

## The Investment Environment for Agri-Food Research and Innovation

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WEB CONFERENCE REPORT



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Research and innovation<sup>1</sup> in agri-food are key enablers of economic growth. They also create opportunities to fight against climate change, improve nutritional security, and enhance sustainability. To succeed, research and innovation require investments and support from governments, non-profit organizations and private actors. Federal and provincial governments can encourage the success of research and innovation by creating an attractive climate for investment.

To encourage discussions on the issue, AIC has invited speakers from the whole agri-food system to share their views on themes such as returns on investment, investment gaps, venture capital funding, and government investment and taxation.

This document includes a summary of key discussion points raised by the speakers, as well as recommendations made by AIC that were informed by the conference's proceedings.



<sup>1</sup> Research includes the acquisition of new knowledge for which new applications may later be developed, while innovation includes the adoption of new or significantly improved products and processes by an organization.

## Overview

The share of Canada's public investments in agri-food research and development as a share of GDP puts Canada in the middle of OECD countries, according to OECD research. Currently, Canada relies significantly on tax incentives to promote research and innovation in agri-food. Defining outcomes desired from research and innovation and the type of innovation to support is key, as certain instruments will respond better to different circumstances.

Research and innovation are a key strength for Canada's agri-food sector. Together, they have the potential to enable a significant transformation of the sector. To leverage this strength to its full potential, the federal and provincial governments will need to address challenges to taxation and the investment environment.

## Challenges

Key challenges identified by the web conference's speakers include:

1. While Canadian universities are renowned for the quality of their research in agri-food, more could be done to commercialize it.
2. The agri-food sector is underserved by private investments. Factors that contribute to this situation include pension funds having moved away from venture capital as an asset class in agri-food and limited knowledge of investment opportunities in the sector.
3. The innovation ecosystem in the agri-food sector has not yet reached its peak maturity. Factors that contribute to this issue include the lack of incubators and accelerators, the limited number of mentorship programs to help entrepreneurs access capital for growth, the limited commercialization of novel technology, and limited efforts to pilot new technologies.
4. In primary agriculture, productivity gains have slowed down during the last decade due to labour shortages, an increase in labour costs, and reduction of opportunities to realize efficiencies with existing technology and practices.
5. Industries in primary agriculture will need a workforce that includes more "enablers" (individuals who possess the skillsets to assist with the adoption of new technology and productivity enhancing practices) and "specialists" (knowledge-based workers capable of improving processes, productivity and well-being) to adopt and maintain innovative technology and practices at the farm level.
6. In food manufacturing, labour shortages resulting from an estimated 28,000 job vacancies across Canada<sup>2</sup> also significantly affect productivity. Government incentives must address the high costs of adoption for production line efficiencies, which are a significant barrier to process innovation.

<sup>2</sup> Estimates from Food and Beverage Canada and the Conseil de la transformation alimentaire du Québec.

## Recommendations

### *Coordination*

The government would benefit from implementing stronger mechanisms that result in better strategic direction and allocation of resources for the agri-food sector.

Within research and innovation in agri-food, matters that require strategic direction and advice notably include incentivizing institutional investors to significantly increase their investments; attracting the next generation of students, researchers and skilled workers in the sector; and continuing to encourage entrepreneurs and researchers to connect.

#### AIC recommends:

- That the Government of Canada establish an interdepartmental task force mandated to provide strategic direction in agri-food while harmonizing the efforts of governmental bodies that support the sector (recommendation 1).
- That an independent and cross-sectoral body (industry, academia and non-profit) be stood up to advise the task force on issues and opportunities that exist to inform strategic direction (recommendation 2).

### *Leadership in access to capital*

Government funding to support the standing up of clusters in agri-food is generally effective, particularly in support of primary agriculture. Such funding has improved research and innovation and helped with the commercialization of innovative products and processes by connecting academia, private sector, entrepreneurs, funders and facilitators. Encouraging the development of new clusters to complement existing ones would contribute to the sector's growth and productivity.

#### AIC recommends:

- That the Government of Canada incentivize the expansion of cross-sectoral non-profits that provide entrepreneurs in agri-food with opportunities for mentorship and access to capital (recommendation 3).

### *Adoption of innovation*

Automation and robotics continue to show promising applications for food manufacturers looking to increase productivity, cut operating costs, and help address significant labour shortage issues.

However, their adoption is capital intensive; initial costs include the acquisition of new technology as well as hiring and training of specialists to operate it. High upfront costs often put adoption of such process innovation out of reach, particularly for small and medium size enterprises.

#### AIC recommends:

- That the Government of Canada design a funding program that reduces the barrier of initial costs to incentivize the adoption of innovation for food manufacturers (recommendation 4).

### *Supporting farmers and ranchers adopt innovation*

The adoption of innovative technology such as precision agriculture or robotization can be challenging in primary agriculture. As noted in RBC's Farmer 4.0 report, barriers include ease of implementation and high costs, particularly for smaller farms and ranches. Moreover, farmers and ranchers will often refrain from implementing experimental technology unless such initiative shows that it will not negatively affect revenues.

#### AIC recommends:

- That the Government of Canada provide direct funding to early adopters and innovative farmers and ranchers looking to cover the high initial costs of implementing technology that improves sustainability and productivity. Such program should incentivize increased adoption of innovative products and processes while de-risking potential loss of revenues if their implementation is unsuccessful (recommendation 5).

We would like to acknowledge and thank our web conference panelists whose valuable contributions helped set the stage for the important discussions that took place during this online event.

## **The importance of investment in agri-food research and innovation and their return on investment (November 10, 2020)**

- Mr. Jean-Philippe Gervais, Vice-President and Chief Agricultural Economist at FCC.
- Mr. Andrew Schrumm, Senior Manager for Research at RBC Thought Leadership.

## **Is there an investment gap for agri-food research and innovation? (November 17, 2020)**

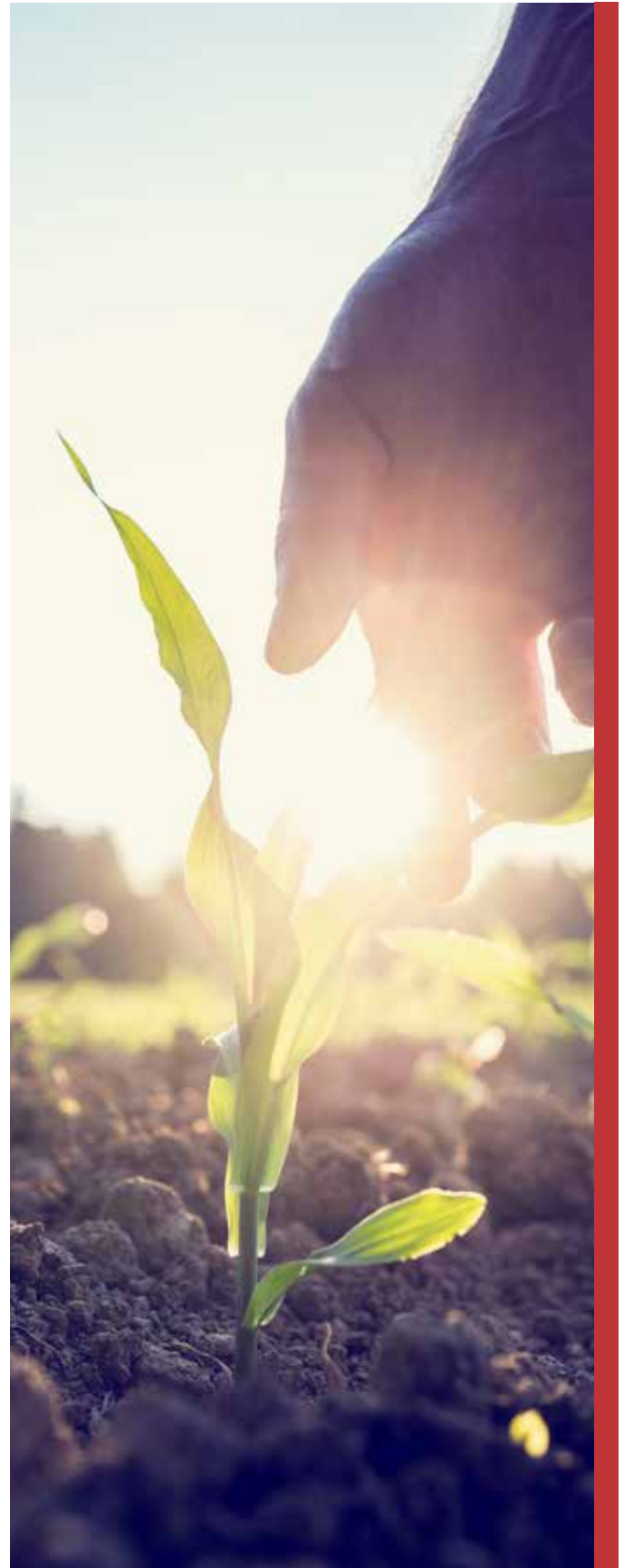
- Ms. Laurie Dmytryshyn, Chief of Equity Investments at PIC Investments.
- Ms. Lynne Godlien, CEO at Perennia Food and Agriculture.
- Mr. Dave Smardon, President and CEO at Bioenterprise Corporation.
- Ms. Alison Sunstrum, Founder and CEO at Conserve X.

## **Venture capital and banking: How they work and what they want (November 24, 2020)**

- Mr. Warren Bergen, President at AVAC Ltd.
- Mr. Eric Dillon, CEO at Conexus Credit Union.
- Mr. Andrew Heintzman, Managing Partner at InvestEco Capital Corp.

## **A better investment climate: Government investment and taxation (December 1, 2020)**

- Dr. Emily Gray, Agricultural Policy Analyst at OECD.
- Ms. Carla Ventin, Senior Vice President at Food and Consumer Products of Canada.
- Mr. Jesse Vincent-Herscovici, Vice President for Business Development at Mitacs.
- Ms. Lee-Ann Walker, Assistant Deputy Minister (Research and Corporate Services Division) at Ontario Ministry of Agriculture, Food and Rural Affairs



## The importance of investment in agri-food research and innovation and their return on investment

### Theme 1: Increasing productivity at the farm level

Canada's productivity gains in agriculture have slowed down during the last decade. This is due to several factors:

1. The share of labour costs in Canada's farm sector has remained one of the highest in the world.
2. The labour requirements in terms of knowledge and expertise have grown and become more specialized while the labour force has simultaneously shrunk.
3. Uncertain returns associated with new technology combined to the capital required can act as a barrier to adoption at the farm level.
4. Most major productivity gains possible under existing technology, equipment and practices have been exhausted.

These factors call for the agriculture industry to review strategies to grow productivity.

Innovation could significantly increase productivity gains in agriculture if focused on incentivizing the adoption of new technology. At the same time, it needs to build new skillsets to reflect changes in practices, machinery, data utilization at the farm level and food demand.

If Canadian agriculture was to return to approximately 3% productivity gains annually, it could add 10 billion dollars to its farm revenues by 2030, according to Farm Credit Canada. Such a bold objective is within reach, as Canada benefits from many advantages such as having a strong entrepreneurial spirit amongst its agriculture leaders.

### Theme 2: Skillsets required at the farm level

The successful adoption and maintenance of innovative technology and practices at the farm level depends largely on the emergence of two skills groups, the "enablers" and "specialists", according to RBC's *Farmer 4.0* report:

- The "enablers", comprised of technicians, electricians and computer specialists, possess the skillsets needed to assist with the adoption of new technology and productivity enhancing practices at the farm level.
- The "specialists", comprised of knowledge-based workers such as plant scientists, regulatory experts and animal geneticists, contribute their expertise to the improvement of processes, productivity and well-being. Currently, approximately one quarter of roles in both skill groups are unfilled.

Adding skillsets at the farm level from these two groups will be an essential condition for success to capture innovation gains from technology and process innovations.

Enabling these skills groups to develop effectively will depend on actions such as: ensuring university agriculture programs become interdisciplinary and inclusive, in particular, of disciplines such as computer science; expanding the use of the clustered approach in agri-food throughout the country, using lessons learned with the Protein Supercluster initiative; and making research funding programs accessible to organizations inside and outside of academia.

Proper domestic funding of research and development will be important to reduce Canada's reliance on foreign knowledge systems. Currently, approximately two thirds of Canada's agriculture equipment is bought from companies established overseas, resulting in a dependence on foreign intellectual property.

## Is there an investment gap for agri-food research and innovation?

### Theme 1: Low commercialization of university research

While Canadian universities are renowned for the quality of their research in agri-food, more could be done to commercialize it. Three factors contribute to the low rate of commercialization:

1. Researchers often do not have the entrepreneurial knowledge and experience needed to commercialize their findings;
2. Universities sometimes encourage licensing at the expense of forming new companies or working with existing ones; and
3. University silos often increase the difficulty of matching researchers with cross-cutting innovation projects.

The low rate of commercialization in agri-food can result in an incorrect perception among large corporations and multinationals that Canada has nothing new to offer, according to Dave Smardon (President and CEO at Bioenterprise Corporation). This perception, combined with the reduction of tech scouting by large corporations and multinationals, has further increased the challenge of commercializing research.

Connecting researchers with entrepreneurs would help address the low rate of commercialization of research. In addition to encouraging a cultural shift amongst universities, organizations like accelerators or incubators can act as the missing link by matching strong management teams with researchers who have little or no business experience.

### Theme 2: Lack of private investments across the research and innovation value chain

The agri-food sector is underserved by private investments when compared to sectors such as health or information and communications technology.

First, antiquated perceptions about the agri-food sector and limited knowledge of investment opportunities in agri-food have historically put the sector at a disadvantage for attracting investments. However, this has noticeably changed in recent years. For example, interest in the application of sensor and robotic technology in agri-food has attracted tech investors into the agri-food community. To build on this momentum, government and industry have a shared responsibility to continuously educate investors on successes, opportunities, and expected returns.

Second, institutional investors, including pension funds, have moved away from venture capital as an asset class in agri-food research and innovation. This removes a significant source of potential funding for growth of capital-intensive businesses like food processing. While angel investors have funded early-stage venture capital funding, particularly where incubators and accelerators are present or where Canada is positioned as a world leader (e.g., plant breeding), this has only covered a fraction of private investment needs.





## Venture capital and banking: How they work and what they want

### Theme 1: State of the innovation ecosystem for entrepreneurs

Additional conditions must be satisfied to build a mature innovation ecosystem in the agri-food sector.

The state of innovation in agri-food today is similar to what it looked like in the information and communication technology (ICT) sector during the mid-1990s: there are few facilitators, mentorship opportunities, and attempts at commercialization.

1. The agri-food sector can only count on a handful of incubators and accelerators, which are primarily localized in major urban areas like Toronto and Vancouver. This low number combined to large geographical distances increases the difficulty of leveraging the full range of competitive advantages found across Canada.
2. A limited number of mentorship programs exist to help entrepreneurs understand how to access capital for growth.
3. Most novel technology does not get commercialized. While Canada can take pride in developing canola, it is largely absent from global conversations on new agriculture technology.
4. Efforts to pilot new technologies by matching entrepreneurs with farm producers exist but are relatively modest.

Time, additional resources, and a critical mass of experienced entrepreneurs in agri-food will be required for the innovation ecosystem to achieve maturity. Building regional cohesive clusters between key actors (e.g., academia, entrepreneurs, government, mentors, investors, etc.), would also enable this effort. These geographically disparate clusters should then be connected to further accelerate maturity.

### Theme 2: Relationship between entrepreneurs and venture capital

Venture capital (VC) firms in agri-food innovation, similar to what is found in other sectors, favour opportunities that emphasize companies with potential to scale up and grow quickly.

Capital intensive companies or lifestyle companies looking to fill a niche space will usually not qualify as ventures. In addition, while VC firms view the quality of an idea or invention as important, they will generally ascribe more importance to founders who have surrounded themselves with a strong management team and board of directors. They will also view favourably entrepreneurs who approach VC firms from a long-term partnership rather than transactional perspective. These entrepreneurs tend to benefit from the support and advice of VC firms throughout the company's lifecycle and are therefore more likely to succeed.



## A better investment climate: Government investment and taxation

### Theme 1: Incentivizing research and innovation using the right instruments

When looking at Canada in terms of funding and taxation, Dr. Emily Gray (Agricultural Policy Analyst at OECD) noted that Canada relies significantly on tax incentives in agri-food research and innovation. With regards to investments, Canada has seen a decline over time in public and private research intensity. This reduction in the share of investments relative to the size of the agri-food sector is partly attributable to the increased value of the sector. Overall, public investments in research and innovation stand at approximately 2%, which puts Canada in the middle of OECD countries, while private investments stand between 0.5% to 1%.

Certain instruments will respond better to different circumstances. It is important for Canada to have a clear idea of what outcomes it desires from innovation and the type of innovation it wishes to support (e.g., stimulating adoption of existing technology, or conducting forward-looking basic fundamental research). For example, tax incentives are typically more beneficial to larger rather than small firms. As such, relying on this instrument may not service the needs of the sector if the aim is to improve the conduct of research and adoption of innovation within small businesses.

Similarly, if gains are expected to come from promoting networks and collaboration, grants may be a more effective way of bringing public and private actors together to work on innovative solutions.

Determining what instruments are most effective is a significant challenge due to lack of publicly available evidence. There is evidence to show that the SR&ED tax incentive program does yield a payoff for the agri-food sector, but the effectiveness of other sectorial tax incentives is difficult to measure.

### Theme 2: Incentivizing innovation in food manufacturing

More investments are needed in food manufacturing, according to Carla Ventin (Senior VP at Food and Consumer Products of Canada). A survey conducted in 2020 in collaboration with the Canadian Manufacturers and Exporters has shown that many food manufacturing executives are discouraged by government incentives and programs for innovation. They do not address the high costs of adoption for production line efficiencies, a significant barrier to process innovation.

As an industry, food manufacturing is very different from the rest of the agri-food sector and other manufacturing industries like aerospace or automobile. As such, governments at all levels should acknowledge that progress in this industry should be measured using metrics other than job creation and large-scale innovation. For several food manufacturing companies, investments in automation would alone significantly bolster productivity. These would help address labour shortages in the industry; an estimated one in ten jobs, or approximately 28,000 positions, are currently vacant.

A research and innovation mindset that is more inclusive of food manufacturing would also be highly desirable. For instance, despite some positive change in recent years, the majority of AAFC researchers continue to focus on research that advances primary production; food manufacturing remains, for the most part, an after-thought.

## Theme 3: Leveraging Canada's core strengths

Jesse Vincent-Herscovici (VP for Business Development at Mitacs) noted the opportunity for Canada to increase support for the agri-food sector in order to leverage its strength to its fullest potential. Notably, food processing expenditures in research and innovation have declined by 25% compared to 2008. As a large country with a comparably small population, Canada will also need to improve access to capital, talent, and markets to enable industrial growth.

One of the ways to address this gap would be for Canada to improve how it leverage its core strengths in agri-food. These include research skills, intellectual property (IP), and its culture of collaboration and openness. First, the country's patent rate and publication rate per capital shows that there is a high number of research opportunities that could be commercialized into innovative solutions. Second, Canada has a fairly robust IP framework and mechanisms to ensure its protection. Improving entrepreneurs' and researchers' IP literacy early on will help with their development into company assets. Third, Canada's diversity combined to a strong culture of collaboration is a competitive advantage.

Given the multifaceted needs in the agri-food sector, Canada needs to move away from individual and siloed initiatives and favour a multifaceted strategy with key players (e.g., policy makers, legislators, funders, facilitators) working together cohesively and purposefully. Such a strategy is more likely to succeed if it starts by identifying industry needs then looking for the right piece of the innovation ecosystem that could address a gap, rather than starting with an innovative solution or IP and trying to push it to industry. This strategy would also strongly benefit from moving away from a sectorial mindset and attempt, instead, to make cross-sectorial connections when innovative solutions could exist in other sectors and have a potential for adoption in agri-food.



## Theme 4: The OMAFRA-University of Guelph Agreement

According to Lee-Ann Walker (ADM (Research and Corporate Services Division) at Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)), the ten-year agreement between OMAFRA and the University of Guelph is unique in Canada. Given how high it ranks in terms of funding and research capability, it is perceived by other jurisdictions as best in class. Instead of specializing in certain commodities only, Ontario has been able to amass resources across several primary sectors to support a variety of agri-food needs. The agreement has led to the establishment of 15 research stations in areas such as field crops, live stocks, greenhouses, horticulture, turf grass and aquaculture.

To help foster innovation in agri-food, Ontario's alliance agreement with the University of Guelph offers different opportunities.

1. Scholarship programs at the masters and doctoral levels have been created to support the development of highly skilled intellectual capacity in the agri-food and rural sectors. Each year, these programs support between 10-50 participants who receive specialized in-class training in areas such as business, agriculture and commercialization, and are offered work placement opportunities in agri-food business or government organizations.
2. An undergraduate experiential learning program allows students to be mentored by University of Guelph professors.
3. The Griffin's lair commercialization program supports researchers interested in commercializing their research findings. Grants and support are provided to reduce barriers to a market launch. Support includes assisting with the validation of the feasibility of new products, creation of prototypes, conduct of field trials, optimization of MVPs, and presentation of a pitch to investors.

Separately, the Ontario Agri-Food Research Initiative (OAFRI) combines and builds on the success of OMAFRA's former New Directions and Food Safety Research Programs. This Ontario-wide research program, open to any private or public research organization, provides \$1.85 million annually to stimulate innovation and support the growth and competitiveness of Ontario's agri-food sector, promote food safety, and strengthen rural communities. OAFRI is jointly funded by the federal and provincial governments under the Canadian Agricultural Partnership (CAP). The partnership supports projects and activities in several areas such as incubators and commercialization centres, pilot projects, demonstrations, and applied research in fields such as productivity, animal health, food safety, plant health, soil health and water quality. In 2018-19, CAP committed over \$5.6 million to more than 50 research and innovation cost-share projects.



# Annex A. Conference Attendees

AIC2020

Attendees to the video-conference series came for a variety of organizations including:



Ag-West Bio  
AgExpert (Farm Credit Canada)  
Agriculture and Agri-Food Canada  
Alberta Canola  
ATB Financial  
Atlantic Canada Opportunities Agency  
AVAC Group  
BCDA  
Beef Cattle Research Council  
BioEnterprise  
Bioscience Association of Manitoba  
Borden Ladner Gervais LLP  
Botaneco  
CanPro Farms Ltd.  
CNSRVX Inc.  
Conexus Credit Union  
Dairy Farmers of Canada  
Dalhousie University  
Embassy of Canada in Moscow  
EMILI Canada  
Farm Credit Canada  
Food & Consumer Products of Canada  
Genome Canada  
Global Institute for Food Security  
Grain Farmers of Ontario  
Innovation, Science & Economic Development Canada  
Intuintu  
InvestEco Capital Corp  
Lakeland College  
Les Producteurs de Bovins du Québec  
Livestock Research Innovation Corporation  
Manitoba Crop Alliance  
McGill University  
McMillan LLP  
MITACS  
National Research Council  
Natural Products Canada  
NorthSpring Capital Partners  
Organisation for Economic Co-operation and Development  
Ontario Genomics  
Ontario Ministry of Agriculture, Food and Rural Affairs  
Perennia Food and Agriculture  
PIC Investment Group  
Prairie Berries Inc.  
Prairie Tide Diversified  
Protein Industries Canada  
Pulse Canada  
Regional District of Bulkely Nechako  
Royal Bank of Canada  
Saskatchewan Barley Development Commission  
Saskatchewan Ministry of Agriculture  
Saskatchewan Ministry of Trade and Export Development  
TD Canada Trust  
Thyagrisson Consulting Limited  
Topigs Nursing Canada Inc.  
UFA Co-Operatives Ltd.  
Université de Montréal  
University of British Columbia  
University of Calgary  
University of Guelph  
University of Ottawa

University of Saskatchewan

VCMx Exchange Inc.

Vineland Research and Innovation Centre

Volker Stevin Canada

WaterSMART Solutions

Western Economic Diversification Canada

Xarvio (BASF)



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