

SUSTAINABLE PROTEIN INNOVATION

Defining the Research Ecosystem in Manitoba



Global demand for protein continues to increase. Rising consumer awareness of the health benefits of adequate protein intake, concurrent with the growing world population and rising wealth in emerging markets, has driven this demand for protein.

The overall sustainability of the full production and utilization cycle is a key challenge facing the protein supply sector. Addressing the multi-dimensionality of sustainability requires a transdisciplinary research approach. Identifying key research opportunities and potential challenges in the protein sphere is critical in positioning Manitoba as a global leader of sustainable protein.

Sustainability, as defined by the Food and Agriculture Organization and World Health Organization², **strives to attain balance across four dimensions:**

1. Place minimal pressure and impact on the environment
2. Promote all aspects of an individual's health and wellbeing
3. Be accessible and culturally acceptable
4. Be economically viable and affordable

Even though dietary guidance has focused on whole food sources of plant protein (e.g. whole pulses), consumers are trending towards plant-based

protein that are produced using plant protein ingredients, including protein concentrates and isolates. Many of these foods are developed as alternatives to traditional animal proteins (e.g. plant-based beverages, patties and nuggets). Canada's Food Guide highlights a shift in the classic food groups with a merger of "meat and alternatives" and "milk and alternatives" into "protein foods".

Although soy dominates the current plant-protein market, there is growing potential for plant protein ingredients derived from canola, hemp, cereal grains and legumes. For instance, while the current focus remains on pressing canola for its oil, the crop has great potential to be used in various other ways in the food industry. The numerous applications of pea protein has gained significant traction and investment in recent years, including its use in the meat alternative and extender category. Manitoba has leveraged its advantages to attract new investments in plant protein processing, and enable plant protein ingredient use in food applications. The province aims to become a leading research and development centre for plant protein extraction, and create new value for producers through crop innovation and value chain collaboration.

Canadians consume approximately 65 per cent of their protein from animal sources. As a long-standing key player in animal protein production, Manitoba is the largest producer of hogs and is the third largest beef-producing province in Canada. Furthermore, meat product manufacturing is the largest food processing industry in the province. The animal protein industry could benefit from research and development on nutritional profiles, sensory appeal and cultural acceptance, all the while reducing environmental footprint and adopting sustainable production practices.



Capturing the Manitoba Protein Advantage

Manitoba has many advantages that make it an ideal location to invest, build and grow protein businesses. The province is well-suited for producing both animal and plant protein, with an economical and sustainable land base and a strong transportation network. Since the release of the Manitoba Protein Advantage Strategy in 2019, the province has attracted investments of over \$650 million in the protein industry and created over 550 new jobs.

The Manitoba Protein Advantage aims to

- Attract investment in both plant and animal protein processing
- Increase production and processing of both animal and plant proteins facilitated by research and development
- Establish specific sustainability targets focused on increasing public trust

Research in sustainable protein is critical to the success of the Manitoba Protein Advantage Strategy. The strategy commits to focus 33 per cent of government research and innovation resources to protein production and processing innovation, facilitate collaboration between researchers and industry, and establish a Research Chair in Protein Innovation at the University of Manitoba. In Manitoba, there is exceptional research expertise and infrastructure in colleges and universities, research institutes, government and industry research/production facilities. This expertise can be well-positioned for both pre-competitive research and for individual proprietary research through the traditional model of sponsored research grants and contracts. Given the multi-dimensionality of challenges and opportunities facing sustainable protein innovation, the potential partners in the innovation ecosystem has grown.

The opportunities for researchers to connect and generate the transdisciplinary research needed to advance innovation in sustainable protein production and processing could be strengthened by:

- Understanding of the available research expertise in the natural sciences, health sciences, social sciences and engineering fields
- Understanding of the research infrastructure available in academic, government, and non-government/industry laboratories
- Establishment of a sustainable protein research nexus needed to facilitate and coordinate connectivity between researchers and industry

This proposal is positioned to advance Manitoba's protein industry, with a focus on sustainability. In considering all elements of sustainability, environmental leadership that leads to economic growth and return on investment is key. Economic viability is highly dependent on consumer confidence in the protein supply chain and acceptability of protein products.

Manitoba is already capitalizing on this opportunity and there is potential for more growth. Enhancing coordination and collaboration aligned with the four dimensions of sustainability will ensure a long-lasting sustainable protein supply chain. The Research Chair in Protein Innovation will collaborate with the Manitoba Protein Consortium and Manitoba Agriculture and Resource Development. We are proposing a phased approach to achieve our goal of enhancing Manitoba's sustainable protein ecosystem.



Phase 1 will focus on developing a sustainable protein research asset map, a strategy for engagement and knowledge translation, and the development of priority research areas in sustainable protein production and processing.

Phase 2 will be driven by the results from Phase 1, with the goal of establishing a research consortium to fund a Research Chair in Protein Innovation.

Phase 1:

The evaluation and mapping of the sustainable protein research ecosystem in the Province of Manitoba

Objectives

- The creation of a research asset map for sustainable protein production and processing, including researcher expertise, available infrastructure and analytical equipment.
- The creation of a knowledge exchange framework for the sustainable protein research community.
- The development of key research questions related to innovation in protein production and processing.

Activities

- Identify “knowledge champions” along the protein food system continuum within each academic, government, non-government and industry setting that can assist in constructing the asset map.
- Establish an Asset Map (Web Portal) of the Research Environment, considering all elements of sustainability.

- Conduct a gap analysis to identify high-priority research areas focused on both pre-competitive and individual proprietary research, through the creation of a Framework for transdisciplinary collaboration, as well as guiding the development of traditional, sponsored research contracts and grants.
- Deliver a Manitoba Protein Research Symposium to share key findings from Phase 1 and host a forum for knowledge exchange for all individuals engaged in this phase.

Note: These knowledge champions will represent the primary production, distribution, processing, economics and marketing, consumer engagement, and nutrient recycling elements of the protein food system, and include expertise drawn from the four dimensions of sustainability. This process will include individual interviews, surveys and focus groups to identify the research expertise, unique equipment and analytical approaches. An in-depth SWOT analysis of Manitoba’s protein industry will complement this process.

Anticipated Results: Phase 1 will lay the groundwork for Phase 2 for the establishment of a Manitoba Research Chair in Protein Innovation. This will provide a nexus for research collaboration and knowledge translation to enable business and industry engagement, leadership and investment in the protein sector in support of long-term economic growth.

Phase 2:

The appointment of a Research Chair to create and lead a nexus for sustainable protein research

Phase 2 will evolve from the **Framework** developed in **Phase 1** and, will establish the research focus and direction for a Manitoba Research Chair in Protein Innovation. This Research Chair will provide leadership to Manitoba’s protein research ecosystem and champion the efforts of translating knowledge, building awareness and promoting protein research expertise, capabilities and achievements.