Canada's agriculture and agri-food sector is under pressure to adapt to a changing economic landscape

• Demand for agriculture and agri-food products is projected to grow at a rapid pace:
  - Growing population and income levels will drive much higher demand for food, fiber and fuel
  - Demand for fuels with lower GHG emissions will lead to increased interest in bio-energy options and demand for agricultural crops
  - Innovations in bio-based processing, propelled by environmental concerns, further contribute to demand for agricultural products

• Rate of growth in agricultural production may not be able to keep up with demand growth:
  - Global resource constraints, particularly water and arable land, is a challenge to global capacity to meet increasing demand for feed, food, fuel, and fibre
  - Breakthrough technologies, such as genetic engineering, could ease these constraints—however, public acceptance is a concern, especially for foods

• Uncertainty about the ability of the global agriculture system to meet these demands has raised food security as a critical global policy issue

• Abundant natural resources and a skilled workforce have been keys to Canada’s success, but there is a need to continuously adapt and innovate to remain competitive and sustainable
Growing Forward 2 provides an integrated approach to respond to economic challenges

• GF2 represents a renewed focus towards achieving:
  - competitiveness in domestic and international markets
  - a sustainable and adaptive sector

• **Innovation** and **Infrastructure** have been identified as the two main drivers that will contribute to strategic outcomes

• As a driver, **innovation** would
  - foster competitiveness through improved productivity, market development and adoption of new business models
  - enable sustainability and adaptability via new products or processes that mitigate risks, diversifies production or improves environmental performance
As a key policy driver, innovation is part of the strategy to advance a modern and sustainable sector

- FPT Ministers have recently agreed to three main policy objectives that will foster innovation:
  - Sustained commitment to public research and development;
  - Improved collaboration/partnerships among key institutions
  - Increased private sector leadership and investment

- To achieve these objectives, proposed GF2 innovation priorities are to:
  - Conduct basic, far-from market research that benefits the sector and Canadians
  - Collaborate on applied research to increase private sector capacity and investment
  - Encourage knowledge diffusion, transfer and adoption
  - Increase commercialization of innovation
  - Create an environment conducive to innovation

**Innovation in the agriculture, agri-food and agri-based products sector is a process that generates new knowledge and develops or adapts new or improved products, processes or practices that are implemented or adopted to add value to farms, firms or the sector.**
As a result, innovation has become a high priority research area

• To further the policy dialogue, a better understanding of innovation is needed in agri-based producing, processing and supporting industries.

• Areas where the policy discussion has been focused recently include:
  ❖ The role of the broader enabling environment
    - Factors affecting investment capacity and the balance between public and private investment
  ❖ Factors driving innovation; factors driving the adoption of new technologies, practices and business models
    - the nature and extent of new products, processes, practices and technologies being developed
    - how these contribute to productivity, sustainability
    - characteristics of firms that innovate/adopt and those that don’t
  ❖ The current regulatory structure and Intellectual Property Rights (IPRs)
    - The factors influencing commercialization
    - Consumer attitudes towards new technologies, products and processes
    - Opportunities and challenges in food and health
  ❖ Opportunities and challenges in the bio-economy - biotechnology, bioproducts and biofuels
The broader enabling environment includes taxes, fiscal policy or other factors that influence competitiveness

- **Current analytical activities include:**
  - Support investment in scientific research and development, and where required, be the provider
  - Enable access to the best research including through collaboration
  - Help to improve coordination in the innovation system, by enabling diffusion, adoption and commercialization
  - Better communicate the opportunities in the agricultural sector and potential to address national and global priorities
  - How can governments assist with reducing risk
  - Better understand research and science capacity through the development of an inventory of R&D activities in the agriculture, agri-food and agri-based products sector (Science Scan)

- **Areas where further analysis is needed include:**
  - Identification of market failures
  - Analysis of the relationship between private and public R&D, analysis of the returns to R&D and how this could be used to target federal resources
  - What is the best mix between public and private investment?
  - What institutional arrangements, partnerships or funding models can be used most effectively to encourage investment?
  - What federal policies help or hinder investment and how can they be improved?
  - What are the features of enabling governments in other countries and how can their successes be adapted in Canada?
Factors driving innovation and adoption are of particular interest to policy makers

• **Current analytical activities include:**
  - Adoption of Best Management Practices (BMP) in various forms (no till, environmental G&S) and the characteristics of farms who adopt versus those who don’t
  - Nature and extent of innovation in agriculture and food processing
    - Characteristics of innovators and non innovators
    - Analysis of business innovation surveys – SIBS, survey of advanced technology, bioproducts, functional foods and natural health products (2012)
    - Benchmarking Innovation in Food and Beverage Processing – Canada/Europe comparison
  - Departmental Strategic Plan for Innovation – provide strategic direction; indicators; performance strategy for programs

• **Gaps in this area include better understanding of:**
  - Adoption and impact of various forms of farm technology or business practices and characteristics of producers
  - Adoption and impact of various forms of technology in the retail, wholesale, and transportation sectors of the agri-food system
  - Nature of the relationship between research, extension, education, and infrastructure and the magnitude of their effects on productivity
  - Returns to research and innovation in terms of profitability and sustainability
  - Impacts of regulations on output growth and market opportunities
  - Indicators for performance measurement of innovation activities and outcomes at the farm level
  - Better understanding of which firms innovate and why – what factors drive or impede innovation and are innovators more profitable
  - Identifying what technologies/science advancements are working and which ones are not
The impacts of the regulatory environment are probably the least understood policy area

• **Current analytical activities include:**
  - The role of Intellectual Property Rights and Institutional arrangements on innovation in agriculture
  - The costs and benefits of health claims and other regulations (transfats, sodium) on the health of Canadians and the performance of the sector
  - Impacts of the U.S. food safety modernization act in Canada
  - Impacts of private standards on competitiveness of the sector

• **Analysis that would fill gaps in the policy development process:**
  - Issues and challenges in food and health regulatory environment – health claims
  - Factors affecting commercialization
  - The role of regulations in the development of private standards for sustainability and other quality attributes
  - Consumer perceptions, regulations and their impact on the development of new products and processes in agriculture and food (irradiation, GE wheat, FFNHP)
The bio-economy - biotechnology, bioproducts and biofuels – presents new market opportunities but at high risk

• Current analytical activities include:
  - Paper on issues related to co-existence of GM and non-GM grains (Departmental working group)
  - Ongoing analysis of results of Bioproducts survey 2009
  - Departmental working group on bio-economy strategy

• Analysis that would fill gaps in the policy development process:
  - Better understanding of the economics of co-existence of GM & non-GM grains
  - Continued analysis of potential impacts of the introduction of GM wheat
  - Assessing the role of patents and other forms of IPR in providing incentives in biotechnology
  - Exploring the role of regulation on biotech investments
  - Assessment of Bioproduct Opportunities (i.e. scientific challenges, feedstock availability, economic analysis, change in GHG emissions, etc.)
  - Coordination along non-traditional value chains


ANNEX:
Examples of recent economic studies on innovation by RAD Staff

• Innovation in Food and Beverage Processing: Results from the 2005 Survey of Innovation (2008)
• Understanding the critical conditions for successful commercialization: The case studies of innovations in Canadian food beverage processing (2009)
• Characteristics of Successful Farms: Managing for Success Is Not the Same for Everyone - Evidence from Grain and Oilseed Farms in Canada (2010)
• Innovation in the Canadian Food Processing Industry: Evidence from the Workplace and Employee Survey (2011)
• Results from the 2007 Survey of Advanced Technology (2011)
• Intellectual Property Rights and Institutions (2011)
• Constraints on Canadian Food Processing Firms' Ability to Compete: Evidence from the 2004 Survey on Innovation in the Food Processing Industry (2011)
• Results from Statistics Canada’s 2009 Bioproducts Development and Production Survey (2011)
• Understanding the factors that contribute to long term success of Leading Edge Producers (2011)