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**Modernising Canada's
Agricultural Policies**

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Shuji Kobayakawa**

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MODERNISING CANADA'S AGRICULTURE POLICIES

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By
Peter Jarrett and Shuji Kobayakawa

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ABSTRACT/RESUME

Modernising Canada's agricultural policies

The agricultural sector in Canada is relatively large, compared to those in most other G7 countries. In recent years, the federal and provincial governments have undertaken a number of sectoral reforms to meet the competitiveness and environmental challenges that it faces. The federal government has tried to end a marketing monopoly in the barley market and may do so for wheat as well. The next generation of agriculture and agri-food policy is being finalised, and implementation of the first part of a new framework, Growing Forward, has begun. But a steady stream of ad hoc programmes in recent years has had significant budgetary costs and no doubt created moral hazard among farmers. There is scope for further liberalisation in supply-managed sectors, which are heavily protected and subsidised by consumers. Moreover, Canada's bio-energy production, in particular the production of second-generation bio-ethanol (from cellulose), is under pressure in light of less costly bio-energy production overseas. Against this background, governments are striving to ensure the long-term viability of the sector. This Working Paper relates to the 2008 *OECD Economic Survey of Canada* (www.oecd.org/eco/surveys/canada).

JEL codes: Q18; Q13; Q14; Q17

Keywords: agriculture; Canada; biofuels; supply management

Moderniser la politique agricole du Canada

Le Canada dispose d'un secteur agricole relativement important, par rapport à la plupart des autres pays du G7. Ces dernières années, des réformes ont été entreprises dans plusieurs domaines, au niveau fédéral et provincial, pour surmonter les problèmes de compétitivité et d'environnement auxquels est confrontée l'agriculture. Le gouvernement fédéral a tenté de mettre fin à un monopole sur la commercialisation de l'orge et pourrait envisager la même démarche pour le blé. La nouvelle politique agricole et agroalimentaire est en cours de finalisation et la mise en œuvre de la première partie d'un nouveau cadre stratégique, Cultivons l'avenir, a commencé. Mais les programmes ad hoc qui se sont succédé depuis peu ont pesé lourdement sur le budget, non sans créer un aléa moral pour les agriculteurs. Il est possible d'aller plus loin dans la libéralisation des filières soumises à une gestion de l'offre, qui sont largement protégées et subventionnées par les consommateurs. Par ailleurs, la production canadienne de bioénergie, notamment de bioéthanol de seconde génération (à partir de cellulose), est concurrencée par une production bioénergétique étrangère moins coûteuse. C'est dans ce contexte que s'inscrivent les efforts déployés par les pouvoirs publics pour assurer la viabilité du secteur à long terme. Ce Document de travail se rapporte à l'*Étude économique de l'OCDE du Canada*, 2008 (www.oecd.org/eco/etudes/canada).

Classification JEL : Q18; Q13; Q14; Q17

Mots-clés : agriculture; Canada; bioéthanol; gestion de l'offre

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Modernising Canada's agricultural policies

By
Peter Jarrett and Shuji Kobayakawa¹

Although agriculture's share of Canadian GDP is near the OECD average, it is much larger than in other G7 economies (except France). The sector is under the dual responsibility of the federal and provincial governments. One of the striking features in the Canadian agricultural system is that, on one hand, there are supply-managed sectors – dairy, eggs and poultry – that are heavily protected, with strong market interventions, consumer-subsidised and that do little exporting; and, on the other hand, there are meat and grain farmers, such as those producing wheat and barley in western Canada, who are very outward-oriented and for whom governments are keen to introduce more market mechanisms. This inconsistency in approach has its roots in the distant past, but the vested interests it has created have made the system resistant to reform as circumstances change. This paper first outlines the key features of the agricultural sector in Canada. It then examines four major topics: the sustainability of national supply-management systems; the potential end of the Canadian Wheat Board's marketing monopoly; a new set of policy programmes to follow the Agricultural Policy Framework; and bio-energy and other environmental challenges. Finally, the paper summarises policy recommendations from the perspective of modernisation of the sector's policies.

An overview of Canada's agricultural sector

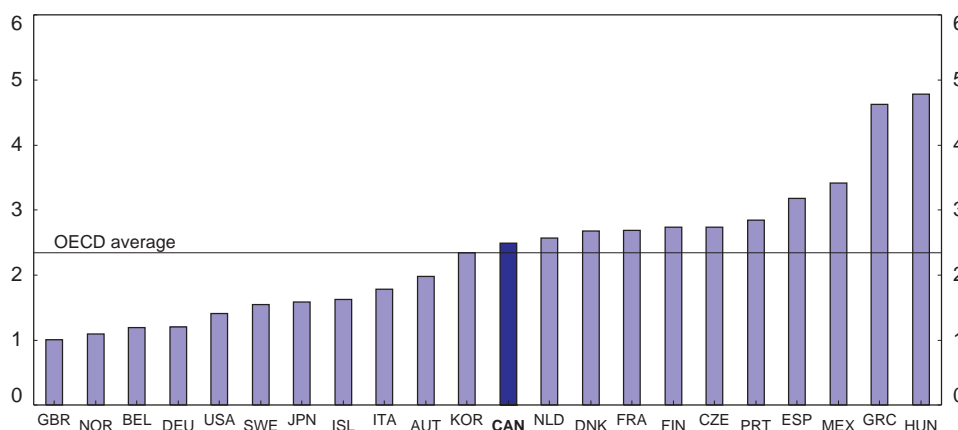
The primary agricultural sector, where the thrust of agricultural policy is targeted, accounts for about 2% of GDP (Figure 1) and one in 36 of the nation's jobs (Figure 2). Overall, the Canadian agricultural sector is near the average in terms of output share among OECD countries, but it does not employ as many people. This reflects its relatively favourable labour productivity performance, due in no small part to the ample availability of land as an additional factor of production. Average farm capital per farm in 2006 reached almost CAD 1.1 million, up nearly 36% since 2001, indicating that rising capital intensity is also an important driving factor.

Canada is both the OECD's fifth largest exporter and importer of agricultural and agri-food products. Given the large amount of land suitable for agricultural production relative to its population, production in the sector tends to outstrip domestic consumption; thus, trade opportunities and access to foreign markets

1. The authors are respectively, Head of Division in the OECD Economics Department, and Director of Financial Analysis and Research in the Financial Systems and Bank Examination Department of the Bank of Japan. This paper was originally produced as a chapter for the *OECD Economic Survey of Canada* published in June 2008 under the authority of the Economic and Development Review Committee. The authors are indebted to Andrew Dean, Roger Martini and Annabelle Mourougane for their valuable comments. Special thanks go to Françoise Correia for research assistance and to Mee-Lan Frank and Sylvie Ricordeau for technical preparation.

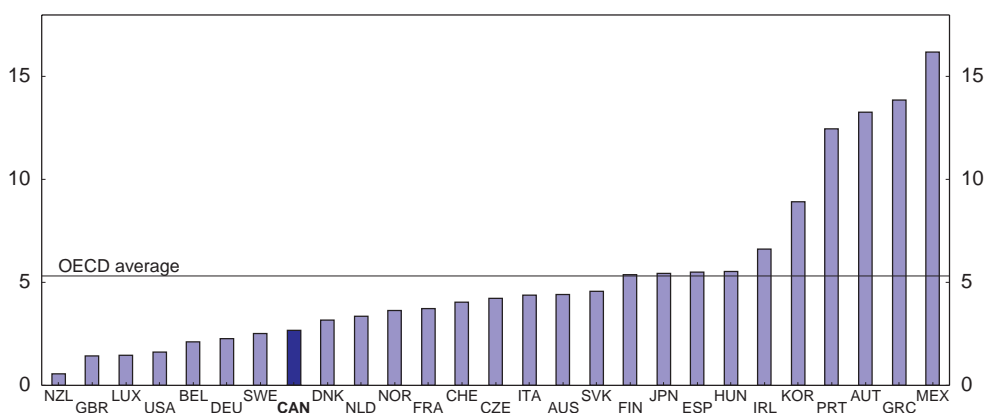
are crucial to its good functioning and longer-term sustainability (Agriculture and Agri-Food Canada, 2006). Canadian farmers, with the exception of those in the national supply-management systems, have consistently sought to increase international opportunities to sell their products.

Figure 1. **Share of agriculture in total output**
Average 2000-05 or latest available year



Source: OECD, Annual National Accounts database.

Figure 2. **Share of employment in agriculture in total employment¹**
Average 2000-06 or latest available year



1. Agriculture, hunting, forestry and fishing.

Source: OECD, Annual National Accounts database.

The government is in full support of the supply-management frameworks in dairy, poultry meat and eggs. This system, introduced several decades ago against the background of the heavy distortions emanating from overseas markets at that point, protects producers and consumers from price fluctuations by effectively matching domestic demand and supply to achieve a target price, while quotas discourage farmers from producing more than domestic demand, and imports are restricted by high tariffs. The lack of producer exposure to market forces results, however, in static resource misallocation. It is consumers who pay for the protection enjoyed by the sector²: for example, wholesale dairy prices are typically more than

2. In general, producers of supply-managed commodities receive little in the way of government subsidies. However, they are eligible for some payments under general risk-management programmes. Nonetheless,

double those prevailing in world markets. In the past year, however, the price gap has narrowed as world prices have increased rapidly and Canadian prices have posted only moderate growth. Dynamic inefficiencies no doubt also ensue.

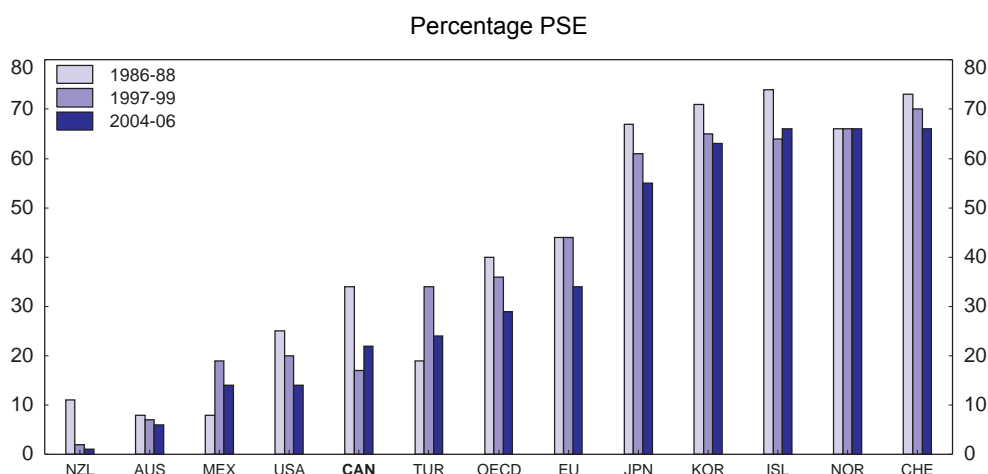
In contrast to the supply-management systems for dairy, poultry and eggs, the federal government has taken steps to further liberalise the barley market in western Canada, until recently a Canadian Wheat Board (CWB) monopoly (other than for feed), and is expected to follow a similar strategy for wheat itself, after having fended off legal challenges to the CWB wheat export regime both before the WTO and the NAFTA.³ Having completed consultations with stakeholders, the “single-desk” monopoly in the barley market was to end in August 2007, giving more marketing choice to barley farmers. However, the CWB asked the federal court to review the legality of the federal government’s action, and indeed the court overturned it in July 2007, a decision that was upheld upon appeal. A legislative change is required, and the Government therefore introduced Bill C-46 in March 2008 to amend the *Canadian Wheat Board Act*.

Canada has made substantial progress over the past 20 years or so in paring back government support to the agricultural sector. It reduced total support from 1.8% of GDP in 1986-88 to 0.8% of GDP in recent years. The amount of direct support to producers as well as the share of support linked to specific commodities or the use of variable inputs – the most distorting forms of support – have declined most. The value of support to the sector as measured by the percentage Producer Support Estimate (%PSE)⁴ fell from 36% in 1986-88 to 22% in 2004-06, well below the OECD average (29%), but still somewhat higher than its NAFTA partners, the United States and Mexico (each with 14%). However, Canada is almost unique in having backtracked since the late 1990s (Figure 3): the percent PSE rose from a low of 14% in 1997 to 23% in 2006 before higher world prices led to a decline of percent PSE to 18% in 2007.⁵ Nevertheless, discretionary increases in support in response to various events are continuing. For example, the government of Ontario promised its livestock and horticulture producers an additional CAD 150 million of financial aid in December 2007, and likewise the federal government has made a “Kickstart” payment of CAD 600 million associated with its new policy framework (see below).

In 2003, the federal and provincial governments agreed to a new Agricultural Policy Framework (APF). The APF was intended to provide a comprehensive and long-term basis to reshape Canada’s agriculture policies, covering a wide range of issues such as risk management, long-run sectoral viability through technology and innovation, food safety and environmental responsibility. The milk, eggs and poultry industries operate under supply-management regimes and have been treated differently in the APF. In light of its originally planned expiration in 2008, the federal and provincial governments undertook joint work on the design of its successor, launching a new initiative in 2008 called *Growing Forward* after broad and multi-phased national consultations. Overall, the new framework will focus more on ensuring that the agriculture and agri-food industry can seize evolving market opportunities in the global context, with a heavier emphasis on innovation and science. Furthermore, more comprehensive income support is being implemented in the form of a new suite of assistance programmes.

since supply management already controls risk through curbing price volatility, these producers have little need of these payments and seldom qualify for them.

3. The WTO decision required that state trading enterprises must behave in a non-discriminatory fashion but found no independent obligation to behave in accordance with commercial considerations (Hoekman and Trachtman, 2007).
4. See OECD (2007a) for further explanation of this concept.
5. Similarly, the amount by which Canadian farm prices exceed world market levels shrank from 40% in 1986-88 to 12% in 2004-05 but rebounded to 15% in 2006.

Figure 3. **Producer support estimate**

Source: OECD, PSE/CSE database 2007.

Exposing dairy, eggs and poultry to market forces

National supply-management systems

The production of dairy, eggs and poultry (chicken and turkey) has been carried out under their respective supply management regimes since the early 1970s against the backdrop of highly distorted international markets at the time and volatile global market prices ever since.⁶ The systems vary in their detail but are essentially designed to match supply and estimated demand by restricting production⁷ to achieve a target price for the product. For poultry, prices are negotiated between processors and provincial marketing boards. In the case of dairy, the target price is based on a cost-of-production formula.⁸ But the rising value of the dairy quota (see below) is *prima facie* evidence that the impact of productivity growth has been systematically underestimated in its calculation. To maintain the target prices, the amount of each commodity that Canadian farmers are allowed to produce is subject to a quota (originally allocated to farmers for free), and imports are restricted by tariff rate quotas whereby only limited quantities of products can be imported at lower tariff rates. Prohibitive tariffs (298.5% for butter, 245.5% for cheese, 238% for chicken and 168% for eggs) are imposed beyond WTO minimum access commitments.⁹

6. Consideration was given in the 1980s to also putting hog production under supply management.

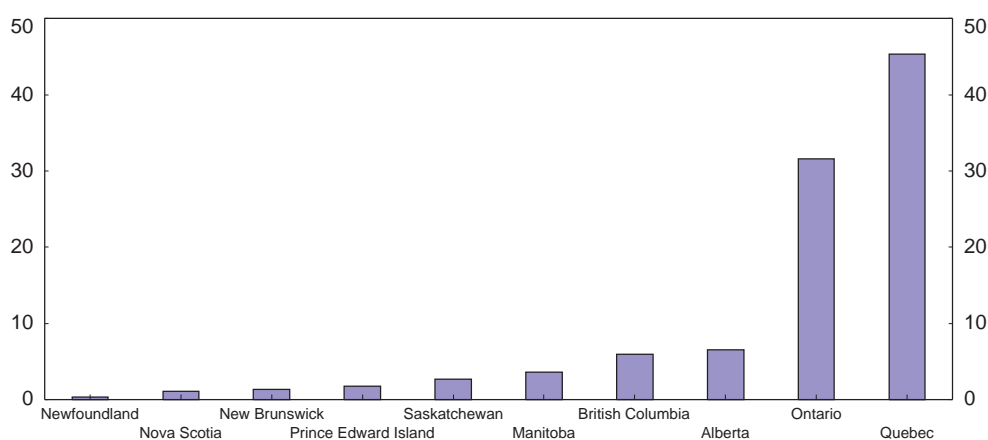
7. Indeed, one commentator recently referred to Canada's "milk cartel", asking why it is treated with such complacency just because it has government backing (Elgrably, 2008).

8. In the case of industrial milk the target price is based on cost of production surveys. The support prices for butter and skim milk powder are set by the Canadian Dairy Commission to effect the target price. Those prices have risen steadily over the past decade: by 35 and 29%, respectively, most recently by around 1% in February. Admittedly, the last three annual increases have been modest.

9. Canada's bound in-quota ad valorem tariff rates for supply-managed products under so-called minimum access commitments are in the range of 0-8.6% and apply to volume of imports representing between 1-8% of the domestic market (which amounts to 10 grams of yoghurt per person, for example, according to Hart (2005)). However, in many cases they are specified as specific amounts in CAD terms, which of course means they have risen sharply in recent years for items whose price has been largely unchanged (that is, all except dairy). For example, milk powder and most cheese is charged CAD 3.32 per kilogram; for the former that works out to around 75% at recent world price levels.

Figure 4. Provincial shares of national milk Market Sharing Quota

Per cent, 31 July 2007



Source: Canadian Dairy Commission, Annual Report 06/07.

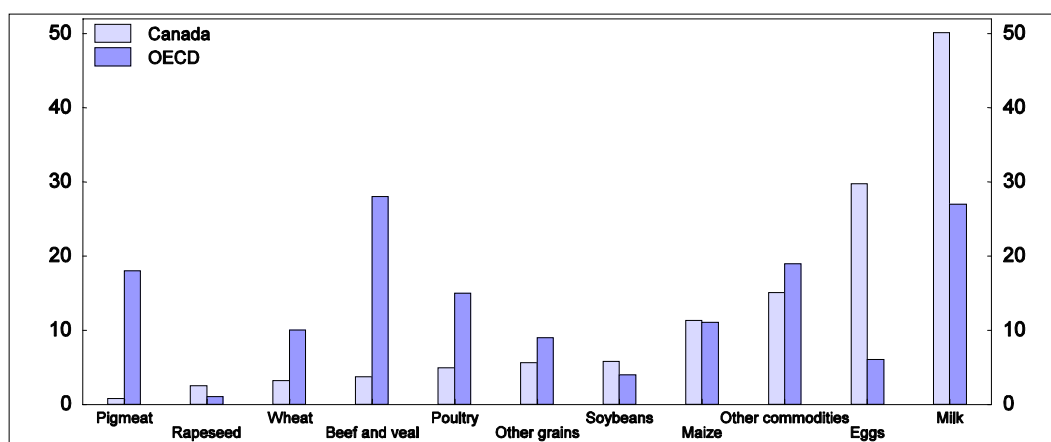
Supply-management systems are controlled by national agencies and provincial commodity marketing boards. In dairy, the Canadian Dairy Commission makes a recommendation to the Canadian Milk Supply Management Committee (CMSMC) on the Market Sharing Quota (MSQ) – the national production target for industrial milk. The CMSMC then allocates milk production among the provinces, and each provincial board allocates its share of national milk production among quota holders. The boards buy all the milk produced in the province; milk revenues are then pooled and paid back to producers. Among the provinces, Quebec receives the largest share of MSQ (46.5%), followed by Ontario (31.2%), whereas the shares of all other provinces are relatively small (Figure 4). Retail prices of fluid milk are also regulated in Quebec and Nova Scotia, raising consumer prices in those provinces well above the national average.

Key features of the national supply-management systems

While the objective of national supply-management systems is to provide stable prices to producers and consumers and a fair return to producers, they limit the working of the market mechanism within the country and internationally— setting the target price *a priori* rather than by open markets, allocating quotas among producers without regard to considerations of cost or efficiency, and effectively prohibiting competition from imports through the use of high tariffs. The result of these market interventions and border protection are prices for commodities subject to supply management that are relatively high,¹⁰ with producers protected against entry because of high levels of minimum efficient scale associated with rising capital intensity (see below). The value of these high prices and the lack of competition are reflected in the considerable value of production quota. Indeed, the situation is arguably more distorted even than the taxi industry, where once the production permit is obtained, there is no quantitative limit on supply (taxis can be driven round the clock).

10. In December 2007 the Farm Product Price Index for dairy products was 141.1 (1997=100), far higher than any other component; the overall index was only 106.3. Other supply-managed products (poultry and eggs) also enjoyed strong price increases in 2007, but beef and pork producers suffered swingeing falls.

Figure 5. **Single commodity transfers**
Per cent of gross farm receipts, 2004-06



Note: "Other commodities" is a calculated residual whose level is strongly influenced by the high level of support to milk.

Source: OECD, PSE/CSE database 2007.

Commodities under supply management (except poultry meat) receive significantly greater producer support than other products in Canada, as shown by the single commodity transfers (SCTs) component of the Producer Support Estimate (PSE), and more than the OECD average (Figure 5). According to the OECD's new classification system within the PSE (OECD, 2007), SCTs as a share of gross farm receipts for milk and eggs were substantially higher than the OECD average.

While the ostensible objective of Canada's supply-management systems is to reduce price variability, in practise they have had the effect of sustaining prices above world levels, considerably so for milk. In particular, prices have been higher than those in the United States, and the gaps between them have tended to widen over time, especially since 1998 (Figure 6). In the last year, however, this trend reversed despite the Canadian dollar appreciation, as world prices increased rapidly while Canadian prices posted moderate growth. In any case, the higher prices paid by consumers have a regressive effect, as low-income households spend a greater share of their budget on food.¹¹ This regressive effect is the opposite of what would result if farmers in supply-managed sectors instead benefited from government payments financed by general taxation, since tax liabilities vary directly with the ability to pay. It is especially disturbing in view of the generally affluent situation of most farmers operating under supply management.

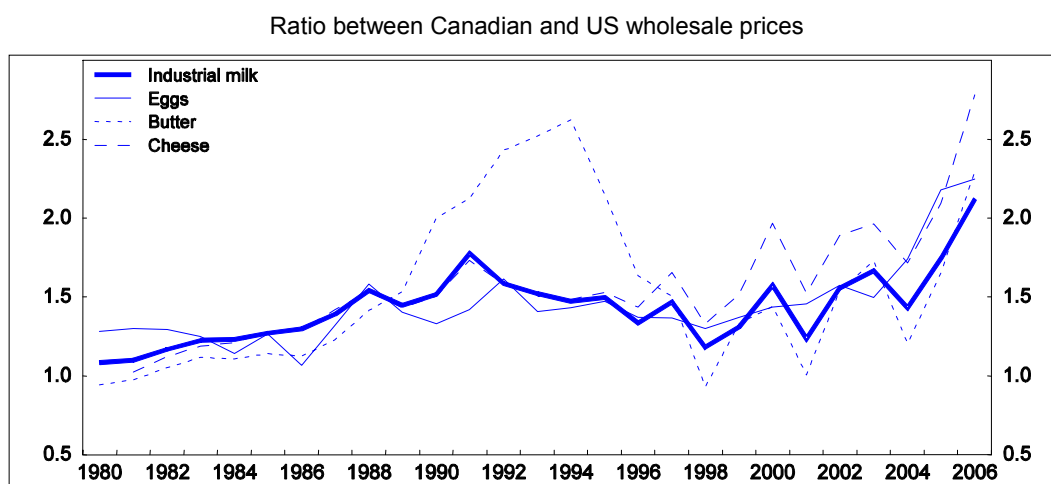
One of the benefits of the higher prices¹² enjoyed by producers in the supply-managed sectors, as well as their enforced stability, has been that they face lower financial risk than their counterparts who farm other products: in 2005 only 6% of dairy farmers and fewer than 14% of poultry and egg farmers were

11. Boyer and Charlebois (2007) estimate that each person in Quebec spends CAD 75 per year more on milk, eggs and poultry than if (s)he could shop at US retail prices. That excludes derivative products such as cheese and butter. The calculations were made at an exchange rate of 0.94; however, the impact of the appreciated Canadian dollar has been more than offset by the more rapid increase in world prices than in Canadian prices. As a result, Canada's SCT for dairy products dropped sharply in 2007.

12. Even before the recent run-up in global dairy prices, Canadian dairy farmers enjoyed a 30% price increase from 1997 to 2006, while prices for cattle only edged up and those for grains and oilseeds fell sharply. Canadian dairy farmers have seen almost no changes in dairy prices in 2007-08 because the Canadian market remains insulated.

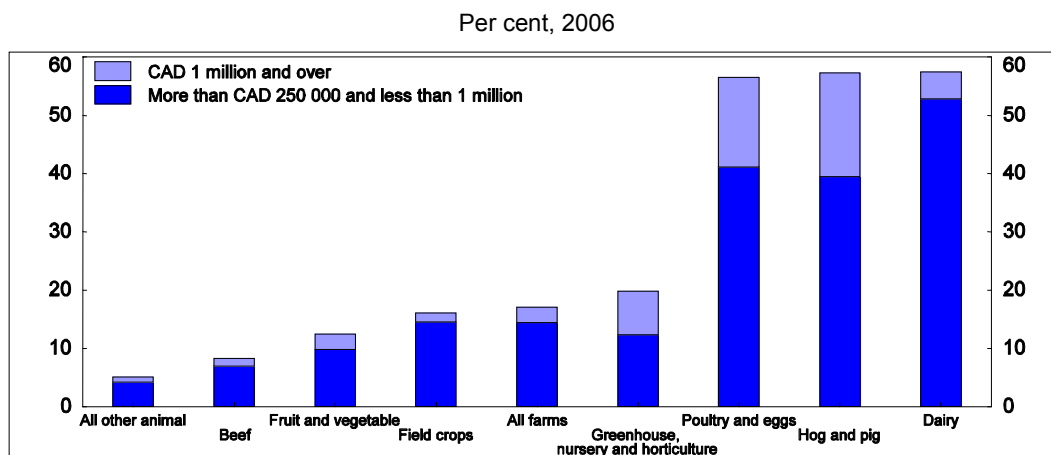
unprofitable, compared to 33% of all farmers.¹³ Moreover, farmers of supply-managed products are often among those farmers with the largest scale (Figure 7). The proportion of dairy farmers with gross farm receipts of more than CAD 250 000 was 57.3% in 2005, the highest among all types of farmers. Indeed, the share of such farms had been only 6% in 1986, similar to the all-sector average. This demonstrates that supply management, like other forms of government intervention, is ineffective in sustaining small-scale producers, often in isolated communities.¹⁴ In addition, with rising prices relative to operating costs and the cost of acquiring quota acting as an effective barrier to entry, the value of milk production quota has risen dramatically over the years (averaging near 10% per year over the past decade), reaching CAD 26 billion in 2006 (Figure 8).¹⁵ Indeed, as a share of total assets in the entire farm sector, quotas now represent nearly one eighth, four times more than a quarter century ago and on a par with machinery and equipment.¹⁶

Figure 6. Dairy product and egg prices between Canada and the United States



Source: OECD, Agricultural Outlook database, 2007-2016 and Economic Outlook 82 database.

13. Indeed, in 2005 dairy farmers were the most profitable in all size classes. This was not just a one-off: the same goes for the previous two census periods (1995 and 2000) as well. Consistent with this picture is the fact that farms in Quebec are the most profitable, and the dairy sector is concentrated there.
14. Since the early 1970s when supply management was implemented the number of dairy farms has fallen from 122 000 to 14 651 (in 2006). While in 1986 an equal number of large farms were in the beef, hog and dairy sectors, by 2006 large dairy farms made up 22% of all large farms as compared to 13% for beef and only 9% for hogs. The only other category to have increased its share of large farms was field crops.
15. At the same time the volume of milk production has remained fairly constant at just over 7 billion litres per year over the past 25 years, while the number of dairy cattle has fallen by half since 1976, reaching 996 thousand in 2006. Thus, the average cow was associated with quota valued at over CAD 29 000 that year, and quota value was some CAD 4 per litre, compared to a support price of around CAD 0.70 for industrial milk that year. The implication is that the free-market price would be closer to CAD 0.50 per litre (assuming a discount rate of 5%). On that basis the support price is some 40% too high.
16. In 2005 data from the 2006 Farm Financial Survey (Statistics Canada, 2007c) show that the 14 665 dairy farms had an average quota of nearly CAD 1.8 million, nearly two-thirds of their total assets and 87% of their net worth. These figures varied substantially across provinces: while Quebec has the most numerous dairy farms, their average quota was worth only around CAD 1.3 million, which represented 81% of their average net worth. However, in the western provinces quota was worth far more (as much as an average of CAD 5 million per farm in British Columbia and over 100% of average net worth in the three prairie provinces).

Figure 7. Large farms by type and receipts¹

1. Proportion of farms with receipts CAD 250 000 and over by farm type.

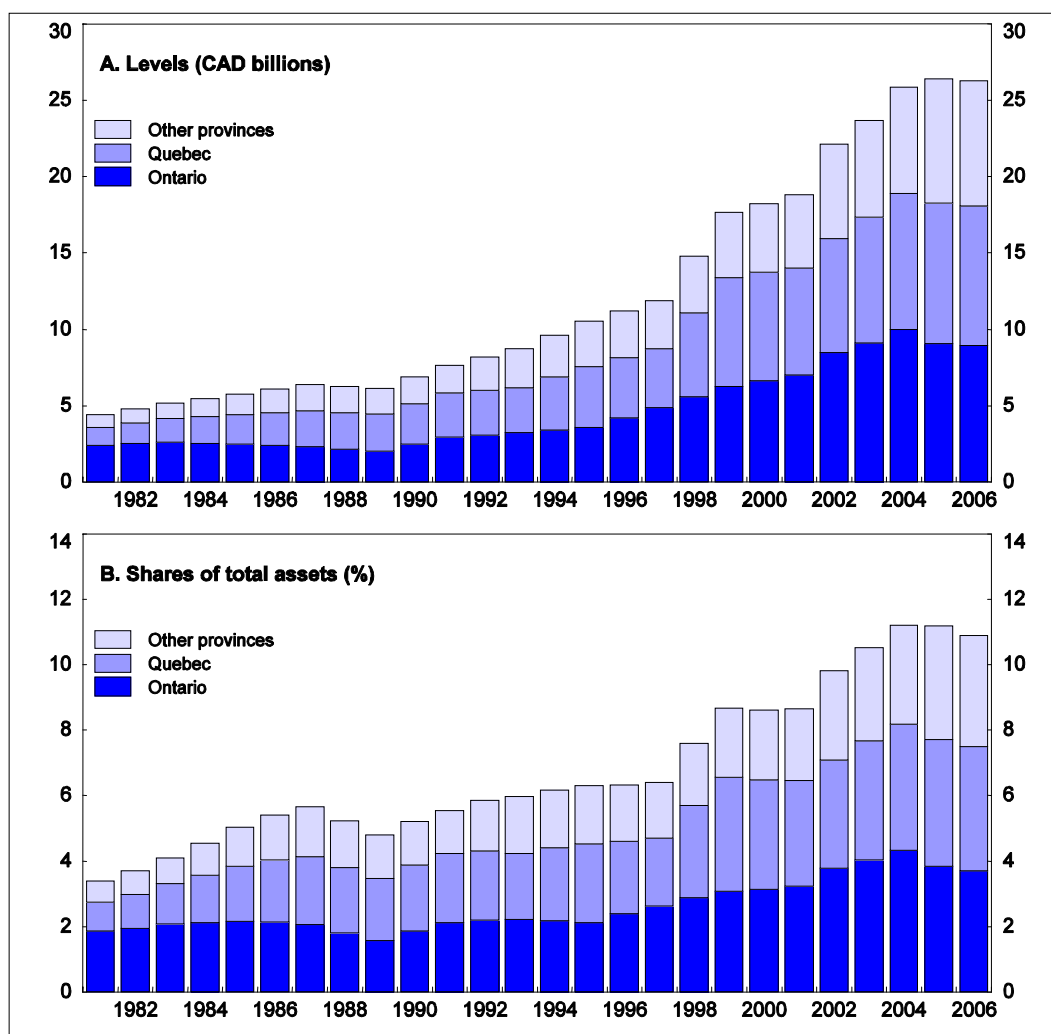
Source: Statistics Canada, Census of Agriculture, 2006.

In sum, commodities under the national supply-management systems receive significantly greater producer support than others, and their prices have been, until recently, much higher than those prevailing on world markets. Against such a background, farmers in these systems have substantially higher income than other farmers and Canadians in general, as well as having higher net worth¹⁷, primarily by virtue of their quota assets. This raises the question as to why these farmers should continue to be protected almost completely from market forces. The rationale is not obvious, particularly from the perspective of consumers who ultimately pay the cost in the form of higher retail prices.¹⁸ Moreover, the system is likely to stifle innovation and the development of value-added products by limiting competition. Faced with the discipline provided by market-based rivalry, the dairy sector in other countries has accelerated consolidation *via* acquisitions and alliances in emerging countries and engages in developing innovative products, such as functional food and flavoured milk, in established markets. The lack of competition and the lack of access to overseas markets are depriving Canadian farmers of these opportunities and preventing consumers from benefiting from improvements in price, quality and choice. Given the recent run-up in world dairy prices, the time seems ripe to begin to wean Canadian farmers from their dependence on protected domestic markets.

17. Average net worth per farm in 2005 was over CAD 2.5 million for poultry and egg producers and over CAD 2 million for dairy farmers. Only potato producers were able to rival these figures; their average net worth was around CAD 2.1 million. Most other farmers had net worth of less than CAD 1 million (Statistics Canada, 2007c).

18. However, there is no evidence that Canadian consumers are upset by the prices they pay for supply-managed products, even though most are undoubtedly unaware of the non-market price-setting system and supplement that supply management schemes cost them. Indeed, 81% of Canadians surveyed in 2007 were not even aware of the existence of the Canadian Dairy Commission (Boyer and Charlebois, 2007). Defenders of the *status quo* also argue that the share of food in total consumers' expenditure is very low in Canada: indeed OECD National Accounts data show that, at 9.6% in 2005, the share of food and non-alcoholic beverages is lower than for most other countries for which such data are available, but nevertheless still well above the corresponding US share of 6.9%. Of course the income elasticity of food is relatively low, so that the country ranking of this ratio is clearly related to levels of GDP per capita.

Figure 8. Marketing dairy quota values



Source: Statistics Canada, Balance Sheet of the Agricultural Sector, January 2008

A useful first step would be to unify the national market by eliminating restrictions on internal trade in quota and allowing at least a modicum of market orientation so that improved domestic competition can weed out the most blatant inefficiencies. But then a difficult political decision has to be taken: that it is unjustifiable to continue to provide one group of farmers special treatment when there is no evidence that their situation is fundamentally different. While it would be admittedly infeasible and indeed unfair to tear down supply management overnight, in the longer term both equity and efficiency arguments call for a single policy framework for the Canadian agricultural sector instead of the two dramatically different systems in place today. However, the vested interests created by the outstanding value of quotas poses a formidable barrier to reform that can be overcome only by a careful reform strategy. Two broad approaches are possible: liberalise the domestic markets immediately while offering compensation for quota holders; or gradually issue new quota such that the increase in supply naturally brings down domestic prices and therefore quota values. Variants of these alternatives include implementing a transitional intermediate system under which existing within-quota production would be eligible for payments from both levels of government to provide farmers with a constant real price on those volumes, but quotas themselves would be scrapped and transactions prices would be market determined. These payments would then be phased down steadily over an adjustment period of, say, 15 years so as to avoid

undue financial harm to the quota holders. An alternative transition package could comprise a mixed mandatory/voluntary quota reduction at the outset along with a long-term phase-out period; federal guarantees on outstanding loans for quota purchases; and assurance that only imports up to the guaranteed access levels will be permitted in the transition period through recourse to safeguards, as has been proposed by Canada's past chief trade negotiator (Gifford, 2005). In any case, should compensation be required to achieve reform, the OECD has developed principles for their application: they should be transparent, time-limited, portable (so as not to discourage exit), cost-effective and not tied to current production levels (Martini, 2007).

Impact of international trade liberalisation on Canada's supply-management system

In the light of its persistently strong popularity among dairy farmers, the federal government has continued to defend the supply-management system during the WTO negotiations and shown little interest in liberalisation. Indeed, the House of Commons voted unanimously in favour of this position in November 2005, and the system got a reprieve at the Hong Kong ministerial meeting in December 2005.

Even if reform can be staved off for the moment, it is ultimately inevitable. If successful, the Doha Round will lead to a reduction in over-quota tariffs. The adjustment will be more difficult if the current high over-quota tariffs are maintained, later – possibly in a future trade round – producers are exposed to significant price declines after tariffs are cut (though if world prices stay high, predictable tariff cuts would not impinge on current Canadian prices – see Gifford (2005)). The earlier the reforms are put in place, the more gradual the transition will be.¹⁹

Trade liberalisation may be beneficial not only to consumers who would gain from lower dairy prices but also to downstream dairy sectors, which would be likely to enhance their competitiveness and engage in value-adding activities as those in New Zealand and Australia have done (Box 1). Indeed, Canada itself has its own example of a farm sector that transformed itself from a sheltered industry producing low-quality product entirely for the domestic market to a much bigger producer of higher-quality output that has won a place in many foreign markets: wine! It is likely that the refusal to open the supply-management regimes is penalising these sectors by reducing their ability to compete in international markets. International evidence also underlines the fact that liberalising the dairy sector would be beneficial to Canada's economic performance both by improving within-sector productivity growth and by accelerating resource reallocation to more productive sectors.

Box 1. Trade liberalisation and the dairy sector

In Australia and New Zealand, supply-management systems, coupled with high levels of protection, were relied on heavily in the past. Their governments, however, have deregulated the industry with a view to exposing it to the market mechanism. The Australian and New Zealand dairy industries went through major restructurings after the two countries signed a free trade agreement in 1983. Competition has generated not only higher productivity growth but also reallocation of resources to more productive sectors. Consumers have also benefited from lower retail prices as well as a wider range of value-added dairy products.

New Zealand

Agriculture in New Zealand stands out among the OECD countries because of its high performance without any form of subsidy. In 1984, the New Zealand government started its agricultural reform as part of a package intended to achieve overall economic restructuring. Importantly, prior to the reform efforts New Zealand farmers had recognised

19. One commentator very recently claimed that “supply management represents a veritable latent tsunami for Quebec and Canadian agriculture. We don't know when it will hit, but its potential strength will destroy the current framework” (translation supplied) (Charlebois, 2008).

that heavy subsidies, causing large budget deficits and inflation, were not sustainable. The export and production support policies were removed, and most reforms were completed by the mid-1980s. Later, single-desk dairy export rights were removed in 2001 with the formation of Fonterra Co-operative Group. Before the recent surge in dairy prices the sector already accounted for around 20% of total merchandise export earnings (Evans, 2004).

Australia

In addition to the free-trade agreement with New Zealand, Australia underwent a major reform of its supply-management system in 2000, eliminating dairy support prices and quotas. The driving factors behind this policy reform were a mandatory review under the National Competition Policy and the backing of dairy farmers in the state of Victoria, where two-thirds of all milk is produced (the system favoured fluid milk production, whereas in Victoria most milk was for manufacturing use). In addition, the Commonwealth government set up a transitional programme (financed by a ten-year retail tax on fluid milk), starting in the form of general assistance, followed by more targeted assistance for farmers in financial distress. The state government also set up an additional aid package.

While the adjustment still continues to some extent in Australia, the industry has become more productive and more export-oriented: over 55% of milk production is exported, primarily as manufactured products (Hart, 2005). Producers are in a good position to capture a large share of growth in demand from emerging markets, an opportunity not available to Canadian dairy farmers, who have no export distribution channels. And consumers have enjoyed a significant cut in the retail price of milk, with consumer savings of AUD 118 million per year just on milk sold through supermarkets (Petkantchin, 2006).

Liberalising the marketing monopolies – implementing marketing choice

Canadian Wheat Board

The Canadian Wheat Board (CWB) was set up with monopoly authority to market wheat and barley on behalf of western Canadian farmers in both overseas markets and the domestic market for human consumption. Established in 1935 under the Canadian Wheat Board Act, it is built on two principles: single-desk selling and price pooling.²⁰

- **Single-desk selling:** The CWB acts as a monopoly seller of western Canada's wheat and barley. It is a big user of the private industry transportation system. The Canadian Grain Commission is a regulatory body distinct from the CWB. It licenses grain elevators, regulates other aspects of the system as well as the variety registration system that seeks to provide high-quality seed that maintains a distinct identity for Canadian grains. While farmers can sell their own output, this requires buying back the grain they delivered to the CWB at spot prices.
- **Price pooling:** The CWB operates a price-pooling arrangement to western Canadian farmers. Under price pooling, farmers receive the same returns for the same grades, varieties and types, regardless of when the grain is delivered during the crop year. The arrangement therefore enables farmers to share the risk of short-term price volatility.

The CWB is, however, faced with a number of challenges. The marketing structure of wheat and barley has been changing rapidly, and the international trade-liberalisation agenda is examining calls for more discipline on the use of state trading enterprises (STEs). The majority of western farmers have argued for the right to sell their products to the buyers of their choice. Against such a background, the federal government has been trying to end the CWB's monopoly in the barley market.

20. Historically, the CWB was established in the aftermath of the Great Depression when farmers wanted to reinforce their market power against large purchasers, railways and input suppliers in order to share risks and stabilise prices (Stiefelmeyer and Mussell, 2005).

Changing marketing structure

While the CWB has advantages for farmers, there is also a cost in terms of reduced opportunities to go beyond bulk commodities so as to market differentiated products. In particular, the single-desk authority takes marketing choice away from farmers, and, given the diversified grain market, the CWB monopoly is likely to undermine the market pricing mechanism that could have been enhanced by giving farmers a choice of marketing methods.

In addition, price pooling is unlikely to provide incentives for farmers to engage in adding value through the production of differentiated grain such as organically grown barley and wheat. For example, reflecting consumers' heightened awareness of food safety, there is now an increasing demand for organically grown farm products.²¹ In contrast to the bulk market, characterised by high volumes and low margins, this requires a system that preserves the identity of grain, under which all parties involved in the supply chain from seed suppliers to grain processors need to be registered and work closely in order to reflect the needs of grain processors and, ultimately, end-users.

Furthermore, while the CWB has offered an effective mechanism to reduce the risk that farmers face with respect to price fluctuations, a greater range of risk-management tools currently available in financial-derivatives markets poses a question as to whether the CWB continues to provide the most efficient method of risk management. For example, delivery restrictions leave farmers with the risk of storage and downgrading losses. In the worst case, farmers end up selling grain fit for human consumption into the feed market in order to avoid storage losses. This could be managed through derivatives contracts.

Other wheat and barley marketing boards have changed their governance structures over the years, switching from mandatory to voluntary systems (Box 2). The Ontario Wheat Producers' Marketing Board has allowed producers to sell their production under the direct marketing programme outside the Board's single desk. This gives producers a choice between the Board programme and the direct marketing programme. Moreover, the Board allows flexibility in setting wheat prices by fixing premiums above the contracted prices. Similar examples are also found in Australia, where marketing arrangements for both wheat and barley have been liberalised to provide choice to growers.

Box 2. Transformation from a single desk seller to a marketing choice for growers

There are a number of examples where a single-desk seller has been transformed into a marketing choice for farmers. This box provides two such examples, one in Canada and the other in Australia.

Ontario Wheat Producers' Marketing Board (OWPMB)

The Ontario Wheat Board was transformed in 2003 from a single-desk marketer to a system under which producers can sell their wheat either directly to the market or through the Board. Producers delivering to a specific pool at the Board receive the same gross prices for similar grades, and those marketing directly may choose freely from among various licensed grain dealers. Producers are now entitled to seek their best pricing options in each crop year. While the share of wheat producers delivering to the pool increased from 6% in 2003 to 26% in 2005 (OWPMB, 2006), there are indications that this trend has recently reversed.

Australia: ABB Grain Ltd and AWB Ltd

Driven by the National Competition Policy initiatives, which aim to improve Australia's economic performance through greater competition, the wheat and barley markets in Australia have been effectively deregulated. First, the Australian Barley Board, which had a monopoly on barley marketing in South Australia and Victoria, was transformed into ABB Grain Ltd in 1999. The domestic barley market was thereby deregulated, and single-desk export sales have

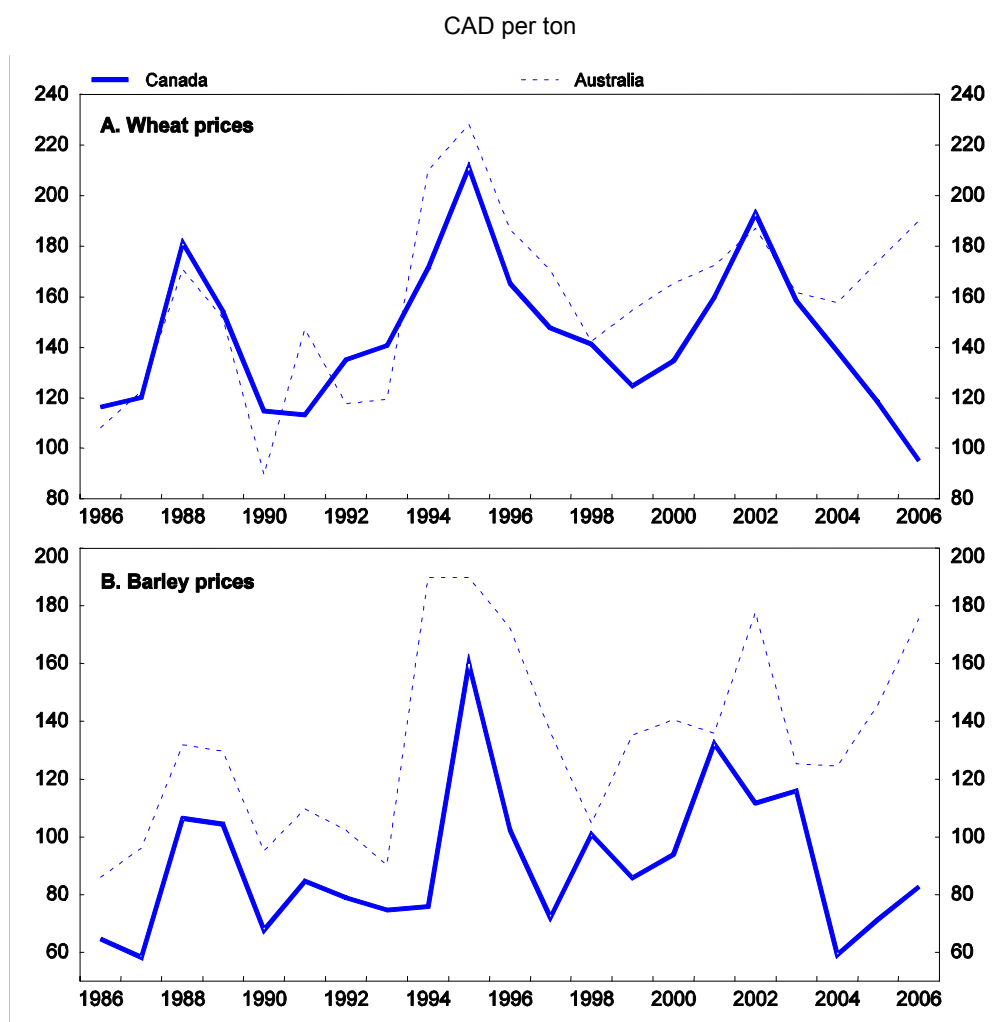
21. In 2006 only 6.8% of all Canadian farms (about 16 000 in all) produced organic products for sale, whether or not they were certified. Most certified producers were selling hay and other field crops.

been eliminated. Shares were issued and listed on the Australian Stock Exchange, where the majority control and ownership are held by grain farmers. ABB Grain Ltd offers many pricing choices as well as pooling in both domestic and overseas markets. Farmers are entitled to choose either to deliver to ABB Grain's pools or to sell through one of the many alternative pricing options.

Similarly, in 2001 the Australian Wheat Board, which had statutory marketing authority over all Australian wheat, became AWB Ltd, a listed company. The domestic wheat market is fully deregulated, and there is no longer a mandatory single desk in the domestic market. Following more recent changes, AWB Ltd. no longer holds single-desk rights over bulk wheat exports. Further legislation is pending that would allow any registered Australian company to apply to export bulk wheat.

It would be of interest to know if the different policy approaches taken in Canada and Australia have had any effect on the prices their farmers receive. Canadian and Australian wheat prices seem to have moved in tandem until the last three years, but a widening gap has opened up since then (Figure 9, Panel A). The reasons are unclear; the Australian drought may have played some role, but so might marketing channels. In contrast, Australian barley prices have been substantially higher than its Canadian counterpart's over the years (no doubt because Australian producers are closer to port), and the differential between the two has also increased since 2003 and by a similar amount as for wheat (Panel B).

Figure 9. Wheat and barley prices in Canada and Australia



1. Producer price at farm gate.

Source: OECD, PSE/CSE database 2007.

Table 1. **Commodities that pool revenues across producers**

Type of commodities	Province	Pooling
Wheat (export and milling)	Prairies (CWB)	Mandatory
	Ontario	Voluntary
Barley (export and milling)	Prairies (CWB)	Mandatory
Milk	All provinces	Mandatory
Hogs	British Columbia, Quebec, Nova Scotia, Prince Edward Island	Mandatory
	Ontario, New Brunswick	Voluntary
Sugar beets	Alberta	Mandatory
Potatoes, onions, carrots	Manitoba	Mandatory
Beans	Ontario	Voluntary
Maple syrup	Quebec	Mandatory
Apples	New Brunswick	Voluntary

Source: K. Stiefelmeyer and A. Mussell (2005), "Pooling in Canadian Agriculture Marketing: Logic, Evolution and Performance", George Morris Centre, Guelph, Ontario.

Apart from wheat and barley, there is no obvious economic reason as to why price pooling has been in place for certain types of commodities in Canada and not for others. The list of commodities where price pooling exists makes it clear that the implementation of price-pooling arrangements is not commodity-oriented. Even among similar types of field crops, there are differences – wheat and barley are pooled, while corn and soybeans are not (Table 1).

Impact of international trade liberalisation

The WTO negotiations may have a significant impact on STEs, and the CWB can be expected to undergo substantial changes as a result of the negotiations. The possible elimination of monopoly powers of STEs remains under intensive negotiation. In addition, the July 2004 package under the Doha Development Agenda stated that trade-distorting activities such as (implicit) export subsidies by the STEs must eventually be withdrawn. This was followed by the Hong Kong declaration in December 2005, which stated that all export subsidies are to be eliminated by 2013.

The federal government's reform strategy

In the light of these developments, the CWB has made efforts to comply with changing market structure, providing farmers with some marketing choice and boosting their incentives to engage in value-adding activities. For example, it introduced a policy that authorises grain processors to buy up to 500 tonnes of wheat or barley directly from each farmer. Also, a new programme was implemented under which producers of organically grown wheat and barley can repurchase their products directly from the CWB, with the latter providing the financial aid in case the buy-back price exceeds the initial price. Furthermore, farmers now have a number of choices in marketing organic grain, including an option to sell directly to buyers with whom an organic premium can be freely negotiated in addition to the CWB spot price for conventional grain.

Against this background, the federal government undertook a barley plebiscite in March 2007, and 62% of farmers opted for marketing choice (*i.e.* allowing sales to other buyers, implying an end to the CWB's monopoly). As a result, the government took steps to amend regulations under the Canadian Wheat Board Act. In the government's view, the CWB's single-desk authority in the barley market rested on the regulations under the Act; hence, there was no need to modify the Act itself.

The CWB, which prefers to evolve in a measured pace towards more flexible marketing of barley, publicly opposed the government's initiative to amend the regulations. It contended that neither the government consultation with its board members nor a binding farmer referendum – a requirement for changing the CWB's mandate under the Act – has been met so far (Canadian Wheat Board, 2007). The CWB asked the courts in June 2007 to review the legality of the federal government's procedures to remove the CWB's single-desk authority (in 1993, the CWB had succeeded in reversing the federal government's decision to remove the CWB's authority in the continental barley market²²). Notwithstanding the CWB's contention, the government felt that it had adequately consulted with stakeholders on the proposed regulatory amendment, and it tried to remove the CWB's single-desk authority in the barley market from 1 August 2007. At the last minute the Federal Court once again ruled against the government, and this ruling was upheld on appeal. The Government then introduced Bill C-46 in March 2008 to amend the Canadian Wheat Board Act to remove the Canadian Wheat Board's authority over the marketing of barley.

The Agriculture Policy Framework and beyond

Agriculture Policy Framework

Following an agreement by agricultural ministers in 2001, Canada's federal and provincial governments began to implement a new agriculture policy called the "Agriculture Policy Framework (APF)" in June 2003 (Box 3). Its aim was to provide a more comprehensive and long-term framework that would reshape Canada's agricultural policies and that would put the agricultural sector ahead of global competition. In essence, the APF was said to be designed to change Canada's agricultural policy from simply focusing on income support to a more comprehensive approach that would include not only risk management but also the long-run viability of the agriculture and agri-food industry through technology and innovation, bearing in mind food safety and quality as well as environmental responsibility. However, some of the policies comprising the APF were either in place before its inception or had been previously proposed but were not nationally implemented.

Box 3. Overview of the Agriculture Policy Framework, 2003-08

The APF consisted of five pillars, namely: business risk management, food safety and quality, science and innovation, environment, and the renewal of the agricultural sector.

Business risk management

While previous programmes had been designed to meet risks faced by producers, gaps in its coverage and inequality across provinces remained. Due to such concerns, federal and provincial governments decided to build a comprehensive safety net. The APF programme in the area of business risk management consisted of three blocks.

First, income-stabilisation and disaster-protection objectives were integrated in a new programme called "Canadian Agricultural Income Stabilisation (CAIS)¹". In essence, producers who joined the CAIS paid a fee, lately 0.45% of the "reference margin" protected. They were then entitled to receive a payment from the CAIS when their current-year margin (allowable income minus allowable expenses) fell short of the average reference margin for the latest five years (dropping the best and worst years from that moving average). By combining the disaster-protection and income-stabilisation programmes, the CAIS aimed to restore the targeted income level more efficiently. The CAIS reflected the "whole-farm" approach where payments are based on the total receipts of the farm, rather than being tied to the production of specific commodities.

Second, Production Insurance, which replaced Crop Insurance in 2003, aimed to stabilise producers' incomes by minimising the production losses caused by natural hazards. It has been run primarily by provincial governments, and

22. In 1993, the federal government attempted to introduce an exemption under which farmers were no longer required to obtain an export license when exporting barley to the United States. The courts confirmed that the Governor in Council did not have the power to authorise barley exports without a license.

both the federal and provincial governments have covered a share of premiums, subsidised administrative costs and provided a reinsurance arrangement to provincial governments.

Third, Provincial and Territorial Programming were intended to provide additional assistance that allowed more flexibility in meeting provincial needs. It included measures to enhance the CAIS, research and innovation, and commodity-specific price supports. While these programmes were supposed to help smooth the transition to the new framework under the APF, there was no provision for their termination.

Food safety and quality

The food safety and quality chapter had multiple aims: to protect human health by reducing hazard exposure; to increase consumer confidence; and to provide value-added opportunities through the adoption of food safety and quality systems. To realise these objectives, the federal government initiated the Canadian Food Safety and Quality Program (CFSQP), under which it helped stakeholders to develop and implement food safety, quality and traceability systems throughout the food chain.

Science and innovation

The science and innovation programmes, some of the most challenging in the APF, were intended to increase the potential for growth and profitability of the Canadian agriculture and agri-food sector in the long run. While many are still at an experimental stage, they fall under three broad categories: sustainable production systems; bio-products and bio-processes; and science and innovation programming.

Sustainable production systems aim to make production more resilient to natural adversities such as disease and the vagaries of the weather. Bio-products and bio-processes provide opportunities to explore new systems in the area of genomics and other bio-products. Under the science and innovation programming, technology transfer and the commercialisation of new products are being accelerated. The programme has been funding the sunrise industries that are engaged in the production of new commodities and bio-products such as bio-fuels and bio-materials.

Environment

The environmental measures under the APF aim to minimise the risks stemming from environmental liabilities and the market loss due to consumer concerns. They are therefore intended to help the agriculture and agri-food sector achieve sustainability in the areas of biodiversity and soil, water and air quality. Activities in this field have included formulating policies that contribute to achieving Canada's commitments in the area of climate change and environmental sustainability, and developing new technologies that promote environmental sustainability and management.

Amongst a number of initiatives, Greencover Canada, a five-year, CAD 110 million federal programme, is designed to promote land use for perennial forage and trees. The objective is to protect land from wind and water erosion, to improve water quality, to enhance biodiversity, and to increase sub-soil carbon sequestration. In order to identify the most sensitive land for eligibility, an index was created to capture the quality of soil, air and water as well as landscape and wildlife implications: the environmental sustainability index (ESI). The ESI helps identify environmentally sensitive agricultural land, and the programme provides assistance for farmers to convert to perennial cover.

Other important components are: the National Farm Stewardship Program, which has provided technical support to individual farmers to develop tailored Environmental Farm Plans to improve their environmental outcomes as well as cost-sharing for implementation; and the National Water Supply Expansion Program, designed to address the growing risk of water shortages, which also provides cost-sharing support for on-farm water infrastructure.

Renewal of the agricultural sector

This pillar provides farmers with assistance to deal with changing market demand and to improve their business management skills. Its cornerstone is the Canadian Farm Business Advisory Services (CFBAS), under which eligible farmers have access to services ranging from consultations relating to their current farming business to building a new business strategy and implementing it by acquiring new knowledge and developing new skills.

1. The programme is federally administered in British Columbia, Saskatchewan, Manitoba, New Brunswick, Nova Scotia, Newfoundland and Labrador, and the Yukon, whereas elsewhere (*i.e.* Alberta, Ontario, Quebec and Prince Edward Island) provincial governments are responsible for delivery.

Beyond the Agriculture Policy Framework

In light of the APF's scheduled expiration in 2008, federal and provincial agricultural ministers established a review panel in April 2005. The objective of the panel was to reassess all elements of APF programmes and to provide advice that would enhance their performance. Among the recommendations made in June 2006, the panel emphasised that, *first*, a broader consultative process should be undertaken in order to capture what Canadian society expects from its agriculture; and, *second*, the framework should be based on a long-term perspective, while de-emphasising mechanisms to solve *ad hoc* short-term crises. In this context, the business risk-management pillar, which has received most attention in the APF, was to be better balanced with other pillars – in particular, more emphasis was to be placed on the science and innovation pillar from the perspective of long-term viability of the agricultural sector.

Furthermore, while the APF intended to avoid resorting to *ad hoc* assistance, there have been a number of such programmes since its enactment, and the dominant budgetary focus has remained on the business risk-management pillar. Additional *ad hoc* programme spending was partially necessitated by the discovery of a Canadian cow with bovine spongiform encephalopathy (BSE) in 2003, which resulted in the closure of Canadian export markets for cattle and beef. The impact of BSE was particularly severe for Canada because the export market accounts for a large share of domestic production, so it was not possible to absorb normal production in the domestic market. Starting with the APF Transition Payment (CAD 1.2 billion) in 2002-03, the federal government then introduced the Transition Industry Support Payment (CAD 995 million) in 2004, the Farm Income Payment (CAD 1 billion) in 2005, the Grains and Oilseeds Payment Program (CAD 755 million) also in 2005, the CAIS Inventory Transition Initiative (CAD 1 billion) in 2006-07, the Cost of Production Payment (CAD 400 million) in 2007 and the AgriInvest Kickstart payment in 2008 (CAD 600 million). Overall federal/provincial government support (both ongoing and *ad hoc* programmes) to the farming sector have been stuck in the CAD 3.8 to 4.4 billion range for each of the past six years (about CAD 16 600 per farm in 2006). The result is that such payments may have become embedded in farmers' expectations, thereby creating moral hazard; that is, farmer behaviour that is based on the expectation that such supposedly one-off payments will be regularly forthcoming, should the need arise. Possible examples of such behaviour would be taking excessive risks in planting decisions in the knowledge that government will provide help if conditions do not turn out as favourable as hoped.

Recent programmes no doubt reflect unprecedented challenges in the agricultural industries – the rising age of farm operators,²³ the fallout from BSE and avian influenza; the increasing cost of fuels, fertilisers and other inputs; and the rapid rise in the foreign exchange value of the dollar. Nevertheless, the series of payments may result in a “*de facto* institutionalisation of income support” (OECD, 2007a, p. 92), and market-based policies that enable farmers to manage their income risks without resorting to government subsidies need to be explored.

After a year of public consultation based on the *Next Generation of Agriculture and Agri-Food Policy* – an initiative for stimulating a dialogue among stakeholders – the federal and provincial governments agreed on the vision and principles of *Growing Forward* in June 2007. This initiative forms the basis for a new agricultural policy framework, which was partially introduced after the APF expired in March 2008. Implementation is planned to be gradual during the year ending 1 April 2009. While some of the details of the new regime have yet to be decided,²⁴ a high priority will be placed on competitiveness and innovation, and the governments have shown commitment to supporting an environment that encourages innovation. Otherwise, the intent is to allow greater provincial/territorial flexibility (combined with nationally set

23. The share of those aged 55 and over jumped from less than a third in 1996 to over 40% in 2006. Those under 35 fell from 20% in 1991 to 9% in 2006.

24. The guiding principles of reform were contained in *Growing Forward*.

objectives). In addition, a new set of business risk-management programmes has been agreed. Replacing the CAIS, the new suite will be made up of four components:

- *AgriInvest* will offer to producers savings accounts where small income losses are covered. It also supports investments for mitigating risks and improving market incomes.
- *AgriStability* will be a margin-based income stabilisation programme that provides income support in case of large income losses.
- *AgriInsurance* will combine the current Production Insurance and other insurance programmes, which minimise producers' income losses from natural hazards (*i.e.* weather, pests and disease). It is being expanded to cover more commodities than under the APF.
- *AgriRecovery* will be a disaster-relief programme that provides rapid assistance not covered by existing programmes.

Overall, the federal government is aiming to make the assistance programmes more responsive, predictable and bankable. Indeed, the new programmes seem to provide a more comprehensive safety net for producers by filling gaps under the current system. Nonetheless, it remains to be seen whether they will lead to less reliance on *ad hoc* assistance programmes,²⁵ since once again it appears as though there is a substantial element of repackaging. Stronger efforts need to be made to resist the temptation to loosen the provisions under which financial support is provided, as has happened in recent years, or else Canada will continue to be an outlier within the OECD by having trend increases in its PSE levels, with all the distortions that would imply. And provincial governments too need to move away from old-style, deficiency-payment programmes that set target prices for different crops and then make up the difference between market outcomes and the target.²⁶ In any case, the private sector could in principle provide a similar safety net, while there is every chance that government programmes could be effectively crowding out the potential for a market-based insurance mechanism. Since the series of government payments have no doubt created moral hazard on the part of farmers, the balance between public interventions and farmers' discipline in terms of business risk management should be carefully taken into account.

Rising to agriculture's environmental challenges

The environment is obviously a key input into farming. Yet farmers not only make heavy use of land and water, they also have a significant impact on the environment through their use of energy and chemicals, such as fertilisers and pesticides, as well as the impact of their operations on biodiversity. This section will briefly examine the environmental performance of Canada's agricultural sector, based largely on OECD (2008a). It will also place a special focus on the recent expansion of bio-energy production.

Improving environmental performance

OECD (2008a) argues that the environmental performance of Canadian agriculture since the early 1990s has been mixed at best. Soil quality has improved, though tillage practices could be better, and some

25. One reason for such scepticism is that moral hazard has not only crept into individual farmers' decision-making but also into that of the sector's leaders in the sense that it is politically easy to argue in favour of spending more on agricultural support. Another is that *ad hoc* payments can be made with low transactions costs in view of the individual accounts that have existed for some time and will continue under *AgriInvest*.

26. Examples of such programmes are Ontario's Market Revenue Insurance and Quebec's *Assurance-stabilisation du revenu agricole*.

cropland at high risk of degradation is still being farmed. High-quality water remains abundant. Nutrient surpluses per unit of land are still among the lowest in the OECD. However, several trends are disturbing.

- Nutrient surpluses (nitrogen and phosphorus balances) have risen faster than in any other OECD country, owing to greater use of inorganic fertilisers and higher livestock numbers.
- Pesticide sales doubled between 1990 and 2003, though their damage may not have increased commensurately because of the use of new, lower-dose products. Although the level has been increasing, it is still very low compared to other countries.
- Though recent data are not available, agriculture's share of water use was rising in the 1990s, because of an increase in the area of land under irrigation.
- Direct on-farm energy consumption has also risen; indeed, the ratio of energy inputs to farm output also increased in the 1990s. This has contributed to its greenhouse gas (GHG) emissions, which have been rising by 1.0 (when measured net) to 1.5% per year (on a gross basis),²⁷ whereas elsewhere in the OECD emissions have been edging down. In 2005 farming was responsible for 8% of Canada's GHG emissions, but less than 2% of its GDP.
- Finally, the capacity of farmland to support wildlife continued to decline in the decade to 2001. Indeed, the deterioration accelerated compared to the previous decade.

Policy makers are aware of these trends and have accordingly been devoting increasing attention to the environmental impact of agricultural policy. The 2004-08 APF included CAD 700 million from the federal government (matched by their provincial and territorial counterparts) to help farmers improve their environmental management through technical assistance, extension, research and demonstration activities. Also, on-farm water infrastructure investments are eligible for a one-third subsidy. Nevertheless, it is fair to say that new Canadian agri-environment policies have concentrated on incentives overlaid on top of existing regulations, especially related to management of manure and pesticides. Elsewhere, the polluter-pays principle seems accepted, but that idea has made precious little headway in Canada's farm sector.

The passage of a new Pest Control Products Act in 2002 enabled Canada to continue major efforts in risk reduction from pesticides, whereas it had previously maintained entirely separate standards for pesticide testing and approval. The achievement was underpinned by an early and consistent stakeholder consultation process. Looking ahead, increased availability of information²⁸ should be a priority, both in this area as well as others such as water use and quality. In that regard the environmental performance benchmark indicators that the federal and provincial governments agreed to gather as part of the APF need to be published more often.²⁹

While point-source discharges to surface water from industrial and urban waste-water systems have been significantly reduced, there remains ample room for improvement in controlling water pollution from

27. The lower figure for net emissions results from a large increase in carbon sequestration by soils as a result of land-use changes and improved soil-management practises. The gross increase is attributable to the expansion in the beef, hogs and poultry sectors as well as higher application of fertilisers in the Prairie provinces (Statistics Canada, 2007d, p. 19).

28. Canada is one of the few OECD countries not regularly reporting on the volume of pesticide use. Responsibility for regulating pesticides resides with Health Canada. While risk assessments are carried out nationally, there have been efforts to harmonise data requirements at the NAFTA level.

29. To date there has been only one report under the APF, and it dates back to 2005. Another is planned but may not be available until 2009.

agricultural sources in Canada, despite a range of measures by some provincial governments (who have sole jurisdiction in this area) to reduce the risk of water contamination. In particular, against the background of the bio-energy expansion (see below), increased use of fertilisers and chemicals to increase crop yields for its production could create further complications. Measures are needed to address such problems, and water quality trading – a market-based approach to improving water quality – could be explored further (Cantin *et al.*, 2006).

Bio-energy expansion

In parallel with the rapid expansion of government-subsidised bio-ethanol production in the United States as well as biodiesel production in the European Union,³⁰ the Canadian government has introduced consumption mandates and subsidies to expand bio-energy³¹ production. Motor fuel blends were exempt from federal excise tax until 1 April 2008 at an annual cost of CAD 40 million in 2006. To date, however, ethanol production in Canada has been on a significantly smaller scale than in the United States and Brazil – Canada produced 231 million litres, whereas the United States and Brazil produced 16 139 and 16 000 million litres, respectively in 2005 (Klein, 2007). Thankfully, Canadian bio-fuels policy was more focussed on research credits than production subsidies, as in the United States where there is a federal blending subsidy, currently of USD 0.51 per gallon (about 0.135 per litre), worth some USD 4 billion in 2007 – in addition to other federal and state support. More recently, however, in 2006 the Canadian federal government launched an initiative to mandate a 5% ethanol blend in gasoline by 2010 and a 2% biodiesel blend in on-road diesel and heating oil by 2012. The mandates will require some 2 billion and 0.5 billion litres of additional ethanol and biodiesel per year, respectively, when they take effect. Accordingly, Canada has already introduced initiatives to help the canola sector to produce biodiesel, and moreover it has started to produce second-generation bio-ethanol – the ethanol from cellulose,³² which has been used as a liquid transportation fuel on a demonstration basis. Budgetary support totalling CAD 2.2 billion over nine years has been made available for operating incentives, construction of production facilities and investment in next-generation technologies while at the same time eliminating the excise tax exemption on motor fuel blends.

The objectives of bio-energy production are threefold. *First*, the production and consumption of bio-energy is expected to reduce reliance on fossil fuels and thereby lower greenhouse gas emissions (environmental objectives). *Second*, it will produce additional income opportunities for farmers by creating new value-added commodities and generating new markets for these commodities (agriculture and rural development objectives), and, *third*, it will contribute to cleaner air in urban areas.

Downside of bio-energy production

The production of bio-energy has a number of advantages, but its largely policy-induced demand increases also have an important downside: rising crop prices as a result of increased competition with

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30. Bio-fuels production is also subsidised in Switzerland and Australia (Doornbusch and Steenblik, 2007).
 31. Bio-energy is a general terminology used for renewable energy produced from biomass, and it includes bio-fuels, bio-power and bio-heat. Among the bio-fuels – fuels used to power engines in transport – there are, broadly speaking, bio-ethanol, biodiesel, synthetic bio-fuels and biogas.
 32. First-generation bio-ethanol produces ethyl alcohol from starch and sugar crops. More recently, Iogen Corporation, one of the leading biotechnology firms in Canada, has developed a technology to convert plant fibre – such as wheat and barley straw and corn stover – into sugar. It will then be distilled to produce cellulosic ethanol.

other forms of usage.³³ Biodiesel produced from canola and vegetable oils, like the first-generation bio-ethanol produced from grains and sugar crops, is more likely to compete directly with other uses of agricultural commodities, in particular with food consumption. Cellulosic ethanol, which mainly uses agricultural residues and wastes, can also compete with other uses in the markets; therefore, it is not immune from impinging on food production, though it is superior for energy production and for environmental preservation. Canadian and foreign meat producers, facing higher costs of feed inputs as a result of increased demand for plant fibre, are sure to have to pass them on to consumers by raising prices of meat and meat products. Higher input and land prices will also create an entry barrier in farming industries. More generally, increased demand for these commodities is not only contributing to higher prices, but probably to increased price volatility as well. Such developments will pose an adverse effect on importing countries, in particular low-income importers. The situation will become even more complex if developing countries choose to produce more energy crops instead of food crops in light of higher demand from developed countries. This “food *versus* fuel” trade-off could therefore exacerbate the plight of the world’s poor and malnourished.

Another downside of bio-energy production concerns how much – if at all³⁴ – it would actually contribute to carbon-emissions reduction (OECD, 2008b), especially given the need to transport the biomass input to large production facilities. From a global perspective, increased demand for bio-energy crops has allegedly contributed to the destruction of natural eco-systems, in particular grasslands and rainforests, such as those in Indonesia and Brazil, with heavy biodiversity costs. The net effect of more forest destruction and more bio-fuel production is difficult to ascertain. The increased use of water to allow the biomass to grow may also be problematic. The first Agricultural Water Use Survey will be helpful in this respect.

Looking at each commodity separately, the amount of greenhouse-gas reduction remains of the order of 20-40% from cereal-based ethanol production, but it increases to a range of 70-90% from cellulosic ethanol production and 40-60% from canola-based diesel production (Klein, 2007). Thus, it seems clear that the second-generation bio-ethanol – which Canada excels at – is a more efficient means of reducing greenhouse-gas emissions than its predecessor.

Nevertheless, the competitiveness of Canada’s potential cellulose-based ethanol remains uncertain. *First*, because of a relatively short growing season, it will be difficult to generate high yields in Canada. *Second*, the logistics involved in cellulosic materials pose significant challenges. *Third*, and not least, its production is more expensive, and most of the alternative forms of bio-energy production cost less, some (especially Brazilian sugar-cane based ethanol) substantially so (Figure 10). In short, irrespective of the efficiency of greenhouse-gas reduction, the competitiveness of ethanol production from cellulose is, at this stage, still unproven in terms of its cost efficiency.³⁵ Indeed, the cost of government support per tonne of CO₂ – equivalent avoided is far greater than what can already be achieved using other renewable,

33. Indeed, calculations show that, even with crude oil prices of only USD 60 per barrel, corn-based ethanol production in the United States is profitable at recent corn prices of around USD 4.75 per bushel (Tyner and Taheripour, 2007).

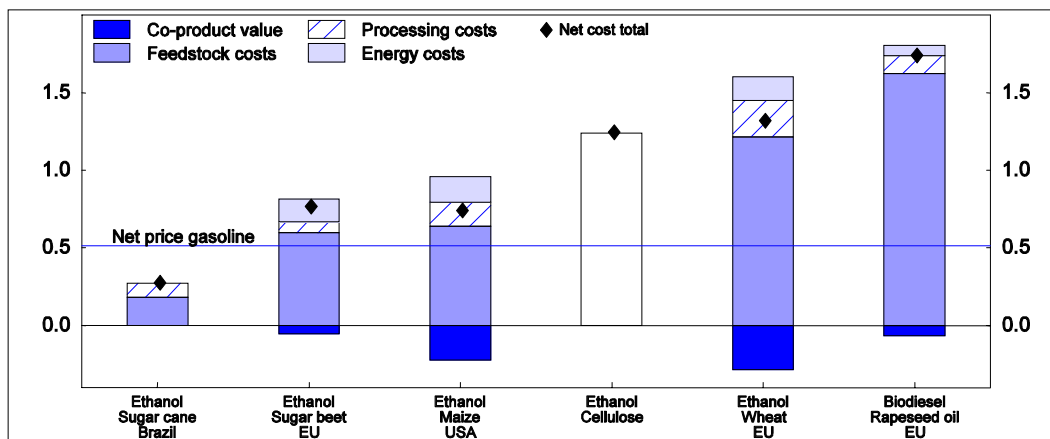
34. Two very recent studies argue that once the carbon generated in the production of the bio-fuels is properly accounted for the net effect on GHG emissions is unfavourable. Previous research is said to have led to erroneous conclusions because it neglected land-use change. See Searchinger *et al.* (2008) and Fargione *et al.* (2008).

35. Against this background, the Canadian firm Iogen Corporation was awarded up to USD 80 million start-up subsidies by the US Department of Energy in February 2007, and it announced a decision to open its first commercial production site in Idaho (USA). However, with corn-based ethanol production so highly profitable at current corn and crude oil prices, convincing potential producers to go ahead with such investments is a difficult proposition.

non-emitting energy forms (Doornbusch and Steenblik, 2007). A carbon tax or permit trading would be superior approaches, as they would not favour any particular technology. If such measures cannot be applied to agriculture on political or technical grounds, then offering increased research subsidies or prizes for technological breakthroughs would be preferable than mandated ethanol use.

Figure 10. **World bio-energy production costs**

2007, US\$ per litre gasoline equivalent



Source: OECD, calculations from Agricultural database and from Worldwatch Institute (2006) for cellulose for which no further breakdown is available.

Policy recommendations

Based on the preceding analysis of these four major issues in Canada's agricultural sector, the following policy recommendations ensue (Box 4).

Box 4. Policy recommendations to modernise the agricultural sector

The priority for Canada's agricultural sector is to ensure its long-term viability in the global context. As the sector is a major beneficiary of world trade, Canada is in a position to encourage open and competitive agricultural markets.

National supply management systems

- Phase out the supply-management regimes by progressive introduction of market forces, while ensuring the availability of transitional support to smooth the adjustment. A useful first step to increase efficiency would be to remove the restrictions on internal trade in quota.
- Reduce the level of producer support by, in particular, shrinking single commodity transfers for milk and eggs, bearing in mind that these producers are among Canada's most affluent.
- As the Supply Management system is phased out, integrate supply-managed sectors under the new policy framework, rather than treating them differently.

Marketing monopolies

- Following the judicial setback on barley, pass the amendments to the Canadian Wheat Board Act. Adopt a similar approach of consultation with stakeholders in the wheat market as was done for barley.

Beyond the Agricultural Policy Framework

- Consider taking greater advantage of business risk-management tools available in the private sector, instead of having governments provide the whole range of safety net programmes.
- Once the new framework is in place, avoid *ad hoc* assistance programmes that serve to build up moral hazard and place a heavy burden on the budget.
- Set measureable benchmarks for assessing programme success and report on progress, especially in reaching environmental goals.

Bio-energy and other environmental challenges

- Implement a regular pesticide use survey, in line with foreign practices.
- Heighten efforts to reduce water pollution from the agricultural sector, and examine if a market-based approach to improving water quality might be a workable solution.
- Further examine the viability of the second-generation bio-ethanol production, taking account of its relatively high production cost and difficult logistics pertaining to collection, storage and distribution of biomass. Rather than mandate use, which is likely to prove cost-inefficient, offer increased research subsidies or prizes for technological breakthroughs if a carbon tax or permit trading are infeasible in agriculture.

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