IFA-FAO AGRICULTURE CONFERENCE

"Global Food Security and the Role of Sustainable Fertilization"

Rome, Italy, 26-28 March 2003

COMMERCIAL FARMS IN DEVELOPED COUNTRIES: INSIGHTS FROM CANADIAN PRAIRIE AGRICULTURE AND "SUBSIDY-FREE" NEW ZEALAND

Ben BRADSHAW
Simon Fraser University, CANADA

Simon Fraser University, Department of Geography,
Burnaby, B.C. V5A 1S6 Canada
Email : bbradsha@sfu.ca

IFA-FAO AGRICULTURE CONFERENCE
Rome, Italy

"Commercial Farms in Developed Countries: Insights from Canadian Prairie Agriculture and "Subsidy-Free" New Zealand"

Paper by Ben Bradshaw
Simon Fraser University

1 CONTEXT: FOOD SECURITY AND DEVELOPED WORLD AGRICULTURE

As re-iterated in the UNFAO's recent assessment of food security, *World agriculture: towards 2015/2030*, progress is being made with respect to growth in global per capita food output and reduced incidence of undernourishment; however 800 million people, primarily in developing regions like south Asia and sub-Saharan Africa, still feel the effects of food insecurity. How does this case study on commercial farms in developed countries fit into this discussion?

Certainly, it should be acknowledged that food insecurity is an issue beyond the developing world. For example a 1999 Statistics Canada Study found that approximately 10% of Canadians live in 'food insecure' households, a great proportion of which are low income, and lone-parent (female). However, the link between food insecurity in Canada and Canadian agricultural output levels is limited. Food insecurity exists despite an abundance of (cheap) food. For example, wheat production in Canada over the past century has steadily increased; indeed, over-abundance largely explains current historically low prices in real dollar terms (SLIDES 3-5). The explanation for this common phenomenon is widely acknowledged in the food security literature; the abundance of food in a region or country represents just one part of as larger formula:

Food Security = **Abundance** + Adequacy + Access

What about the contribution of developed world agriculture to meeting global food demand? While total output among MDCs is significant at present (especially relative to population),[1] and will likely continue to be in the near future, regional self-sufficiency is ultimately a preferred goal. That is, further increasing output levels in MDC agricultural systems is not expected to improve food security amongst the world's poorest people. Indeed, this view is consistent with Canada's official 'Action Plan for Food Security' formulated in response to the 1996 World Food Summit.

[1] *According to the UNFAO, in 2002 MDCs produced nearly 842 million metric tonnes of cereals, while LDCs produced nearly 1190 million metric tonnes.*

2 FOCUS AND STRUCTURE OF THE PAPER

Given (1) the tenuous link between domestic agricultural output levels and domestic food security in a place like Canada; and (2) the declining emphasis on the contribution of MDC agriculture to meeting global food demand, this paper necessarily focuses *not* on farming system productivity in a MDC context and what needs to be done to increase it, *but rather* farming system viability in a particular MDC agricultural region, the Canadian prairies, and what needs to be done to ensure it.

The paper is organized as follows. In the next section, a review of Canadian prairie agriculture is provided that seeks to characterize the farming system according to its conformity with a more widely observed 'trajectory' of agriculture in MDCs. Following this, a number of current challenges and opportunities facing Canadian prairie agriculture are identified. These include:

- climatic change (& variability);
- domestic agricultural policy (and the international trade environment);
- market conditions;
- biotechnology; and
- public/environmental pressures.

Lastly, some recommendations are offered for both Canadian agricultural policy and trade liberalization initiatives through the World Trade Organization.

3 CANADIAN PRAIRIE AGRICULTURE

Canadian Prairie agriculture, which accounts for roughly 51% of Canada's farms, 81% of its farmland, and 44% of its agricultural GDP, has long been recognized as a significant contributor to world cereal output and especially wheat.[2] Historically, production in the semi-arid region has centred on specialized, indeed often monoculture, cereal cropping, enabled via frequent summer-fallowing (for moisture retention) and extensive use of conventional tillage (for weed control and bed preparation). More recently, however, summer fallowing and conventional tillage have increasingly been replaced with extended crop rotations and conservation tillage, while the production of livestock[3] and non-traditional crops has greatly expanded. In particular, increased interest in oilseeds such as canola and flax seed, and pulses such as field peas and lentils, and the parallel decline in traditional spring wheat through the 1990s (SLIDE 20), has lead many to identify crop diversification (rather than specialization) as a new trend within Canadian prairie agriculture. This may be true at the scale of the Prairies as a whole and even at smaller scales, but recent evidence confirms that, at the individual scale, crop specialization remains remain the norm (SLIDES 21 & 22).

---

[2] *Canada is the world's #6 producer of wheat, and the prairies produce 94% of Canada's total. More exactly, for the period 1991-2000 wheat production in the Canadian prairies accounted for 4.5% of world wheat production (Source: Canadian Wheat Board, 2003).*

[3] *The prairies now account for 70.3% of Canadian cattle and 40.7% of hogs.*

In this and many other regards, Canadian prairie agriculture appears to conform to a standard model, or better, a 'trajectory' of agriculture in MDCs, which many have labelled as 'productivist' given its narrow focus on ever-expanding production. Over the past half-century, the farming system has consistently displayed a number of key characteristics of this model, including:

- increased output productivity (SLIDE 4 & 5);
- larger and fewer farms (SLIDES 17 & 18);
- more specialized production (SLIDES 19, 21 & 22);
- more intensive production (SLIDES 23 & 24);
- greater integration of farms into the agri-food system (SLIDE 25); and
- more 'pluriactivity' (SLIDES 26 & 27).

While a small percentage of prairie operations are beginning to display characteristics that might better be labelled as 'post-productivist' given their interest in producing differentiated, quality goods for speciality or niche markets, the bulk of prairie producers remain entrenched in the 'productivist' model of primary agriculture. Whether good or bad, right or wrong, this model can largely be thought of as the inherent product of long-term adaptation by thousands of producers to a variety of challenges and opportunities.

4 CURRENT CHALLENGES/OPPORTUNITIES

4.1 Climatic Change (and Variability)

Since initial settlement, agricultural production in Canada's semi-arid prairies has been greatly influenced, and indeed constrained, by climatic conditions such as inconsistent moisture availability. Under projected climate change, this influence is expected to intensify given anticipated warmer temperatures, more variable precipitation, increased evaporation, and more frequent and extreme weather events. These altered conditions will clearly result in system impacts, some positive and others negative. On the positive side, combination global circulation - crop production models have identified increased crop yield potential for the prairies, all other things being equal (SLIDE 32). Also of a positive nature, current national scale efforts to mitigate future climate change through reducing domestic Greenhouse Gas (GHG) emissions may afford prairie farmers an opportunity to 'sell' GHG off-sets in exchange for implementing such practices as no-till.

On the negative side, it must be recognized that climate change will be experienced at the farm-level through annual (and even shorter period) weather conditions, and at their extremes, these conditions may exceed the current coping range of producers (SLIDE 33). As is true today (as evident in the drought crisis that has befallen large parts of the prairies through 2001 and 2002; SLIDES 34 & 35), climatic variability (year-to-year weather and extreme events) will present a greater problem for producers than will gradual change in average climatic conditions.

In order to expand the current coping range of the farm system, governments and industry itself are looking for ways for Canadian prairie agriculture to become better adapted to projected climatic conditions, often focussing on farm-level production practices (e.g., reduced tillage, more diversified crop mix, increased fertilizer use) and risk management strategies (e.g., increased use of crop insurance). Ideally, these adaptations will serve to minimize the negative impacts associated with projected climate change, but it is unclear, as yet, whether the ideal with be realized.

4.2 Domestic Agricultural Policy (and the International Trade Environment)

The mid-1990s was a period of significant change for the regulation of Canadian prairie agriculture. In 1995, a year marked by relatively buoyant prices for most grains and especially wheat, a century-old government programme, which aggressively subsidized the cost of transporting export grains and oilseeds to ports,[4] was discontinued. The termination of the Western Grain Transportation Act (WGTA) and its annual Can$560 million export subsidy came in addition to the phasing out of a commodity-based revenue protection program, the Gross Revenue Insurance Plan, in the years following. Whether a function of constrained federal budgets or Canada's commitments to certain international trade agreements (e.g. the General Agreement on Trade and Tarriffs, and the North American Free Trade Agreement), these policy shifts produced a significant decline in overall farm support as measured in proportion to total farm receipts or by the Producer Subsidy Equivalent (PSE) (SLIDES 38 & 39). In contrast to their European and even American counterparts, prairie producers receive limited support from government and this has resulted in some distress during a recent period of financial decline. New Zealand agriculture after 1984 represents an even more extreme case of policy reform; as such, this discussion briefly turns attention to it in order to better reveal how such a policy change can impact upon farm incomes and land use.

Almost one decade prior to the signing of the Uruguay Round of the General Agreement on Trade and Tariffs and during a period when government support of agriculture reached record highs in Europe and North America, New Zealand's (pastoral) agricultural sector experienced the outright termination of almost all direct and indirect forms of assistance (SLIDE 39). More specifically, the policy changes included the elimination of all output price assistance, fertilizer and other input subsidies, advisory and inspection services, tax concessions, environmental stewardship grants, and subsidized credit. The immediate impacts of the reduction in farm support were severe. In the sheep and beef sector, the sudden withdrawal of output price assistance and other subsidies virtually halved the value of livestock and land overnight, thereby putting increased pressure on farm debt and reducing net farm income (SLIDE 40). The dairy sector did not experience such a devastating combination of negative factors partly because dairy producers never drew on output price assistance; however, these farmers also experienced a considerable drop in income following subsidy removal (SLIDE 40).

---

[4] *For example, by 1989, the cost of hauling export crops from Moose Jaw, Saskatchewan to the port of Thunder Bay under the WGTA was just Can$8.41/tonne compared to a full compensatory rate of Can$28.31/tonne.*

With respect to changes in land use, one of the first items trimmed from many farm budgets was land development expenditures (SLIDE 41). Similarly, with the loss of the fertilizer subsidy, as well as other supports, fertilizer use plummeted in the immediate post-1984 period to a low of just 1.7 million tonnes by 1987 (SLIDES 42 & 43). While farmers regretted the forced nature of this shift, many also recognized the benefits associated with more refined and site-specific fertilizer use. Rather than spread equal (and often excessive) quantities of fertilizer across all sections of a property regardless of need, many farmers came to identify the specific needs of specific paddocks or sections, and applied fertilizer only as needed. As one sheep and beef farmer suggested:

Of course now, we're a little bit more sensitive about the cost...and so we're more specific. That is why we soil test and we blood test the cattle, and look carefully at what is needed.

Finally, in the post-1984 period, total livestock numbers and stocking rates (stock units per ha) decreased as pasture productivity dropped off from reduced fertilizer use (SLIDE 45). Given the 'liquidation' of the sheep herd after 1984, overall stock units declined 12% between 1984 and 1994, despite a 6% and 13% expansion in beef cattle and dairy cows, respectfully. This reduction in livestock numbers produced a similar reduction in overall stocking rates. After hovering around 6.1 stock units per hectare in the mid-1980s, these rates began to decline after 1987, reaching a low of 5.5 stock units per hectare in 1993.

In summary, the data reveal a general reduction in incomes and farming intensity in post-1984 New Zealand, and this is a response that, at least in the short term, can generally be anticipated with other farming systems subjected to similar policy change. Of course, these kinds of policy change are especially difficult to adjust to when your competitors continue to benefit from substantial government assistance. As is currently true of New Zealand dairy producers and Canadian prairie wheat producers, the international trade environment is a hostile one given a highly uneven playing field (SLIDE 46). Not only do some producers benefit from continued government subsidization of their sectors, but tariff and non-tariff barriers often shut out foreign competitors from certain domestic markets. Of course, Canada is also guilty of this kind of protectionism and hence, in the interest of promoting improved agricultural-based economic development in LDCs, many argue that Canada and the rest of the developed world must actively work to open up their markets to foreign producers.[5]

[5] *See Bradshaw (2002) paper for a review of this line of argument and one critique (available from author via email or in print form in Rome).*

4.3 Market Conditions

With respect to market conditions, prices for Canadian prairie cereal crops, and especially spring wheat, declined significantly after a 1995 peak year to levels comparable to the early 1990s but well below those of the prior decade in real dollar terms

Year	End of Season Price (nominal)	End of Season Price (real 2000 dollars)
1978-92 average	$171.37	$286.41
1993	$164.01	$182.86
1994	$195.59	$217.64
1995	$263.60	$287.13
1996	$216.54	$232.08
1997	$201.73	$212.79
1998	$198.85	$207.82
1999	$180.57	$185.47
2000	$190.80	$190.80

Source: Canadian Wheat Board, 2003

In the prairie region in particular, the downturn in output prices coupled with ever-increasing input prices (albeit at below CPI rates - SLIDE 48) has put a significant strain on farm profitability, especially within Saskatchewan (SLIDE 50 & 51). Producers continue to be caught in the infamous 'cost-price squeeze' (SLIDE 49) and narrow profit margins continue to compel farmers to expand their operations in the hope of improving profitability through capturing economies of scale.

4.4 Biotechnology

The introduction of certain agricultural biotechnologies appears to be a most welcome phenomenon in Canadian agriculture, and Canadian prairie agriculture in particular, as reflected in its recent adoption (SLIDE 52). This is especially true of genetically modified ('Round-Up Ready') canola. Based on a 2000 survey of its membership, the Canola Council of Canada determined that 80% of growers had chosen to plant GM canola, representing 55% of the total Canola acreage of the prairies. When questioned, survey respondents indicated that the use of the novel seed enabled: (1) direct seeding into un-tilled soils, which resulted in less fuel usage; (2) a 6000 tonne overall reduction in herbicide use by the group as a whole; (3) a 10% increase in yields; and (4) an increase in grower's revenue by $2.35/ha. While these results might suggest increased adoption rates in the future, this outcome is unlikely given growing public 'distaste' for GM products in both domestic and international markets. Farmers in the prairies are uncertain of market access for GM products and this makes their use a risky undertaken.

4.5 Public/Environmental Pressures

Not only must Canadian prairie producers be aware of, and respond to, public demands for GM-free produce, they must also satisfy heightened public expectations surrounding agriculture's interactions with the biophysical environment. For example, prairie producers are increasingly being called upon to reduce agri-chemical use, GHG emissions, soil erosion (via reduced summer fallow and tillage of marginal soils, or permanent conversion to pasture), and soil salinity. At the same time, they are asked, or indeed required, to provide healthy, cheap food, while protecting rural water quality, biodiversity (and wildlife habitat), and scenic amenities. Of course, Canadian prairie farmers generally recognize the benefits of these acts; that is, they have come to realize that what is good for agricultural environments is usually good for agricultural livelihoods. At the same time, many acts of environmental stewardship require producers to spend money or accept losses without equal or sufficient financial benefit; that is, the incongruence between the scales of expenditure and benefit results in the production of what economists call a 'public good' (SLIDE 57). As such, and given the difficulty of providing socially optimal levels of environmental stewardship during periods of financial crisis (SLIDE 58), the public must contribute to such efforts through grant programs that reward environmentally progressive behaviour.

5 RECOMMENDATIONS

This last point represents the first of many policy recommendations that naturally follow from the observations and arguments presented in this paper. In terms of national policy measures needed to ensure the viability of Canadian prairie agriculture, funding for agri-environmental stewardship represents just one mechanism of support. Additionally, there is a clear need to maintain, and perhaps even expand, (decoupled) support programs such as the (Canadian) Net Income Stabilization Account (NISA), which has the potential, once individual accounts become better endowed, to even out farm incomes over time without unduly influencing production decisions. Canada's relatively more vulnerable export-oriented agricultural sectors, which tend to dominate in the Canadian prairies, will need to be actively defended and even, at times, protected, but so too must we recognize the limits to the 'productivist' model of agriculture and encourage gradual adaptation to enable increased financial self-sufficiency. Most generally, policy should focus less on promoting increased output and export sales, and more on reducing the vulnerability of individual producers and the prairie farming system as a whole. For example, in the case of managing for anticipated climate change, this implies a focus on addressing current vulnerability to current climatic variability (and especially extreme events) with the expectation that such efforts cannot help but expand the coping range of producers to future climatic conditions.

Of course, these domestic actions need to be undertaken in tandem with international efforts to reduce foreign subsidies and secure increased access to foreign markets. Canadian prairie producers would clearly benefit from a more 'level playing field', and this can only be realized through further reductions in coupled-support (especially export subsidies) and improved access to foreign markets. However, Canadian prairie producers themselves would not want trade liberalization to be undertaken at the expense of producers in LDCs.

As argued by Pinstrup-Anderson in the 2002 Fellows Address to the American Agricultural Economics Association, trade liberalization will not enable improved farm profitability for producers in the Canadian prairies or elsewhere without institutions and regulations in place to specifically promote this end. That is, liberalization should be pursued, but not at the expense of, for example, 'green box' programs for MDC farmers that ensure environmentally-sound farm practices, or 'development box' programs for LDC farmers that might better facilitate cash crop exports and staple crop production for improved 'food security'.

Appendix: Accompanying Power Point Slides