Chapter 1

Overall assessment and recommendations

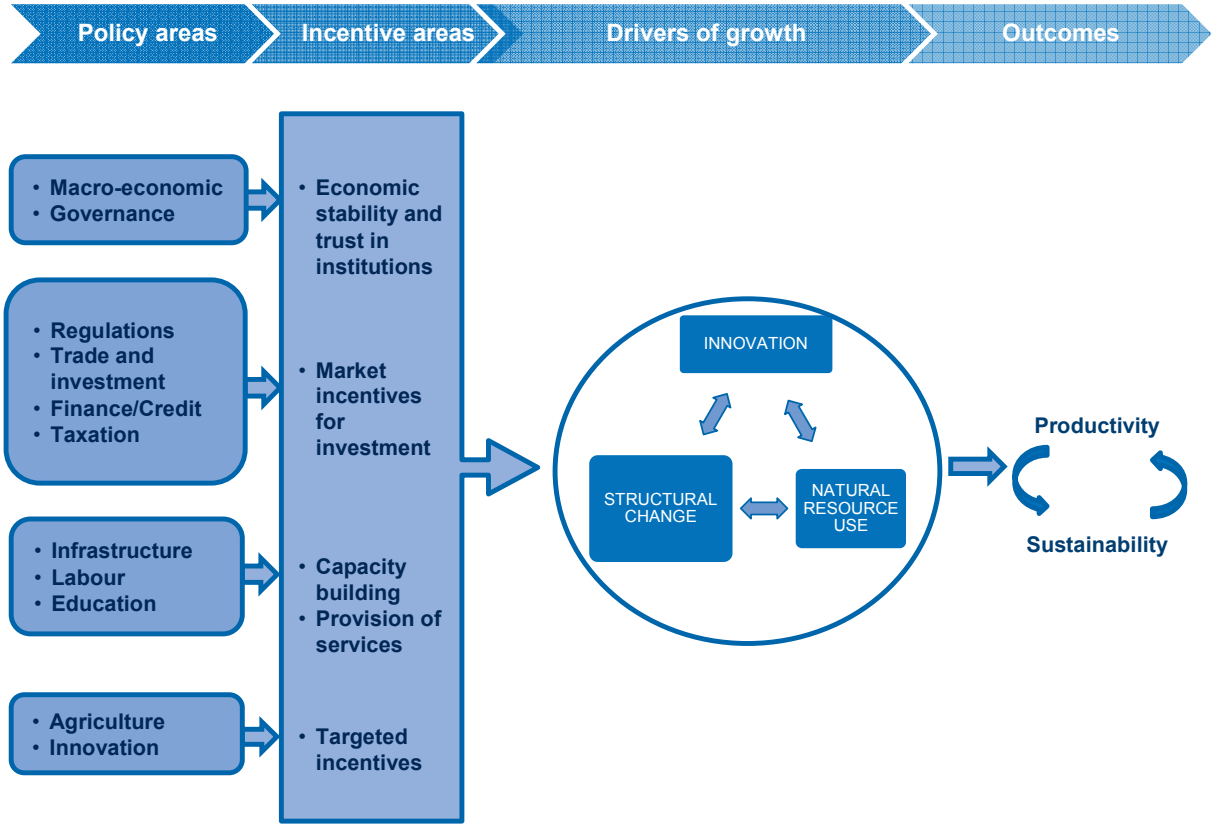
This chapter presents the framework applied in the review to analyse the extent to which Canadian policies are supportive of innovation for productivity and sustainability and the findings of the review of a wide range of policies in Canada. In each policy area, it develops specific policy recommendations.

A framework for analysing policies for innovation, productivity and sustainability in the food and agriculture sector

Improvements in agriculture productivity growth are required to meet the growing demand for food, feed, fuel and fibre, and must be achieved sustainably through the more efficient use of natural and human resources. A common finding is that a wide range of economy-wide policies affect the performance of the food and agriculture sectors, and thus need to be considered alongside agriculture-specific policies. Recognising that innovation is essential to improving productivity growth sustainably along the whole agri-food chain, OECD work has focused on the performance of agricultural innovation systems.

The framework used in this report to review Canadian policies considers policy incentives and disincentives to innovation, structural change and access to natural resources, which are key drivers of productivity growth and sustainable use of resources (Figure 1.1). The current focus is mainly on agricultural innovation systems. The Oslo Manual defines innovation as the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations (OECD and Eurostat, 2005).

Figure 1.1. Policy drivers of innovation, productivity and sustainability in the food and agriculture sector



Source: OECD (2014), "Analysing Policies to improve agricultural productivity growth, sustainably: Revised framework", www.oecd.org/agriculture/policies/innovation.

This review begins with an overview of the characteristics and performance of the food and agriculture sector, and outlines the challenges and opportunities (Chapter 2). A wide range of policies is then considered according to the four main channels or incentive areas through which they affect drivers of productivity growth and sustainable use of resources.

- Economic stability and trust in institutions (justice, security, property rights), both of which are essential to attract long-term investment in the economy (Chapter 3).
- Private investment, which in turn requires a transparent and predictable environment that balances the interests of investors and society (Chapter 4).
- Capacity building, including provision of essential public services (Chapter 5).
- Targeted incentives to food and agriculture, which ensure agricultural policies and agriculture innovation systems align the supply of innovation with sector demand and facilitate the adoption of innovation at farm and firm levels (Chapters 6 and 7).

A policy area can affect innovation through more than one channel. Policies can affect innovation positively or negatively depending on the type and intensity of measures. This review reports country-specific information when readily available.

This report aims to review the extent to which the Canadian policy environment contributes to improving productivity growth and sustainable use of resources in the food and agriculture sector by fostering the creation and adoption of innovation. Throughout the report, the likely impacts of each policy area on innovation are first discussed in general terms. Specific country measures are then analysed in this regard. Overall assessment and recommendations are drawn from this review on a large range of policy areas.

Overview of the Canadian food and agriculture sector

The Canadian food and agriculture sector, similar to other countries worldwide, faces a changing environment that is characterised by a stronger and more diversified demand for food, feed, fuel and fibre, more stringent consumer requirements on products and practices, more variable commodity prices, and stronger competition from emerging economies that have higher agricultural productivity growth rates. Despite facing challenges that can vary substantially between regions, the Canadian food and agriculture sector is, however, well placed to seize opportunities both at home and in the international market. It has abundant natural resources, competitive and generally open markets, an educated labour force, a sound banking system, and good governance. Canadian agriculture offers a variety of crop and livestock products and most commodity sectors are competitive and export-oriented. A few sectors, however, continue to be highly protected and regulated by domestic market measures. Structural adjustment and the wide adoption of innovation in competitive sectors have led to a steady increase in productivity, albeit at a slower pace since 2004. Canadian agriculture faces limited environmental constraints which relate mainly to local water pollution by agricultural nutrients. The adoption of innovative production practices, such as precision agriculture, has permitted production growth while limiting increased pressure on natural resources.

The Canadian food and agricultural system operates within a framework that is generally favourable to investment and innovation. Canada enjoys stable and reliable institutions, with effective property rights and justice systems. Macroeconomic policies have helped maintain modest growth despite the world economic crisis; fiscal consolidation should continue as planned at both the federal and provincial levels of government (OECD, 2014a). Business development is facilitated by a well-developed banking sector and regulations, as well as by relatively low corporate tax rates. The largely open trade and investment environment also facilitates access to agricultural factors of production, including capital, and participation in the international trading system. Canada ranks relatively high in terms of coverage and quality of infrastructure and public services are widely available in rural areas. There is, nevertheless, a shortage of required skills in the economy, particularly in the food and agricultural system, and this occurs despite flexible employment legislation, a well-performing education system, and a well educated population.

Canada's agricultural policy framework has recently placed more emphasis on strategic initiatives that focus on innovation, competitiveness and market profitability, while, risk management remains a

key area of focus. The dairy, poultry and eggs sectors are highly protected and domestic markets are regulated by supply management schemes. Canada's agricultural innovation system is diverse and contributes strongly to agricultural innovation at the regional, national and world levels. The public sector plays an important role as a coordinator, funder and provider of research and development (R&D). Private investments in R&D in Canada are growing, but there is scope for improvement. The Canadian food and agricultural sector benefits, however, from international innovations, in part due to its open trading system, and innovations are widely adopted at the farm level.

This review of Canadian policies that affect drivers of productivity growth and sustainable use of resources offers the following policy recommendations for consideration, recognising that significant differences exist in how federal, provincial and territories fund, support and encourage innovation.

Improve incentives for private investment

The Canadian **regulatory framework** is well-developed and generally facilitates investment. Product Market Regulations (PMR) promote competition and low barriers to entrepreneurship facilitate the creation of innovative businesses in the agri-food sector. The competitive business environment also gives farmers access to world class inputs. In contrast, supply-managed sectors are largely isolated from international competition and while R&D and innovation occurs within the supply managed sectors, the system is focused on domestic considerations rather than bolstering productivity and responding to new product and export market opportunities.

Natural resources are regulated at both the federal and provincial levels, while many environmental regulations are under provincial or local jurisdiction. Water governance varies widely across provinces, as do agri-environmental policy approaches. These differences may reflect specific circumstances in terms of availability, quality and demand, and it would be useful to compare experiences. Significant farmland consolidation has occurred in Canada, suggesting that current regulations enable land markets to function smoothly.

The regulatory process related to farm inputs and outputs is responsive to industry demand and decisions are based on scientific evidence. This approach provides a predictable regulatory environment that is key to promoting innovation and increased competitiveness. Canada's efforts to respond to producer and consumer demand, and to consult and communicate standards and science-based information facilitate the introduction of new products on markets, while protecting consumers and the environment. However, according to a panel of industry representatives, approval procedures can be lengthy and costly, the regulatory process is sometimes more reactive rather than forward looking, and there remain areas where regulations are not clear, such as for bio-chemical plants. In response, efforts are being made at the federal and provincial levels to reduce regulatory burden without compromising health and environmental safety outcomes. Outcome-based regulations, which enable more latitude in the processes that are used as long as the end result meets the required outcome, for example, help lessen regulatory burden on small businesses. Regulations are being streamlined and updated. Efforts are being made to increase regulatory-related transparency and predictability to improve services to business. This includes reducing time for the registration of new products, anticipating new regulatory needs, reducing duplication, minimising burden on small business and communicating more clearly.

When developing and reviewing standards, Canada endeavours to make national standards compatible with international rules. Efforts to update and align regulations with the United States are made in response to industry concerns about compliance costs and excessive constraints on their business decisions, and aim to foster the competitiveness of the Canadian industry. The extent to which differences in regulations across provinces add to the cost of marketing products at the national level is not covered in the survey of stakeholders undertaken for this review.

The **trade and investment** environment facilitates access to agricultural production factors (including capital) and participation in the international trading system, which foster innovation and productivity growth. Very low tariffs for capital and most intermediate goods mean that the food and

agriculture sector can obtain advanced foreign technologies and equipment at a competitive cost. Export-oriented agricultural sectors receive little protection and are competitive on world markets. However, some agricultural commodity sectors remain highly protected, imposing costs on consumers and potentially impeding adjustment and innovation. Lowering protection, while implementing appropriate adjustment measures, could improve the competitiveness of those sectors.

Reflecting its good governance and regulatory framework, Canada performs well in terms of trade facilitation (i.e. customs and other border procedures), allowing both inputs and outputs to flow without imposing unnecessary costs on traders. Further effort in this area could focus on improving external border agency cooperation. Barriers to Foreign Direct Investment (FDI) are mainly in the form of ownership restrictions or regulatory discretion over mergers and acquisitions and are generally not considered to create major disincentives in practice. There are few specific restrictions to FDI in food processing and FDI stocks in this sector have significantly increased in recent years, with most investment originating from the United-States and European countries. The main restrictions in primary agriculture concern access to land and this differs by province.

Farmers have access to credit thanks to a well-developed **financial and banking sector**. The agricultural and food sector also benefits from specialised and personalised services, including from Farm Credit Canada which provides loans to farmers. In addition, it benefits from specific agricultural credit programmes which lower the cost of credit for farmers, cooperatives and the agri-food industry. Access to finance has helped the sector invest and innovate to improve productivity, but the extent to which investment support is still justified by market failure in the current economic environment and domestic financial system is not clear.

As in many countries, venture capital, which is particularly important for innovative firms, is in short supply and the government has taken steps to support the development of venture capital markets. Government support to venture capital access will focus on areas where risks are higher, although there is the risk that venture capital will remain dependant on public support over the long term. Care should be taken that these markets do not become dependent on government support in the long-run. OECD 2012 recommendations for boosting business innovation (Box 1.1) suggest to that effect to:

> "Carefully design support to venture capital by means of strictly temporary co-financing arrangements, giving private partners full management control and possibly capping government returns in order to leverage private returns. Eliminate tax credits to retail investors in Labour-sponsored Venture Capital Corporations (LSVCC) funds. Provide institutional support to angel funds." (OECD, 2012a).

It also recommends to "Promote efficient and deep financial markets by: improved accounting for intellectual assets, more vigorous competition in financial services, and consistent and high standards in provincial securities market regulation." (OECD, 2012a).

So far venture capital benefits mainly Information and Communications Technology (ICT) companies, and only a few agri-food companies have been successful at accessing it.

The Canadian average corporate **tax** rate is relatively low. It is close to the OECD median rate and lower than that of the United States. Small businesses benefit from even lower corporate tax rates. This may have unintended consequences on business practices, including discouraging some small farms and agri-food firms from investing in activities that would increase the size of the business above the lower tax threshold. Applying the same rate to all firms would remove this distortion and might encourage increased investment and innovation.

Special tax provisions for farmers aim to facilitate transfer to the next generation of farmers and to encourage income risk management. The taxation system also allows for faster depreciation of machinery and equipment in farms and food processing industries, and thus supports investment.

Both federal and provincial governments provide tax incentives to support private investment in R&D. The tax subsidy rate is one of the highest among OECD countries, and is particularly high for

small firms. One federal programme (SR&ED) represents one of the most expensive R&D tax expenditures in Canada. The OECD has recommended simplifying and better targeting fiscal credit to R&D to ensure support benefits firms which would not have otherwise invested in innovation (Box 1.1). The OECD has also recommended strengthening cooperation with provinces to align their grants and tax credits to R&D and venture capital with those of the federal government (OECD, 2012a).

Recommendations to improve incentives for private investment

- To improve macroeconomic stability, fiscal consolidation should continue as planned at both the federal and provincial levels of government.
- Efforts to modernise regulations should continue. This involves improving clarity, consistency and responsiveness to industry and consumer needs, using more outcome-based regulations, and adopting a forward-looking approach to developing regulations for new products and services. Regulatory services to businesses should be strengthened. To reduce compliance costs, information relevant to companies could be included in a single platform. Further efforts could focus on regulatory collaboration between provinces and with main trade partners.
- The extent to which agriculture credit programmes are well targeted and respond to the current credit market situation should be reassessed.
- Access to capital is crucial for innovation. Efficient and deep financial markets should continue to be promoted, as recommended by OECD (2012a) (Box 1.1). In addition, placing information on market and programme opportunities on a single platform would improve access to capital.
- Lower rates of corporate tax for small firms may act as a disincentive to firm innovation and growth. Applying the same rate to all firms would remove this disincentive (see Box 1.1 on OECD 2012 recommendations for overall business innovation).

Improve capacities and services for innovation

Given the size of the country, providing strategic **infrastructure** for the development of rural areas and good access to public services is a challenge which is met through a diversity of federal and provincial policy interventions. Public services are widely available in rural areas. Regarding health services, proactive policies encourage medical staff to settle in rural areas through conditional education grants. According to the World Economic Forum (WEF) Global Competitiveness Index, Canada ranks relatively high in terms of coverage and quality of transport, electricity and telephone infrastructure, in absolute terms and relative to its large geographical size. Infrastructure development has benefited from efforts by "PPP Canada" to fund Public-Private Partnerships. However, with respect to information and communication technology, Canada's cellular telephone services are less developed than in other OECD countries and Internet usage in rural areas is less developed than in urban areas.

Canadian **employment** legislation facilitates labour mobility and the use of temporary, often foreign, workers, including seasonal labour in agriculture. Despite this flexibility, there is a continuing mismatch between skills supply and demand, which is more pronounced in certain sectors and in some regions, but which also affects the food and agricultural sector. Government policy aims to match labour supply and demand across regions, sectors and skills though education, skills development, retraining, and immigration systems, including temporary work visas. The government also works upstream to promote careers in agriculture and to develop business skills, a determining factor in the adoption of innovation.

The **education** system has an important role to play in maintaining the supply of skilled labour needed for the development of a knowledge-based economy that rapidly evolves. To that effect, the participation rate in higher education needs to continue expanding. According to a recent OECD review, this could be achieved by encouraging access to higher education for disadvantaged socio-economic groups, while enhancing the flexibility of the system to allow students with diverse needs to move between institutions more easily to meet their learning objectives. Skills for innovation can also be improved by increasing the integration of technical, business and communications skills training with practical industry experience within tertiary education programmes to meet the demands of the labour market. In an environment of government spending restraint, the quality of tertiary education could be

strengthened by increasing the distinction between institutions that target research and those that emphasise teaching, and by re-evaluating tuition policies in provinces where public finances are stretched (also see OECD, 2012a, Chapter 2).

Earlier OECD recommendations to reduce the skills shortage would also contribute to reduce the mismatch between supply and demand of labour for agriculture. In particular, OECD (2014) recommends to "provide better information on expected returns to post-secondary education to improve students' study choices. …. continue to work with provinces and territories to harmonise training and certification requirements of all apprenticeship programmes across the country to increase completion rates and inter provincial mobility of apprentices. … and enhance opportunities for seasonal workers to retrain." It also suggests to "Reduce the incidence of weak numeracy or literacy skills being a barrier to post-secondary education (PSE) completion, perhaps by requiring students to study mathematics and English/French until the end of secondary school or by investing in remedial education in PSE institutions. Increase experiential-learning components of university programmes to develop the soft skills sought by employers. Sustain programmes for immigrants to complement their foreign credentials and become qualified to local standards."

Specific programmes may be also warranted to upgrade or adapt skills in the agricultural labour force as the sector evolves rapidly to adopt new technologies, marketing and management practices. Agricultural education supply does not seem to be the problem as the Canadian system attracts a significant number of foreign students in this area. For the food and agricultural sector, competition in the education and labour market with dynamic sectors with higher wages is a challenge which cannot be met by the education system alone. The industry itself has a role to play to make agricultural and agri-food careers more attractive and better known.

Recommendations to improve capacities and services for innovation

- Skills for innovation could be reinforced by increasing integration between education, formal training and practical experience within tertiary education, increasing the distinction between institutions that target research and those that emphasise teaching, and re-evaluating tuition policies.
- Increased efforts should be made, in particular by the private sector, to better communicate evolving needs to educators and to promote further opportunities, such as internships, which are responsive to evolving business needs.
- Further efforts could be made to enhance the public's perception of agriculture and its role in the economy, including by improving information on job market opportunities in the sector.

Remove unintended impediments to innovation from agricultural policy

Canadian agricultural policy traditionally provides farmers with tools and support to manage risk and facilitate investment. Innovation has received more attention in the most recent Growing Forward 2 policy framework, with the implementation of specific programmes that provide funding for innovation, and promote cooperation between the public and private sectors as well as the adoption of innovation by the food and agricultural sector. The impacts of risk management programming on innovation likely depend on an individual producers' risk tolerance. While long-term risk management support may have reduced the incentive to invest in innovation and contributed to maintaining more farmers in the sector, it may also have encouraged some risk-averse farmers to invest when they may otherwise have not done so in the absence of this support. In any case, it would be more efficient to continue to develop programmes that target innovation directly, like the AgriInnovation programme under Growing Forward 2, and to provide incentives for private investment in the creation and adoption of innovation. To be effective, this emphasis needs to be pursued and reinforced over the long-term, in the light of evaluation of current programmes.

The dairy, poultry and egg sectors operate under a supply management system, with production levels established to meet domestic demand at a regulated pricing level, and high tariffs limiting the

importation of foreign products. OECD analysis shows that such market price support mechanisms affect production decisions and affect structural adjustment as they reduce incentives to use production factors more efficiently. While Canadian milk yields are high (IFCN, 2013), evidence suggests that structural adjustment in dairy farms has been slower in Canada than in the United States and New Zealand (Barichello, Castellanos and McArthur, 2012; Informa Inc., 2010). Domestic competition is restricted as the high cost of production quota raises the cost of entry as producers need to buy quota in order to produce supply managed commodities (OECD, 2008). These factors discourage structural adjustment, which is an important driver of productivity growth, together with innovation.[1] Removing impediments to structural adjustment could facilitate the adoption of larger-scale innovations, lower costs of production, and facilitate increased overall total factor productivity growth in these sectors.

Transforming the Canadian Wheat Board monopoly into a voluntary marketing organisation implies changes in the way the western Canadian wheat and barley sector operate. However, whether and how these changes impact on innovation and sector productivity remains to be seen.

Recommendations to remove impediments to innovation from agricultural policy

- High levels of support through domestic and border measures like those in place for supply-managed commodities distort markets and can impose a high cost on intermediate and final consumers. Lowering support and minimising distortions could help the industry adapt to market opportunities, including through enhanced innovation.
- Removing impediments and/or disincentives to structural adjustment could facilitate the adoption of innovation and increase productivity growth.
- Programmes that target innovation directly and provide incentives for private investment in the creation and adoption of innovation should be further developed.

Strengthen direct incentives to innovation in food and agriculture

Public research and public supply of knowledge are strong in Canada, as measured by the number of scientific articles per capita and spending on higher education R&D as a proportion of GDP. However, business investment in R&D is limited compared to some sectors and efforts are being made to better link public and private initiatives. Earlier OECD recommendations to improve general innovation systems would also benefit the Canadian agricultural innovation system, as agricultural innovation increasingly depends on knowledge infrastructure (including general purpose technologies such as information and communication technology, biotechnology, and nanotechnology), education, and skills development.

The Canadian agricultural innovation system has been performing relatively well. It is a major contributor to world innovation and has delivered innovations that have been widely adopted at farm level. As a result, total factor productivity has continued to grow at a relatively good pace and the efficiency with which natural resources are being used has increased.

Agricultural innovation includes a large diversity of actors, which calls for strong cooperation and governance systems. Various mechanisms help coordinate innovation priorities and actions between the federal and provincial levels, and stakeholders are widely consulted. Innovation has recently received increased emphasis in agricultural policy, but it is important to ensure even stronger coherence between economy-wide, agriculture and innovation policy so that they work together to achieve the long-term objective of improving the profitability, competitiveness and sustainability of the food and agriculture sector.

The public sector is the main supplier and funder of agricultural R&D through various institutions and programmes. Private investment in agricultural R&D is increasing, mainly in the food processing area, but in general, there appears to be scope for an expanded private sector role. While public expenditure on agriculture R&D is decreasing in real terms, agricultural R&D intensity – expenditure

as a proportion of value added – remains high compared to other countries at a similar level of development and relative to the contribution of the sector to GDP.

An increasing share of public funds to agricultural R&D at the federal level is of a targeted or time-limited nature. Small and large private sector firms use both agricultural specific and general innovation programmes to reduce risk, leverage funds, and identify innovation with potential. The most frequent complaints from industry are about administrative burdens, differences in rules depending on the source of funding, delays in obtaining funds, and the lack of policy predictability.

Knowledge infrastructures, such as research centres and universities, are well-spread across Canada and tend to specialise into regional systems. However, these infrastructures are ageing, and funding should continue to cover maintenance and upgrading costs where possible. Information on genetic resources and research results is widely shared and communicated to diverse audiences.

Intellectual property protection, which is essential to attracting private investment in innovation, is generally high by international standards. Plant variety protection, however, is lower than in many developed countries, as Canada did not sign the more protective 1991 UPOV convention. This may have prevented foreign breeders from introducing new varieties in Canada and put Canadian farmers at a competitive disadvantage. Increasing plant variety protection would place Canadian farmers at a level playing field with their major competitors on world markets. Legislation is currently being discussed to reinforce plant breeders' rights. There are various mechanisms and facilitators in Canada which provide information and advice on how to use Intellectual Property.

Recent programmes clearly encourage public-private cooperation through funding mechanisms. At the same time, a wealth of institutional arrangements such as research centres, centres of excellence, Agri-science clusters, and value-chain round tables aim to foster collaboration within the national agricultural innovation system and with the general innovation system. Researchers, however, mention problems of culture between public and private actors, short-term length of public programmes and related funding cycles, and inconsistency of budget procedures to apply for funding as obstacles to cooperation. As innovation success is largely determined by the integration of efforts, these obstacles need to be addressed.

Canadian researchers are active in cross-country cooperation, with a large share of patents and publication involving foreign researchers. International cooperation is encouraged through measures that facilitate staff and student exchanges, as well as through participation in international science-based organisations and networks. Maintaining a high quality education and research system, with stable funding, is essential to pursue effective collaboration at the international level.

Training and advisory services play an important role in facilitating the adoption of innovation at the farm level. The supply in Canada is diverse and accessible. As extension services vary by province, it is difficult to evaluate and compare the different systems, or to provide an overall picture of what is available. But there is survey evidence that Canadian farmers adopt new high yield varieties and production practices, such as no-till, on a wide scale. Government programmes to improve business management skills are very effective in facilitating the adoption of innovation. The current agricultural policy framework includes specific measures to facilitate the commercialisation and adoption of innovation at the farm and firm levels, which would need to be evaluated over time. Finally, government and private actors are playing an important role in providing strategic market information, as well as information on programmes and innovative technologies and practices. Independent brokers, such as consultancy firms, can facilitate access to this information and help decision-making related to investments or a change in practices.

Innovation policies are regularly evaluated according to the common framework used to evaluate all government policies, and which is mainly based on trends in economic performance. There is too little evidence to evaluate the cost-effectiveness of the agricultural innovation system, in particular regarding non-government activities and the adoption of innovation. To improve the effectiveness of government actions, it would be important to strengthen monitoring and evaluation tools. Indicators

on innovation outcome and performance should be developed to monitor the enabling environment, investment in R&D (including by the private sector) and higher education, and the adoption of innovative practices at the farm and firm levels. These indicators could be used for economic evaluation of policy impacts, which would then feed the policy-making process. A challenge would be to take account of time lags in the innovation process as this calls for continuity in programmes and evaluation processes.

Recommendations to strengthen direct incentives to innovation

- Establish a common strategy for agriculture and broader, government-wide innovation objectives to strengthen policy coherence. This will ensure that agricultural policy facilitates the adoption of innovation and that broader innovation policy contributes to long-term objectives to improve the profitability, competitiveness and sustainability of the food and agriculture sector to the extent possible.
- All agricultural programmes should be evaluated in terms of their impact on innovation, as the results would help to strengthen the focus on innovation of future frameworks. The development of outcome and performance indicators needs to be built into the policy-making process and used to evaluate policy impacts to allow for future improvements.
- Simplifying programming, such as initiatives related to financial support and business management advice, that aim to facilitate the adoption of innovation in farms and firms, would improve access to support and information, and thus to innovation.
- There should be a single platform which can identify all sources of available government funding. Streamlining fragmented federal granting programmes would encourage businesses to collaborate with researchers in the public sector. It would also help if provinces aligned their grants with those of the federal government.
- To maintain research capacity, it is also important to ensure stable funding for knowledge infrastructure, including general knowledge technologies, institutions, networks and databanks, as well as funding for long-term projects. It is also important to explore funding models that can help attract private sector investment, as well as public private partnerships that can support agricultural knowledge infrastructure and further innovation.
- Further investigate the demand and supply for venture capital for agricultural businesses and identify constraints and possible government role to ease these constraints.
- It is important to review the effectiveness of coordination and the responsiveness of the system to stakeholder demands. To increase collaboration and partnerships between public and private actors it is important to explore and tackle difficulties such as differences in culture, constraining requirements for using public funds, and frictions over the handling of IPR. .
- Strengthening Plant Breeders' Rights would attract private investment and place Canadian farmers at a level playing field with their major competitors on world markets.
- An important role for the government is to facilitate flow and access to information. It must also contribute to improving public understanding of the importance of innovation in the agricultural sector, as well as to society at large.

Box 1.1. OECD 2102 recommendations for boosting business innovation

Provide a stronger culture of competition, risk taking and customer orientation

- Increase competitive intensity in network sectors and professional services, in line with Going for Growth (OECD, 2012b) and Compete to Win (CPRP, 2008) recommendations. Fully implement the Agreement on Internal Trade to dismantle provincial barriers. Clarify the net benefit test for Foreign Direct Investment and apply it narrowly.
- Promote efficient and deep financial markets by: improved accounting for intellectual assets, more vigorous competition in financial services, and consistent and high standards in provincial securities market regulation.
- Examine how institutions can better develop cognitive and social skills for entrepreneurship and risk-taking. Support and encourage risk-takers across the board, from high-tech avant-garde to skilled trades.

Better target fiscal supports to R&D

- Scale down SR&ED tax subsidies, reducing the small firm subsidy rate towards that of large firms while keeping the base broad (inclusive of capital) to avoid distortions in technology choice. Restore the 20% general SR&ED rate.
- Streamline fragmented federal granting programmes to boost business interest in collaborations with academics. As IRAP[1] is expanded, consider partial cost recovery of pre-commercial business advice.
- Carefully design support to venture capital by means of strictly temporary co-financing arrangements, giving private partners full management control and possibly capping government returns in order to leverage private returns. Eliminate tax credits to retail investors in Labour-sponsored Venture Capital Corporations (LSVCC) funds. Provide institutional support to angel funds.
- Co-operate with provinces to align their grants and tax credits to R&D and venture capital with federal government.
- Design low-budget-cost policies to foster market demand for innovations, including "green" technologies, e.g. consumer policies and getting prices right via carbon taxes. Public procurement is relevant here, though it needs to be carefully designed to focus on technology neutrality and performance to stimulate innovation.
- As the policy mix shifts towards more granting and procurement, design safeguards against the risks of: lack of capacity in the public sector to wisely choose projects; inefficient policies and market distortions (including at the international level) due to Canada-only provisions; and capture by vested interests.

Update institutional foundations of the "knowledge economy"

- Motivate technology transfer from academia by means of improved incentives for academics, e.g. by adopting a more open and inclusive research-granting process, and business vouchers for academic collaborations. Consider rationalisation of currently widespread distribution of research resources in order to promote Canadian "star" universities better able to command market interest for their research.
- Strengthen the IP system: i) modernise the relevant legislation/public agencies to enhance transparency and guidance to inventors; ii) establish national protocols for sharing/transfer of IP in academic-business collaborations; iii) provide IP management services to small and medium enterprises (SMEs), e.g. within regional centres of excellence; iv) establish a specialised Patent Court or section of a court; and v) promote international IP collaboration.
- Build capacity to undertake comparative evaluations of fiscal supports to better guide funding allocations and programme design. This could be done by an arms-length Innovation Council as recommended by the Jenkins panel.
- Tailor privacy protections to minimise trade-offs with knowledge diffusion and network benefits from the Internet and integrated electronic medical records.

1. The Industrial Research Assistance Program (IRAP) is the major grant programme targeting SMEs.

Source: OECD (2012a), *OECD Economic Surveys: Canada*, OECD publishing. http://dx.doi.org/10.1787/eco_surveys-can-2012-en .

Note

1. Evidence suggests that expansion of farm size and exit of smaller farmers is an important driver of productivity growth (OECD, 2011 and 2012c; Kimura and Sauer, 2015). Recent analysis shows that dairy productivity has increased with the gradual phasing out of milk quotas in selected EU member states (Kimura and Sauer, 2015).

References

Barichello R., V. Castellanos and C. McArthur (2012), "Dairy Farm Structure in Canada: International Comparisons and the Effect of Farm Quotas", Research Poster from the Canadian Agricultural Trade Policy and Competitiveness Research Network (CATPRN): Enabling Research for a Competitive Agriculture, 2nd Annual Agriculture Policy Conference "Growing Forward in a Volatile Environment", 11-13 January 2012, Ottawa, Canada. http://www.ag-innovation.usask.ca/policyconference/Research_Posters/2012Poster_PDF/CATPRN03_Castellanos.pdf.

CPRP (Competition Policy Review Panel) (2008), *Compete to Win: Final Report*, Ottawa, June.

IFCN (International Farm Comparison Network) (2013) *Dairy Report 2013*. http://www.ifcndairy.org/en/output/dairyreport/index.php.

Informa Economics, Inc. (2010), An International Comparison of Milk Supply Control Programs and Their Impacts (Dairy Group, Informa Economics, Inc.) https://www.fsa.usda.gov/Internet/FSA_File/diac_informa_intl_supply.pdf.

Kimura, S. and J. Sauer (2015), "Dynamics of dairy farm productivity growth: Cross-country comparison", *OECD Food, Agriculture and Fisheries Papers*, No. 87, OECD Publishing, Paris. http://dx.doi.org/10.1787/5jrw8ffbzf7l-en.

OECD (2014a), "Analysing Policies to improve agricultural productivity growth, sustainably: Revised framework", available at: www.oecd.org/agriculture/policies/innovation.

OECD (2014), *OECD Economic Surveys: Canada 2014*, OECD Publishing, Paris. DOI: http://dx.doi.org/10.1787/eco_surveys-can-2014-en.

OECD (2012a), *OECD Economic Surveys: Canada*, OECD Publishing, Paris. DOI: http://dx.doi.org/10.1787/eco_surveys-can-2012-en.

OECD (2012b), *Economic Policy Reforms 2012: Going for Growth*, OECD Publishing, Paris. DOI: http://dx.doi.org/10.1787/growth-2012-en.

OECD (2012c), *Agricultural Policy Monitoring and Evaluation 2012: OECD Countries*, OECD Publishing, Paris. DOI: http://dx.doi.org/10.1787/agr_pol-2012-en.

OECD (2011), *Fostering productivity and competitiveness in agriculture*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264166820-en. OECD (2012a), *Economic Surveys: Canada, 2012*, OECD Publishing, Paris. DOI: http://dx.doi.org/10.1787/eco_surveys-can-2012-en.

OECD (2008), *OECD Economic Surveys: Canada 2008*, OECD Publishing, Paris. DOI: http://dx.doi.org/10.1787/eco_surveys-can-2008-en.

OECD and Eurostat (2005), *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, The Measurement of Scientific and Technological Activities*, 3rd Edition, OECD Publishing, Paris. DOI: http://dx.doi.org/10.1787/9789264013100-en.