcine embryo production, recovery, maintenance and transfer systems for use in domestic and international genetic transport and the elimination of environmental pathogens in swine.	Licensed
Prescott 20070405	Protective immunogens against <i>Clostridium perfringens</i> -induced necrotic enteritis in chickens	Licensed and Patented
Prescott 20120416	US Prov - A novel toxin from type A <i>Clostridium perfringens</i>	Patented
RandallSimp 20060802	Nutrition screening tool for every preschooler (NutriSTEP)	Licensed

Raizada 20101130	Screening for nitrogen fixation	Patented
Raizada 20120309	Nitrite transporter and methods of using same	Patented
Rothstein 20120126	Methods of increasing tolerance to heat stress and amino acid content of plants	Patented
Shewen 19850207	Vaccine for prevention of <i>Pasteurella haemolytica</i> pneumonia in Cattle.	Licensed
Squires 20100514	Method and Compositions for Control of Boar Taint	Patented
Subden 19960201	A method and nucleotide sequence for transforming microorganisms: wine yeast	Licensed and Patented
Subramanian 20120323	Pesticide compound and compositions from the rhizome of <i>Curcuma amada</i>	Patented
Viel 20110929	Equine Rhinitis vaccine	Patented
Wootton 20100113	Enhancing protein expression of adeno associated virus vectors	Patented
Zheng 20100423	Growth substrates	Licensed

Report Back on Program Milestones (from 2011/12 Agreement Business Plan)

(High Level) Outlook for AFL Program Delivery

Fiscal year	Key Milestones	Status/Completed
2011/2012 Q1	- Review the allocation of resources for Schedule F - Completion of Sampling Plan costing for new fiscal year. - Implementation of annual price increase - Exchange Meeting (s) planned for June 2011; technically focused sessions on program basis. - Accreditation priorities assessed, plans implemented - Expansion of multi-drug residue methodology per OMAFRA request - Implementation of BactoScan for goat milk bacteria tests - Continue developing Emergency Response and Business Continuity Plans for the AFL. - Review of instrumentation needs (CAPEX program) and discussion with OMAFRA to identify key items affecting Schedule F - General Staff Meeting	- Completed - Completed - Completed - Completed - Completed - Completed - Completed - In progress – Living document - Completed - Completed
Q2	- Infrastructure improvements – e.g. lab space efficiency projects, replacement of environmental monitoring system (EMS) - Expansion of specific method accreditations, and scope extension of existing methods. - Graduated implementation of multi-drug residue methodology - Follow up consultations with federal, provincial, and US for ongoing acceptance of MRD approach - Continue developing Emergency Response and Business Continuity Plans for the AFL. - General Staff Meeting - Review of new corrective action system “CAPA” to replace “LabTrack” system.	- Lab space efficiency projects: In progress – Ongoing process - Replacement of EMS: In progress - Completed - Completed - Completed - In Progress – Living document - Completed
Q3	- Continue developing Emergency Response and Business Continuity Plans for the AFL. - General Staff Meeting - Implementation of new corrective action system “CAPA”	- In progress – Living document - Completed - Completed

Q4	- Continue developing Emergency Response and Business Continuity Plans for the AFL. - AFL to provide annual list of publications and impact ratings of publications in scientific journals by specified researchers and published project reports. - The contribution margin of each lab section is reviewed with each supervisor - Pricing Review for annual price increases in Q1 of following year - General Staff Meeting - Annual Budget Planning	- In progress – Living document - Completed - Completed - Completed - Completed - Completed
2012/2013	- Full implementation of MRD – expanded to additional OMAFRA programs as requested. - Continue developing Emergency Response and Business Continuity Plans for the AFL. - Revised Marketing and Sales Plans for AFL and by lab for external services - Review and allocation of resources for Schedule F - General Staff Meetings - Contract Review for final 5 years of 10-year term	- Completed - In progress – Living document - In progress – living document - Completed - Pending - In progress

(High-Level) Outlook for AHL Program Delivery

Fiscal year	Key Milestones	Status/Completed
2011/2012 Q1	- AHL client service will continue; the May 1/2011 User's Guide and Fee Schedule will be released. - Implementation and validation of new equipment purchased under AHSI will proceed, and new test development will progress. - The AHSI project manager will continue to monitor the 53 AHSI-funded projects and generate a quarterly report. - Continue developing Emergency Response and Business Continuity Plans for the AHL. - Participate in a poultry disease simulation in summer/fall 2011 to test logistics and AHL lab surge capacity. - Hold a quarterly General Staff Meeting, - Compile input for the AHL Annual Report for fiscal 2009/2010.	- UG/FS published and mailed in April 2012 - MALDI-TOF and GS Jr are on line; ELISA robot in full production - Monitored and Q report sent - See commentary in PIs on FAD simulations; poultry and swine - GSMs June 23/11, Nov 24/11, April 26/12 - Done

Q2	• The AHSI project manager will continue to monitor the 53 AHSI-funded projects and generate a quarterly report. • Continue developing Emergency Response and Business Continuity Plans for the AHL. • Review of instrumentation needs (CAPEX program) and discussion with OMAFRA to identify key items affecting Schedule E. • Hold a quarterly General Staff Meeting. • Complete the Annual Report for fiscal 2010/2011. • Participate in the fall 2011 OMAFRA Animal Health Forum.	• Monitored and Q report sent • See commentary in PIs on FAD simulations; poultry and swine • Purchases made • GSMs June 23, Nov 24, April 26 • Done • AHL update March 8, 2012
Q3	• The AHSI project manager will continue to monitor the 53 AHSI-funded projects and generate quarterly reports. • Continue developing Emergency Response and Business Continuity Plans for the AHL. • Hold a quarterly General Staff Meeting	• Monitored and Q report sent • See commentary in PIs on FAD simulations • GSMs June 23, Nov 24, April 26
Q4	• The AHSI project manager will continue to monitor the 53 AHSI-funded projects and generate a quarterly report. • The year 4 milestone for Schedule G (Business Continuity, Emergency Response and Surge Capacity Planning) will be met, i.e., test the enhanced Essential Level Continuity Plan through scenario exercises, and test the updated Emergency Surge Capacity plan through a table-top exercise. • Provide annual list of publications. • Review fees for May 1, 2012 AHL Fee Schedule. • Hold a quarterly General Staff Meeting.	• Monitored and Q report sent • See commentary in PIs on FAD simulations; OLPC contracted for small ruminant FAD sim Sept/12 • 2011 publications AHL Newsletter, March/12, p.2 • Fees reviewed and UG/FS published • GSMs June 23, Nov 24, April 26

(High Level) Outlook for Research Program Delivery

Fiscal year	Key Milestones	Status/Completed
2011/2012 Q1	• Develop a Strategic Framework for each of the seven research themes, identifying such factors as succession planning to articulate continued delivery of OMAFRA research priorities • Compile data and information	• In process • Completed

	required for completion of the Annual Report • Begin developing 3rd annual “Yearbook” to be completed Summer 2011. • Continue to develop in collaboration with OMAFRA, specific program initiatives within the KTT Program (i.e., website development and KTT project reporting). • Awarding of successful HQP & KTT applicants. • Fourth call for HQP applications in May/11 for the fall 2011 program. • Working with OMAFRA, begin Agreement ‘five-year review’ including a <i>‘five year summary report of accomplishments for each research theme’</i>, required of UofG in Schedule B Article 5.6. • Support OMAFRA’s lead responsibility in ‘five-year review’ for <i>‘expert review of research themes’</i>, required in performance indicators R#5 and R#9), through Q1 to Q4.	• Completed • On-going collaboration. • On going • Completed • Completed (PWC document) • Completed (Stoddart Report)
Q2	• Receive research revised annual priorities, if applicable, from OMAFRA’s Theme Advisory Groups (TAG) for the next Call for LOIs/Proposals. • RPMC &/or Executive Committee to meet for strategic discussion, obligations under Schedule B. • Complete Strategic Framework for each of the seven research themes. • Issue a Call for Research LOIs/Proposals to the UofG Faculty/Researchers for projects to commence May 1/12 taking into account the new Strategic Framework for each theme. • Compile one annual case study from each research theme that impacted Ontario • Research Program Management Committee (RPMC) submits draft Annual Report and approves Consolidated Annual Report	• Completed • Continuing to meet • Ongoing process • Done • Completed • Completed

	- Finalize and submit OMAFRA-UofG Consolidated Annual Report to OMAFRA - HQP applications reviewed and selections for fall 2011 program - Continue to develop and implement new KTT program initiatives (i.e., Website development; development of program performance measures)	- Completed - Completed - On-going collaboration.
Q3	- Review LOIs and request Full Proposals from successful LOIs. - Solicit and receive annual status reports or final project reports for approved projects - Continue to develop and implement new KTT program initiatives (compilation of material on new KTT website; development of program performance measures and program evaluation material)	- Done - Completed - On-going collaboration.
Q4	- Review Full Proposal submissions and project annual and final reports. - Research Program Management Committee (RPMC) submits draft Annual Business Plan and approves Consolidated Annual Business Plan - Finalize and submit OMAFRA-UofG Consolidated Business Plan to OMAFRA - Continue to develop and implement new KTT program initiatives (KTT project reporting; compilation of material on new KTT website; program performance measures and program evaluation material)	- Completed - Done - On-going collaboration.
2012/2013	- Issue a Call for LOIs/Proposals in each (or most) research themes - Research Program Management Committee (RPMC) submits and approves Annual Business Plan and Annual Report - Solicit, receive and review annual status reports or final project reports for approved projects - UofG and OMAFRA complete five-	- Done - In process - January 2013 - Completed

	year review in Q1.- Q2 - Review HQP and KTT Program implementation and initiatives. Formulate recommendations for program continuance. - Continue to address all PIs and Research Program Management Committee responsibilities.	- In process - Ongoing process
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(High Level) Outlook for VCEP Program Delivery

Fiscal year	Key Milestones	Status/Completed
2011/2012 Q1	B1 - Externship program begins for DVM 2012 class. C1- 5 interns from 2010-11 leave the Large Animal Clinic C1- 5 new interns start in the Large Animal Clinic for one year C2 - 6 new graduate students enter the three year DVSc program D2 - recruitment campaign for DVM candidates to enroll in the MPH E2 – Meet with external stakeholders to seek funding support for the Bovine Education Trust. E3 – Internal discussions of the Rural Practice/Food Animal career emphasis proposal.	Completed Completed Completed Completed Completed On-going - Several meetings held On-going discussions with faculty
Q2	Prepare 2010/11 Annual Report B1 – All Phase 4 students will have completed their Externship course C2 - 6 semester level 9 students complete their DVSc program D2 – enroll fourth cohort of DVM MPH students E1 – Deliver all DVM Large Animal teaching labs in the Clinical Skills building E2 - Continue delivery of an Equine Primary Care Rotation on a trial basis to Phase 4 DVM students E2 – continue to work with the OVMA on the study of the future supply and market demand for Food Animal practitioners in Ontario. VCEP Program Management Committee meets	Completed Completed Completed Completed On-going On-going Report completed and distributed

	bi-annually.	Completed
Q3	E2 – Repeat offering of a pilot project for the Phase 4 Food Animal Stream students to gain targeted learning experiences with a collaborating private practice. E2 - Continue delivery of an Equine Primary Care Rotation on a trial basis to Phase 4 DVM students	On-going On-going
Q4	Prepare 2012/13 VCEP business plan E3 – Determine feasibility of implementation of a modified Rural Practice/Food Animal career emphasis program for DVM students. VCEP Program Management Committee meets bi-annually.	Completed On-going Completed

APPENDIX A

SPARK Research Stories with OMAFRA Sponsorship 2011/12

Research news articles can be accessed from:

<http://www.uoguelph.ca/research/research-publications>

General information on the University's research communications department can be found at:

<http://www.uoguelph.ca/research/services-divisions/research-communications>

All SPARK media materials acknowledge the support of the OMAFRA-U of G Partnership in funding of the subject material presented.

In Print

The University of Guelph, *Research Magazine*: highlights the University's diverse research strengths in a concise news format. Published three times a year, each issue focuses on a specific area of research activity. One issue is also dedicated to the results of the Partnership programs. *Research* is written and produced by SPARK, which also produces videos for the magazine's electronic version.

Summer/Fall - 2011-2012 – Agri-Food Yearbook

Illuminating the secrets of effective nitrogen management

Researcher: Manish Raizada

Developing green roof technologies for Canadian climates

Researcher: Youbin Zheng

Culls no more/How to make bean plastic

Researcher: Peter Pauls

Making progress towards high oil soybeans

Researcher: Istvan Rajcan

Bacteria can't beat roboguts

Researcher: Emma Allen-Vercoe

Identifying healthier herds

Researcher: Bonnie Mallard

Cover your ears – researchers preparing for arrival of western bean cutworm

Researcher: Art Schaafsma/Jocelyn Smith

Better management practices control poultry pathogens

Researcher: Michele Guerin

Designer functional foods for a thriving agriculture and food sector

Researcher: Gopi Paliyath

Bio-bins: renewable products from agricultural materials

Researcher: Amar Mohanty

Improving beef tenderness – it's in the genes

Researcher: Steve Miller

Rural communities are embracing change

Researcher: Wayne Caldwell

Ontario pork remains a market contender

Researcher: Ken McEwan

Pinpointing profitability in marketing

Researcher: Richard Vyn

Beetlemania – researchers seek to predict and manage populations of bean leaf beetles

Researcher: Rebecca Hallett

A new approach to beef tenderness and feed efficiency

Researcher: Ira Mandell

Food for your genes

Researcher: David Mutch

Relief for osteoarthritis sufferers may be sips away

Researcher: Laima Kott

Towards better health and plant hardiness

Researcher: David Wolyn

Whole food may be a whole lot better

Researcher: Krista Power

Eat local, taste global

Researcher: Glen Filson

Good food, better aging

Researcher: Alison Duncan

New smartphone app helps guard against soybean aphids

Researcher: Rebecca Hallett

Improved methods streamline multi-residue testing

Researcher: Perry Martos

Entering a new era in dairy monitoring

Researcher: David Kelton

Ontario Cattleman's Association (OCA) – Ontario Beef Magazine

A new approach to beef tenderness and feed efficiency

Researcher: Ira Mandell

December 2011

Feeding distillers grains proves cost efficient, safe

Researcher: Kendall Swanson

February 2012

Grain Farmers of Ontario (GFO) – Grain Farmer Magazine

Mind the herbicides for safer replanting

Researcher: Clarence Swanton

Dec 2011

Sustainable car parts from soy

Researcher: Manju Misra

March 2012

Planting now for high yields later

Researcher: Horst Bohner

April 2012

Guelph, OMAFRA researchers launch field crop news site

Researcher: Francois Tardif

April 2012

Adopting fusarium's tactics for disease resistant corn

Researcher: Peter Pauls

May 2012

Dairy Farmers of Ontario (DFO) – The Milk Producer Magazine

Value-added protection

Researcher: Silvio Miranda

June 2011

Identifying healthier cows

Researcher: Bonnie Mallard

July 2011

Potential natural cure

Researcher: Brian McBride

November 2011

Greenhouse Canada Magazine

Robots get a grip

Researcher: Medhat Moussa

January 2012

Nutrient loss focus

Researcher: Mike Dixon

April 2012

Canadian Poultry Magazine

Backing off bird flu

Researcher: Shayan Sharif
Summer 2011

Controlling Pathogens

Researcher: Michele Guerin
January 2012

Owen Roberts

Since Owen Roberts' appointment with the OMAFRA-U of G Partnership, he had written several of his weekly columns, *Urban Cowboy*, in the Guelph Mercury about the Partnership. The following stories all appeared on page A8.

July 4, 2011 – Market insurance assures us quality food

August 21, 2011 – New soy varieties result from research alliance

September 5, 2011 – Our farmers and food researchers doing all they can

October 4, 2011 – Vote to keep our agri-food sector vibrant

October 30, 2011 – Herbicide defenses are becoming less effective

December 18, 2011 – Grocery war forecast has local food tilt

January 9, 2012 - China is becoming one very hungry country

January 15, 2012 – New livestock facility good for farmers, economy

January 23, 2012 - Looking to farming for health care cost relief

January 30, 2012 – Farming everywhere is being linked to economic recovery

March 5, 2012 – No production naturally limits food choices at markets

March 26, 2012 – Budget must bolster Ontario's research capacity

Broadcast

SPARK*Air Video Broadcasts on YouTube

Ethno-Cultural Vegetables Introduction Video

Researcher: Glen Filson
June 1, 2011

High Immune Response Technology

Researcher: Bonnie Mallard
July 20, 2011

Two stage weaning in beef cattle

Researcher: Derek Haley
August, 25, 2011

The SMART initiative

Researcher: David Hooker

August 31, 2011

Selenium in Dairy Cattle

Researcher: John Cant

September 2, 2011

Fusarium Headblight Resistant Wheat

Researcher: Lily Tamburic-Ilincic

November 3rd, 2011

Early response tools for the field

Researcher: Albert Tenuta

November 11, 2011

Aphid Advisor – U of G smartphone app for crop pest management

Researcher: Rebecca Hallett

February 8, 2012

APPENDIX B

2011/12 Revisions to Agreement Performance Indicators (PIs)

(Agriculture & Food Laboratory Program PI#7)

Key Outcome	Performance Indicator AFL 7	Purpose	Measurement / Metric	Methodology	Potential Data Sources	Baseline Exists?	Resp.
Improved U of G research through laboratory-based expertise	Scientific merit and relevance of research conducted by AFL or University personnel or students to articles, presentations final project reports, and peer reviewed journals.	To demonstrate the scientific merit of AFL's contribution to research.	a) Total number of publications in peer reviewed journals and % of those appearing in high impact journals. b) Summary of knowledge transfer events related to new practices and including number of attendees.	a) This measure will track and report the total number of publications in peer reviewed journals and the percentage appearing in high impact journals. For the purpose of this measure, 'highest impact' publications is defined in R (c) b) This measure will track and report annually, a summary of a knowledge transfer events by the AFL, related to new practices or technologies (e.g. workshops, seminars, technical bulletins etc), The summary report should also include statistical information, such as the number of events/publications, number of participants and results of any event evaluation that may have taken place. Reporting frequency: Annually	Publications and citations in scientific journals by specified researchers and published project reports. • Annual and final project reports of publications and citations related to OMAFRA priorities. • Further defined in "R3 c)" (see appendix).	a) No b) No	AFL

APPENDIX C

OMAFRA - U of G Audited Statement of Revenues and Expenses