



NATIONAL RESEARCH STRATEGY FOR CANADA'S POULTRY SECTOR

Prepared as a discussion document by
The Canadian Poultry Research Council

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**NATIONAL RESEARCH STRATEGY
FOR CANADA'S POULTRY SECTOR**

EXECUTIVE SUMMARY

OBJECTIVE

What do we want to do?

Enhance the long-term viability of the Canadian Poultry Value Chain by supporting a profitable and sustainable industry through research

DESIRED OUTCOMES

Where do we want to go?

A national poultry research program that:

- Meets the needs of **Industry, Animals & Consumers**, which pertain to nine overlapping research areas:
 1. Economic viability
 2. Genetics
 3. Food Safety
 4. Animal Health Products
 5. Poultry Health
 6. Poultry Welfare
 7. Environment
 8. Functional and Innovative Products
 9. Poultry Feedstuffs
- Recognizes the need for multidisciplinary research
- Fosters ecological, economic and social sustainability
- Pushes research discovery along **The Poultry Research Value Chain**

APPROACH

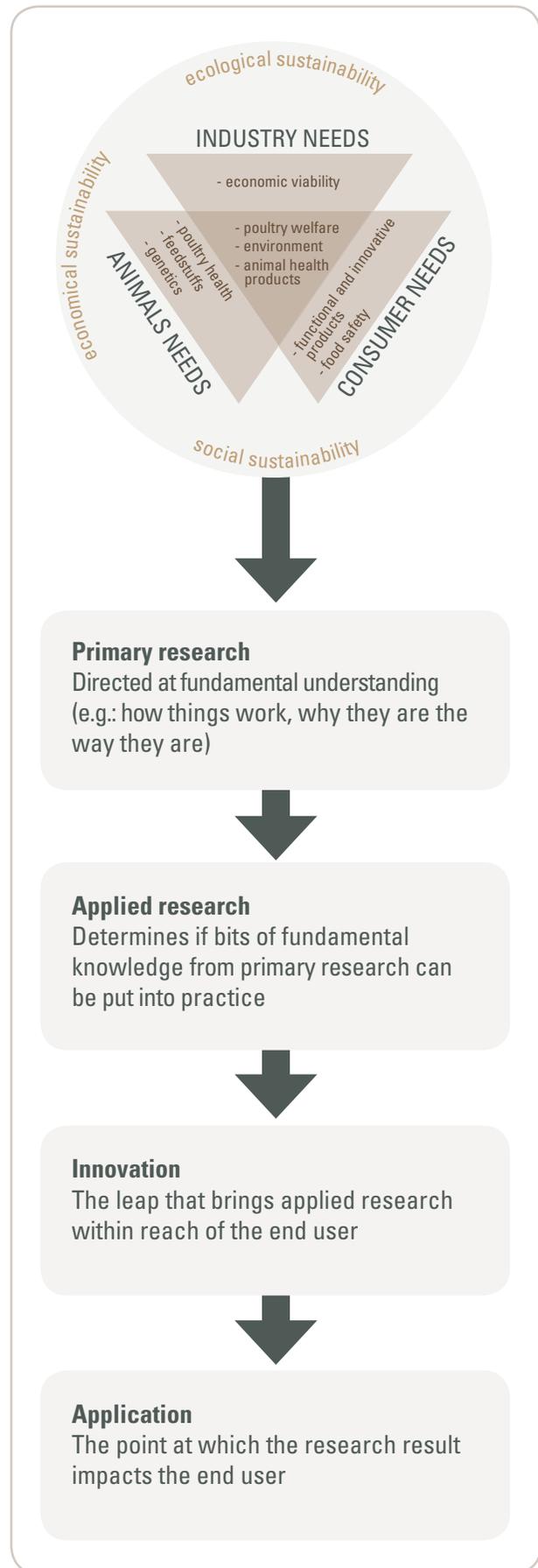
How do we get there?

Develop a strategy that focuses on:

- Coordination
- Cooperation
- Communication
- Efficient management of resources
- Collecting and sharing information
- Fostering commercialization
- Good governance

NEXT STEPS

- Seek input from co-operators
- Develop initial communications strategy
- Develop Terms of Reference for Innovation Committee
- Design and develop poultry research database
- Develop CPRC business/action plan



The National Research Strategy for Canada's Poultry Sector was prepared as a discussion document for Canada's Poultry Sector by The Canadian Poultry Research Council

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1.0 INTRODUCTION

Globally, the poultry sector has been one of the most aggressive in adopting new technologies into its value chain. Advancements include:

- Improved genetic lines
- Capitalization on the benefits of hybrid vigor
- An accurate understanding of poultry nutrition
- The development of comprehensive disease control programs through vaccination and biosecurity
- Improved processing procedures to further assure the consumer of the safest product possible

A long-term commitment to both discovery and applied research will foster future innovations that will sustain the growth and competitiveness of the poultry industry. An effective research strategy will ensure that the dollars invested in research, both public and private, are utilized to maximum effect.

The Canadian Poultry Research Council (CPRC) has prepared this *National Research Strategy for Canada's Poultry Sector* (The Strategy) based on a number of workshops, conferences, discussions with industry members and input from its member organizations¹.

2.0 STRATEGY OBJECTIVES

The objective of The Strategy is to enhance the long-term viability of the Canadian Poultry Value Chain by supporting a profitable and sustainable industry through research. This objective will be achieved by:

1. Ensuring a strong Canadian poultry research community
2. Enhancing the level of innovation and competitiveness of Canada's poultry sector
3. Ensuring that the sector is in a strong position to meet Canadian consumers' demand for healthy and safe poultry products
4. Ensuring a sustainable poultry sector that is economically and socially strong from producer to consumer through research on all aspects of industry sustainability
5. Providing a research framework within which the Canadian industry and its partners can plan for the future

These objectives align with those of the Canadian Federation of Agriculture's (CFA) *National Food Strategy*² which includes the mission: "Canada will be a leader in providing safe and nutritious food ..." (page 3).

The CFA strategy identifies research and innovation as important tools in achieving this mission (page 6):

Farmers, food processors and all members of the value chain will continuously research and innovate to provide the products in demand by Canadian consumers.

This Strategy for the poultry value chain is designed to achieve that goal.

¹ CPRC members include Canadian Hatching Egg Producers, Canadian Poultry and Egg Processing Council, Chicken Farmer of Canada, Egg Farmers of Canada and Turkey Farmers of Canada.

² Towards a National Food Strategy: A framework for securing the future of food, www.cfa-fca.ca/programs-projects/national-food-strategy.

3.0 THE POULTRY RESEARCH VALUE CHAIN

Research and innovation can be viewed as a value chain that impacts stakeholders at each link. The value chain is a continuum from primary research to industry application.



Each stage of the research value chain builds on results from the previous stage.

Primary research is directed at fundamental understanding (e.g.: how things work, why they are the way they are). **Applied research** determines if bits of fundamental knowledge from primary research activities can be put into practice. **Innovation** is the leap that brings applied research within reach of the end user. **Application** is the point at which the research result impacts the end user.

A weak link anywhere along the chain reduces return on investment of the research activity. Factors that impact the efficiency and effectiveness of the Poultry Research Value Chain include:

- Accurate identification of issues facing the poultry industry at all points of the production and distribution system through to the consumer
- Communication of important issues to all parts of the Poultry Research Value Chain so that research and innovation needs are clearly understood by all stakeholders and activities can be targeted to specific outcomes
- Modern research and innovation resources including highly-trained people and physical infrastructure
- Management and coordination (administration) of activities to ensure that resources are used effectively
- Speedy transfer of research and innovation results to the next point on the chain and eventually to the end user so that the benefits of the new knowledge can be applied
- Careful management of funds and balance of activities along the chain

The planning environment for poultry research is complex and changing. Research emphasis has shifted over the years from productivity-related research to include environment, sustainability, new technologies, human and animal health and welfare, and novel products. There are challenges, opportunities and trends that will continue to impact research requirements and a research strategy has to be flexible enough to encompass these changes as they influence the poultry industry.

4.0 USES OF THE STRATEGY

The Strategy will be used by many industry stakeholders to enhance the long-term viability of the Canadian poultry sector.

- The Strategy document will provide researchers with information on which topics are considered to be important by the whole industry
- Government will be able to design programs and policies that support industry-identified research priorities
- Funding organizations will be able to assess new projects and programs in relation to the research priorities identified in The Strategy
- Producers and their organizations, input suppliers, processors and the general public will be able to evaluate poultry research in relation to their interests and priorities

5.0 A SUSTAINABLE POULTRY VALUE CHAIN

Global concern is mounting for the state of the earth and depletion of its resources. Agriculture is often cited as a significant consumer of natural resources and emitter of greenhouse gases.

Sustainability of agricultural practices is interpreted differently by agricultural stakeholders or groups with an interest in agriculture. A definition from the United Kingdom Department of International Development³ provides a comprehensive view of agricultural sustainability. That paper states (page 3):

Current understanding maintains that agriculture is sustainable when current and future food demands can be met without unnecessarily compromising economic, ecological, and social/political needs. This moves beyond interpretations of sustainability based solely on ecological factors and farming systems.

Research is the key to providing sound scientific information for advances in sustainable systems and practices in agriculture. Virtually all factors that impact agricultural sustainability are covered by research activities that address providing poultry products to meet the demand for healthy, cost-effective food produced by birds that are well cared for in an environmentally-compliant production system.

The concept of sustainability is a constant thread throughout the rest of The Strategy. Approaches that support the concepts inherent in the definition require a comprehensive approach to research that encompasses the interests of all parties in the Canadian Poultry Value Chain.

The poultry industry must reach beyond the traditional scope of expertise and develop a multidisciplinary research program that encompasses all interests of the Canadian Poultry Value Chain. These interests can be broadly categorized as needs of the Industry, Animal and Consumer.

This comprehensive approach to research can be found in the *One Health Initiative*, which is defined as "... strategy for expanding interdisciplinary collaborations and communications in all aspects of health care for humans, animals and the environment."⁴ This initiative, a tripartite agreement between the Food and Agriculture Organization (FAO), World Health Organization (WHO) and World Organization for Animal Health (OIE), is designed to bring researchers and innovators together to cooperate to address the animal-human-ecosystem interface.

5.1 INDUSTRY NEEDS

To be viable, the industry must sell product at a profit. All components of the value chain must be profitable to ensure continued success and financial viability. An important component of this viability is that industry must have the confidence of the consumer, which is based on an accurate understanding by industry of the food choices consumers make and ensuring that consumer preferences for poultry products are met. The industry must meet the demands of a growing population and a consumer base that is increasingly interested in niche products and alternative production systems. Innovations in production, technology and management will be required to meet these demands.

Continued success of the poultry industry also requires that it is able to adjust and adapt to emerging challenges. Relocation of production agriculture due to urban sprawl, new disease threats, and a continual shift in industry's responsibilities regarding emergency management, worker safety, extension, research and government regulations must all be addressed if the Canadian poultry industry is to enjoy continued success.

3 *Agricultural Sustainability*, Working Paper of the United Kingdom Department of International Development in collaboration with Jules Petty, Department of Biological Sciences, University of Essex, August 2004.

4 <http://www.onehealthinitiative.com/about.php>

5.2 ANIMAL NEEDS

As an industry, we are obligated to provide the best possible management for healthy, productive flocks by ensuring the best welfare within the production systems employed. Flocks should be protected from metabolic and pathogenic disease, the effects of high performance should be minimized and appropriate conditions should be maintained from chick processing, flock production, transport through to slaughter. These goals require effective management techniques along the production chain and that the bird is genetically suited to the production system in which it is placed.

5.3 CONSUMER NEEDS

Canadian consumers want to choose from a wide range of healthy, tasty products at a reasonable price. They demand that the food production system is safe and want proof that their food was produced in a socially-responsible manner. Animal welfare, environmental stewardship and traceability are issues that continue to move to the forefront of consumer concerns.

As illustrated in the diagram to the right, Industry, Animal and Consumer needs are inter-related and pertain to a number of overlapping research priority areas. This overlap points to the need for multidisciplinary research, an approach to address the increasingly complex issues faced by the poultry industry. Within this system, it is industry's responsibility to clearly articulate to the research community what problems need to be addressed. Researchers will respond by forming teams with the appropriate expertise necessary to solve problems. Such a system will mesh poultry science with food safety, public health, biomedical sciences, crop science, economics, social science, or any other fields of expertise necessary to address the

issues of the day.

6.0 APPROACH TO STRATEGY DEVELOPMENT

The approach to strategy development is to identify the desired outcomes of Canada's poultry research programs, with a view to meeting the needs of the industry, animals and consumers. Articulating desired research outcomes or "destinations" will focus the research community on assessing what work needs to be done to reach those destinations. This focus will create momentum and maintain direction towards each destination.

Success of this approach requires that the appropriate destinations are identified. Development of this Strategy, therefore, involved stakeholders from across the country representing industry, government and academia providing input during a number of meetings on desired outcomes and methods for achieving them. These stakeholders recognized the need to develop a strategy that is focussed on destinations, yet flexible enough to adapt to emerging challenges.

There must be balance between industry's desire for quick research application and the need for discovery research that will reveal tomorrow's destinations. The Strategy is a living document that will be continually re-assessed to ensure it meets the current and future needs of the Canadian poultry industry.



7.0 CANADIAN POULTRY RESEARCH DESTINATIONS

The following sections outline major issues relating to each of the main research priority areas and specify industry-identified desired outcomes or “destinations” of the related research programs. It is the vision of these destinations that will focus and direct future poultry research in Canada. However, there are overarching goals that bridge all aspects of poultry research and are critical to successful results. These include:

- Accurate information is available upon which decisions can be made at all levels of the value chain. This information must be available in a form that is relevant to, and understandable by, the end user.
- Poultry research must bring together researchers from traditional and new fields of study in multidisciplinary teams to support a sustainable poultry industry. Interdisciplinary research must become an integral part of our research efforts to ensure comprehensive research results and efficient use of resources.

7.1 ECONOMIC VIABILITY

Industry profitability is critical to a long-term, sustainable Canadian Poultry Value Chain. This encompasses a wide range of economic activity, including reducing production and processing costs, increasing input effectiveness, ensuring maximum productivity at each stage of the value chain balanced by incorporation of societal needs, and a solid understanding of consumer attitudes and expectations related to the poultry products they consume. Resources, including feed, labour, and energy inputs such as fuel, fertilizer and electricity, must be used efficiently to be profitable.

Industry Goal	Ensure all levels of the poultry industry are profitable over the long term
Research Target Outcomes	<ul style="list-style-type: none"> • Enhance revenue through continued consumption growth, both total and per capita • Control and reduce costs at all points in the production system

7.2 GENETICS

Genetic issues and opportunities encompass most of the other classifications discussed in this section; therefore, outcomes identified in this area of research are broad. Specific genetic outcomes associated with other areas of research are identified within those sub-sections.

A major issue faced by all agriculture is the loss of genetic diversity within the gene pools of the agricultural products produced. Preserving beneficial genetic traits is a risk management tool in case of unexpected challenges, such as an acute disease outbreak. With the advent of more sophisticated methods of gene identification for specific traits, gene preservation also maintains the potential for new discoveries related to currently unimagined new, desirable and/or marketable characteristics. The poultry sector also faces a narrowing genetic foundation on which commercial poultry flocks are built. The diversity of genetic material is constantly being challenged due to economic pressures and increased selection intensities. Some steps have been taken to investigate methods of preserving the genetics of previous poultry strains so that their specific, preferred characteristics are not inadvertently lost; however, more must be done to manage the risks associated with a narrowing genetic base.

The growing fields of bioinformatics, genomics and proteomics represent significant scientific opportunity for the poultry sector. A greater understanding of the molecular basis of phenotype promises to expand the horizon of desirable traits and mitigate the effects of deleterious ones.

Industry Goal	Protect and enhance beneficial genetic traits to the benefit of the poultry industry, poultry, consumers and society
Research Target Outcomes	<ul style="list-style-type: none"> • Beneficial genetic characteristics are preserved so that there is ready access to diverse genetic material • Poultry research uses the most effective and current genetic tools to support poultry industry sustainability

7.3 FOOD SAFETY

Canadians expect and deserve a safe food system. Canada has one of the safest poultry value chains from the producer to the consumer of any poultry sector worldwide. Maintaining this level of food safety for the Canadian consumer presents ever-changing challenges that must be anticipated well in advance. Protecting the poultry value chain, as it extends from the parent flock through production and processing to the consumer, from pathogens that may cause human illness is a fundamental issue with constantly evolving challenges.

Industry Goal	Continue to provide safe food and maintain consumer confidence in light of emerging issues
Research Target Outcomes	<ul style="list-style-type: none"> • Reduce the incidence of poultry-related pathogens (e.g. campylobacter, salmonella, E. coli, Listeria, emerging issues) • Consumers recognize that poultry products are safe • Benchmark, improve and validate food safety programs, including biosecurity

7.4 ANIMAL HEALTH PRODUCTS

The poultry sector currently uses antibiotics to treat bacterial diseases and sub-therapeutically for disease prevention. There is increasing pressure from consumer groups to reduce antibiotic use in poultry because of fears of antibiotic resistant bacteria. Research must define the prudent use of antibiotics and explore innovations that will provide the poultry sector with an array of alternative methods with which to combat disease and optimize flock performance.

Industry Goal	Continue to promote the prudent use of antimicrobials and reduce their use where possible. Increase the use of alternatives to antibiotics
Research Target Outcomes	<ul style="list-style-type: none"> • Understand the link between the use of antimicrobials in the poultry industry with emergence of bacterial resistance in animals and humans • Understand the mechanism of resistance to antimicrobials • Development of evidence-based mitigation procedures/tools related to the use of antimicrobials based on: <ul style="list-style-type: none"> ○ International lessons ○ Effect of currently used antimicrobials on gut microflora, emergence of resistance and avian immunity • Alternatives to currently used antimicrobials • Understanding of the impact of alternative production systems and genetics

7.5 POULTRY HEALTH

A healthy national poultry flock is vital to the viability of the industry. Canadian poultry stakeholders must regularly address the presence and evolving nature of disease-causing organisms and must be ready for any disease outbreak that could put Canada's poultry populations or human health at risk. Research will be required to develop improved disease prevention and control strategies.

Innovations in poultry health will not only benefit the health of Canada's poultry flocks, but could also create opportunities for development of intellectual property in Canada's allied animal health sector.

Industry Goal	Continue to enhance poultry health while reducing the possibility, and mitigating the effects of, severe disease outbreaks in Canada's poultry flocks
Research Target Outcomes	<ul style="list-style-type: none"> • Improve and enhance programs to maintain and enhance poultry health • Safe and effective use of alternative approaches to ensure poultry health • Stronger poultry immune systems through research on genetics, nutrition, etc. • Prepared for catastrophic disease outbreak (including bird depopulation and disposal) • Development of effective vaccines for use in poultry (e.g.: necrotic enteritis, salmonella, avian influenza) • Understand how diseases spread and predict their future occurrence • Understand impact of high performance on poultry health and sustainability of various production systems

7.6 POULTRY WELFARE

Canadian consumers expect poultry to be produced, transported and processed under humane conditions. A comprehensive poultry welfare program requires expertise not only in behaviour, but also in animal health, genetics, nutrition, and management.

Ongoing research and innovation is required to ensure that the Canadian poultry sector is at the forefront of poultry welfare. This research must be based on sound science and examine all of the production factors that affect a bird's well-being, including housing, lighting, feed and water delivery. Poultry welfare should be considered throughout the entire value chain from the parent flock through production to harvest and must take into account the uniqueness of Canadian climatic conditions and geography.

Industry Goal	Enhance existing and develop new science-based production systems and strategies to further improve the well-being of Canada's poultry flocks and maintain consumer confidence and trust
Research Target Outcomes	<ul style="list-style-type: none"> • Safe and effective use of alternative approaches to ensure poultry welfare at all levels of the complex poultry production chain • Understand the link between genetic selection and poultry welfare • Methods to identify and humanely euthanize birds with undesirable characteristics • Identification of science-based management practices and tools for: <ul style="list-style-type: none"> ○ Maintaining appropriate conditions throughout flock production, catching, transport and slaughter ○ Determining humane endpoints for sick or injured birds and euthanasia techniques ○ Morphological alterations ○ Transportation and handling in all sectors ○ On-farm harvesting techniques • Understand links between productivity and welfare, including the relationship between production system (e.g.: cage design, housing), genetics and high productivity

7.7 ENVIRONMENT

Canada's poultry value chain has made significant progress in reducing its environmental footprint and in providing better environmental conditions for both the birds and the people who work with them. A recent study⁵ found that chicken and egg production has the smallest carbon footprint of any Canadian livestock industry.

Significant challenges continue to emerge, however, as we better understand the environmental impact of day-to-day poultry production practices and potential emerging requirements for such things as the disposal of birds to control a disease outbreak. The complexity of factors that affect air quality in production units is garnering more attention in relation to the well-being of poultry workers and the birds themselves. Reducing the environmental footprint of poultry manure and other waste materials from the poultry production and processing system may include innovative, value-added products and modifications to poultry diets. As an example, the disposal of offal from processing plants presents both challenges and opportunities.

Industry Goal	Minimize the effects of poultry production practices on birds, humans and the environment, and encourage sustainability
Research Target Outcomes	<ul style="list-style-type: none">• Mitigation approaches to improve housing environment impact on humans, birds and the environment from poor ambient air quality, emissions of ammonia and particulate matter, waste materials, leachates, pharmaceutical residues, greenhouse gases, etc.• Improved waste management systems at all levels of the poultry production system• Reduce clean water consumption during processing• Understand relationship between production practices (e.g.: location, geography, bird density, biosecurity practices) and environmental impact• Develop alternative energy and other techniques to utilize poultry by-products and ensure that there are no unused carcass components

7.8 FUNCTIONAL AND INNOVATIVE POULTRY PRODUCTS

Most poultry food products are developed by value chain partners downstream from primary producers. However, poultry producers are interested in this area of research because the industry as a whole benefits when new products that increase and sustain consumption of poultry are offered to consumers. Also, research into primary production, particularly related to nutrition, can enhance the ability of processors and distributors to satisfy consumer needs.

Poultry nutrition is a precise science. Highly-specialized feeding regimes have evolved to meet specific requirements for different species at different life stages in the production cycle. Thus, the link between what birds eat and the functional value of their products has the potential to yield a wide variety of functional foods that will enhance the health and well-being of Canadians.

Perhaps the best known example of poultry-derived functional foods is omega-3 eggs. Each 50-gram omega-3 egg contains 400 mg of omega-3 fatty acids, which has beneficial impacts on health. Research is now underway on cost effective methods to deliver omega-3 fatty acid benefits to consumers through the chicken and turkey meat they consume.

5 J.A. Dyer, X.P.C. Vergé, R.L. Desjardins and D.E. Worth, 2010. "The Protein-based GHG Emission Intensity for Livestock Products in Canada." *Journal of Sustainable Agriculture*, 34:618-629.

Enhancement of poultry products with omega-3 fatty acids is only one example of industry's move toward product differentiation. A focused research effort based on innovation and technology will yield new functional foods with unique properties and additional uses for poultry by-products to the benefit of both industry and consumers.

Industry Goal	Develop functional and value-added products that enhance the health and well-being of Canadians, meet niche market demands, utilize by-products and support industry sustainability
Research Target Outcomes	<ul style="list-style-type: none"> • New functional foods to sustain and enhance the Canadian poultry production system • Develop non-food uses for by-products • Value-added products from poultry • Developing innovative new foods

7.9 POULTRY FEEDSTUFFS

Across Canada's poultry sector, feed is by far the largest part of the cost of production. Depending on geographic region, Canadian poultry rations are based on corn, soybean, wheat or canola. Increasing demand for grains for human consumption as the world population expands and demand for bio-ethanol products from traditional feed grains will continue to put pressure on the availability and price of feed grains for poultry diets.

Canada's poultry sector must characterize and develop alternative feedstuffs through a focused and innovative research program. This program should include cost-benefit analyses for grains produced in Canada and innovative approaches to enhancing the utilization (efficiency) of these grains. The poultry sector must also work with the grain sector to develop new and/or improved grain varieties for Canada's poultry sector, which will also benefit Canada's grain sector if new and/or improved varieties which are developed can be sold on world markets.

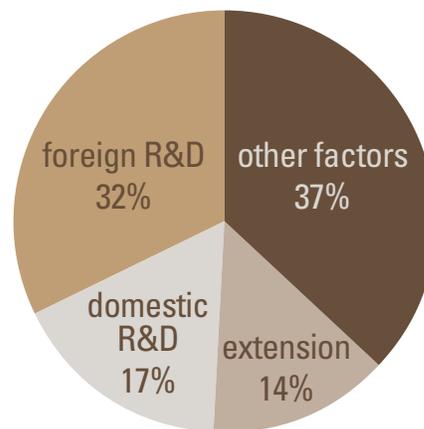
Industry Goal	Enhance and improve feedstuffs/systems for poultry flocks across Canada
Research Target Outcomes	<ul style="list-style-type: none"> • Determine suitability (e.g.: nutrition, economics) of alternative feed ingredients and additives. • Determine cost effective poultry feeding strategies • Feed inputs targeted toward particular market characteristics (e.g.: health)

8.0 APPROACH TO ACHIEVING RESEARCH GOALS

This Strategy is designed to provide a clear, strong vision of industry goals and research objectives and an organized approach on behalf of industry to support their achievement. The Strategy will provide our value-chain partners (e.g.: researchers, government) with a basis upon which they can plan their activities to achieve both industry's and their own goals. This approach emphasizes cooperation and communication among all stakeholders in the research value chain.

For a variety of reasons, there is always pressure to concentrate funds at one or another point in the research value chain. Some believe that we can import primary and applied research from other countries but this position ignores the reality of Canada's geography and weather patterns, as well as the significant changes that we have seen, and continue to see, in our demographics. Alternatively, a concentration on primary and applied research will block or slow the adoption of research discoveries and the resulting economic and social benefits that research is designed to create.

Productivity Growth Factors



However, it is important for the Canadian poultry value chain to use research conducted in other jurisdictions to enhance the efficiency of Canadian research and innovation activities and maximize the return to research investment. A 2011 Australian government study⁶ found that research and extension are the main drivers of increases in broadacre⁷ total factor productivity, representing up to two-thirds of the influences on improved productivity. The above chart breaks those factors into extension, domestic research, foreign research and other factors. The results of the Australian study clearly show the benefit of a strong domestic research establishment that incorporates the results of research from other countries and ensures that discoveries are adopted through a comprehensive outreach program (i.e.: extension).

While there are many stakeholders in the Canadian poultry research value chain, a common refrain at various workshops and meetings has been that the CPRC should form the hub of activities necessary to make The Strategy work. CPRC's Board of Directors and five member organizations take this mandate seriously. This section discusses the approach to achieving these results based on input from a number of workshops and meetings and individual discussions with industry stakeholders.

6 Sheng, Yu, J.D. Mullen and A. Davidson, *Public Investment in Agricultural R&D and Extension: an Analysis of the Static and Dynamic Effects on Australian Broadacre Productivity*, Grains Research and Development Corporation, Australian Bureau of Agricultural and Resource Economics and Sciences, September 2011.

7 Broadacre production includes non-irrigated crops, beef and sheep.

8.1 COORDINATION, COOPERATION AND COMMUNICATION

Canadian investment in research and innovation by the primary poultry production sector is estimated at more than \$2-million annually. This investment is delivered through national (i.e.: CPRC and member organizations) and provincial industry organizations. While there is informal coordination and communication of these research activities, a more formal system of harmonizing research funding and technology transfer is needed to maximize research investment efficiency and returns.

Effective coordination will depend on the willingness of all industry funders to cooperate. Cooperation does not require that various industry organizations give up their funding independence, forego their individual research focus or compromise competitiveness. An approach to research coordination and cooperation will be designed to reduce the possibility of duplication, ensure that projects reflect other work that may be ongoing or completed through other funding agencies, and balance funding along the research value chain so that all types of activities are adequately supported.

Poor communication leads to misunderstandings, delay, inefficiency, and missed opportunities that reduces the return to investments in Canadian poultry research. An effective communication system for the Canadian Poultry Research Value Chain will link stakeholders through interfaces that are most effective for their specific needs, qualifications and objectives and that take into account the complexities of the system so that all components work together to ensure strong multi-directional information transfer.

CPRC will take the lead in ensuring that industry research activities are coordinated through development and maintenance of a database of past and present research projects and results (see Section 8.4), organizing periodic meetings

to review research focus and priorities, and supporting efforts to leverage industry investment from other funding sources.

CPRC, in cooperation with other stakeholders, will assess present communications resources and develop a system that effectively and efficiently supports the Canadian poultry research value chain. CPRC will also take steps to engage the federal government to ensure efficient communication and coordination with funding sources and research policy interests to address common issues.

8.2 CLUSTER VERSUS PROJECT RESEARCH

The "Cluster" approach to science, which emphasizes collaboration and efficient use of resources, is widely supported by government and others in the research community. A science strategy that brings together multidisciplinary teams, or "clusters" of scientists, to solve complex problems is an effective way to create synergies in research efforts and it is a way to make the most of available resources. A cluster approach may make it easier to create collaboration within and across disciplines because of the inherent aspect of looking at broader research questions encompassed by research cluster programs. Clusters facilitate cooperation between poultry researchers and other types of research that have developed new techniques and technology (e.g.: genomics) that can provide new lines of investigation for the poultry sector.

The poultry industry is presently supporting a Poultry Research Cluster funded by Agriculture and Agri-Food Canada (AAFC) under the Canadian Agri-Science Cluster Initiative section of the *Growing Forward* program, industry and other provincial funding sources. This research program has guaranteed funding until March 2013. Another example of a cluster approach is the *Canadian Virtual Centre for Poultry Welfare* located at the University of Guelph, which was established under an agreement between AAFC, University of Guelph,

the Poultry Industry Council (PIC) and CPRC. Centre research and educational activities are based on cooperation among national and international government and university researchers. Its close cooperation with University of Guelph's *Campbell Centre for the Study of Animal Welfare* creates the opportunity to leverage additional resources and knowledge relevant to poultry welfare issues.

However, a good strategy maintains flexibility to respond to developing issues and addresses research questions that may not easily fit into a research cluster. Project research will continue to be important to react quickly to developments (e.g.: disease outbreaks) and will also be necessary to adapt the results of other research to specific regional characteristics, such as weather and market variation. Funding for individual projects will remain an important part of the ongoing poultry research environment.

8.3 RESEARCH FUNDING AND RESOURCES

Research funding is being challenged by austerity measures at various levels of government. This makes it incumbent upon the Canadian poultry research spectrum to maximize the funds that are, or may be, available and to ensure that those funds are invested efficiently and effectively. The Canadian poultry industry can achieve the most immediate and significant increase in returns to its research investment by improving the efficiency and effectiveness of the speed with which discoveries move along the research value chain to the end user.

Virtually all meetings of poultry research stakeholders over the past decade and longer have lamented the loss of Canadian poultry research resources, including researchers and modern research facilities, as a result of funding challenges as governments and universities struggle to balance declining revenue with increasing costs.

Researchers not only conduct research that leads to improved knowledge and practices, but are a repository of information about research being conducted in other countries and within potentially related disciplines that can be adopted by, and adapted to, the Canadian poultry industry. However, researchers need to be replaced as some retire and others seek opportunities in other jurisdictions. Students have to be exposed to and interested in the poultry sector and a career based on Canadian poultry research to replace departing researchers. Novel approaches need to be designed to attract students to poultry to maximize the impact of limited financial resources (e.g.: recruitment, co-operative education, mentorship).

Modern research requires modern facilities including laboratories, equipment and buildings that can be adapted to a variety of research investigation. Much of our present equipment and facilities are old and need to be upgraded or replaced, while others are idle because of funding shortfalls. Can Canadian researchers cooperate with researchers from other disciplines to access specialized infrastructure resources? What dedicated poultry-research resources need to be provided and maintained?

The Canadian poultry industry will take all feasible steps to ensure that the *National Research Strategy for Canada's Poultry Sector* is implemented and that the Canadian Poultry Research Value Chain operates at peak performance. In addition to maintaining funding for poultry research, industry will continue to make a strong business case to existing and potential investors for continued and enhanced poultry research funding.

Industry will lead a dialogue with government and universities to assess present resources, gaps and opportunities designed to ensure the most effective Canadian Poultry Research Value Chain possible. This dialogue will challenge all those involved to realistically evaluate past

and present practices and develop a plan of action to ensure that resources are available to meet our national and regional research needs and goals.

CPRC will take the lead on industry's behalf in engaging potential funding partners, both traditional agricultural and funders with other interests (e.g.: health, environment), early in the process of initiating The Strategy to identify common interests and areas of cooperation. The action plan that will be developed to take The Strategy forward (Section 8.6) will include a strong focus on ensuring adequate resources are available and that they are used efficiently.

8.4 INFORMATION COLLECTION AND DISSEMINATION

Research is targeted to generating information through discovery and must be available to those that need and use the results of research activities. Thus, research results must be collected and disseminated to be of value. Many of those that want to use research results or identify gaps in poultry research must conduct exhaustive searches to determine if the information they need is available. This situation is inefficient and can lead to duplication of research that may have been completed, or is presently being conducted, within or outside Canada.

An effective information collection and dissemination system would include information on:

- Canadian and international poultry research both completed and under investigation through ongoing research
- Canadian poultry research resources both human and physical
- Contact information and links to national and international research resources, including institutions, scientists, funding sources, government, and industry organizations

Much of this information is presently available from a number of resources; however, there are gaps that have been identified in workshops and meetings and no single source is available to access or link all of the information needed for a comprehensive information system.

The Canadian poultry industry will work with other stakeholders to identify the components of, and develop, a comprehensive information collection and dissemination system and will support its maintenance as required.

8.5 COMMERCIALIZATION AND EXTENSION

Commercialization of discoveries to enhance stakeholder sustainability by protecting and enhancing existing markets, developing new opportunities, reducing costs and increasing productivity is a critical part of maintaining a sustainable Canadian Poultry Value Chain. The concept of commercialization can be extended to the adoption of results that address societal concerns regarding environmental, food safety and animal welfare issues because they address the credibility of industry and the food system.

Agricultural extension as it relates to research traditionally applied to direct involvement with primary agriculture on production methods. More recent concepts expand this definition beyond the primary producer to the larger value chain so that it "... operates within a broader knowledge system that includes research and agricultural education."⁸ Extension is viewed as an important part of the three pillars (i.e.: research, education and extension) that promote learning and adoption of new research discoveries.

If technology of interest emerges, industry must actively help move it along the innovation continuum to adoption. Discussion with industry and researchers has identified potential extension opportunities

8 Rivera, W.M., M.K. Qamar and L. Van Crowder, "Agricultural and Rural Extension Worldwide: Options for Institutional Reform in Developing Countries", Food and Agricultural Organization of the United Nations, November 2001, Page 7.

that could address research challenges and help spur adoption. These include:

- Collaboration between industry and researchers to identify commercial farms on which discoveries in controlled research environments can be tested
- Regional or provincial demonstration farms that could be used both to test preliminary results and demonstrate the effectiveness of new approaches, discoveries and technologies to producers and other industry stakeholders – these farms could also be used as an educational tool for both the industry and general public
- Development of risk mitigation tools (e.g.: insurance, compensation) for farmers and other commercial portions of the poultry value chain to enhance opportunities for testing preliminary results in a commercial setting

The above are only a few of the potential commercialization and extension approaches that could accelerate development and adoption of research and innovation discoveries. CPRC, in cooperation with other stakeholders, will take the lead in establishing a standing Innovation Committee, representative of the Canadian Poultry Value Chain, to identify and investigate the potential of a full range of extension activities designed to further develop and commercialize discoveries. Investigations will be comprehensive and will identify financial, logistical, resource and liability issues and methods for addressing challenges and developing opportunities.

8.6 GOVERNANCE, ADMINISTRATION AND SUPPORT

Achieving cooperation across a wide range of stakeholders requires a governance structure for The Strategy that provides research participants with the confidence that they are being adequately represented. Industry needs to know that their issues are being addressed, particularly if they are committing resources to research efforts, whether those resources consist of funding or time commitments. Strategy governance systems need to include representation from a broad range of stakeholders. While CPRC will provide administration and support for The Strategy, those involved in Strategy governance will need to provide input and ideas for moving The Strategy forward. CPRC will seek input from industry stakeholders on the most representative, effective and efficient approach to governance and coordinate the governance organization's formation and activities as required.

A research system is complex and administratively onerous, particularly when communications requirements are considered. However, CPRC's member organizations have taken steps to enhance the organization's resources as a first step to CPRC taking a more active role in research coordination, communication and funding.

CPRC's Board of Directors and member organizations believe that CPRC is well placed to deliver a variety of services and support to the Canadian Poultry Research Value Chain. In addition to the actions identified in the previous sections, these services and support include, but are not limited to:

- Prepare a business/action plan to deliver The Strategy. This plan will include a detailed work plan with responsibilities, timelines and estimated costs for the actions identified in The Strategy.
- Survey industry funding organizations to determine their research objectives and resources.
- In cooperation with national and provincial poultry organizations and funders, design a system to support research initiatives of provincial and regional industry organizations based on local funding opportunities that will help address issues of specific geographic interest.
- Develop a system to evaluate poultry research effectiveness. CPRC is conducting an evaluation of its funding and organizational effectiveness over the past decade based on quantitative and qualitative factors and this approach will be used internally in future. The CPRC evaluation system may be a valid approach to a broader, ongoing poultry research evaluation system for the Canadian Poultry Research Value Chain.

- Maintain the National Research Strategy: A good strategy is a “living document” in the sense that it is regularly revisited to ensure that its components remain relevant to the industry as the business and social environment within which the industry exists changes. CPRC will establish a system of regular reviews of the research strategy in which stakeholders will be consulted as part of the review process. The Strategy will be updated and amendments circulated to value chain members after each review.

9.0 NEXT STEPS

The business/action plan will include longer-term initiatives but it will take time to develop and review that document with stakeholders. However, there are short-term steps that are precursors to actions that will take longer to initiate and develop and that can be started pending completion of the business/action plan. Some of these activities will provide valuable input to the business/action plan. Next steps include:

- Seek input from research funding organizations and other industry stakeholders on the structure and terms of reference for a research governance structure for application of The Strategy and poultry research system
- Develop an initial communications strategy to inform stakeholders of The Strategy and to keep them informed of developments as the first stages are implemented
- Consult with industry funders to gather information and discuss cooperation and coordination
- Make initial contact with non-industry funding organizations to open lines of communication
- Develop a proposed structure and terms of reference for the Innovation Committee
- Begin design and development of the database discussed in Section 8.4, which includes a survey of research resources

10.0 CONCLUSION

The Canadian poultry industry has benefited from research and innovation discoveries and continues to do so. A coordinated, efficient and effective National Research Program will yield significant returns to investment and further enhance the positive impact of research and innovation on the sustainability of the Canadian Poultry Value Chain.

Canadian poultry research faces challenges but these can be overcome if all members of the research community work together. The Canadian poultry industry recognizes the value of poultry research and is committed to enhancing the impact of the Canadian Poultry Research Value Chain by supporting a strong, vibrant research system nationally, provincially and regionally.