2014-2015 ANNUAL REPORT



Reaching new heights begins in the





Growing science for life

PotashCorp - a Founding Partner







MESSAGE FROM THE CHAIR

Welcome to the Global Institute for Food Security

Salles Howe

Dallas Howe CHAIR, BOARD OF DIRECTORS Global Institute for Food Security (February 5, 2013 – Present)

The unique spirit of partnership and shared interest in addressing food security around the world continues in Saskatchewan. In 2012, PotashCorp, the world's largest crop nutrient company, the Government of Saskatchewan, and the University of Saskatchewan combined resources and expertise to form the Global Institute for Food Security, and I am pleased to report that much was accomplished this past year.

In this year of reporting, the Institute announced the appointment of Dr. Maurice Moloney to lead the Institute as Executive Director and CEO. Dr. Moloney is a respected and internationally recognized scientist, and brings to the Institute agricultural research expertise and organizational building skills that will help take GIFS to the next level both here in Canada and internationally. With this strong and permanent leadership now in place, we know the Institute will grow as a substantial contributor of solutions to the global issue of food security.

The Institute also finalized and embarked on a focused research approach to address food security – one that will result in real outcomes in the areas of seed and developmental biology, soil quality and fertility, and agriculture information and communications technology. This research will seek to develop technological improvements to benefit both developed and developing nations around the world.

A major first step in the research strategy was also achieved this year. The first of many world-leading researchers was hired and arrived at the Institute this fall from Germany to begin work in the area of seed developmental biology. A team of researchers from Germany and a number of new local graduate students will also be hired, and I look forward to the science results this team will bring to the Institute in this research area.

I look forward to continuing to work with the Board and with GIFS management in the coming year as we continue to put into place exciting and meaningful human resources that will help us achieve our vision of ingenious science that delivers sustainable food security for the world.

Our Directors



Alanna Koch DEPUTY MINISTER Saskatchewan Ministry of Agriculture (February 5, 2013 – Present)



Michael Atkinson PROFESSOR Johnson-Shoyama Graduate School of Public Policy (June 25, 2014 – Present)

MESSAGE FROM THE EXECUTIVE DIRECTOR & CEO

"The demand for food is escalating around the world."



It is a pleasure and a privilege to have been chosen by the Board of the Global Institute for Food Security to serve as its Executive Director and CEO.

The creation of the Institute by the founding partners – PotashCorp, the Government of Saskatchewan, and the University of Saskatchewan – is a recognition that food security is one of the most crucial issues that we face globally.

In a country like Canada, we are blessed with abundant agriculture, natural resources and a high quality of life. In consequence, we may easily forget the critical nature of the global food supply chain. However, food insecurity is an insidious global problem, with major implications for rich and poor countries alike. For wealthy and food-secure nations, this poses a moral responsibility and also a unique opportunity. We can and should respond to the needs of developing nations to empower them to build thriving economies catalysed by enhanced food production.

The Global Institute for Food Security (GIFS) is developing technologies that will contribute to the agriculture of the developed and developing world. We will do this through focused research programs and international collaborations, working with agribusiness companies and with international agricultural agencies such as CGIAR (Consultative Group on International Agricultural Research) and the FAO (Food and Agriculture Organization of the United Nations).

Saskatchewan is the ideal venue for an institute dedicated to global food security. If this province were a nation, it would still be in the top 10 wheat-exporting countries globally. Saskatchewan's commitment to agricultural research and technology development explains why the province continues to be a powerhouse of agricultural productivity and a synonym for quality around the world. GIFS is situated in a rich research community on the University of Saskatchewan campus with access to over 100 companies in Innovation Place (our research park) all keen to access and commercialize research.

Since joining GIFS in October 2014, I have been working with the Board and an international group of advisors to forge a strategy for the Institute, which assures its sustainability. It is designed to offer short-and long-term impact from our discovery programs. We have already made major strides in our path to sustainability and are now recruiting internationally acclaimed researchers to lead our major programs focused on seeds, roots, soil, and computational agriculture.

In the coming year, we will expand our efforts and staff as we build our programs and international networks. We look forward to making major announcements in this regard in the coming months and into 2016.

Ollauri Ololongo

Maurice Moloney EXECUTIVE DIRECTOR & CEO Global Institute for Food Security (October 1, 2014 – Present)



Lorne Hepworth Corporate Director (October 18, 2013 – Present)



Stephen Visscher DEPUTY CHIEF EXECUTIVE Biotechnology and Biological Sciences Research Council (April 2, 2015 – Present)



A Focused Approach to Meeting the Global Food Security Challenge

Access to sufficient, safe and nutritious food is already an issue in many parts of the world. With world population growing steadily, the amount of arable land decreasing, and climate change affecting major agricultural zones, feeding the world's population will become even more challenging.

The Institute's research will focus on developing technologies that increase crop productivity and yields and that can deliver agricultural benefits to both developed and developing nations.

In developed nations where agriculture is already technologyintensive, these benefits will include improving photosynthesis and resilience to environmental factors that are detrimental to plant growth. Enhancements are also required with respect to the functioning of ecosystems, soil quality and fertility, crop nutritional value, and general agronomy and land management.

Yields in developing nations where the fastest-growing populations are found are often pitiful and need to improve. Achieving this will require technological interventions, which can be maintained locally. Thus, reliance on external support from developed nations can be lessened.



The Institute's research outcomes are focused on addressing the critical needs associated with food security: improving the genetic potential of seeds, soil quality and fertility, and agriculture information and communications technology.

To address these critical needs, GIFS is developing its own funded research programs and recruiting world-leading researchers who will focus their efforts on finding sustainable solutions to the global food security challenge.

Seed and Developmental Biology

Research Focus: This research into seed and developmental biology focuses on disruptive technologies that can achieve the benefits of hybrid vigour or high productivity in ways that can be maintained in subsequent generation. This includes research on apomixis, hybrid mimics and perennial cereal grains.

CORE RESEARCH OUTCOM

Root-Soil-Microbial Interactions

Research Focus: The interaction between and among roots, soil and its micro-organismal complement is a dynamic ecosystem that has a substantial effect on soil fertility and crop health. The emphasis of this research will be on beneficial soil micro-organisms, chemical ecology and natural semiochemicals in soils, enhancement of organic matter in soils, and the role of the rhizosphere in crop productivity and quality.

CORE RESEARCH OUTCOM

Digital and Computational Agriculture

Research Focus: The initial goals of this research will be on digitizing phenotyping to accelerate plant breeding and creating digital technologies to improve agricultural practices and local agribusiness in the developing world.





to Achieve Transformational Outcomes



seed and Developmenta Siology

Dr. Tim Sharbel GIFS RESEARCH CHAIR IN SEED BIOLOGY

GIFS' research into seed and developmental biology will focus on disruptive technologies that achieve the benefits of hybrid vigour or high productivity in ways that can be maintained in subsequent generations. This includes research on apomixis, hybrid mimics and perennial cereal grains. This research area is applicable to all major crops, including wheat, barley, canola, pulses and protein crops.

In the developed world, improving seed quality by incorporating beneficial traits into the seed can reduce input cost and thereby boost farmer income. Crops that are more resilient to insect attacks can reduce crop failure and increase yields.

In developing nations, technologies created through research into seed and developmental biology could result in farmers being able to repeatedly use saved seed that maintains its integrity, cutting down on production costs. Minimizing input costs will help to build a virtuous economic cycle and reduce dependency on interventions from the developed world.



Dr. Timothy Sharbel, an internationally acclaimed expert in apomixis in plants, joined GIFS in fall 2015 to help build the Institute's research in this area. Apomixis involves reproduction without fertilization that results in offspring that are genetically identical to the parent plant. Dr. Sharbel's research on a transition (sexual or asexual seed development) species called Boechera has resulted in the isolation of two genes, APPOLO and UPGRADE, which appear to have a pivotal function in the transition to apomixis. This is now being tested in canola.

Dr. Sharbel is coming to GIFS from Gatersleben, Germany, where he was a group leader and principal investigator at the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK). He will bring several key researchers to Saskatoon from his team in Germany and plans to recruit locally for several other positions and graduate students.

Seed development and quality are critical to the economy of Western Canada, where the major agricultural crop exports are all seeds or derived from seeds such as wheat, canola and pulse crops. With world reliance on Canada's cereal and oilseed production, the benefits of higher quality seeds present significant opportunities for Canadian farmers over the next 30 years.



The amount of Canada's arable land that is located in Saskatchewan.



In 2014, Saskatchewan was responsible for 65% of the world's lentil exports.



Wheat, canola and pulse crops account for over 80% of Saskatchewan crop exports. Saskatchewan supplies 11% of global wheat exports.



The percentage of the world's known potash reserves located in Saskatchewan.



The number of tonnes of wheat that Canada exports each year. Canada is also the second-largest exporter (21% of global exports) and the largest exporter of canola (8% of global oilseed trade).



The percentage of seed oil that China imports. Emerging affluent nations in Asia, like China and India, represent growing markets for Saskatchewan.

The Institute received approval for funding from the Government of Canada for a Canada Excellence Research Chair and an offer has been made to a world-class senior researcher. This means that GIFS will have a new research chair in root-soil-microbial interactions effective July 1, 2016.

Once in place, GIFS expects the candidate to build a lab with over 30 researchers and to hire two new faculty members at the assistant or associate professor level. These individuals will also be GIFS researchers and will build their own research programs in the area of root-soil-microbial interactions.

Root-soil-microbial interactions are currently one of the most vibrant areas of plant science. It is fueled by major discoveries on nodulation and mycorrhizal signaling and has practical implications for soil health, crop productivity and nutrient use.

GIFS' research in this area will be enhanced through the Institute's relationship with one of its founding partners, the University of Saskatchewan (U of S).



The Canadian Light Source (synchrotron) is located on the U of S campus.



The U of S has strong soil science and microbiology programs.



The top analytical facilities for plant hormones and signaling chemicals are located at the U of S, as is the National Research Council Canada (NRC).



The U of S has a strong profile with local companies who also conduct research in this area.



The U of S and GIFS were awarded a Canada Excellence Research Chair position (\$10 million) in this area.





Dr. Andrew Sharpe SENIOR RESEARCH OFFICER National Research Council Canada (Saskatoon) Information and communications technology are part of all aspects of human activity, from healthcare, finance, and education to recreation. Agriculture and food production GIFS' research in this area will focus on digitizing the science of phenotyping to enhance and accelerate plant breeding and on developing digital technologies to improve agricultural practice and local agri-business in the developing world. Large-scale integrated data acquisition and management systems and technologies, including genomics, global positioning systems and high-precision satellite imaging, will affect everything from plant breeding and soil science to automated on-farm practices in developed nations. The ability to link genotypes to phenotypes digitally will optimize and streamline breeding strategies that will have profound impacts on plant breeding. The acquisition of data through imaging, sensing and agri-metrics will result in large data-sets that will be useful to individual farmers planning the most optimal and sustainable cultivation strategies over several years. In developing nations, farmers in remote regions will benefit from using their smart phones to access databases that are created to identify plant pests and diseases, to do research to find the least expensive ways of addressing these issues and to share data from their region with developed nations.



Largest Federal Investment for Research in U of S History Awarded to the **University and GIFS**

The U of S and GIFS were awarded \$37.2M by the Government of Canada through the Canada First Research Excellence Fund (CFREF), which is the largest federal investment for research ever received by the University. The CFREF will be managed by the Institute to create a campus-wide effort on field- and greenhouse-based plant phenotyping in collaboration with other University of Saskatchewan campus assets like the Canadian Light Source. Digitizing databases and images will lead to more rapid and comprehensive means of performing research on seeds and crops. The program will employ four new faculty members, 25 post-doctoral fellows and over 200 graduate students across campus; an additional 20 GIFS researchers and over 30 GIFS affiliated researchers will eventually be working on campus in this area.

Digital agriculture will help to attract new external partners to GIFS and will also bring together the Canadian Light Source, Sylvia Fedoruk Centre for Nuclear Innovation, NRC, and Agriculture and Agri-Food Canada, as well as faculty from several departments across the U of S, including Agriculture and Bioresources, Computer Science, Engineering, and the Johnson-Shoyama Graduate School of Public Policy.

The result will be the creation of new agribusinesses based on IT, genomics, biologics and imaging technologies and the boosting of Canada's reputation for safe, nutritious food with traditional and new international trading partners.

Impacting Food Security and Agriculture Policy

The Institute's work on seeds, soils and software is filled with questions about socio-economic relevance, public perception, and the politics of food.

From the introduction of hybrids in the 1930s, to the present era of biotechnology, sociological and political debate has been vigorous and diverse.

At GIFS, it is our view that if we work on new agricultural and food technologies, we will need to expect controversy and suspicion, as well as positive encouragement and adoption. For this reason, we will take a proactive approach to socio-economic analysis, policy development and public engagement.

National and international policy plays a major role in the success of agriculture, both in Canada and abroad. The Institute will capitalize on the relationship it has established with the Johnson-Shoyama Graduate School of Public Policy. For research undertaken and sponsored by GIFS, policy experts in the School will provide advice and data on agriculture and food policy. The Institute's research in this area will focus on quantitative risk assessment and risk benefit analysis, thresholds for public trust and confidence in food-related research and international implications, which may impact the accrual of benefits to the developing world.



2014 - 2015 Highlights

Dr. Maurice Moloney, a respected and internationally recognized scientist, was recruited by GIFS' Board of Directors to lead the Institute as its first permanent **Executive Director and** Chief Executive Officer.



GIFS, in partnership with the universities of Saskatchewan, Alberta, and Calgary, was a Titanium sponsor of the Agricultural Bioscience International Conference 2014 held in Saskatoon.

WABIC²⁰¹⁴

Dr. Moloney Institute's inaugural 'state of the union' address.

delivered the

GIFS undertook a comprehensive strategic planning process that established the Institute's scientific strategy and key science pillars: seed and developmental biology, root-soilmicrobial interactions, and digital and computational agriculture.





Dr. Timothy Sharbel, an internationally acclaimed expert in apomixis in plants, was recruited to help build the Institute's research seed developmental biology. Dr. Sharbel's appointment took effect September 1, 2015.



Partnering with Innovation Saskatchewan and the Canada-Israel Industrial R&D Foundation, the Institute hosted a roundtable event in Saskatoon to bring together world-class scientists from Israel and Saskatchewan in both academia and industry to explore potential for collaboration in agricultural biotechnology, including seed and developmental biology, phenomics, and related areas.



GIFS and the U of S are awarded \$37.2 million through the Canada First Research Excellence Fund to pursue research on digital and computational agriculture.





Independent **Auditor's Report**

June 26, 2015

To the Board of Directors of the Global Institute for Food Security

We have audited the accompanying financial statements of Global Institute for Food Security, which comprise the statement of financial position as at April 30, 2015 and the statements of operations and unrestricted net assets and cash flows for the year then ended, and the related notes which comprise a summary of significant accounting policies and other explanatory information.

Management's responsibility for the financial statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of Global Institute for Food Security as at April 30, 2015 and the results of its operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.



Chartered Professional Accountants

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"PwC" refers to PricewaterhouseCoopers LLP, an Ontario limited liability partnership.

Statement of Financial Position For the year ended April 30, 2015		
	2015	2014 (\$)
Assets		
Current assets Cash held by University of Saskatchewan (note 3)	19,407,318	13,654,276
Liabilities		
Current liabilities Accounts payable and accrued liabilities	121,718	411,699
Unrestricted net assets	19,285,600	13,242,577
	19,407,318	13,654,276
Economic dependence (note 1) Commitments (note 6)		
Approved by the Board of Directors		

Dallas Howe, Chair

Alanna Koch, Director

Statement of Operations		
and Unrestricted Net Assets	April 30, 2015	April 20, 2014 (\$)
Revenue		
Contributions from founding partners (note 4) Contributions from industry partners (note 5)	8,000,000 -	8,000,000 2,000,000
Interest income (note 3)	386,588 8,386,588	10,212,223
Expenditures	0,300,300	10,212,223
Administration Salaries and benefits Office operations (note 3) Communications and marketing Travel and recruitment Consulting fees	558,730 246,898 191,521 164,867 34,155	301,900 246,465 92,166 250,115 113,939
	1,196,171	1,004,585
Research and education Grants and awards (notes 3 and 6) External science advisory Salaries and benefits Scholarships	998,700 90,010 39,044 19,640	492,000 71,622 2,500 –
	1,147,394	566,122
	2,343,565	1,570,707
Excess of revenue over expenditures Unrestricted net assets – Beginning of year	6,043,023 13,242,577	8,641,516 4,601,061
Unrestricted net assets – End of year	19,285,600	13,242,577

Statement of Cash Flows

For the year ended April 30, 2015

Cash provided by (used in)		
Operating activities Excess of revenue over expenditures for the year	6,043,023	8,641,516
Changes in non-cash working capital items	0,0 13,023	0,011,510
Cash held by University of Saskatchewan	(5,753,042)	(9,029,261)
Accounts payable and accrued liabilities	(289,981)	387,745
	(6,043,023)	(8,641,516)
Net change in cash	_	_
Cash – Beginning of year	_	-
Cash – End of year	_	_

01 NATURE OF BUSINESS

The Global Institute for Food Security (the "institute" or "GIFS") was established by a Memorandum of Agreement (the "agreement") dated November 19, 2012 between the University of Saskatchewan, the Government of Saskatchewan, and Potash Corporation of Saskatchewan.

The institute is a Type B Centre of the University of Saskatchewan (the "university"). The mandate of the institute is to place Saskatchewan among global leaders in food security research and policy development.

The operation of the institute is economically dependent on the funding from Potash Corporation of Saskatchewan and the Government of Saskatchewan (note 4).

02 SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

a) Basis of presentation

These financial statements include the accounts of the institute and are presented in accordance with Canadian accounting standards for not-forprofit organizations ("ASNPO").

b) Use of estimates

The preparation of financial statements in conformity with ASNPO requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amount of revenue and expenditures during the reporting period. Actual results could differ from these estimates.

c) Revenue recognition

The institute follows the deferral method of accounting for contributions which includes funding from the Government of Saskatchewan and Potash Corporation of Saskatchewan as well as other funding sources.

Unrestricted contributions are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and collection is reasonably assured. Restricted contributions for expenses of the current period are recognized as revenue in the current period and restricted contributions for expenses of one or more future periods are deferred and recognized as revenue in the same period or periods as the related expenses are recognized.

Investment income earned on the cash held by University of Saskatchewan is recognized as revenue when the university can measure and transfer the income to the institute.

Contributions of materials and services are recognized only when a fair value can be reasonably estimated and when the materials and services are used in the normal course of the institute's operations and would otherwise have been purchased.

d) Financial instruments

Financial assets and financial liabilities, consisting of cash held by University of Saskatchewan and accounts payable and accrued liabilities, are initially recognized at fair value and subsequent measurement is at amortized cost. The institute does not consider itself to have significant exposure to credit risk, currency risk, interest rate risk, liquidity risk, market risk or other price risk.

03 RELATED PARTY TRANSACTIONS

During the year, the institute entered into various transactions with the university. The institute purchased goods and services from the university in the amount of \$144,322 (2014 - \$214,461), which are included in expenditures. Of the grants made during the year by the institute, \$998,700 (2014 - \$492,000) were made to the university, including individuals or entities related to or employed by the university.

During the year, the university provided the institute with access to facilities, phones, computer networks and financial administrative systems needed to support the operational needs of the institute.

All funds received by the institute are held in, and payments to vendors of the institute are made from, bank accounts administered by the university, which are included on the statement of financial position as "Cash held by University of Saskatchewan". The balance earns a rate of approximately 2.5% and interest income of \$386,588 (2014 - \$212,223) was received from the university during the year.

04 CONTRIBUTIONS FROM FOUNDING PARTNERS

The agreement features a funding commitment of \$15 million from the Government of Saskatchewan over seven years ending April 30, 2020 and a provisional donation to the institute of a contribution of up to \$35 million by Potash Corporation of Saskatchewan over seven years, subject to an annual review of the institute including certain reporting requirements being met and satisfactory performance against certain objectives and metrics. The contribution from Potash Corporation of Saskatchewan may be structured such that funds are provided evenly over the seven year period, or proportionally matched with the growth of the institute, or by some other agreed upon manner. Potash Corporation of Saskatchewan will determine on an annual basis whether or not to make a contribution during any fiscal year.

An additional contribution was provided by Potash Corporation of Saskatchewan in the period ended April 30, 2013 in the amount of \$937,000. This contribution was to fund the feasibility study of the institute and the initial public relations campaign for the launching of the institute.

05 CONTRIBUTIONS FROM INDUSTRY PARTNERS

On November 4, 2013 Viterra Inc. signed an agreement with the university and the institute to provide a one-time contribution of \$2 million. These funds are to be used for any purposes consistent with the institute's overall mandate of food security.

06 COMMITMENTS

a) Funding awards

One of the core activities of GIFS is to provide grants to eligible scientific investigators for the purpose of research in a wide range of issues related to food production and food security. The institute held its first call for proposals in October of 2013 and three projects were awarded with multiyear grants. The total maximum commitment on these projects, with grant awards to be funded over five years, is \$3,238,800, of which \$433,700 was funded during the year (2013 - \$427,000).

During the year ended April 30, 2015, three additional projects were awarded with multi-year funding. The total maximum commitment on these projects, to be funded over the next five years, is \$8,800,000, of which \$525,000 was funded during the year.

In addition, the institute has committed \$600,000 of matching research funds for a project that has been submitted to a funding competition held by an external agency. This commitment is contingent upon a successful review and reward by the external agency.

Based on the above, total anticipated maximum commitments over the next five years are as follows:

2016	\$4,061,225
2017	\$2,609,125
2018	\$1,728,375
2019	\$1,854,375
2020	\$1,000,000

b) Operating leases

During the year, the university entered into a "License to Occupy Premises at the National Research Council" on behalf of the institute for office space. The minimum future commitments under the agreement are as follows:

2016	\$136,418
2017	\$162,668
2018	\$188,918
2019	\$215,168

The institute has the opportunity to reduce the total cost of the lease payments by the amount of leasehold improvements (approximately \$250,000) provided by the landlord through the development of mutually agreed collaborations during the term of the agreement.





Growing science for life

PotashCorp - a Founding Partner

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Founding Partners





