

BSE, FARMERS AND RURAL COMMUNITIES: IMPACTS AND RESPONSES
ACROSS THE CANADIAN PRAIRIES

By

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ABSTRACT

The emergence of the zoonotic disease, bovine spongiform encephalopathy (BSE) in Canada resulted in a severe agricultural crisis. However, little is known about the ways in which farmers and rural communities were affected. The overall objective of this study is to characterize and better understand the impacts on and responses of farmers and rural communities as they relate to this crisis. Research was undertaken in strata throughout the diverse three Canadian prairie provinces – Alberta, Saskatchewan and Alberta – by employing surveys and focus groups.

Results indicated there were numerous direct and ‘spillover’ impacts on farmers and rural communities resulting from the BSE crisis. Declines in cattle prices, herd equity and cash flow, often resulting in the need for bank loans, farm credit or off farm employment, as well as emotional and psychological stress were all experienced by farmers as a result of BSE. Importantly, many additional factors such as adverse weather and market volatility compounded the impacts related to BSE, adding to what was already a crisis situation for many farmers. These impacts were not restricted to farms but, rather, extended into the surrounding community fabric in the form of financial and social stress.

Results further indicated government policies contributed to the impacts and the effectiveness of farmer responses related to BSE. A longer-term policy shift that has embraced agro-industrialization and entrenchment into the global marketplace has resulted in clear disparities between the biggest and smallest players in the beef industry and agriculture as a whole. This was illustrated in the ways in which governments

responded to the BSE crisis, favouring the needs of the largest farmers and agribusinesses over those of smaller-scale, cow-calf producers. This policy shift and response has left the Canadian beef industry, family farmers and rural communities more susceptible to the emergence of similar future risks. A more inclusive approach to risk research and policymaking that meaningfully involved farmers and their rich, longer-term local knowledge might help mitigate similar risks that will inevitably confront agriculture in the future.

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DEDICATION

The late, Dave Brophy, affirmed to me one day that doing a masters is a worthwhile and life-changing undertaking. He was right. Dave was also an incredible force for social change, helping build a more just and sane world, so this thesis is dedicated to his amazing efforts and successes along with everyone else with such a bold, courageous and crucial vision.

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CHAPTER I

Introduction to the Project



Photo taken at Lefke and Peter Eggers' farmyard, near Sexsmith, AB – Summer 2006

“In the age of globalization, there can be no greater need than understanding sustainability, and rural communities provide the perfect reference point for meeting this need. They are the canary in the mine that warns us of impending disaster, the feedback loop that tells us all is not well” – Sumner 2005 (p. 13)

From disease to crisis

Bovine spongiform encephalopathy (BSE) has simultaneously been one of the most puzzling and devastating infectious diseases to emerge in recent times. This recently discovered disease is riddled with unique characteristics and uncertainties and has piqued the interests and concerns of a diverse and countless many –academics, governments, risk managers and the public alike. Importantly, it has become the basis of extreme and widespread social and economic consequences, worldwide.

The emergence of BSE would not likely have occurred if not for the extreme industrialization of agriculture. Likewise, its dissemination around the world would not have been facilitated without the entrenchment of international trade and export-oriented food systems that both enable and reflect the prevailing, global economic paradigm (Tacke 2001).

This is the manner in which ‘modern’ industrial risks unfold, emerging more unexpectedly and yielding more extreme impacts, these often on a global scale (Kimball *et al.* 2005; Beck 1999). Further, the immense economic interests often vested in the industries related to (and even responsible for) emergent risks and the dual role of institutions charged with managing the private and public interest have made mismanagement of these risks commonplace. This was demonstrated by the BSE crises that transpired in the UK in the mid-1990s (Powell & Leiss 1997) and subsequently elsewhere, the world over (e.g. Tacke 2001; Osterveer 2002). The conventional framework seeking to predict, calculate and manage the emergence and effects of such ‘modern’ risks are increasingly at odds with these uncertainties and challenges coupled with the more complex social, economic and political fabrics in which such risks unfold

(Beck 1992). Many thus advocate a more inclusive risk evaluation paradigm is necessary (Tierney 1999; Kunreuther & Slovic 1996).

Indeed the discovery of BSE in Canada came unexpectedly and with it came extreme impacts on farmers and rural communities (CAHC 2003). Impacts resulted largely from trade embargoes imposed by the US, Canada's largest trading partner, and were thus especially severe in western Canada, where much of the export-oriented beef industry is located (O'Neill 2005). But this agriculture-dominated region had already been under great stress from a host of factors occurring in the years leading up to the BSE crisis, leaving it more vulnerable to this most recent risk-turned-reality.

A Changing farmscape in western Canada

In short, western Canada was already in the midst of a farm crisis (Qualman & Wiebe 2002), this arguably the outcome of an explicit shift in government agricultural priorities and policies three decades prior (NFU 2003). The historic, Federal Task Force on Agriculture report: Canadian Agriculture in the Seventies (1969) firmly entrenched a commitment to a more industrial agricultural production model as to serve expanding export-oriented markets (FTFA, 1969). The subsequent signing of the North American Free Trade Agreement (NAFTA) in 1994 galvanized market-based governance in agriculture. With these came a push to reduce government subsidies and supports for agriculture, liberalization in trade, and increased foreign investment, all of which enabled more (multinational) corporate ownership over domestic industries (McBride 2001). While overall farm production has increased under this paradigm, it has led to significant changes in the structure and composition of agriculture and rural communities.

Over the past three decades, rural prosperity, well-being and agronomic sustainability have noticeably declined in western Canada. Yes, farms have become bigger, more specialized, intensive and productive (Smithers & Johnson 2004). But net farm incomes have been in an overall state of decline, reaching negative digits at the turn of the 21st century (NFU 2005). Farmers have become more indebted (Statistics Canada 2007) and dependent on off-farm incomes (Simpson & Kapitany 1983), this accompanied by increased social stress, disparities and strains on the environment (Thurston *et al.* 2003; Hanson 2007). Further, the number of farmers and farms, and indeed rural populations, has been in a steady state of decline since the 1970s (Statistics Canada 2007), which, in turn, has resulted in a loss of rural infrastructure, services for rural communities throughout the prairie landscape (Boyens 2001). Importantly, as farmers have become more entrenched in the global marketplace, there has been a concomitant increases in vulnerability to distant market volatility, rises in farm input costs, the recent rise in the Canadian dollar, and indeed the introduction of zoonotic diseases like BSE.

Yet farmers and rural communities have been found ways of responding and adapting to these challenges. But these responses have all been faced with tremendous challenges, which are further a result of the larger structural changes to the food system.

This is the context in which the emergence of the BSE crisis in Canada should have been examined. Yet with the exception of shorter-term, aggregate economic impact assessments (e.g. CAHC 2003; Mitura & Pietro 2004) and more localized socio-economic assessments (see Betkowski 2006), little is known of the wider socio-economic implications of BSE for farmers and rural communities much less how governments and farmers have responded

Thesis Objectives

Objective one. The overall goal of Chapter III is to explore the role of farmer knowledge in analyzing risks related to the emergence of the BSE in Canada. In particular, I will:

- Characterize the impacts of BSE on farmers and their larger rural communities;
- Explore how other background risks associated with rural decline and changes in climate contributed to these impacts; and
- Assess to what degree these findings allow us to anticipate and better manage disease-associated risks in the future.

Objective two. The overall goal of Chapter IV is to characterize the BSE crisis in Western Canada and the degree to which underlying government agricultural policies contributed to additional risk and impacts experienced by farmers and rural communities and how these changes have affected their ability to respond in ways that were successful in the past. In particular, I will:

- Characterize the BSE crisis in Canada and its resulting impacts on farmers and rural communities in the Canadian Prairies;
- Better understand farmer attitudes toward the roles of underlying government policies and restructuring in contributing to the risk;
- Explore farmer attitudes towards governmental responses regarding the crisis; and
- Examine to what degree farmer-led agricultural cooperative have been able to mitigate the impacts of BSE.

Analytical Framework

I undertook this study using a qualitative research approach informed by the constructivist grounded theory paradigm. Constructivist epistemology is premised on the notion that realities are subjective and multiple in approach, and that research is inherently value-laden (Creswell 1994). Given the many unknowns, overall lack of understanding of the issues in the studied region and sensitive social nature of the topic, grounded theory allowed for a more gentle way for theory to emerge from the research process rather than be preemptively decided and forced upon the participants (Berg 1998). Unlike the objectivity-based and positivist underpinnings of grounded theory, which assumes that metatheory is important, constructivist grounded theory is a more engaged and integrated approach. As Charmaz (2005) indicates: “(Constructivist grounded theory) is a reflexive stance on modes of knowing and representing studied life. This means giving close attention to empirical realities our collected renderings of them – *and* locating oneself in these realities” (p. 509). Community-building and partnership are important underlying aspects of this epistemology, so integrating and enmeshing myself, my personal agricultural and rural experiences, worldviews, opinions and ideas into the research process was important in the development and outcomes of this study.

Overall, informed by this epistemology, I carried out the research design, data collection and analysis in such a way that would help facilitate the construction of a new risk analysis paradigm. Although risk analysis is currently dominated by a highly technical, top-down and expert-based approach, I believe there is great potential to build a more inclusive, bottom-up analysis framework into understanding and managing risk, especially with respect to agricultural risks (Roppel 2006).

Thesis Structure

This is a ‘sandwich’ style thesis, and following the supplementary regulations for the Department of Environment and Geography here at the University of Manitoba, constructed the thesis so that each of the empirical chapters (III and IV) is written as a self contained and potentially publishable manuscript. I have constricted the preceding (I) and subsequent (V) chapters in a way that threads these main thesis outcomes together, providing additional context, further discussion and elaboration of key findings.

Thus, I lead off the thesis by examining the foundational underpinnings for the larger study area by reviewing the related and relevant literature (Chapter II). This provides context for then examining risk and impacts related to BSE as experienced by farmers and rural communities in western Canada, based on data obtained from mail-out survey responses and focus groups and qualitative analysis (Chapter III). Next, in order to gain a better understanding of the responses to the BSE crisis in western Canada, I further explore participant attitudes and experiences, especially the ways in which governments and farmers responded to the BSE crisis (Chapter IV). Finally, I close the thesis by summarizing research findings, drawing general conclusions and providing my own personal reflections on the overall study, thesis and process in which it came together (Chapter V).

Literature Cited

- Beck, U. (1992). *Risk society: Towards a new modernity* New Delhi: Sage.
- Beck, U. (1999). *World risk society* Cambridge: Polity Press.
- Berg, B.L. (1998). *Qualitative research methods for the social sciences* (3rd Edition).
Needham Heights, MA: Allyn and Bacon.
- Berkes, F. (1999). *Sacred ecology: Traditional ecological knowledge and resource management*. Philadelphia: Taylor and Francis.
- Betkowski, B. (April 2006). Ranchers' adaptability may have softened impact of BSE.
Express News, University of Alberta. Available online at:
<http://www.expressnews.ualberta.ca/article.cfm?id=7467> (accessed 29 July, 2008).
- (CAHC) Canadian Animal Health Coalition. (2003). Economic implications of BSE in
Canada, 2003: Final report. *Serecon Management Consulting Inc.*, Edmonton, AB.
- Chambers, R., Scoones, I. & Thompson, J. (1994). *Beyond farmer-first*. Cambridge, UK:
Cambridge University Press.
- Charmaz, K. (2005). Grounded theory in the 21st century: Applications for advancing
social justice studies. Pp. 507-535 in N. K Denzin and Y. S. Lincoln (Eds.) *Sage
handbook of qualitative research* (3rd edition). London: Thousand Oaks.
- Cook, M.L. & Chaddad, F.R. (2004). Redesigning cooperative boundaries: The emergence
of new models. *American Journal of Agricultural Economics* 86 (5): 1249-1253.
- Creswell, J. (1994). *Research design*. London: Sage Publications.
- Glaser, B.G. (1992). *Emergence vs. forcing: Basics of grounded theory analysis*. Mill
Valley, CA: Sociology Press.
- Gregoire, A. (2002). The mental health of farmers. *Occupational Medicine* 52: 471-476.
-
- BSE, Farmers and Rural Communities: 14 T. Stozek 2008
Impacts and Responses Across the
Canadian Prairies

- Hanson, L.L. (2007). Environmental justice across the rural Canadian Prairies: agriculture restructuring, seed production and the farm crisis. *Local Environment* 12(6): 599-611.
- Kimball, A.M., Arima, Y. & Hodges, J.R. (2005). Trade related infections: Farther, faster, quieter. *Globalization and Health* 1(3).
- Kunreuther, H. & Slovic, P. (1996). Science, Values and Risk. *The ANNALS of the American Academy* 545: 116-125.
- McBride, S. (2001). *Paradigm shift: Globalization and the Canadian state*. Halifax: Fernwood Publishing.
- McCallin, A.M. (2003). Designing a grounded theory study: Some practicalities. *Nursing in Critical Care* 8(5).
- Mitura, V. & Pietro, L.P. (2004). Canada's beef cattle sector and the impact of BSE on farm family income. Canada: Statistics Canada.
- (NFU) National Farmers Union, Canada (2003). The farm crisis, bigger farms and the myths of "competition" and "efficiency". *NFU Report* November 2003. Available online at: http://www.nfu.ca/Releases/Myths_news_release_THREE.rel.pdf (accessed 15 February 2008).
- Powell, D. & Leiss, W. (1997). *Mad cows and mother's milk: The perils of poor risk Communication*. Montreal: McGill-Queens University Press.
- Qualman, D. & Wiebe, N. (2002). The structural adjustment of Canadian Agriculture. *Canadian Center for Policy Alternatives* November.
- Raynolds, L.T. (2000). Re-embedding global agriculture: The international organic and fair trade movements. *Agriculture and Human Values* 17: 297-309.

Roberts, B.C. (2002). *Past present and how we can survive in the future in the beef Cattle business*. Pomeroy, WA: Benjamin Roberts Publications.

Roppel, C., Desmarais, A.A. & Martz, D. (2006). *Farm women and Canadian agricultural policy*. Ottawa: Status of Women Canada

Rude, J., Carlberg, J. & Pellow, S. (2007). Integration to fragmentation: Post-BSE Canadian cattle markets, processing capacity and cattle prices. *Canadian Journal of Agricultural Economics* 55: 197-216.

Simpson, W. & Kapitany, M. (1983). The off-farm work behavior of farm operators. *American Journal of Agricultural Economics* 65: 801-805.

Smithers, J. & Johnson, P. (2004). The dynamics of family farming in North Huron County, Ontario. Part I: Development trajectories. *The Canadian Geographer* 48(2): 191-208.

Smithers, J. Johnson, P. & Joseph, A. (2004). The dynamics of family farming in North Huron County, Ontario part II: Farm-community interactions. *The Canadian Geographer* 48(2): 209-224.

Statistics Canada (2007). *Agricultural Perspectives from Seven Censuses, Canada and Provinces*. Ottawa: Canada. Available online at:
<http://www.statcan.ca/english/freepub/95-632-XIE/2007000/histmenu-en.htm#ii>
(accessed 10 February 2008).

Statistics Canada (2004). *Farm Outstanding Debt: Agriculture Economic Statistics*. Ottawa: Canada. Available online at: <http://www.statcan.ca/english/freepub/21-014-XIE/21-014-XIE2004002.pdf> (accessed 19 February 2008).

Sumner, J. (2005). *Sustainability and the civil commons: Rural communities in the age of*

globalization. Toronto: University of Toronto Press.

Thurston, W.E., Blundell-Gosselin, H.J. & Rose, S. (2003). Stress in male and female farmers: An ecological rather than an individual problem. *Canadian Journal of Rural Medicine* 8(4): 247-254.

Tierney, K.J. (1999). Towards a critical sociology of risk. *Sociological Forum* 14(2).

Weigel, R.R. & Weigel, D.J. 1987. Identifying stressors and coping strategies in two-generation farm families. *Family Relations* 36 (4): 379-384.

CHAPTER II

Review of the literature



Photo taken on highway 58, near High Level, Alberta, July 2006

“The past is our definition. We may strive, with good reason, to escape it, or to escape what is bad in it, but we will escape only by adding something better to it.” – Wendell Berry

Chapter Summary

Economic globalization and agro-industrialization have drastically affected and transformed agriculture and rural communities around the world, including Canada (Watson & Winson 1993). Furthermore, they have contributed to the emergence and spread of more severe, far-reaching and less predictable disease-associated risks (Kimball *et al.* 2005), including that associated with bovine spongiform encephalopathy or BSE (Tacke 1999). The objective of this chapter is to critically examine globalization, food system restructuring and emergent risks, namely BSE, and the research paradigms that help shape our understanding and management of these.

The Global Industrial Food System

“The process and consequences of transnationalization of the food and agriculture sector, a process that reflects broader societal transformation... represents a basic restructuring of the very structures that govern our society” (Hendrickson & Heffernan 2002, p. 349).

Globalization

Globalization is a widely used term and is applied in a multitude of contexts. It is generally associated with human economic or social integration on an international scale (Sassen 1998). Global movement and integration of people, trade and commerce dates back thousands of years, so some assert likewise does globalization (Moore & Lewis 2000). Arguably, the first expeditions by those traversing beyond established national

boundaries for the purposes of trading, extracting or otherwise accessing foreign resources could be described as globalized phenomena (Chossudovsky 1997).

It has only been more recently that deep global integration has taken place, largely as a result of technological achievements. Advances in modern communication technologies (e.g. the internet) characteristic of the 20th century have facilitated the widespread dissemination, sharing and inevitably integration of knowledge and ideas, thus culture, in unprecedented ways (Tomlinson 1999). Similarly, advances in transportation technology (e.g. air travel, shipping) have likewise facilitated global cultural integration (ibid.). Importantly, these technologies have also created the grounds for more systemic global economic integration to occur, namely through the establishment of a highly interconnected global marketplace. Indeed communication and transportation technologies have played a central role in the global entrenchment of corporate power in the international economic, political and social arenas in 20th century, namely via high speed investment and trade capabilities (Brownlee 2005).

Economic globalization

Economic globalization is generally considered to be a postwar paradigm related to increased flows of trade, capital and foreign investment across international boundaries (Sepehri *et al.* 2005). Sassen (1998) characterizes it as a “duality of national-global, where the global gains power and advantages at the expense of the national” (p. 161) and is often closely associated with neoliberalism, an economic and political ideology geared towards achieving three broad goals: market liberalization, government deregulation and privatization (McNally 2004). Harvey (2007) further asserts that neoliberalism represents

“a new class system operating on an international level” (p. 13). Economic globalization has thus drastically transformed the global economy by facilitating laissez-faire economic policies (Dobbin 2003) and the establishment of global trading and financial systems (Robinson and Harris 2000). Transnational corporations (TNCs), international banks and free trade arrangements represent the dominant institutions of this paradigm (Korten 2001).

The World Bank (WB), International Monetary Fund (IMF) and World Trade Organization (WTO), often referred to as ‘the three sisters’, have been instrumental in carrying out these global neoliberal reforms (McBride 2001). The WB and IMF were established as outcomes of the historic postwar Bretton Woods conventions¹ to serve as a vehicle to re-develop a war-torn Europe and help industrialize ‘developing’ countries (Braithwaite & Drahos 2000) while the WTO has been an attempt to solidify and enforce the creation of a single global market (UNCTAD 1996). As Chossudovsky (1997) articulates:

The IMF, the World Bank and the World Trade Organization (WTO) are administrative structures, they are regulatory bodies operating within a capitalist system and responding to dominant economic and financial interests. What is at stake is the ability of this international bureaucracy to supervise national economies through the deliberate manipulation of market forces (p. 16).

Embedded within the structure of the WTO are not only mechanisms to reduce state tariff and other barriers of trade, but additional mechanisms to control the rules related to intellectual property, textiles, agriculture and new trade dispute resolution

¹ The General Agreement on Tariffs and Trade (GATT) was also established at Bretton Woods but later became the WTO in 1995, following the Uruguay Rounds of negotiations (Harvey 2007).

mechanisms (Patel 2007). To date, WTO negotiations among its 146 member countries have had only limited success, especially in achieving an agreement on the agricultural trade governance. Essentially, the richest member countries in the Global North (i.e. the U.S. and E.U.) are reluctant to compromise their state agricultural subsidization programs, while insisting those in the Global South eliminate theirs, so negotiations in the recent Doha Round have been locked in stalemate over the last five years (Williams 2001).

In response to this stalemate, smaller-scale ‘free trade’ arrangements and treaties (e.g. the North American Free Trade Agreement) have been much more effective at facilitating longer-term commitments to economic globalization and replacing state with market governance (McCarthy 2003). Thus, decisions at the state level that are deemed hindrances to trade and foreign investment (e.g. environmental protection, agricultural subsidies) can result in trade sanctions or undergo evaluation by international trade tribunals (Mann & von Moltke 2002).

These institutions have arguably been used as vehicles to transfer vast wealth and resources from the poorest to the richest in the world (Harvey 2007). Indeed, total indebtedness among all ‘developing’ countries between 1980 and 2000 increased from \$500 billion to \$2 trillion while that of the poorest increased from \$60 billion to \$205 billion during the same period (Peet 2003). Allthewhile, wealth held among TNCs has reached unprecedented levels. To put this into perspective, “the wealth of the poorest 4.5 billion people – 80 percent of global population – together earn little more than half the amount earned from the sales made by the world’s 200 largest corporations” (Lutsky

1996, p. 1) and of the 100 largest economies in the world, 51 are corporations (Anderson & Cavanagh 2000).

Agro-industrialization

Agriculture and the larger food chain have been among the most important sectors in global trade and arguably have been the most drastically affected by economic globalization processes. Structural adjustment programs (SAPs)² administered by the WB and IMF to loan-receiving countries have entailed sweeping reforms including government deregulation and restructuring food production towards commodity production for exports in the global marketplace (Patel 2007). Thus, a culture of subsistence-oriented food production has become ever more oriented around specialized, intensive, technology-dependent and capital-intensive agricultural systems (Friedmann 1982; Marsden 1998). Similar ‘structural adjustment’ has also taken place in advanced capitalist countries such as Canada, where government removal of agricultural subsidies and trade liberalization and entrenchment in the global marketplace has occurred (Qualman & Wiebe 2002).

Among the most significant changes in the food system has been the drive to increase food production efficiency through industrialization. A dependence on modern

² Following the 1970s recession and what became a debt crisis in the 1980s, many countries in the Global South were reeling economically (Raghavan 1999). With funds (credit) available from the richest countries, the IMF and WB agreed to finance loans to already vastly indebted nations on the condition that sweeping economic reforms were made. Importantly, these structural adjustment programs (SAPs) generally entailed compliance by way of limiting government expenditures, privatizing government services, ceasing state subsidies and liberalizing trade and foreign investment through gradual tariff reductions, these changes ostensibly better enabling them to repay the loans (Killick 1995).

agricultural technology and inputs to help achieve economies of scale production is now widespread in grain, oilseed, legume and livestock production systems (Norberg-Hodge *et al.* 2001). Agricultural biotechnology – e.g. genetically modified organisms (GMOs) – in food crop technologies are widely used by farmers around the world in order to achieve more effective weed and insect management (Engel *et al.* 2002). Since their release in the mid-1990s, total acres sown to GMO crop varieties have increased 60-fold, from 1.7 million ha to 102 million ha (James 2006). Use of this technology generally enables other significant farm management changes. For example, the use of GM crops decreases the need for tillage in turn requires additional farm inputs in the form of pesticides and fertilizers, which in turn generally entails the use of more specialized and costly farm implements (Smithers & Johnson 2004). As global meat consumption demand continues to rise, intensive livestock operations (ILOs) have also become more prevalent around the world. ILOs have indeed resulted in increased efficiency and productivity (output) in poultry, pork and beef sectors by utilizing modern animal housing, the ‘scientization’ of animal feeding and husbandry and by capitalizing on economies of scale production (Tait 2003). Yet ILOs are also one of many ways in which corporate agribusinesses have further concentrated their presence in the marketplace at the expense of more traditional, smaller scale food production systems (Boyd & Watts 1997).

Beyond food production, substantial changes have been occurring further down the food chain, mostly in the form of agribusiness consolidation and concentration in the global marketplace. This is often described in terms of corporate market concentration ratios of the top four companies (CR4) in major food system sectors (Patel 2007). From

flour milling, poultry production, beef and pork processing to food retailing, the percentage of the market controlled by the top four companies is on the rise (Qualman 2001). Between 1990 and 2002, the CR4 in the US beef packing sector climbed from 70% to over 80%; that of pork processing increased from 40% to 60% in that same period; and the retailing sector CR4 nearly doubled from 25% to 45% between 1996 and 2004 (Hendrickson *et al.* 2001). Agribusiness corporations have averted state competition laws by rationalizing mergers and acquisitions in the name of increased economic efficiency (Dobbin 2003), which is paradoxical, given that these increases in concentration ultimately lead to less competition in the marketplace (Patel 2007).

Agribusiness corporations, rather than farmers, seem to have been the main beneficiaries of restructuring and agro-industrialization. In Canada, virtually every sector involved in the food industry supply chain has been enjoying record profits and increased market shares, except for farmers themselves. In 2004, the top companies from within seed, farm chemical and machinery industries, to those in food processing, storage, shipping and retailing sectors, made record or near-record profits (NFU 2005). Meanwhile, as production costs continue to increase, farmer incomes have reached record lows, with net farm incomes plummeting to negative \$20,000 in 2001 (Qualman & Wiebe 2002), rendering many multi-generational farms unviable (Sumner 2005). Although some are obviously benefiting from and adapting readily to these changes, agro-industrialization arguably occurs at the expense of most farmers. This re-orienting of agriculture has also led to other significant problems.

Agro-industrial impacts

Environmental impacts of food system restructuring and agro-industrialization are becoming increasingly evident, particularly at the production level. Reductions in government regulations and subsidies as dictated by structural adjustment programmes, have led to greater prevalence of intensive agricultural practices (Dyson 1996), in turn contributing to water shortages and soil erosion from excessive irrigation, deforestation (e.g. Riddell 1992; Redclift 1995) and the emergence of new infectious disease risks, such as highly pathogenic avian influenza (Chuengsatiansup 2008) and, the focus of this thesis, BSE. Further, “genetic pollution” and losses in biodiversity from use of GMOs (e.g. Hoyle 1999) and eutrophication of water systems from ILO waste runoff (e.g. Novek 2003) are a few additional impacts attributable to agro-industrialization. Further, ecological impacts from present actions may not be revealed until long into the future as a result of the many uncertainties related to many modern agriculture technologies and practices (Dyson 1996). Some contend agro-industrialization even undermines the potential for more sustainable agriculture practices to emerge and thrive (Hamilton 1994; Hinrichs & Welsh 2003).

Similarly, social impacts of agro-industrialization are becoming increasingly evident. On the world stage, tens of millions of rural Chinese and Mexicans have “flooded” cities in search of employment – a “tidal wave” of migrant labour (Roberts 1997). For most, this has meant living in substandard housing and working for insufficient wages in manufacturing and processing sectors (Klein 2000). Food insecurity remains a longstanding problem related to food system restructuring; specifically the shift away from subsistence to industrial agriculture (Friedman 1981, 1992). The ‘global food

crisis' has resurfaced most recently as a result of rising grain prices from burgeoning 'biofuels' industries and a growing global meat demand, thereby increasing grain prices to a point of inaccessibility for many (Bello 2008), these changes in turn reflecting underlying global economic changes.

Severe emotional and psychological stress is growing in agriculture-based rural communities around the world (e.g. Pollock *et al.* 2002; Thurston *et al.* 2003; Gregoire 2003) and as youth become less interested in farming they similarly migrate from rural areas into urban centers (Jentsch 2006; Neufeld 2008), thereby perpetuating the decline of once vibrant rural communities in many areas (Boyens 2002). Indeed the farm population in Canada has drastically been reduced, declining by an average of 5% per year since the mid-1970s (Statistics Canada 2007). Yet, despite the many adversities experienced by farmers and rural communities, there are countless ways in which they and their communities are responding and indeed confronting these threats head on.

Responses

In part as a response to the impacts of food system restructuring and also an increased demand for food safety and quality assurance from consumers (Swimmen 2007), a wide diversity of farmer-driven initiatives are occurring around the world (Juska *et al.* 2005). The formation of agricultural cooperatives is one of the more traditional ways in which farmers have collaborated to obtain greater market power when confronted with corporate concentration, consolidation and vertical integration in the marketplace, locally (Doyon 2002) and globally (Swimmen & Maartens 2007).

There is a rich history of agricultural cooperative development in North America, especially in the former half of the 20th century (Sharp 1948). In 1929, arguably the height of the ‘cooperative movement’, there were 12,000 agricultural cooperatives in the U.S. (Mather *et al.* 1999). Entrepreneurial spirit combined with a desire to access greater rights and influence for farmers laid the foundations for greater farmer equity in the marketplace (Watson & Winson 1993) through the establishment of The Grange, Farmers Alliance and National Farmers Union in the U.S. (Mather *et al.* 1998) and the “cooperative (grain) pools”, Canadian Wheat Board (CWB) and ‘supply management’ system for dairy and poultry sectors in Canada (Schulz 2006). The development of new generation cooperatives (NGCs) is now being explored by farmers, as they provide a unique form of commitment by member farmers. These NGCs are being used “as a method for farmers to climb higher up the economic food chain. By processing their raw commodities themselves, farmers are hoping to capture a greater share of the consumer food dollar...they are seen as a way to help keep rural families on farms and in small towns” (ARDI 1999, p. 13). However, NGCs have had limited success. Most of the 18 NGC meat slaughter and processing initiatives that emerged in western Canada in the wake of the recent BSE crisis either never got off the ground or were abandoned (MacLachlan pers. comm. 2008).

The organic farming movement is another response to restructuring. Organic agriculture is based on employing more ‘environmentally sound’ food production techniques, free of synthetic chemicals, fertilizers and GMOs (Burch *et al.* 2001). Organic agriculture is generally part of a standardized and regulated certification process that enables farmers to collect a market premium for their produce and to provide

consumers with quality assurance (Gonzalez & Nigh 2005). It both reflects and has contributed to a growing demand for food that is produced in a more environmentally and socially sustainable manner, and it continues to be the most rapidly growing component of the agricultural sector in Europe and North America. In Europe, some predict organic food consumption demand may increase to 30% of the total European food diet by the end of the decade (Lockie *et al.* 2002). While farmer motivations for adopting organics are inevitably rooted in economics and access to a secure niche market, personal beliefs about land stewardship, government incentives and consumer demand contribute as well (Hall 2007).

Likewise, there is a growing ‘local food’ movement that explicitly emphasizes the interdependence on farmers and consumers in these alternative agricultural food systems (Smith & MacKinnon 2007). Direct marketing between farmers and consumers through farmers markets in urban settings, community shared agriculture (CSAs) (Fieldhouse 1996) and the recent 100-mile diet (Smith & MacKinnin 2007) are indeed efforts shared by consumers and farmers alike to depart from the corporate-dominated food system by supporting the local, rather than the vast, global.

There are still larger, more visible and arguably still more effective peasant movements happening in the Global South, this arguably because neoliberalism and restructuring have impacted more people in predominantly agrarian societies (Desmerais 2007). Established in 1984, the now 500,000 member strong, Brazilian, *Movimento dos Trabalhadores Rurais Sem Terra* (MST), or Landless Rural Workers Movement, is one of the most successful among the many recent Latin American ‘landless peasant movements’ (Robles 2008). Robles (2008) proclaims participating peasant families are

motivated to resist what they feel are the injustices of neoliberal policies, namely that they have facilitated their displacement from what they feel is their traditional or agrarian lands. Solidarity among all affected rural people “to pursue agrarian reform via the direct occupation of unused public or private lands” (p. 147), has led to the creation of a strong political voice and the successful reclamation of 7.3 million hectares of land (ibid.).

Similarly, La Via Campesina emerged in 1993 in order to resist the advancement of neoliberal policies and reforms, specifically those proposed in the latter Uruguay Rounds, which preceded the creation of the World Trade Organization in 1995 (Desmerais 2008). It is distinct from MST in that it has become an international movement, largely consisting of peasants, farmers and indigenous people from Asia, the Americas, Europe and Africa seeking, in part, solidarity with non-peasants/farmers, non-governmental organizations and other social movements in resisting globalization (ibid.)

Despite the many adversities created by the global industrial food system, farmers and rural communities have clearly demonstrated their ability to adapt and even reject economic globalization, neoliberalism and agro-industrialization. What is less well understood is the role science and expert-driven research has played in perpetuating many of the aforementioned risks associated with these changes

Risk Research

“To calculate a risk is to master time, to discipline the future. To provide for the future does not just mean living from day to day and arming oneself against ill fortune, but also mathematizing one’s commitment” (Ewald 1991, p. 207)

Risk background

The origins of risk likely extend as far back as our ability to contemplate our own mortality (Renn 1998). Though its meaning has evolved over time and there is no consensus on the precise origins and definition (Mythen 2004), risk is a term generally related to balancing between opportunities and dangers (Wilkinson 2001). Understanding risks has long-since been a mathematical and quantitative endeavor (Covello & Mumpower 1984) centered on calculating in order to predict undesired adverse future events (Ewald 1991).

Risk ‘science’ is quite young, however (Fischhoff *et al.* 1984; Freudenberg & Pastor 1992), and is generally thought to be a post-war development (Renn 1998). One of the earliest contemporary manuscripts on risk goes back to a publication centered on the weighing of benefits and costs of technological progress concerning decisions that affect public safety (Starr 1969).

The expert-driven risk paradigm

Risk assessment and analysis are utilized as institutional decision-making tools for the purposes of evaluating and managing risks (McNabb 2001). Risk assessment is generally a technical process of calculating the probability and likelihood of a hazard occurring (Covello & Mumpower 1984). Risk analysis on the other hand, though also often a highly technical, quantitative endeavor is generally a more systematic evaluation, attempting to better understand the *nature* of risks, their probabilities of occurrence *and* the corresponding consequences unfolding in society and the environment (Van Loon

2002). As such, it is generally seen as comprising risk assessment, risk management, and

risk communication. Regardless, these views of risk are dominated by the scientific paradigm, treating risks as measurable, quantifiable ‘objects’ (Beck 1992).

Quantitative assessments have been utilized to try to calculate, predict and measure underlying risks related to industrial development (Kasperson *et al.* 1988). Nuclear energy development (e.g. Fullwood & Hall 1988), industrial chemical exposure (e.g. Cohen 1981) and, more recently, use of genetically modified organisms (GMOs) in agriculture and food systems (e.g. Parker & Kareiva 1996) are a few examples. Mythen (2004) states, “the steady expansion of industry and capital further cemented risk to calculation” (p. 13).

The world has undergone drastic changes over the last century and the same can be said regarding the nature of risks, making the shortcomings of scientific and technical risk assessments and analyses evident (Van Loon 2002). Indeed, accidents such as the Chernobyl disaster, BSE (“mad cow disease”) and implementation of genetically modified crops (Pidgeon *et al.* 2003) demonstrate that the scale and scope of technological risks have changed in ways that “violate many of the assumptions of risk calculation” (Taylor-Gooby & Zinn 2006, p. 25). Beck (1992) articulates further:

The ecological and high-tech risks that have upset the public for some years now... are no longer tied to their place of origin – the industrial plant. By their nature they endanger all forms of life on the planet. The normative bases of their calculation do not fit the basic dimensions of these modern threats. Atomic plants, for example, are not privately insured or insurable... accidents are no more. They outlast generations. The affected even include those not yet alive at the time or in the place where the accident occurred but born years later and long distances away. This means that the calculation of risk as it has been established so far by science and legal institutions collapses (p. 22).

There is a whole complex social, economic and political fabric in which modern technologies are developed, employed and experienced. With increased global interconnectivity, information is increasingly available to the “lay” public, and awareness and perception of risks have ever-increasing roles in the identification and severity of these threats (Beck 2002). In fact, Hillier (2006) describes risks as involving two hazards: the physical hazard itself and the reaction to it (p. 2). That many of the expert-based institutions charged with managing risks that emerge in a socially complex and interconnected world are still dependent upon linear, quantitative risk analysis tools, is highly problematic (Tierney 1999). The shortcomings of conventional risk analyses have been addressed by the social sciences over the past three decades (Renn 1998).

Risk in the social sciences

Risk research in the social sciences shares the common principle that social processes mediate the causes and consequences of risks (Renn 1998). Indeed risks are culturally located and influenced by personal worldviews, beliefs, experiences and perceptions of reality (Slovic 1999). Hence, many view risks as social constructions (Douglas 1992) that ought not be defined and understood exclusively in the realm of science and experts (Beck 1992, 1999) but, rather, should be more subjective in nature (Kunreuther & Slovic 1996) and inclusive of larger society (Tierney 1999).

The ‘psychometric paradigm’ represents a step in this direction, acknowledging that important social and cultural factors such as trust, blame and gender influence public perceptions of risks and the ways their consequences unfold in complex social settings

(Fischhoff *et al.* 1978; Slovic *et al.* 1982). This paradigm utilizes quantitative tools such as standardized questionnaires in order to quantify, model and explore inter-relationships among cultural, institutional and psychological factors in order to “illuminate the responses of individuals and their societies to the hazards that confront them” (Slovic 2001, xxiii). The resulting conceptual framework better accommodates the complexities of the social fabric by incorporating multiple factors that may further ‘amplify’ risk and risk perceptions (Kasperson *et al.* 1988). Thus, ‘social amplification of risk’ (SARF) theory evolved as an attempt to “overcome the fragmented nature of risk perception and risk communication research by developing an integrative theoretical framework capable of accounting for findings from a wide range of studies” (Kasperson *et al.* 2003, p. 13).

Though these developments help illuminate the important subjective realities of the non-expert public realm in which risks emerge and unfold, they still remain rigid, quantitative and expert-driven in nature. There are very few examples of qualitative approaches to evaluating risk in the literature. Most approaches, even those that are qualitative in nature, describe research participants as ‘lay’ people, with ‘lay knowledge’ (e.g. Shaw 2003; Wynne 1996), implying that these insights are inferior to those of the more informed ‘expert’. Attempts by these social scientists to engage with risk research have in many ways undermined the strengths of public knowledge by succumbing to the pressures of science and the (ostensible) need to quantify in order to legitimate (e.g. Legesse & Drake 2005), which in turn perpetuates the science-based risk paradigm (Beck 2004).

It is likely that these inclinations also reflect the deep affinity of the “risk field” with government and major private industries, such that “government and industry have

cornered the market on risk analysis” (Tierney 1999, p. 224). With most aspects of private sector and the state being highly vested in short-term economic and political gains, risk analyses often reside in the conflict zone between private and public interests (Kunreuther & Slovic 1996). Indeed, Slovic (1999) argues that those who define what a ‘risk’ is exercise great power in that they determine how and what is ‘risk’, thereby influencing what and how risks are evaluated, managed and communicated. Indeed, the emergence, (mis)management and spread of the recent ‘mad cow disease’ risk demonstrated such a tension (Leiss 2000).

BSE and ‘Reflexive Modernization’

Hendrickson and Heffernan (2002) describe ‘reflexive modernization’ as “the consequences of our knowledge (having) outstripped our ability to deal with them,” which is a particularly interesting notion for examining risks associated with the current food and agricultural system (p. 347). Some assert the emergence of the zoonotic, bovine spongiform encephalopathy (BSE), is a prototypical example of how ‘modern risks’ unfold (Tacke 2001) – unpredictably, being borne of the industry and carrying far-reaching consequences (Kimball *et al.* 2005).

The disease, BSE

Since its discovery in the United Kingdom in 1986 (Phillips *et al.* 2000), our understanding of BSE has expanded in many directions. It is part of a larger family of transmissible spongiform encephalopathy (TSE) diseases, including scrapie in sheep,

chronic wasting disease (CWD) in deer and elk and new variant Creutzfeldt-Jakob disease (vCJD) in humans (Hill *et al.* 1997). It is widely thought that TSEs are caused by the misfolding of protein-like agents, called prions, that degenerate the central nervous system tissue of infected hosts, eventually resulting in death (Prusiner 1997; Lasmezas *et al.* 1997). Symptoms include motor skill dysfunction, tremors and the presence of nervous system tissue scarring, abnormalities that are consistent of its histology in affected hosts (Nathanson *et al.* 1997).

Agro-industrialization, namely the push for increased efficiency and farm productivity (Latouche *et al.* 1998) and subsequent utilization of animal byproducts for animal feed – meat and bone meal (MBM) – in the UK, is believed to have been the means by which BSE was initially transmitted across species, from scrapie-infected sheep to beef and dairy cattle (Baker & Ridley 1996). Hence, the rendering technology played a central role in the emergence of BSE as an infectious disease (Brown 1998).

Unbeknownst to the most current of science at the time, BSE quickly became widespread in the British beef cattle herd. Despite regulatory measures taken which banned the use of MBM for use in animal feed in 1988 (Nathanson *et al.* 1997), 467,000 cases entered into the food chain in the UK prior to 1988 and an additional 299,000 entering between 1990 and 1995 (Ferguson *et al.* 1997). The prevalence of the disease in the national cattle herd peaked in 1992, which is consistent with the five-year incubation period postulated for BSE in beef cattle, and some anticipated that further incidences of the disease would decline in response to the implemented regulatory measures (Nathanson *et al.* 1997). Yet, the short-term economic motivations for utilizing industrial practices and byproducts,

namely MBM for livestock feed, ultimately proved to be very risky and soon resulted in long-term and far-reaching consequences – reflexive modernization indeed.

BSE Crisis in the UK

A further chain reaction and severe crisis resulted from BSE in 1996, following the announcement by the Secretary of State for Health that BSE could be transmitted to humans by ingesting infected products and materials and that it had long-since entered into the food chain (Hill *et al.* 1997; Ratzan 1998). Declines in public confidence in meat safety immediately resulted in a drastic 40% reduction of beef consumption in the UK (Atkinson 1999; Palmer 1996). Further, following food safety and trade guidelines set up by the World Organization for Animal Health, all of Britain's international trading partners banned imports of live and processed British beef and byproducts (Phillips *et al.* 2000). As a country renowned for its beef and cattle industry and one that had developed a burgeoning beef export industry, these trade sanctions were devastating. Losses in exports markets resulted in two thirds of the total £3.5 billion³ economic impacts, while declines in domestic beef sales represented much of the rest (Atkinson 1999).

By 2002, 129 human deaths from vCJD had been confirmed and attributed to BSE (Andrews *et al.* 2003). While some estimates indicate the vCJD epidemic risk would likely soon stabilize (Ghani *et al.* 2003), there remain many uncertainties about TSEs, especially with respect to how many humans have been exposed to the infective prion agent coupled with the exceptionally long incubation period (40-60 years) and possibility

³ This figure represents total government expenditures and market-related impacts related to the BSE crisis within the first year. The former equated to £1.5 billion between 1996-97 (Atkinson 1999).

that they might be transmissible in more ways than initially expected (Brown *et al.* 2001). Thus, some still claim that there is a potential for a sharp increase in the number of vCJD cases in the future (Taylor-Gooby & Zinn 2006).

Government mismanagement of the risk was one of the defining factors that led to the escalation of the crisis in the UK. Risk communication had an influential role in forming public perception of BSE and related human health risks, thus the severity of the crisis (Harvey 2001). In fact, British authorities adamantly denied that there were significant public health risks related to beef consumption for years leading up to the crisis, despite having access to evidence that there was considerable risk (Powell & Leiss 1997). Declines in beef consumption were linked to public mistrust in government (Burton & Young 1996) and media alarmism (Dornbusch 1998).

Impacts of the BSE crisis on the agriculture sector in the UK were also severe, but are less understood. The pre-emptive slaughtering of 4.5 million cattle over 30 months of age had a devastating impact on the UK livestock industry (Brown *et al.* 2001). Though government compensation and financial assistance programs were administered, these were discontinued after one year, despite signs of long-term impacts such as depressed cattle market prices and ongoing international trade embargoes (Atkinson 1999). The degree to which individual farm households have been impacted by the BSE crisis remains unknown, as do any resulting risks this may entail for rural Britain and British society as a whole.

Globalization and BSE

As a result of globalization and the global food system, domestic-level crises, such as those related to the emergence of BSE in the UK are less contained to the local and often have greater potential to permeate across international boundaries *vis a vis* trade (Gibbs 2005) and even communication (Tacke 2001). Indeed, following the 1996 announcement in the UK that BSE could be transmissible to humans (Baker & Ridley 1996), disruptions in meat markets were immediately observed worldwide (Kenneth *et al.* 2002). Though trade embargoes were eventually imposed on the British beef and beef products by its beef importing partners, further damage had already been done – BSE had disseminated throughout Europe and around the world. Between 1990 and 2003, 25 additional countries had confirmed cases of BSE (OIE 2008). This spread had long-since been facilitated by unbeknownst exportation of BSE-infected cattle and feed from Britain to many of its trading partners prior to the imposed sanctions (Phillips *et al.* 2000).

Impacts were similar to those of the UK in many of these affected countries. In Belgium, for example, where only 10 cases of BSE had been found⁴, significant declines in beef consumption were observed (Verbecke 1999, 2000). Government denial of the BSE risk resulted in similar unpreparedness for the impacts of BSE on beef consumption in Germany (Tacke 2001; Osterveer 2002). In fact, unpreparedness and inadequate government risk management seem to characterize all BSE-affected countries. In Japan, government ‘confusion’ and initial denial of the risk to public food safety even after their first case of BSE was confirmed in 2001, resulted in public distrust and severe declines in beef consumption (Kamisato 2005).

⁴ This represents the number of confirmed BSE cases in Belgium until 1999. Now, 123 cases have since been discovered (OIE 2008).

BSE arrives in Canada

Government denial of the BSE risk also resulted in unpreparedness for the resulting severe impacts of BSE in Canada. Leiss and Nicol (2007) assert the inadequate communication of the potential for BSE to be found in the Canadian cattle herd, despite knowing that there was a reasonable chance that it would be, the government effectively placed the entire beef industry at risk, especially farmers. Canada reported its first indigenous case of BSE in May 2003. This catalyzed an agricultural crisis, with preliminary impacts on the Canadian economy equating to \$7 billion after the first year (CAHC 2003) and having severe lasting impacts that continue to this day (Monchuk 2004; White 2008).

Interestingly, these impacts were not at all a result of public distrust in food safety or domestic beef consumption declines (Lemyre *et al.* 2008) but rather because of extreme foreign market dependence (Grier 2005) and lack of insulation from such market shocks by the North American Free Trade Agreement (NAFTA) (Loppacher *et al.* 2005). Prior to 2003, Canada had been shipping 40% of its total beef production to the United States – 3.5 million head (17%) of its feeder cattle, 990,860 head (44%) of its cull cattle (Canfax 2004) – and an additional 9% to other countries (AAFC 2005). Trade to the U.S. and Mexico ceased entirely for four months, until both lifted their ban on processed ‘boxed beef’ from cattle under thirty months (UTM) in August, 2003 (Rude *et al.*, 2007). Trade bans persisted for 26 months until exports of live cattle UTM resumed to the U.S. (O’Neill 2005) and 54 months until they were lifted for all Canadian beef and live cattle born after March 1, 1999 (CFIA 2005, 2008). Early estimates indicated impacts of \$1

billion from losses in exports but long-term economic impacts have yet to be estimated (Mitura & Pietro, 2004).

Due to the resulting domestic beef market saturation during this time, prices for slaughter, processing and cattle all declined substantially, affecting cattle producers throughout the beef industry. By August, 2003, an estimated \$192 million in impacts were absorbed by the cattle feeder sector and \$300 million had occurred in the dairy sector from losses in cull cattle sales (SMCI 2003). Especially hard hit were those at the primary production end of the beef industry. Between 2002 and 2003, farm cash receipts from cattle and calves declined from \$5.2 to \$3.5 billion (33%) translating to a similar (33%) average loss of farm equity and income over the same period (Mitura & Pietro 2004). Beyond these preliminary economic assessments, there has been inquiry into the ways in which the government responded to the BSE crisis and the degree to which the Canadian meatpacking sector averted competition rules during the beef industry market disruption (Grier 2005), but only in the province of Alberta. Further examination has focused on the trade-related implications on BSE on the structure and regulations of North American markets (Rude *et al.* 2007; O'Neill 2005; Loppacher *et al.* 2004; Sparling & Caswell 2006) and the inadequacies of the Canadian risk management framework (Leiss & Nicol 2006), but with little empirical evidence. Some recent research demonstrates ways in which farmers adapted and mitigated the impacts related to the crisis by exploring direct marketing (Anderson & McLachlan 2008) and even alternative, holistic farm management systems (Yestrau 2008). But there remains a gap in our understanding of the wider socio-economic impacts and implications of BSE on farmers and rural communities, in part reflecting the ever-widening gap between agricultural

research and the farmers and rural communities that this research is ostensibly meant to serve.

‘Bottom-up’ Research?

Local knowledge

“Communities do not conserve or despoil; at least, they do not act as simple, isolated agents. Rather, they are embedded in larger systems, and they respond to pressures and incentives... we need a more nuanced understanding of the nature of people, communities, institutions and their interrelations at various levels” (Berkes 2004, p. 628). Berkes wrote this specifically in relation to the new directions that conservation biology must take. More specifically, those with interests in natural resource sustainability must become more inclusive of local perspectives and knowledge in order to more effectively garner successful and long-term solutions to local problems; they must become community-led and located, more participatory and holistic in nature (Berkes 1999). Local knowledge and community-led research approaches thus draw from the experiences and expertise of people in local environments in order to better understand the myriad ways in which ecology, economics and even politics interact, and who indeed ultimately have the most long-term stake in land sustainability (Berkes 2002; Brook & McLachlan 2005; Mauro & McLachlan 2008; Anderson *et al.* 2007; Yestrau & McLachlan 2007).

Countless many have advocated that similar community-led research approaches be taken in rural development (Herbert-Cheshire & Higgins 2003; Murray & Dunn 1995;

Day 1998), but also in agricultural research (Alroe & Kristensen 2002) and even risk

research (Renn 1998; Tierney 1999). But little if any risk research is community-located and little agricultural research conducted in the Global North is participatory in nature.

Chambers' (1994) work in developing 'participatory rural appraisal' (PRA), 'rapid rural appraisal' (RRA) and 'farmer-first' research advocated more participatory and community-led agricultural research. These approaches have been utilized to encourage farmers to more actively engage with the research process, especially in the development of more locally relevant agricultural technologies (Chambers *et al.* 1994) and a step in the right direction to confronting the otherwise 'top-down' research and policy-making processes affecting marginalized farmers in regions throughout the Global South (Binns *et al.* 1997). But PRA has been criticized for producing few actual technological developments (Bentley 2005) and it might further be argued that its funding ties to institutions like the World Bank is problematic, this a result of the inherent conflict between meaningful participatory process and the rapid results and expectations of these financial institutions (Bhatnagar 1992). Perhaps for the World Bank, PRA or RRA is appraisal is not rapid enough.

Action-oriented research

Action research (AR) and participatory action research (PAR) are still more 'bottom-up' approaches. These involve a collaborative process between researchers and participants, a critical inquiry process, a focus on social practice and a deliberate process of reflective learning (Checkland & Holwell 1998). Further, AR and PAR require a democratic, power-neutral setting and the enabling of social action (Lincoln 1995). This paradigm is largely rooted in the education and health sciences (Greenwood & Levin,

2007), improving education by building more inclusive and empowering settings for administrators, teachers and students (McLean 1995), challenging political ideologies, racism and gender inequality in schools (Noffke 1997; Trinh 1991). But because of its ability to respond to particular problem domains in almost any setting, AR and PAR are now being practiced and published in numerous other areas, including computer information systems (Baskerville 1999) and business management (Coughlan & Coughlan. 2002).

It has only been more recently that risk and action-oriented research has begun incorporating local farmer knowledge with participatory and action-oriented approaches, located in the context of agricultural risk research. Particularly, farmer attitudes and experiences with genetically modified crops in western Canada and the role of farmer knowledge in risk analysis related to agricultural crop technology development have been explored (Mauro & McLachlan 2006, 2008). This is the first farmer-focused risk analysis of its kind and had action elements that came in the form of a documentary film (Mauro 2008), which has been described as an effective communicative and empowering tool in AR (Kindon 2003). It has also been demonstrated that local farmer knowledge has been beneficial in helping understand the complexities related to zoonotic diseases, specifically bovine tuberculosis and the wildlife-livestock interface in the Riding Mountain National Park region of Manitoba (Brook & McLachlan 2006). Brook's (2007) larger research was laden with action and participatory elements and worked actively with farmers, organizations and wider community to help develop a more proactive risk management framework that bridged the social and natural sciences and expert and farmer knowledge. My research will build on these more inclusive, farmer-focused

research foundations in order to address some of the shortcomings of more conventional risk research approaches and fill some of the knowledge gaps related to our understanding of the now global BSE risk.

Study Area

The Canadian Prairies

The Canadian Prairies is a vast ecozone comprised of three provinces – Alberta (AB), Saskatchewan (SK) and Manitoba (MB) – accounting for a total area 520,000 km² (Laycock 1972). The zone is characterized as sub-humid to semi-arid, with average temperatures ranging from -9.4°C (AB) and -18.3°C (MB) in the winter to 16.1°C (AB) and 19.7°C (MB) in the summer (ESWG 1996). Mean annual precipitation is highly variable, ranging from 250mm in the more arid southeastern AB and southwestern SK to 700mm in the Lake Manitoba Plain (ibid.).

This region is dominated by agriculture, with 135,054,707 acres in production on 112,814 farms (Statistics Canada 2006), accounting for 80% of Canada's total agricultural land (PFRA & AAFC 2000). Agricultural production and practices are diverse, ranging from grain, oilseed and legume crop production to beef cattle, bison, sheep, goat and hog production in the livestock sectors, along with myriad production combinations ('mixed farms') (Shaykewich *et al.* 1994). Because this study has been primarily focused on issues pertaining to and centered on the beef industry, I will provide an overview of this industry below.

The Beef Industry and Supply Chain

The beef industry has become a very significant element of Canadian agriculture, with one third of Canadian farm families producing beef cattle, equating to 21% of the total \$36 billion in farm cash receipts (Mitura & Pietro 2004). The total Canadian cattle population (including dairy) grew from 10.7 million head in 1987 to 15.1 million in 2005 and has presently leveled off at 14.3 million head (CBEF 2008). Cattle production has become especially prominent in the prairies, where over 75% of Canada's beef cows and slaughter cattle are located (MacLachlan 2001). The regionalization of the industry came mostly following the dismantling of the nearly 100-year old Crow rate subsidy⁵ and Western Grain and Transportation Act in 1995 (Ramsey & Everett 2001) resulting in a shift from grain to increased forage production for many farmers. Furthermore, the Canadian beef industry has positioned itself as one that is largely oriented on expanding export markets around the world (Table 1.1).

Several distinct phases of production (and distribution) comprise the beef industry supply chain. The starting point is in calf production, where cow-calf producers maintain a herd of breeding cows, facilitate adequate nutrition intake required to produce and raise calves to a weights ranging between 350-650 lbs, at which point they are typically marketed and sold. Feeding, grazing and breeding programs vary based on the limitations of the land, personal beliefs, marketing decisions and herd genetics.

'Cow-calf' production is based on an annual schedule, with heifers producing their first calf at two years of age and producing one calf per year thereafter (ABP 2008). Breeding cows have a nine-month gestation period and traditionally producers operate on

⁵ The Crow rate subsidy was established in 1898 to help offset the costs of shipping grain to distant coastal ports for the more isolated prairie grain producers. It was abolished in 1995 (Ramsey & Everett 2001).

Table 1.1 *Canadian beef and veal export market expansion 1991-2007*

Year	Japan	South Korea	Taiwan	Hong Kong	Mainland China	Mexico	US	Other	Total
<i>Tonnes</i>									
1990	4,168	774	9	184	0	1,427	85,011	2,673	94,336
1991	4,449	62	100	250	0	521	86,868	1,992	94,553
1992	4,566	133	48	151	0	1,135	134,228	3,889	144,311
1993	5,928	390	73	428	24	1,481	164,654	3,846	177,329
1994	8,711	1,778	254	524	139	1,713	189,930	8,520	212,012
1995	11,733	3,945	834	575	1,009	2,996	189,399	10,753	221,861
1996	14,314	4,468	849	1,664	923	3,149	251,817	14,959	292,825
1997	18,357	6,732	1,673	1,252	526	6,700	300,059	14,370	350,629
1998	22,628	4,745	1,613	1,647	473	8,506	341,813	17,859	400,372
1999	27,547	15,956	2,053	1,756	1,369	27,516	328,921	20,559	425,967
2000	28,380	20,593	2,655	2,112	1,203	53,189	318,464	17,876	445,916
2001	29,245	9,420	2,991	1,664	1,405	69,674	355,942	18,531	489,725
2002	23,971	17,342	7,971	625	2,551	77,687	363,453	25,349	521,467
2003	8,501	6,368	3,672	616	764	29,442	253,499	19,675	324,765
2004	0	0	0	10,214	0	87,067	336,714	18,339	454,662
2005	0	0	0	20,368	0	52,064	370,742	13,754	458,377
2006	2,117	0	0	15,336	0	40,243	298,087	11,513	368,097
2007	3,520	0	244	17,166	0	51,154	323,139	14,444	413,063

*Source: Red Meat Section, Market and Industry Services Branch, Agriculture and Agri-Food Canada (CFIA Data)

a summer breeding routine, calving in January, February and March. In this way, cows and calves graze together on pasture for the spring and summer, calves can be weaned in the fall and either sent to market, or fed over the winter for sale as ‘yearlings’.

Prior to the ‘finishing’ phase, some cow-calf producers choose to feed their calves for a longer duration of time, fattening them up on low cost high forage diets of either grass or grain until they reach a weight of approximately 750 lbs. This is called ‘backgrounding’ (ABP 2008). ‘Finishing’ is the process of fattening calves up with forages and grains to a slaughter weight, which ranges from 1150-1300 lbs for steers to 1050-1150 lbs for heifers (Ilbery 1985). Though some cow-calf producers will undertake this process themselves in smaller-scale feeding pens, finishing is predominantly

achieved in larger-scale, industrial feedlots, some of which have the capacity to house upwards of 40,000 animals and which utilize highly specialized feed nutrition science (MacLachlan 2005). This is a major industry in the province of Alberta, which is home to over 65% of Canada's slaughter steer and heifer population (MacLachlan 2001).

Finally, the 'slaughter' phase processes and markets finished animals. Alberta is home to the two largest such facilities in Canada, which have the capacity to kill and process 52,000 head of beef cattle per week (*ibid.*). These are federally inspected plants, enabling them to market processed beef and animal products outside of provincial and indeed national boundaries. Saskatchewan and Manitoba are each home to an additional, albeit smaller, federally inspected slaughter and processing facilities. Provincially inspected plants are also scattered across western Canada, which differ in that they can only market beef and animal products within their respective provincial boundaries. While the amount of beef processed in provincially inspected plants is expected to level off at 250,000 head (fed and non-fed) of cattle per year, that of larger, federally inspected plants, is on the rise, increasing from 3,657,000 in 2003 to 4,844,000 in 2006 (Rude *et al.* 2007). Thus, the concentration of the cattle feeding, slaughter and processing in Alberta is likely to increase still further.

Literature Cited

- (AAFC) Agriculture and Agri-Food Canada (2005). Livestock market review. Ottawa: Market and Industry Services Branch. Available online at: <http://www.agr.gc.ca/misb/aisd/redmeat/almrcalendar.htm> (accessed 7 May 2008).
- (ABP) Alberta Beef Producers (2008). *Beef Industry: production*. Available online at: <http://www.albertabeef.org/industry/beef-production-chain> (accessed 22 July, 2008).
- (ARDI) Agri-Food Research and Development Initiative (1999). New Generation Cooperatives on the Northern Plains. *Manitoba Agriculture, Food and Rural Initiatives* (MAFRI).
- Alroe, H.F. & Kristensen, E.S. (2002). Towards a systemic research methodology in agriculture: Rethinking the role of values in science. *Agriculture and Human Values* 19: 3-23.
- Anderson, C. R. & McLachlan, S. M. (2008) Farm-level and collective responses to the BSE crisis and the future of Canadian agriculture. Presented at the *PrioNet Annual Conference, February 3, 2008. Toronto, Ontario*.
- Anderson, S. & Cavanagh, J. (2000). Top 200: The rise of global corporate power. *Institute for Policy Studies* 4, December. Available online at: <http://www.corpwatch.org/article.php?id=377> (accessed 28 June, 2008).
- Andrews, N. J., Farrington, C. P., Ward, H. J. T., Cousens, S. N., Smith, P. J., Molesworth, A. M., Knight, R. S. G. *et al.* (2003). Deaths from variant Creutzfeldt-Jakob disease in the UK. *The Lancet* 361: 751-752.
- Baker, H.F., & Ridley, R.M. (1996). What went wrong in BSE? From prion disease to

- public disaster. *Brain Research Bulletin* 40(4): 237-244.
- Baskerville, R. (1999). Investigating information systems with action research. *Communications of the Association of Information Systems* 2: 2-31.
- Bhatnagar, B. (1992) Participatory development and the World Bank: Opportunities and concerns. Pp. 13-30 in B. Bhatnagar and A.C Williams (Eds.) *Participatory development and the World Bank: Potential directions for change*. Washington: World Bank.
- Beck, U. (1992). *Risk society: Towards a new modernity* New Delhi: Sage.
- Beck, U. (1999). *World risk society* Cambridge: Polity Press.
- Bello, W. (2008). Manufacturing a food crisis. *The Nation*, June 2nd edition. Available online at: <http://www.thenation.com/doc/20080602/bello> (accessed 5 July, 2008).
- Berkes, F. (1999). *Sacred ecology: Traditional ecological knowledge and resource management*. Philadelphia: Taylor and Francis.
- Berkes, F. (2002). Cross-scale institutional linkages: Perspectives from the bottom up. Pp. 293-321 in E. Ostrom, T. Dietz, N. Dolsak, P. C. Stern, S. Stonich and E. U. Weber (Eds.) *The drama of the commons*. Washington, DC: National Academy Press.
- Berkes, F. (2003). Rethinking community-based conservation. *Conservation Biology* 18(3): 621-630.
- Binns, T. Hill, T. & Nel, E. (1997). Learning from the people: Participatory rural appraisal, geography and rural development in the 'new' South Africa. *Applied Geography* 17(1): 1-9.
- Boyens, I. (2001). *Another season's promise: Hope and despair in Canada's farm*

country. Toronto: Viking.

Boyd, W. & Watts, M. J. (1997). Agro-industrial just in time: The chicken industry and postwar America. In D. Goodman and M. J. Watts (Eds.) *Globalizing food:*

Agrarian questions and global restructuring. New York: Routledge.

Braithwaite, J & Drahos, P. (Eds.) (2000). Bretton Woods: Birth and breakdown. Pp. 97-101 in *Global business regulation*. Cambridge: Cambridge University Press.

Brook, R. & McLachlan, S.M. (2006 May). Elk – agriculture interactions in the greater Riding Mountain ecosystem: Final report to Parks Canada. *Environmental Conservation Lab*, University of Manitoba.

Brook, R. (2007). Elk-agriculture conflicts in the greater Riding Mountain Ecosystem: Building bridges between the natural and social sciences to promote sustainability. (Doctoral dissertation, University of Manitoba).

Brownlee, J. (2005). *Ruling Canada: Corporate cohesion and democracy*. Halifax: Fernwood Publishing.

(CAHC) Canadian Animal Health Coalition. (2004). Economic implications of BSE in Canada, 2003: Final report. *Serecon Management Consulting Inc.*, Edmonton, AB.

(CBEF) Canadian Beef Export Federation. (2008). Our industry: What makes Canadian beef special. Available online at: <http://www.cbef.com/Industry.htm> (accessed 24 July, 2008).

(CFIA) Canadian Food Inspection Agency. (2008). Completed investigations of BSE in Canadian cattle. Available online at: www.inspection.gc.ca/english/anim/hes/disemala/bseesb/comenqe.shtml (accessed 4 June, 2008).

- (CFIA) Canadian Food Inspection Agency (2005). Technical overview of BSE in Canada. Available online at: www.inspection.gc.ca/english/anim/hsean/disemala/bseesb/200503canadae.shtml#chap2 (accessed 20 January 2008).
- Canfax (2004). *Annual report*. Calgary: Canfax Research Services.
- Chambers, R., Scoones, I. & Thompson, J. (1994). *Beyond farmer-first*. Cambridge, UK: Cambridge University Press.
- Checkland, P. & Holwell, S. (1997). Action research: Its nature and validity. *Systemic Practice and Action Research*, 11: 10-22.
- Chuengsatiansup, K. (2008). Ethnography of epidemiologic transition: Avian flu, global health politics and agro-industrial capitalism in Thailand. *Anthropology and Medicine* 15(1): 53-59.
- Chossudovsky, M. (1997). *The globalization of poverty*. Malaysia: Third World Network.
- Coughlan, P. & Coughlan, D. (2002). Action research for operations management. *International Journal of Operations and Production Management* 22: 220-240.
- Covello, V.T. & Mumpower, J. (1984). Risk analysis and risk management: An historical perspective. *Risk Analysis* 5(2).
- Day, G. (1998). Working with the grain? Towards sustainable rural and community development. *Journal of Rural Studies* 14(1): 89-105.
- Dobbin, M. (2003). *The myth of the good corporate citizen: Canada and democracy in the age of globalization*. Toronto: James Lorimer and Company Ltd.
- Dornbusch, D. (1998). An analysis of media coverage of the BSE crisis, in Britain. In C. Scott (Ed.) *The Mad Cow Crisis: Health and the public good*. New York: New

York University Press.

Douglas, M. (1992). *Risk and blame: Essays in cultural theory*. London: Routledge Press.

Doyon, M. (2002). An overview of the evolution of agricultural cooperatives in Quebec.

Canadian Journal of Agricultural Economics 50: 497-509.

Dyson, T. (1996). *Population and food: Global trends and future prospects*. London: Routledge.

(ESWG) Ecological Stratification Working Group (1996). A national ecological framework for Canada. Ottawa: Agriculture and Agri-Food Canada, Research Branch, Center for Land and Biological Resources Research; and Ottawa: Environment Canada, State of the Environment Directorate, Ecozone Analysis Branch.

Emilson, K. (2005). *Just a matter of time: A grassroots look at Canada's cattle industry struggling through the aftermath of mad cow disease*. Vogar, MB: Nordheim Books.

Engel, K. H., Frenzel, T. & Miller, A. (2002). Current and future benefits from the use of GM technology in food production. *Toxicology Letters* 127(1-3): 329-336.

Ewald, F. (1991). Insurance and risk. Pp. 197-210 in G. Burchell, C. Gordon and P. Miller (Eds.) *The Foucault effect: Studies in governmentality*. London: Harvester Wheatsheaf.

Ferguson, N.M., Donnelly, C.A., Woolhouse, M.E.J. & Anderson, R.M. (1997). The epidemiology of BSE in GB cattle herds: Model construction and analysis of transmission dynamics. *Philosophical Transactions of the Royal Society of London B* 352: 803-838.

- Fieldhouse, P. (1996). Community shared agriculture. *Agriculture and Human Values* 13(3): 43-47.
- Fischhoff, B., Slovic, P., Lichtenstein, S., Read, S. & Combs, B. (1978). How safe is safe enough? A psychometric study toward technological risk and benefits. *Policy Science* 9: 127-152.
- Fischhoff, B. (1995). Risk perception and communication unplugged: Twenty years of process. *Risk Analysis* 15(2).
- Fischhoff, B., Watson, S. R. & Hope, C. (1984). Defining risk. *Policy Sciences* 17:123-29.
- Friedmann, H. (1982). The political economy of food: The rise and fall of the postwar international food order. *The American Journal of Sociology* 88: 248-286.
- Friedmann, H. (1992). Shaky foundations of the world food economy. *Third World Quarterly* 13(2): 371-383.
- Fullwood, R. R. & Hall, R. E. (1988). *Probabilistic risk assessment in the nuclear power industry*. Elmsford, NY: Pergamon Books.
- Ghani, A.C., Donnelly, C., Ferguson, N.M. & Anderson, R.M. (2003) Updated projections of future vCJD deaths in the UK. *BMC Infectious Diseases*, 3(4).
- Gibbs, E.P.J. (2005). Emerging zoonotic epidemics in the interconnected global community. *Veterinary Record* 157: 673-679.
- Gonzalez, A.A. & Nigh, R. (2005). Smallholder participation and certification of organic farm products in Mexico. *Journal of Rural Studies* 21(4): 449-460.
- Greenwood, D. J. & Levin, M. (2007). *Introduction to action research: Social research for social change* (2nd Edition). California: Sage.
- Gregoire, A. (2003). The mental health of farmers. *Occupational Medicine* 52(8): 471-

476.

Grier, K. (2005). Analysis of the cattle and beef markets pre and post BSE: Final report to the competition bureau. *George Morris Centre*. Available online at:

<http://www.competitionbureau.gc.ca/epic/site/cb-bc.nsf/en/01311e.html> (accessed 10 May, 2008).

Hall, A. (2007). Restructuring, environmentalism and the problem of farm safety.

Sociologia Ruralis 47(4): 343-368.

Hamilton, N. (1994). Agriculture without farmers? Is industrialization restructuring

American food production and threatening the future of sustainable agriculture?

Northern Illinois University Law Review 14: 613-637.

Harvey, D. (2007). Neoliberalism as creative destruction. *The ANNALS of the American*

Academy of Political and Social Science 610: 22-44.

Herbert-Cheshire, L. & Higgins, V. (2003). From risky to responsible: Expert knowledge

and the governing of community-led rural development. *Journal of Rural Studies*

20(3): 289-302.

Hendrickson, M., Heffernan, W. D., Howard, P. H. & Heffernan, J. B. (2001).

Consolidation in food retailing and dairy. *British Food Journal* 103(10): 715-728.

Hendrickson, M. K. & Heffernan, W. D. (2002). Opening spaces through relocalization:

Locating potential resistance in the weaknesses of the global food system.

Sociologia Ruralis 42(4).

Hilton, D. A. (2005) Pathogenesis and prevalence of variant Creutzfeldt-Jakob disease.

The Journal of Pathology 208(2): 134-141.

- Hill, A.F., Desbruslais, M., Joiner, S., Sidle, K.C.L., Gowland, O., & J. Collinge. (1997). The same prion causes vCJD and BSE. *Nature* 389: 448-450.
- Hinrichs, C.C. & Welsh, R. (2003). The effects of industrialization of US livestock agriculture on promoting sustainable production practices. *Agriculture and Human Values* 20: 125-141.
- Hoos, J. (2006). *Global Governance*. Budapest: Akademiai Kiado.
- Hoyle, B. (1999). Canadian farmers seek compensation for “genetic pollution”. *Nature Biotechnology* 17: 747.
- James, C. (2006). Global Status of Commercialized Biotech/GM Crops: 2006. Available online at: <http://www.esaaa.org/resources/publications/briefs/35/executivesummary/default.html> (accessed 30 June, 2008).
- Jasanoff, S. (1993). Bridging the two cultures of risk analysis. *Risk Analysis* 13(2): 123-129.
- Jentsch, B. (2006). Youth migration from rural areas: Moral principles to support youth and rural communities in policy debates. *Sociologia Ruralis* 46(3): 229-243.
- Juska, A., Poviliunas, A. & Pozzuto, R. (2005). Resisting marginalization: The rise of the rural community movement in Lithuania. *Sociologia Ruralis* 45(1/2): 3-21.
- Kasperson, R.E., Renn, O., Slovic, P., Brown, H.S., Emel, J., Goble, R., Kasperson, J.X. & Ratick, S. (1988). The social amplification of risk: A conceptual framework. *Risk Analysis* 8(2): 176-187.
- Kenneth, H.M., Bernstein, J. & Buzby, J.C. (2002). *International Trade and Food Safety*. AER-828. Washington, DC: Economic Research Service, USDA.
- Killick, T. (1995). *IMF programmes in developing countries: Design and impact*.

London: Routledge.

Kimball, A.M., Arima, Y. & J.R. Hodges. (2005). Trade related infections: Farther, faster, quieter. *Globalization and Health* 1(3).

Kindon, S. (2003). Participatory video in geographic research: A feminist practice of looking? *Area*, 35:142-153.

Klein, N. (2000). *No Logo*. Picador: Knopf Canada.

Kunreuther, H. & Slovic, P. (1996). Science, Values and Risk. *The ANNALS of the American Academy* 545: 116-125.

Korten, D. (2001). *When corporations rule the world* (2nd Edition). Bloomfield: Kumerian Press.

Lanska, D.J. (1998). The mad cow problem in the UK: rRsk perceptions, risk management, and health policy development. *Journal of Public Health Policy* 19(2): 160-183.

Lasmezas, C.I., Deslys, J.P., Robain, O., Jaegly, A., Beringue, V., Peyrin, J.M., Fournier, *et al.* (1997). Transmission of the BSE agent to mice in the absence of detectable abnormal prion protein. *Science* 275: 402-404.

Latouche, K., Rainelli, P. & Vermersch, D. (1998). Food safety issues and the BSE scare: Some lessons from the French case. *Food Policy* 23(5): 347-356.

Laycock, A.H. (1972). *The Diversity of the Physical Landscape in Studies in Canadian Geography: the Prairie Provinces*. In Smith, P. J. (Ed.) Toronto: University of Toronto Press.

Legesse, B. & Drake, L. (2005). Determinants of smallholder farmers' perceptions of risk in the Eastern Highlands of Ethiopia. *Journal of Risk Research* 8(5): 383-416.

Leiss, W. & Nicol, A.M. (2006). A tale of two food risks: BSE and farmed salmon in Canada. *Journal of Risk Research* 9(8): 891-910.

- Leiss, W. (2000). Between expertise and bureaucracy: Risk management trapped at the science/policy interface. Pp. 49-74 in G. B. Doern and T. Reed (Eds.) *Risky business: Canada's changing science-based policy and regulatory regime*. Toronto: University of Toronto Press.
- Lemyre, L., Brazeau, I, Gibson, S., Markon, M.P., Bure, P., & Krewski, D. (2008). Mad cow disease (BSE) and food-related risks: A national survey of what the public thinks, Poster presented at the *PrioNet Annual Conference, February 21, 2008*. Toronto, ON.
- Lincoln, Y. S. (1995). Emerging criteria for quality in qualitative and interpretive research. *Qualitative Inquiry* 1 (3): 275-289.
- Loader, R. & Amartya, L. (1999). Participatory rural appraisal: Extending the research methods base. *Agricultural Systems* 62: 73-85.
- Lockie, S. Lyons, K., Lawrence, G. & Mummary, K. (2002). Eating 'green': Motivations behind organic food consumption in Australia. *Sociologia Ruralis* 42(1): 23-40.
- Loppacher, L. J., Kerr, W. A., & Vliet, V. (2004). *The BSE crisis in Canada: A trade perspective on sanitary barriers*. Saskatoon, Canada: Estey Center for Law and Economic in International Trade.
- Lutsky, J. (1996). The top 200 corporations: Bigger than big. *People's Weekly World*, November.
- MacLachlan, I. (2001). *Kill and chill: The restructuring of Canada's beef commodity chain*. Toronto: University of Toronto Press.
- MacLachlan, I. (2005). Feedlot growth in southern Alberta: A neo-Fordist interpretation. Pp. 28-47 in S. Essex, A. W. Gilg, B. Richard and J. Yarwood (Eds.) *Rural Change*

and Sustainability. CABI Publishing.

Manisato, T. (2005). BSE crisis in Japan: A chronological overview. *Environmental Health and Preventative Medicine* 10: 295-302.

Mann, H. & von Moltke, K. (2002). Protecting investor rights and the public good: Assessing NAFTA's chapter 11. Background paper to the *ILSD Tri-National policy workshops Mexico City: March 13*. International Institute of Sustainable Development. Available online at: <http://www.iisd.org/trade/ilsdworkshop> (accessed 15 May 2008).

Marsden, T.K. (1993). *Constructing the countryside*. London: UCL Press.

Mather, J.W., DeVille, K.C., Gessner, A.L. & Adams, C.C. (1998). Cooperative historical statistics. *U.S. Department of Agriculture, Cooperative Information Report 1, Section 26*. Available online at: <http://www.rurdev.usda.gov/rbs/pub/cir1s26.pdf> (accessed 6 July, 2008).

Mauro, I. & McLachlan, S.M. (2008). Farmer knowledge and risk analysis: Post release evaluation of herbicide-tolerant canola in western Canada. *Risk Analysis* 28: 463-476.

Mauro, I. & McLachlan, S.M. Farmer experiences and attitudes towards risks associated with genetically modified crops in Manitoba, Canada. *Agriculture and Human Values* (accepted).

McBride, S. (2001). *Paradigm shift: Globalization and the Canadian state*. Halifax: Fernwood Publishing.

McCarthy, J. (2003). Privatizing conditions of production: trade agreements as neoliberal environmental governance. *Geoforum* 35(3): 327-341.

- McLean, J. (1995). *Improving education through action-research: A guide for administrators and teachers*. Thousand Oaks, CA: Corwin.
- McNab, W.B. (2001). *Notes for employees of the Ministry of Agriculture, Food and Rural Affairs (Draft)*. Canada: OMAFRA.
- Mitura, V. & Pietro, L.P. (2004). Canada's beef cattle sector and the impact of BSE on farm family income. Canada: Statistics Canada.
- Miller, D. (1999) Risk, science and policy: Definitional struggles, information management, the media and BSE. *Social Science and Medicine*, 49(9): 1239-1255.
- Monchuk, J. (2003) Economic pain of mad cow widespread as crisis enters 2004, *Canadian Press Newswire*, 23 December.
- Moore, K. & Lewis, D. (2000). *Foundations of corporate empire: Is history repeating itself?* London: Prentice Hall.
- Murray, M. & Dunn, L. (1995). Capacity building for rural development in the United States. *Journal of Rural Studies* 11(1): 89-97.
- Mythen, G. (2004). *Ulrich Beck: A critical introduction to the risk society*. London: Pluto Press.
- (NFU) National Farmers' Union, Canada (2003). The farm crisis, bigger farms, and the myths of 'competition' and 'efficiency.'" *Union Farmer*.
- (NFU) National Farmers Union, Canada. (2005). The farm crisis and corporate profits. *A report by Canada's National Farmers Union*, November 30. Available online at: www.nfu.ca (accessed June 2, 2008).
- Nathanson, N., Wilesmith, J., & Griot, C. (1997). Bovine spongiform encephalopathy (BSE): Causes and consequences of a common source epidemic. *American Journal*

- of Epidemiology* 145(11): 959-969.
- Neufeld, D.M. (2008). Brooding over the next generation of prairie farmers: Making space for practical-minded youth. *Canadian Center for Policy Alternatives*, Winnipeg, MB.
- Noffke, S. (1997). Professional, personal and political dimensions of action research. *Review of Educational Research* 22.
- Norberg-Hodge, H., Merrifield, T. & Gorelick, S. (2002). *Bringing the food economy home: Local alternatives to global agribusiness*. Halifax: Fernwood Publishing.
- Novek, J. (2003). Intensive hog farming in Manitoba: transnational treadmills and local conflicts. *The Canadian Review of Sociology and Anthropology* 40(1): 3-27.
- (OIE) International Office of Epizootics. (2008). Geographical distribution of countries that reported BSE confirmed cases since 1989. OIE Animal Disease Data. Available online at: http://www.oie.int/eng/maladies/en_alpha.htm (accessed 8 July, 2008).
- O'Neill, K. (2005). How two cows make a crisis: US-Canada trade relations and mad cow disease. *The American Review of Canadian Studies* 35(2): 295-319.
- Osterveer, P. (2002). Reinventing risk politics: Reflexive modernity and the European BSE crisis. *Journal of Environmental Policy Planning* 4: 215-229.
- Parker, I. M. & Kareiva, P. (1996). Assessing the risks of invasion of genetically engineered plants: Acceptable evidence and reasonable doubt. *Biological Conservation* 78(2): 193-203.
- Peet, R. (2003). *Unholy trinity: The IMF, World Bank and WTO*. England: Palgrave MacMillan.

- Phillips L., Bridgeman, J. & Ferguson-Smith, M. (2000). *The BSE Inquiry*. London: The Stationery Office.
- Pidgeon, N. F., Kasperson, R. E. & Slovic, P. (2003). *The social amplification of risk*. London: Cambridge Press.
- Pollock, L., Deaville, J, Gilman, A. & Willock, J. (2002). A preliminary study into stress in Welsh farmers. *Journal of Mental Health* 11(2): 213-221.
- Powell, D. & Leiss, W. (1997). *Mad cows and mother's milk: The perils of poor risk Communication*. Montreal: McGill-Queens University Press.
- Prusiner, S.B. (1997). Prion diseases and the BSE crisis. *Science*, 278: 245-251.
- Qualman, D. (2001). The farm crisis and corporate power. *Canadian Center for Policy Alternatives*.
- Qualman, D. & Wiebe, N. (2002). The structural adjustment of Canadian Agriculture. *Canadian Center for Policy Alternatives*, November.
- Raghavan, C. (1999). Globalization agenda threatens market system. South-North Development Monitor, 3 May. Available online at:
<http://www.globalpolicy.org/globaliz/econ/globmark.htm> (accessed 16 July, 2008).
- Ramsey, D. & Everitt, J.C. (2001). Post-Crow farming in Manitoba: An analysis of the wheat and hog sectors. In R. Epp and D. Whitson (eds) *Writing Off the Rural West*. Edmonton: University of Alberta Press.
- Ratzan, S.C. (1998). *The mad cow crisis: Health and the public good*. New York University Press: New York, NY
- Redclift, M. (1995). The environment and structural adjustment: Lessons for policy interventions in the 1990s. *Journal of Environmental Management* 44(1): 55-68.

- Renn, O. (1998). Three decades of risk research: Accomplishments and new challenges. *Journal of Risk Research* 1(1).
- Riddel, J.B. (1992). Things fall apart again: Structural adjustment programmes in sub-Saharan Africa. *The Journal of Modern African Studies* 30(1): 53-68.
- Roberts, K.D. (1997). China's "tidal wave" of migrant labor: What can we learn from Mexican undocumented migration to the United States? *International Migration Review* 31(2): 249-293.
- Robinson, W.I. & Harris, J. (2000). Towards and global ruling class? Globalization and transnational capitalist class. *Science and Society* 64(1): 11-41.
- Roppel, C., Desmarais, A.A. & Martz, D. (2006). *Farm women and Canadian agricultural policy*. Ottawa: Status of Women Canada
- Rude, J, Carlberg, J. & Pellow, S. (2007). Integration to fragmentation: Post-BSE Canadian cattle markets, processing capacity, and cattle prices. *Canadian Journal of Agricultural Economics* 55: 197-216.
- Sassen, S. (1998). From globalization and its discontents. In G. Bridge and S. Watson (Eds.) *The Blackwell City Reader*. London: Blackwell Publishing.
- Schulz, H. (2004). *Betrayal: Prairie agricultural politics in the fifties*. Calgary: University of Calgary Press.
- Sepehri, A., Chernomas, R. & Haroon, A.L. (2005). *Globalization, neo-conservative policies and democratic alternatives: Essays in honor of John Loxley*. Winnipeg: Arbeiter Ring.
- Sharp, P.F. (1948). *The agrarian revolt in western Canada*. New York: Octagon Books.
- Shaw, A. (2004). Discourses of risk in lay accounts of microbial safety and BSE: A

- qualitative interview study.” *Health, Risk and Society* 6(2).
- Shaykewich, C., Holliday, N, Jeffrey, S, Kennedy, A., Mooney, S. and Woodbury, B. (1994). Weather, climate and prairie agriculture. Pp. 31-48 in J. Elliot, I. Morrison, I. and D. Kraft (Eds.) *Sustainability of Canada’s agri-food system: A prairie perspective*. Winnipeg: International Institute for Sustainable Development.
- Slovic, P., Fischhoff, B. & Lichtenstein, S. (1982). Facts versus fears: Understanding perceived risk. In D. Kahneman, P. Slovic & A. Tversky (Eds.) *Judgment under uncertainty: Heuristics and biases*. Cambridge: Cambridge University Press.
- Slovic, P. (1999). Trust, emotion, sex, politics, and science: Surveying the risk-assessment battlefield. *Risk Analysis*, 19(4): 689-701.
- Slovic, P. (2001). *Smoking: Risk, perception policy*. Thousand Oaks, CA: Sage.
- Slovic, P. (1987). Perception of risk. *Science*, 236: 280-285.
- Smith, A. & MacKinnon, J.B. (2007). *The 100-mile diet: A year of local eating*. Toronto: Vintage Canada.
- Smithers, P. & Johnson, P. (2004). The dynamics of family farming in North Huron County, Ontario, Part 1: Development trajectories. *The Canadian Geographer* 48(2): 191-208.
- Sparling, D.H. & Caswell, J.A. (2006). Risking market integration without regulatory integration: The case of NAFTA and BSE. *Review of Agricultural Economics* 28(2): 221-228.
- Statistics Canada (2007). Agricultural Perspectives from Seven Censuses, Canada and Provinces. Ottawa: Canada. Available online at:
<http://www.statcan.ca/english/freepub/95-632-XIE/2007000/histmenu-en.htm#ii>

(accessed 10 February 2008).

Sumner, J. (2005). *Sustainability and the civil commons: Rural communities in the age of globalization*. Toronto: University of Toronto Press.

Swimmen, J.F.M. (Ed.). (2007). Introduction in *Global supply chains, standards and the worlds poor*. London: CAB International.

Swimmen, J.F. & Maertens, M. (2007). Globalization, privatization and vertical coordination in food value chains in developing and transition countries. *Agricultural Economics* 37(1): 89-102.

Tacke, V. (2001). BSE as an organizational construction: A case study on the globalization of risk. *British Journal of Sociology* 52(2): 293-312.

Tait, F. (2003). Pork politics and power. In A. M. Ervin, C. Holtslander, D. Qualman and R. Sawa (Eds.) *Beyond factory farming: Corporate hog barns and the threat to public health, the environment and rural communities*. Saskatoon: Canadian Center for Policy Alternatives.

Taylor-Gooby, P. & Zinn, J. (2006). *Risk in social science*. New York: Oxford University Press.

Thurston, W.E., Blundell-Gosselin, H.J. & Rose, S. (2003). Stress in male and female farmers: An ecological rather than an individual problem. *Canadian Journal of Rural Medicine* 8(4): 247-254.

Tierney, K.J. (1999). Towards a critical sociology of risk. *Sociological Forum* 14(2).

Tomlinson, J. (1999). *Globalization and culture*. Chicago: University of Chicago Press.

Trinh, T. (1991). *When the moon waxes red: Representation, gender and cultural politics*. New York: Routledge.

- UNCTAD. (1996). *UNCTAD and WTO: A common goal in a global economy*. Geneva: United Nations Conference on Trade and Development.
- Van Loon, J. (2002). *Risk and technological culture: Towards a sociology of virulence*. London: Routledge.
- Verbeke, W., Viaene, J. & Guiot, O. (1999). Health communication and consumer behaviour on meat: From BSE until dioxin. *Journal of Health Communication* 4: 345-357.
- Verbeke, W., Ward, R.W. & Viaene, J. (2000). Probit analysis of fresh meat consumption in Belgium: Exploring BSE and television communication impact. *Agribusiness* 16(2): 215-234.
- White, E. (2008). No good news for beef producers. *The Western Producer*, January 24.
- Wilkinson, I. (2001). *Anxiety in a risk society*. London: Routledge.
- Williams, M. (2001). Trade and environment in the world trading system: A decade of stalemate? *Global Environmental Politics* 1(4): 1-9.
- Wynne, B. (1996). May the sheep safely graze? A reflexive view of the expert-lay knowledge divide. Pp. 44-83 in L. Scott, B. Szerszynski and B. Wynne (Eds.) *Risk, environment and modernity*. London: Sage.
- Yestrau, M. 2008 *Holistic Mmnagement: A western Canadian perspective*. Masters dissertation, University of Manitoba).

CHAPTER III

More than cows at the table: Risk and BSE as experienced by farmers and rural communities in the Canadian prairies

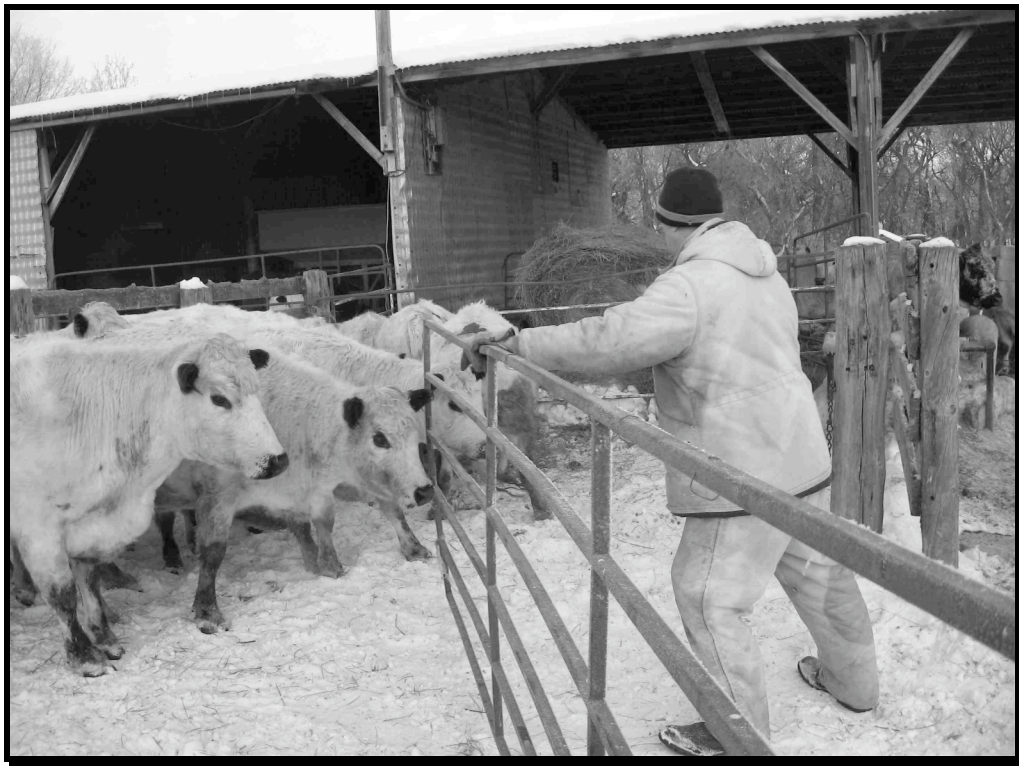


Photo taken at the Guilford farm, near Clearwater Manitoba – Winter 2007

“I know exactly where I was when the BSE was announced, just like I know where I was when Kennedy was shot.” (FGMB1)

Chapter Summary

Bovine spongiform encephalopathy (BSE) has now been found in 28 countries. Despite its severe implications for agriculture as a whole, its impacts on farmers have yet to be systematically evaluated. Our goal was to assess the implications of BSE for farmers and rural communities and to explore the role of qualitative farmer knowledge in understanding and managing risk associated with BSE. In 2006, we mailed questionnaires to 9,600 farmers and conducted 12 group interviews in three provinces in western Canada. The disease had substantial and adverse effects on cattle producers but also producers of other ruminants including bison, elk, and sheep. Impacts were aggravated by a longstanding rural crisis, climatic variation, and by market stressors including rising input costs. Rural communities, especially small businesses and volunteerism, were also affected. These changes contributed to great stress, and many indicated that they were leaving agriculture altogether. This qualitative approach allowed us to explore the cumulative and indirect nature of these risks. Although few decision-makers anticipated the consequences of BSE in Canada, past experience and local knowledge of farmers could play an important role in anticipating and managing disease-associated risk that affect the agricultural sector of this and other countries in the future.

Introduction

The far-reaching risks related to the zoonotic disease bovine spongiform encephalopathy (BSE) have had severe economic and health consequences around the world. To date, it has been found in 28 countries (OIE 2006a), resulted in the fatal

infection of both humans (as vCJD) and animals, and led to the pre-emptive slaughtering of millions of cattle and to billions of dollars in economic and societal costs. BSE is one of several other transmissible spongiform encephalopathies (TSEs), including chronic wasting disease (CWD) in deer and elk, scrapie in sheep, and Creutzfeldt-Jakob disease (CJD) in humans. Characterized by the presence of misfolded protein-like prions that accumulate in and degenerate nervous system tissues, it has no known cure (Dalsgaard 2002). Its spread has been facilitated by the use of rendered meat and bone meal (MBM) from scrapie-infected animals in animal feed, thereby transmitting the disease to ruminant animals (Wilesmith *et al.* 1988).

Although our understanding of BSE is quickly evolving, much remains unknown regarding its precise origins (e.g. Brown 1998), epidemiology (e.g. Smith & Bradley 2003) pathogenesis (e.g. Chesebro 1998), or degree to which it poses risks for human health (Brown *et al.* 2001). Likewise, and perhaps because of the grave concern for human health in most high BSE-incidence countries, its economic and social impacts also remain largely unknown, especially for farmers and rural communities (Jones 2004). This uncertainty characterizes most “modern risks” (Beck 1992).

Risk is generally viewed as the probability and corresponding consequences of an undesired event, a technical and quantitative approach that is largely seen as value-neutral (Renn 1998). Risk assessment is conventionally seen to exist strictly in the realm science, where “expert-based” institutions are empowered to calculate thus predict risk likelihood and potential harm (Powell & Leiss 1997). Yet the notion that this activity can be objective is misleading, as science-based risk assessments are also value-laden (Doppelt 2007). Indeed, as in all scientific inquiry, results of quantitative risk

assessments are predicated on the specific questions that are asked, which in turn inevitably limiting the scope of understanding (Kunreuther & Slovic 1996).

The emergence of a global BSE risk arguably demonstrates the shortcomings of expert-dependent, quantitative risk assessment and management and highlights the need for a more inclusive approach to risk analysis. Unlike extreme risks of the past associated with naturally occurring disasters, “modernity” risks often originate from technological progress itself, are difficult to predict, and are generally far-reaching in nature (Beck 1992). Indeed, some have called BSE the textbook example of a modern risk (e.g. Tacke 2001). It has its origins in technology of the rendering of industry and the likelihood of BSE and its equally lethal human variant vCJD was then unknown. The now globalized food system and mismanagement by government agencies, especially in the UK, facilitated the spread of the disease around the world (Kimball *et al.* 2005) while the resulting adverse public reaction and distrust in government responses to the disease led to an enormous social amplification of the risk (Raude *et al.* 2005).

Yet, there was a substantial variation in how affected countries responded to these risks (see Lewis *et al.* 2008). Because risk is both born of and unfolds in society, it can be seen as social construction that reflects its cultural context (Douglas 1992). Risk assessment often occurs within highly charged political and public climates (Powell & Leiss 1997) and the science underlying risk analysis is arguably only as good as the level of communication to decision-makers and larger society. Many of the long-lasting consequences of the emergence of the BSE risk and resulting crisis in the UK, for instance, are attributed to the miscommunication of science to government risk managers (Jakob & Hellstrom 2000), the subsequent mismanagement of the crisis as a whole

(Baker & Ridley 1996) and the resulting public distrust and furor (e.g. Jasanoff 1997; Smith *et al.* 1999). Indeed, with increasing public skepticism as to the accuracy and legitimacy of technical expert based analyses, some suggest that quantitative risk “analysts are assuming more responsibility for risk management than they can deliver” (Fischhoff 1995, p. 139).

Science-based approaches to risk evaluation have been criticized for assigning values to the immeasurable, providing an artificial sense of precision and accuracy, being disconnected from everyday life, and failing to provide important context within which risks unfold (Bryman 2001). A complementary approach has focused on the role of ‘lay’ public perceptions in risk discourse (Shaw 2004). Many of these psycho-social approaches are also quantitative in nature and highlight a dichotomy between “experts” and the “lay” public (Renn 1998). Employing terms like “lay accounts” (Shaw 2004) and “lay expertise” (Wynne 1996), and even “concerned citizens” (Bergman 2008), they often imply that public perceptions and knowledge are less informed than those of ‘experts’ (Mauro & McLachlan 2008).

Yet local knowledge (LK) reflects the rich, long-term understanding of those with the closest connection to the landscapes being studied and can provide much additional breadth to scientific approaches to risk (Mauro & McLachlan 2008). The outcomes of research that documents and incorporates LK in management often hold more relevance and benefit for those involved (Lidskod 2008). This is especially true of participatory approaches that involve community input at each step in the research process (Brook and McLachlan accepted) Although the use of LK has long been advocated for development in the Global South (Chambers *et al.* 1994; Loader & Amartya 1999), this is only

beginning to be explored with farmers in industrialized countries. For example, it has been used to better-characterize risks associated with bovine TB (Brook & McLachlan 2006) and GM crops (Mauro & McLachlan 2008).

In retrospect, the incorporation of these lived knowledge systems would have contributed to the better understanding and managing of risks associated with BSE in Canada. Although the likelihood of BSE-related risk was indeed assessed (CFIA 2005; SSC 2000), the consequences received much less attention and was not effectively communicated to decision-makers or the public (Leiss & Nicol 2006). These shortcomings reflect the deficiency of risk assessment that is expert-driven, quantitative, and far-removed from the realms in which risks-turned hazard would soon unfold. Even once the first BSE-positive cattle were discovered and the risks had become apparent, the dependence on science-based risk management continued (Wilson 2005) and many important historical, cultural and spatial factors that would help shape the impacts of this disease on rural residents were ignored. The BSE crisis in Canada thus provides an opportunity to explore the role that farmer knowledge could play in characterizing the cumulative and indirect consequences of the disease for farmers and rural communities and the role that these knowledge systems might play in anticipating the scale and magnitude of future risks associated with such zoonotic diseases.

The BSE crisis in Canada

The BSE crisis in Canada unfolded in a unique manner. Whereas in most other countries, BSE-associated risks were “amplified” by factors such as perceived health risks among the public, the media and distrust in governments (Latouche *et al.* 1998;

Raude *et al.* 2005), they were attenuated in Canada (Lewis *et al.* 2008). Indeed, beef consumption actually *increased* during the BSE crisis (Yang & Goddard 2008). Three years later, consumer attitudes are characterized by the absence of concern and they have little if any recollection of the BSE threat (LeMeyer *et al.* 2008). The implementation of regulatory measures to mitigate or prevent BSE from entering into the human food chain were effective and there have been no cases of vCJD linked to BSE-infected meat originating in Canada (CFIA 2005). So how then did the emergence of BSE constitute a crisis?

Following the discovery of a BSE-infected cow on May 20, 2003, 34 countries immediately imposed trade bans on Canadian live and processed beef products (Le Roy & Klein 2005), including the US, which then comprised 80% of Canada's beef and live cattle exports (Grier 2005). Though US markets partially reopened in August 2003, trade embargoes on all other beef products and live cattle persisted until July 2005, when the US trade embargoes were lifted for live cattle under thirty months of age (Rude *et al.* 2007). Even early estimates of the economic impacts on the Canadian economy were upwards of CAD \$7 billion (Mitura & Pietro 2004).

In Canada, the BSE crisis primarily affected the agricultural sector, particularly cattle producers who experienced severe income and equity losses primarily from the trade embargoes imposed on this largely export-oriented industry (SMCI 2003). From a global perspective, Canada's pre-BSE cattle industry was relatively small (1.2% total global cattle inventory), but it was a major contributor to total global exports (15%) (Canfax 2003). Indeed, Canada had been developing a burgeoning export-based beef industry for over two decades and was exporting over 75% of its beef production prior to

May 20, 2003 (Le Roy & Klein 2005). Thus, the beef industry was extremely vulnerable to the emergence of BSE (Leiss & Nicol 2006). Within weeks of its discovery, farmers had already deemed the potential impacts on the cattle industry as “unprecedented” and as “the biggest train wreck in our history” (Jahnke in Duckworth 2003). Evaluation of the impacts of BSE in Canada have been short-term, economic and almost entirely quantitative in nature, focusing on the impacts of international trade embargoes on the Canadian economy and beef sector as a whole (e.g. Mitura & Pietro 2004; SMCI 2003) and how these impacts were related to deep trade integration with the US (e.g. Loppacher *et al.* 2004; Grier 2005; Rude *et al.* 2007). While it is recognized that the impacts on primary producers were severe, at \$3.5 billion within the first year (SMCI 2003), the implications for farmers, farm families, and rural communities remains unknown.

The overall goal of this paper is to explore the role of farmer knowledge in analyzing risks related to the emergence of the BSE in Canada. More specifically, I will: characterize the impacts of BSE on farmers and their larger rural communities; explore how other background risks associated with rural decline and changes in climate contributed to these impacts; and assess to what degree these findings allow us to anticipate and better manage disease-associated risks in the future.

Methods

Study area

Alberta (AB), Saskatchewan (SK) and Manitoba (MB) are all provinces that comprise the Canadian Prairies Ecozone. Comprising over 520,000 km (Laycock 1972), most of the land cover in the southern portion is dominated by agriculture (Shaykewich *et al.* 2008). BSE, Farmers and Rural Communities: 74 T. Stozek 2008
Impacts and Responses Across the Canadian Prairies

al. 1994). The zone is characterized as sub-humid to semi-arid, with average temperatures ranging from -9.4°C (AB) and -18.3°C (MB) in the winter to 16.1°C (AB) and 19.7°C (MB) in the summer (ESWG 1996). Mean annual precipitation is highly variable, ranging from 250mm in the more arid southeastern AB and southwestern SK to 700mm in the Lake Manitoba Plain (*ibid.*).

Crop cover is dominated by cereal and oilseed production, whereas livestock production largely consists of beef cattle, sheep, bison, elk and goats. Although some operations are characterized as “mixed farms”, most farm production systems have adopted a more intensive approach and specialize in either grain or livestock (Shaykewich *et al.* 1994).

This region has undergone much structural economic and social transformation in recent years. There has been a change from grain towards livestock production since the elimination of the Crow Rate, a subsidy that helped offset the costs of grain transport to distant coastal ports (Ramsey & Everitt, 2001). Livestock production has since increased substantially in the Prairies, and now comprises >77% of the beef cattle and >74% of the slaughter cattle herds in Canada (MacLachlan 2001, p. 21). Slaughter facilities have relocated from eastern Canada to AB, which is now home to three federally-inspected slaughterhouses that collectively account for 80% of the national beef slaughter capacity (Rude *et al.* 2007). SK and MB are each home to an additional federally inspected slaughter facility.

Research approach

We employed a qualitative approach to research, making use of surveys and both individual and group interviews. The research design, data collection and analysis have been premised on constructivist, grounded theory whereby the researcher acknowledges realities are multiple and subjective and that they are constructed by both researcher and research participants (Charmaz 2005). This approach to research allows for theory to emerge from rather than drive the research process, important when dealing with socially sensitive subjects (Roppel *et al.* 2005), such as farmer perceptions of and experiences with BSE.

Preliminary focus groups

In December 2005, group interviews were conducted with farmers from two distinct regions in Manitoba. General questions were asked about the ways in which participants had experienced the BSE-related risk and impacts on their farms and communities. The primary purpose of these interviews was to learn how farmers and communities were affected by BSE as well as to receive feedback about possible mail-out survey designs.

Mail-out survey

A random stratified approach to sampling was taken, with 12 strata selected across the 3 prairie provinces. These strata were based on cattle production density (i.e. low and high) and proximity (i.e. close and far) to the nearest federally inspected slaughterhouse. Low and high cattle production classes were defined as 0-21 cattle km⁻² and 22-65 cattle km⁻², respectively whereas close and distant classes were defined as

<150 km and >150km to the nearest slaughterhouse. Two census districts (CDs) were randomly selected from each of the four strata for each of the three provinces (n=24). All post offices consisting of less than 80 farms, as defined by Canada Post, were identified for each CD and post offices randomly selected from this list until 400 farms had been selected from each CD (Fig. 1.1).

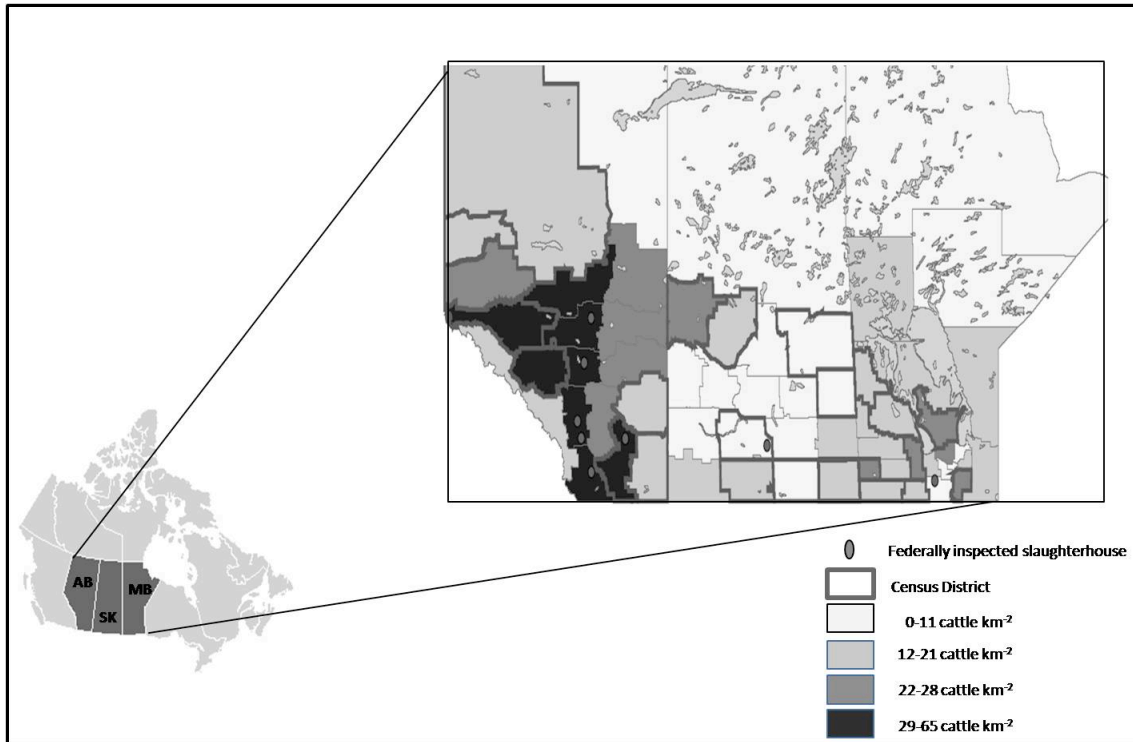


Figure 1.1 Questionnaires mailed and group interviews conducted in the western Canadian provinces of Alberta (AB), Saskatchewan (SK), and Manitoba (MB).

The questionnaire was eight pages in length and consisted of both Likert-scaled and open-ended questions. Using broad themes identified from the group interviews with farmers, the first half focused on perceptions and experiences that could be filled out by any rural resident. These included direct and indirect impacts related to BSE, additional

agricultural structural changes and government responses to BSE. In contrast, the latter half focused on perceptions and experiences of farmers and any farm-level impacts.

These included BSE-related impacts on farm equity and assets, farm and ranch expenditure changes, adaptive responses, environmental and animal health implications and changes, marketing choices and changes.

On March 7, 2006, 9,713 surveys were distributed using an unaddressed ‘ad mail’ mailing option to all those who had self-identified as ‘farmers’ in the selected postal regions. The use of ad mail was unavoidable since mailing lists are unavailable for farmers for all three provinces. A reminder letter and finally a condensed four-page version of the original larger survey were sent out at one-week intervals after the initial mail-out (Dilman 1978). The shorter survey was sent in order to provide an additional opportunity for busy farmers to participate in the research, anticipating that some would have lost or discarded the original questionnaire (ibid.).

In total, 1,473 completed surveys were returned, for a 15% absolute response rate. Using contact information available to us, residents in the strata/census districts sampled were telephoned, allowing us to assess how many of the questionnaires had actually been received and an adjusted response rate was calculated to be 33.1%. Although somewhat low, these response rates are typical of large-scale mail surveys conducted in rural areas and reflect a trend of declining mail survey response rates in natural resource-based sectors (Connelly *et al.*, 2003). Non-response bias was assessed by telephoning 10 farmers in each of the test CDs (n=240), five of whom had already responded and five of which had not responded to the questionnaire. All were asked five questions selected from the questionnaire and, for the non-responders, why they had not responded. No

significant ($p=0.6758$) differences in response among these two groups and the written responses from the former groups were evident, although telephone respondents were less likely to indicate BSE-associated hardship, in part because they were being interviewed.

Follow-up focus groups

Once the survey data had been analyzed in a cursory manner, group interviews were conducted in communities within each of the 10 remaining sample strata between August-November 2006. Respondents to the survey whom had indicated that they wished to participate further in the research were identified, contacted and invited to participate in a location central to those interested. Overall, 93% of those contacted agreed to participate in-group interviews. Participants were diverse, ranging from primary producers in the livestock and grain sectors, community business owners and employees (agricultural and non) to participants who self-identified as community leaders and agriculture experts. Most (85%), however, identified as ‘cow-calf’ farmers that raised cows for their calves and to maintain a viable herd, this higher than the 76.3% of respondents to the questionnaire that were cow-calf operators. Age ranged from 24 to 75, with an average of 53.3 yoa and the participation of men (85%) greatly exceeded that of women, this generally comparable to the questionnaire respondents who were on average 52.9 yoa and of which 90.9% were male.

Data analysis

A qualitative approach was taken to data analysis in this study. Data arising from open-ended questions in the survey were entered and from the group interviews were

transcribed in their entirety. These data were systematically analyzed and coded using ATLAS/ti™ software and any emerging themes were identified and explored (Muhr 1991). Although responses from both questionnaires and interviews occurred in each theme, survey respondents were more inclined to share personal and emotional experiences than interviewees. This is likely due to the ability to remain more anonymous and distanced from the researcher (Dilman 1978). Finally, quantitative Likert-scale data from the mail-out surveys were entered and descriptive statistics for questions related to impacts were recorded using SPSS™ v16.0. 3.5

Results

BSE crisis in Canada: Risk turned reality

The discovery of the first indigenous case of BSE in the Canadian herd on May 20, 2003 precipitated a devastating crisis on farmers and rural communities across western Canada. The 26 months of trade embargoes and market volatility attributable to BSE was the most severe agricultural crisis most (73%) survey respondents (n=1097) had ever experienced. Some compared the impacts experienced to those experienced by farmers during the Great Depression:

“We were forced to either sell our animals at rock bottom prices, prices not seen since the “dirty thirties,” or to keep them and hope the market would improve. Prices were greatly depressed for the cow-calf sector and other markets, causing tremendous stress on cattle producers...The industry as we knew it will never be the same” (633L).

Those most immediately affected by BSE-related trade embargoes were farmers who had the largest animal inventories. Large feedlot operators experienced equity losses of upwards of \$192 million in the first three months (SMCI 2003). This sector underwent a period of recovery after August 2003, when the US lifted its trade ban on processed boneless beef from cattle under thirty months of age, the age demographic marketed by commercial feedlot operators. Moreover, government compensation programs were quite effective in mitigating the impacts of these losses for feedlot and processing sectors (AAFC 2004).

It was those farmers who supply feedlots with calves (i.e. cow-calf operators), who were most severely impacted by the trade embargoes and resulting BSE crisis in the longer-run.

“Our agriculture sector is predominantly beef agriculture, mostly cow-calf. Cow-calf farmers were the ones affected the worst by far. The residual effects of this crisis are still felt today. It will be years before these farmers will recover from the uncertainty and economic devastation experienced” (1260S).

Overall, reduced beef processing and domestic market over saturation led to declines in calf prices upwards of 40% relative to pre-BSE levels in the first four months following the initial imposed trade bans throughout the Prairies (Rude *et al.* 2007).

Although calf prices partially recovered in the winter of 2004, soon after the US partially lifted its trade ban, prices remained extremely low for breeding stock and cull cows, as this respondent from MB described:

“We used to see a thousand dollars or more for a particularly good grading cow that was a large, heavy cow. We haven't seen even half of that since BSE. Most

cows now sell for a third to a half of what they used to sell. The (cull) cows were very much the profit for a year... The calves paid your expenses and the cull cows were your profit. When you lost the income from those cull cows, it really hurt your operation even if your calves were still getting a fair dollar” (987L).

Prices still remain lower than pre-BSE levels (Table 2.1). Importantly, because older culled cows typically comprise upwards of 20% of total cattle sales, these losses in income had substantial effects on farmer herd equity and consequently their ability access loans and indeed to operate:

“Our equity, as a result of BSE decreased from \$1200 per cow, on 300 cows, to \$200 per head. This adds up to a \$300,000 loss of equity. This negative resulted in our suppliers/creditors withholding credit from us to purchase the necessary supplies needed to operate” (145L).

Table 2.1 Average beef cattle prices across Alberta, Saskatchewan and Manitoba, 2002-2007

	2002	2003	2004	2005	2006	2007
Steers	98.25	88.08	78.50	83.44	85.59	86.98
Heifers	98.60	89.69	76.34	82.80	84.29	85.26
Cows	55.56	38.14	23.52	28.69	34.55	36.30
Bulls	70.00	43.09	20.98	27.21	33.04	32.16

Source: Canfax

These losses in equity from cull animals spanned all cattle sectors, including cow-calf and dairy farmers, and pure-breeders. Many received mere pennies for their marketed cull animals and, in extreme cases some indicated that income from their marketed cattle failed to even cover the costs of shipping. Although some respondents reduced their herd sizes or even exited agriculture altogether, most delayed selling their stock, hoping that markets would improve or that the cows would at least maintain their reproductive value,

despite their frequent ill-health. Most (69%) respondents reported euthanizing sick or aging cows on the farm, in part because they lacked the necessary resources (e.g. pasture space, winter feed) and because they were unwilling or unable to bear the added market risk or to hire a veterinarian to perform this service:

“The old cull cows never left the farm. We can’t afford to sell them for 5-10 cents per lb. Leave them to have calves on the farm until they can’t have any more calves or are crippled and then dispersed on the farm. We can’t afford the vet bills” (288L).

Direct impacts on non-beef livestock sectors

Despite being identified as a mad “cow” crisis, producers of *all* ruminant livestock (e.g. sheep, goats, bison and elk) were similarly affected by the trade bans. These sectors comprise a smaller but still significant proportion of livestock production across the prairies. Inventories in all of these sectors increased following BSE, especially for bison, which has increased by 35% since 2001 (Statistics Canada 2006a). Many described their frustration at being overlooked by the public and government:

“Much attention has been given to beef producers during BSE. Sheep producers were severely affected as well. Yet few people knew that the border was also closed to sheep. The sheep industry is too small to have major lamb promotions the way beef was promoted” (453L).

There is also a limited slaughter capacity for other ruminant livestock types and, following the border closures, shipping costs to these more distant facilities became prohibitive and, without access to the US market, caused a further reduction in prices.

Prior to the BSE crisis, farmers in western Canada had been diversifying their production systems and, thus, risk by incorporating these other livestock types as well as by growing more specialized cash crops and feed grains. Yet BSE simultaneously compromised many sectors, directly or indirectly.

The interconnected local farm economy meant that one farmer's risk mitigation strategy often became another's risk. Thus, many in the grain and feed sales sectors were also adversely affected:

"We produce feed for sale and due to BSE and farmers holding onto their herds, they did not and could not afford to buy extra feed – feed straw or grain feed. Due to this fact, our hay prices were down and so were sales. Our livelihood was cut down by 30-40%" (142L).

Farming is one of the highest risk professions and subject to much uncertainty, especially now, when corporate consolidation and increased competition among farmers around the world has driven farm profits to record lows (NFU 2005). These risks are being further aggravated by global climate change and poverty in many parts of the world (O'Brien *et al.* 2004), as was the case for BSE in Canada:

"The issue was more than just BSE; BSE pushed people from slowly sinking to being drowned quickly" (FGAB3).

Importantly, overall BSE was ranked only eighth compared to other rural stressors (Table 2.2), at once indicating the extreme duress experienced by many farmers and reflecting how interlinked these stressors are.

Compounding risk factors: Climate and market stressors

Severe drought conditions had occurred across large regions of Saskatchewan and Alberta in 2001 and 2002 prior to the BSE crisis, resulting in widespread livestock feed and water shortages and \$3.6 billion worth of losses in crop productivity (Wheaton *et al.* 2005). In drought-ridden areas, some described feed shortages as having an adverse effect on the rate at which their calves gained weight, affecting their market value and in some regions were as much of a crisis as BSE:

“There was a major drought over large areas of the Province (SK) that affected cattle producers far more than other sectors. We feel the drought had as much effect on producers as the BSE crisis” (27L).

Those in drought-affected areas described being further affected by associated grasshopper infestations and large regions in throughout southern Saskatchewan and Manitoba were subject to early frost in August 2004. Indeed, it was hard for respondents to distinguish the impacts of these stressors. However, they summarized their impacts as having a cumulative effect on those associated with BSE:

“BSE would not have had the impact that it did if it were not compounded by drought in 2003 and hard frost in 2004. Most years if grain is poor, cattle are strong, and vice versa but this time that was not possible” (137S).

Market-related stressors, such as the soaring price of oil, appreciation of the Canadian dollar, and the increase in production costs also aggravated risks associated with BSE. Nearly all (96%) survey respondents across all three provinces agreed the rising fuel costs was the most significant risk facing farmers in western Canada (Table

2.2). These increases in costs compromised profit margins alongside the BSE-related market impacts:

“The cattle industry has recovered from BSE somewhat but high input costs: fuel, machinery fertilizer, repairs, etc., are going to cripple the farming industry as we know it” (26L).

During the BSE crisis, oil prices doubled from \$30 (USD) per barrel in 2003 to \$60 (USD) in 2006 (Rewet 2006) and has since climbed above \$100 (USD) per barrel (Mufson 2008), these with concomitant increases in fuel (27%) and anhydrous ammonia (10%) (AAFC 2006).

Table 2.2 Mean responses and associated standard error to issues that may place farmers and rural communities at risk across Manitoba (MB), Saskatchewan (SK), and Alberta (AB), in order of declining overall importance (n=1609)

Issue	MB		SK		AB		Overall	
	\bar{x}	SE	\bar{x}	SE	\bar{x}	SE	\bar{x}	SE
Rising fuel costs	6.63	(0.05)	6.66	(0.06)	6.42	(0.08)	6.59	(0.03)
Loss next generation of farmers	6.43	(0.05)	6.50	(0.06)	6.21	(0.09)	6.39	(0.04)
Loss of rural infrastructure	6.28	(0.06)	6.51	(0.05)	5.81	(0.10)	6.23	(0.04)
Rural depopulation	6.30	(0.06)	6.46	(0.06)	5.69	(0.11)	6.19	(0.04)
Farm bankruptcies	5.95	(0.06)	6.19	(0.06)	5.63	(0.10)	5.95	(0.04)
Loss of locally owned businesses	6.04	(0.06)	6.13	(0.07)	5.44	(0.10)	5.91	(0.04)
Rising property taxes	5.96	(0.07)	6.13	(0.07)	5.04	(0.10)	5.77	(0.05)
BSE disease	5.77	(0.08)	5.81	(0.09)	5.56	(0.10)	5.73	(0.05)
Elimination of Crow rate subsidy	5.49	(0.08)	6.16	(0.08)	5.29	(0.11)	5.66	(0.06)
Fewer job opportunities	5.90	(0.07)	6.03	(0.07)	4.74	(0.13)	5.63	(0.05)
Alcohol and drug abuse	4.97	(0.08)	5.22	(0.08)	4.97	(0.11)	5.05	(0.05)
Chronic wasting disease	4.86	(0.08)	5.10	(0.09)	4.76	(0.11)	4.92	(0.05)
Avian flu disease	4.93	(0.08)	4.93	(0.09)	4.69	(0.10)	4.86	(0.05)
Environmental decline	4.68	(0.09)	4.96	(0.10)	4.63	(0.12)	4.76	(0.06)
Overall	5.72	(0.07)	5.91	(0.07)	5.35	(0.10)	5.67	(0.05)

Increases in oil prices also explain disparity in risk experienced by farmers across provinces in western Canada. Alberta's thriving economy is largely based on the oil and gas industry, which in the shorter-term has benefited farmers in Alberta. Greater access to a high-paying job markets and well endowed provincial government BSE support programs helped mitigate the stress experienced by farmers throughout the BSE crisis compared to their counterparts in Manitoba and Saskatchewan (Ashraful & McLachlan 2008): *"Our local towns and villages would be in real trouble if it weren't for the oil and gas industry" (1199S)*. It also helps explain why risks as a whole were ranked lower in Alberta than the other two provinces (Table 2.2).

Indeed, the high wages in Alberta attracted many respondents from Manitoba and Saskatchewan, who reported having to leave the province during the winter months to work in the oil fields. That stated, the boom has in turn resulted in dramatic increases in the value of land and taxes in Alberta, which further placed some respondents at risk.

Another recent contributing market factor has been the appreciating Canadian dollar:

"Profitability from my beef enterprise was impacted at least as much by the change in the relative value of the Canadian dollar at the same time as BSE. This factor has been largely ignored in the media and by industry leaders" (234L).

Relative to the US dollar, the Canadian dollar increased from \$0.67 in 2004 to \$1.15 in 2008 (Pingue 2008). An equivalent rising pound sterling in the UK likewise contributed to the longer-term impacts experienced by British farmers from BSE (Atkinson 1999).

Many used off-farm employment to compensate for declining farm incomes. Between 2001 and 2006, the percentage of farmers deriving an income from off-farm

sources increased from 44% to 48% (Statistics Canada 2007). Many respondents indicated the BSE crisis aggravated this trend and that off-farm income played a central role in coping with the financial stress (Anderson & McLachan 2007), especially when confronted with multiple stressors:

“We had three years of drought, then BSE, and now high fuel prices. Everybody is stressed, many farms are for sale, and people have had to find off-farm work” (1156L).

Yet for many, this additional workload created further stress and some communicated their extreme frustration with the efficiency treadmill whereby they were still unable to generate a living farm income. These circumstances led many to abandon farming all together:

“I am quitting farming because of BSE and high costs. Had to work two other jobs just to pay the bills” (470L).

The combined effects of these aforementioned stressors represented what some have called a “perfect storm in agriculture” (Rance 2006), a storm that shows no sign of abating.

Farmer stress

In most cases, stress associated with the long-standing farm crisis were compounded by the further decline in income, outstanding credit, debts and loans, increased need for off-farm employment, and resulting strenuous workload during the BSE crisis. Nearly all (96%) survey respondents indicated experiencing increased stress and worry during BSE, which had implications for entire families:

“Stress! I’ve got to feed the cows and calves but have no income! I’ve got to work harder so have less family time and have more health risks. And I still had to spend money to keep cattle fed, calved, pay for veterinary fees, etc. Much more stress on the farmer trying to get the job done without income” (438L).

Farmers expressed difficulty in having to borrow funds year after year while, in the face of so much uncertainty, they were unsure whether they would ever be able to repay those debts. In 2003, outstanding farm debt increased by 7.2% to \$47.7 billion (Statistics Canada 2004). Those already having large debt loads before the crisis suffered even more, especially those that had just begun farming.

“In our area the hardest hit by the BSE crisis were beginning farmers, especially those who had been talked into bison, elk and deer farming, who had a high debt load from buying breeding stock at greatly inflated prices and then seeing their assets turning into liability after May 20, 2003” (930L).

In many cases, worry was aggravated by having to work off-farm, especially when these income earners were separated from their families. For some, these pressures led to marital breakdowns in their communities and many sought professional counseling. Others suffered from depression, much of this arising from an inability to make the family farm viable. Several shared experiences with suicide and how it has affected their lives and communities. Most attributed these extreme measures to financial hardships and the seemingly never-ending crisis in agriculture. As one respondent from Saskatchewan starkly described:

“I am extremely bitter about the agriculture situation. Two of my neighbors have been killed lately, both with young families. One took a high-powered rifle, put it

in his mouth and blew his head off. The other stepped in front of his tractor and was pinned against a gate while feeding his cattle. I found him frozen like a rock. I had to tell the family what happened. My life has not been the same since” (1111S).

Increases in the rates of farmer suicides have occurred around the world. In Australia, where farmers have been plagued with the worst drought in a hundred years, one farmer takes their own life every four days (Page & Fragar 2002) and similar data exist for India (Stone 2002) and Europe (Stark *et al.* 2006). Farmer suicide has recently become a serious problem (White 2005) and is worthy of further study, especially since it is generally under-reported (Pollard 1985). Such increases in stress themselves speak to the importance of assessing risk in holistic ways that recognize that BSE and its impacts operate within a larger context of rural and environmental decline and that, for many, *“BSE was the proverbial straw that broke the farmer’s back” (128S).*

Rural community impacts

Difficulties experienced by farmers and farm families during the BSE crisis also had ramifications for their larger communities. The success of local rural businesses is ultimately dependent upon the success of the farmers.

“The businessmen in our rural town are hurting. When the farmers have no money to spend, the rural businesses are the first to feel it” (12L).

As the crisis persisted, farmers were inclined to reduce expenditures wherever possible. Agriculture-oriented businesses were adversely affected by declines in sales, such that

some local machinery outlets suffered a 50% decline in sales, and accounts often went unpaid:

“Money became very, very tight. There were lots of unpaid bills to local retailers, stores, seed growers, trucking companies, custom sprayers, fertilizer dealers” (366L).

Non-agricultural businesses were similarly affected, whether these be bowling alleys and curling rinks, restaurant, bars, or even grocery stores. Social services were compromised as an indirect consequence of the BSE-related and other stressors experienced by farmers. Churches and sports clubs, which play a central role in many small communities, were also affected, as they are largely dependent on the fundraising and volunteerism efforts of community members. This decline in participation in community events and social functions in turn contributed to longer-term trend of decline in rural infrastructure and services:

“Our community has witnessed the closure of our school, a grain elevator and a fertilizer plant. Most of the businesses have already closed years ago. Watching ones way of life slowly disappear is stressful as is the struggle to pay bills” (1049S).

BSE, like other agricultural stressors, had implications for the entire rural social fabric and contributed to the ongoing trend of rural decline in the Prairies, impacts that can persist over decades. Thus, the government dismantling of the Crow Rate subsidy in 1984 resulted in major changes throughout the rural landscape, including the loss of railway lines, grain elevators and other infrastructure throughout the Canadian Prairie region. Losing this fundamental economic infrastructure in turn contributed to losses of other

services, infrastructure, jobs and workers (Boyens 2001). These impacts linger into the present, such that the majority (76%) of survey respondents (n=800) ranked the loss of the Crow Rate as a significant risk to Canadian agriculture 20 years later (Table 2.2). Indeed, it still ranked higher than BSE in Saskatchewan. Many identified that the community-level impacts of BSE would also be long-lasting and difficult, if at all possible to reverse.

Future implications

The landscape of Canadian Prairies is rapidly changing and many believed, in the wake of one farm crisis after another, the future of family farmers and rural communities was increasingly at risk and in decline. Although exports of live animals and meat from ruminant animals over thirty months have resumed, the entire livestock sector is reeling from the lingering effects of drought, the appreciating dollar, and of course BSE. Most recently, the price of grain has soared in part because a global shortage of food often associated with the fast growing demand for biofuels (CBC 2008). While these changes obviously reflect another increase in the cost of inputs, they also represent an indirect threat to the livestock industry as producers are now transforming their perennial pastures and haylands to annual grain crop production. Many further expressed that they were just “hanging on,” feeling vulnerable to potential future risks:

“We aren’t make any money off the farm and have used up all of our savings If there is a drought or one poor year, we will be finished. We are just hanging on by the skin of our teeth. I could pick beer bottles and make more money then I can in farming” (160L).

Others indicated they have already exited or intend to exit from farming altogether:

*“I’m fifty years old; as soon as someone comes by and buys my place, I’m gone”
(FGSK1).*

Indeed, we recently (February 2008) conducted follow-up phone interviews with respondents and 30% of those who had indicated they wished to participate in future research projects were no longer farming. Others wanted to quit farming but felt unable to:

“The farms that are going are living off Visa or MasterCard, which will not last long. Some farmers in trouble do not want to believe that they have a problem. Myself, I want to sell my cows so that I can go out to work, but can’t get enough money for them, so I feel I am trapped. I can’t get out even if I want too. Soon the bank will force me” (1156L).

The great majority (98%) of respondents agreed that the “loss of the next generation of farmers” was a significant threat, ranking it as the penultimate risk after rising fuel costs in all three provinces (Table 2.2). Over the last 30 years, there has been a widescale loss of farmers and an associated depopulation of rural communities across western Canada. The number of farms declines 5% each year from 164,192 in 1976 to 123,814, 30 years later (Statistics Canada 2006b). This loss has been accompanied by a concomitant loss of future farmers. The average farmer in the Prairies is now 55 yoa (Statistics Canada 2006a) and, coupled with an understandable lack of interest among farm youth (and their parents) to take on the family farm, raises the question of what will rural communities look like in ten or twenty years?

“When young farmers give up. Who will replace the older retiring and dying farmer? Will corporations be more economical? No, most rely on government handouts (taxpayers). My mother always said we will starve when we could have a full table” (769S).

There was little incentive for often highly skilled rural youth to pursue a livelihood with such high risk, especially when there are other more lucrative opportunities elsewhere, most notably in the oil and gas industry (Neufeld 2008). Indeed, many felt that the legacy of multi-generational family farms would soon be a thing of the past:

“I feel that when our generation (50 yrs. old), are finished, it will be the end of the family farm as it has been for generations. The young people are not interested in farming and who can blame them? And I for one would not encourage this line of business to them” (1122S).

Discussion

The impacts of BSE on farmers and rural communities throughout the Canadian Prairies have been devastating and will persist long into the future. We have argued that the consequences of BSE for farm families and rural communities are cumulative and often indirect in nature and thus can only be fully appreciated in this larger context. In many cases, farmers and rural communities had still been reeling from the effects of a larger and longer-term farm crisis characterized by declining financial returns on farm commodities, rising costs of production, and net farm incomes that have plummeted to negative digits (Qualman 2001; Wheaton *et al.* 2005) as well as challenges arising from climatic variation including drought, early frost, and pest infestation.

The emergence of BSE revealed that rapid technological advances and benefits associated with intensive agriculture can come with great costs. Some of the risks are relatively easy to measure at larger scales of organization, including the direct national economic losses experienced from domestic beef sales declines in the UK (e.g. Phillips *et al.* 2000) or losses in export markets in Canada (e.g. Mitura & Pietro 2004). Yet many others remain poorly understood, especially those affecting rural communities and farm families, where risks are often felt first and are most severe. Although the agricultural sector is widely recognized as being adversely affected by BSE, this to our knowledge is the first published and systematic evaluation of this disease on farmers and their communities – anywhere in the world.

How can this be when BSE has been discovered in 26 countries and has been accompanied by widespread and high profile border closures, consumer concern, and financial chaos? In part, this oversight likely reflects the near-absence of consumer and health concern in Canada, these fears having perhaps eclipsed the otherwise very real impacts of BSE on farmers in other high-incidence countries. But it also likely reflects the way risk is evaluated – a process that is urban centered, expert-based, and quantitative in nature.

Although expert and quantitative approaches to risk evaluation generate much needed information for managing and communicating risks associated with zoonotic disease, they are, in-of-themselves, insufficient. Where they fail, as indicated by our results, is in assessing the generally context-dependent consequences of disease, contexts that vary both over time and in place. While some have indicated that these shortcomings were plagued by miscommunication (Baker & Ridley 1996), incompetence (Nikiforuk

2006), and even subterfuge (Leiss & Nichol 2006), I further argue that they also reflect an inherent shortcoming of any approach to risk evaluation that is strictly quantitative and science-based (Lidskod 2008).

Risks associated with a globalized agricultural system such as BSE are inevitable yet highly complex. We have contended elsewhere that approaches to risk evaluation that are located in the lived experiences of those most affected by the stressors can play an important and complementary role to science-based approaches when evaluating risks associated with GM canola (Mauro & McLachlan 2008) and wheat (Mauro *et al.* 2005) and zoonotic diseases such as bovine TB (Brook & McLachlan 2006). Yet farmer-focused and empirical studies on agriculture-associated risk remain rare.

Rarer yet is the qualitative approach we took in this study. As such, these results reflected the holistic and cumulative nature of many of the farmer experiences, these sometimes extending over multiple generations. Located in the lived expertise of many rural residents, they show how otherwise disparate stressors can contribute to risk that at once reflects and surpass any one stressor, BSE or otherwise. Thus, other disparate stressors –climate change, a rising Canadian dollar, and increased costs of inputs –together resulted in multiple exposure, aggravating the impacts of BSE. These same residents readily looked beyond their own individual concerns and made links with their larger communities and regions. Indeed, it was remarkable how similar the concerns and experiences were, regardless of livestock sector or of province.

Although the BSE crisis in Canada is widely seen as ending with the reopening of the US border, at which point the associated compensation programmes and mainstream media coverage ended, its impacts on farmers and rural communities continue unabated.

These consequences would have been apparent had decision-makers meaningfully consulted farmers and other rural residents before and during the crisis, and if mechanisms had been constricted that would allow producers to participate alongside experts and other stakeholders (Bergmans 2008).

That many of the risks are cumulative in nature and reflect a changing agricultural landscape that spans multiple decades makes these risks more complex at first glance, but it also makes them more predictable and manageable. Each risk is rooted in both the near and long-past histories of these communities, and, thus, each risk does not have to be examined in isolation. Once the connections between the issue of concern and others are understood, the future implications of these and other yet unencountered stressors become much more knowable and, indeed, predictable. From our study it is clear that rural residents have the expertise that is required to inform future decision-making around these and other risks. Now all that is needed is recognition by decision-makers that these lived-experts have an active and informed role to play in managing risks that confront communities in agriculture-dominated landscapes.

Literature Cited

- (AAFC) Agriculture and Agri-Food Canada (2006). Canada: Farm fuel and fertilizer expenses, Bi-Weekly Bulletin. Available at: http://www.agr.gc.ca/mad-dam/index_e.php?s1=pubs&s2=bi&s3=php&page=bulletin_19_05_2006-03-24 (accessed 10 February 2008).
- (AAFC) Agriculture and Agri-Food Canada (2004). Measures to assist industry in response to BSE, *2004 Backgrounders*. Available at: http://www.agr.gc.ca/cb/index_e.php?s1=b&s2=2004&page=bse-esb (accessed 20 December 2007).
- Alam, M. & McLachlan, S.M. (2007). Socio-economic impacts of the BSE crisis in rural communities in western Canada. Presented at the *PrioNet Annual Conference, February 17, 2007, Calgary, AB*.
- Anderson, C.R. & McLachlan, S.M. (2008). Farm-level and collective responses to the BSE crisis and the future of Canadian agriculture. Presented at the *PrioNet Annual Conference, February 21, 2008, Toronto, ON*.
- Atkinson, N. (1999). The impact of BSE on the UK Economy, Paper presented to the *1st Symposium on Animal and Human TSEs, Buenos Aires, August 11th, under the auspices of the Instituto Interamericano de Cooperacion Para La Agricultura*.
- Baker, H.F. & Ridley, R.M. (1996). What went wrong in BSE? From prion disease to public disaster, *Brain Research Bulletin*, 40: 237-244.
- Beck, U. (1992). *Risk society: Towards a new modernity*. New Delhi: Sage.
- Bergmans, A. (2008). Meaningful communication among experts and affected citizens on risk: challenge or impossibility? *Journal of Risk Research* 11:175-193
- Berkes, F. & Folke, C. (2002). Back to the future: Ecosystem dynamics and local BSE, Farmers and Rural Communities: 98 T. Stozek 2008
Impacts and Responses Across the Canadian Prairies

- knowledge. Pp. 121-146 in L.H. Gunderson & C.S. Holling (Eds.) *Panarchy: Understanding transformations in human and natural systems*. Island Press: Washington, DC.
- Boyens, I. (2001). *Another season's promise: Hope and despair in Canada's farm country* Toronto: Viking.
- Brook, R. & McLachlan, S.M. (2006). Factors influencing farmers' concerns regarding bovine tuberculosis in wildlife and livestock around Riding Mountain National Park. *Journal of Environmental Management* 80: 156-166.
- Brown, P. (1998). On the origins of BSE. *Lancet* 352: 252-253.
- Brown, P., Will, R. G., Bradley, R, Asher, D. M. & Detwiler, L. (2001). Bovine spongiform encephalopathy and variant Creutzfeldt-Jakob disease: Background, evolution, and current concerns. *Emerging Infectious Diseases* 7: 6-16.
- Bryman, A. (2001). *Social Research Methods*. New York: Oxford University Press.
- (CBC) Canadian Broadcasting Corporation (2008). Stop biofuels to fight world hunger, food scientists say, April 30, 2008. Available online at:
<http://www.cbc.ca/world/story/2008/04/30/tech-corn-prices.html> (accessed 19 May, 2008).
- (CFIA) Canadian Food Inspection Agency (2005). Technical overview of BSE in Canada. Available online at:
<http://www.inspection.gc.ca/english/anima/heasan/disemala/bseesb/200503canadae.shtml#chap2> (accessed 20 January 2008).
- (Canfax) Canfax Research Services. (2003). *Annual Report*. Available online at:
<http://www.canfax.ca> (accessed 12 December 2007).

- Chambers, R., Scoones, I. & Thompson, J. (1994). *Beyond farmer-first*. Cambridge, UK: Cambridge University Press.
- Charmaz, K. (2005). Grounded theory in the 21st century: Applications for advancing social justice studies. Pp. 507-535 in N.K Denzin and Y.S Lincoln (Eds.) *Sage handbook of qualitative research* (3rd edition). London: Thousand Oaks.
- Chesebro, B. (1998). BSE and prions: Uncertainties about the agent. *Science* 279: 42-43.
- Connelly, N.A., Brown, T. L. & Decker, D. J. (2003). Factors affecting response rates to natural resource-focused mail surveys: Empirical evidence of declining rates over time. *Society and Natural Resources* 16: 541-549.
- Dalsgaard, N.J. (2002). Prion diseases: An overview. *Acta Pathologica, Microbiologica et Immunologica Scandinavica (APMIS)* 110: 3-13.
- Dilman, D.A. (1978). *Mail and Telephone Surveys: The Total Design Method*. New York: Wiley.
- Doppelt, G. (2007). The value-ladenness of scientific knowledge. Pp. 188-217 in H. Kincaid, J. Dupre and A Wylie (Eds.), *Value-Free Science: Ideals and Illusions*. New York: Oxford University Press.
- Douglas, M. (1992). *Risk and blame: Essays in cultural theory*. London: Routledge Press.
- Duckworth, B. (2003). Industry still recovering from BSE repercussions, *The Western Producer*, June 5.
- (ESWG) Ecological Stratification Working Group (1996). A national ecological framework for Canada. Ottawa: Agriculture and Agri-Food Canada, Research Branch, Center for Land and Biological Resources Research; and Ottawa:

Environment Canada, State of the Environment Directorate, Ecozone Analysis Branch.

Fischhoff, B. (1995). Risk perception and communication unplugged: Twenty years of process, *Risk Analysis* 15: 137-145.

Fischhoff, B., Watson, S. R. & Hope, C. (1984). Defining risk, *Policy Sciences* 17: 123-29.

Grier, K. (2005). Analysis of the cattle and beef markets pre and post BSE: Final report to the Competition Bureau. Guelph, ON: George Morris Centre. Available online at: [http:// www.competitionbureau.gc.ca/PDFs/Cattle%20and%20Beef%20Markets_Industry %20Report.pdf](http://www.competitionbureau.gc.ca/PDFs/Cattle%20and%20Beef%20Markets_Industry%20Report.pdf) (accessed 17 January 2008).

Jakob, M. & Hellstrom, T. (2000). Policy understanding of science, public trust and the BSE-CJD crisis. *Journal of Hazardous Materials* 78: 303-317.

Jasanoff, S. (1997). Civilization and madness: The Great BSE scare of 1996. *Public Understanding of Science* 6: 221-232.

Jones, K. (2004). BSE and the Phillips report: A Cautionary tale about the uptake of 'risk'. Pp. 161-186 in N. Stehr (Ed.) *The Governance of Knowledge*. New Brunswick, NJ: Transaction.

Kasperson, R.E., Kasperson, J.X. & Turner II, B.L. (1999). Risk and criticality: Trajectories of regional environmental degradation. *Ambio* 28: 562-568.

Kimball, A.M., Arima, Y. & Hodges, J.R. (2005). Trade related infections: Farther, faster, quieter. *Globalization and Health* 1. Available online at: <http://www.globalizationand health.com/proxy1.lib.umanitoba.ca/content/1/1/3> (accessed on 19 January 2008).

- Kunreuther, H. & Slovic, P. (1996). Science, values and risk, *The ANNALS of the American Academy of Political and Social Science*, 545: 116-125.
- Latouche, K., Rainelli, P. & Vermersch, D. (1998). Food safety issues and the BSE scare: Some lessons from the French case. *Food Policy* 23: 347-356.
- Laycock, A.H. (1972). The diversity of the physical landscape. Pp. 2-32 in P. J. Smith (Ed.) *Studies in Canadian geography: The prairie provinces* Toronto: University of Toronto Press.
- Leiss, W. & Nicol, A.M. (2006). A tale of two food risks: BSE and farmed salmon in Canada. *Journal of Risk Research* 9: 891-910.
- LeMyre, L., Brazeau, I., Gibson, S., Markon, M.P., Bure, P. & Krewski, D. (2008). Mad cow disease (BSE) and food-related risks: A national survey of what the public thinks. Poster presented at *PrioNet Annual Conference, February 21, 2008, Toronto, ON*.
- Le Roy, D.G. & Klein, K.K. (2005). Mad cow chaos in Canada: Was it just bad luck of did government policies play a role? *Canadian Public Policy*, 31: 381-399.
- Lewis, R., Tyshenko, M.G. & Krewski, D. (2008). The impact of social amplification and attenuation of risk and the public reaction to BSE in Canada. Poster presented at *PrioNet Annual Conference, February 21, 2008, Toronto, ON*.
- Lidskod, R. (2008). Scientised citizens and democratized science: Re-assessing the expert-lay divide. *Journal of Risk Research* 11: 69-86.
- Loader, R. & L. Amartya. (1999). Participatory rural appraisal: Extending the research methods base. *Agricultural Systems* 62: 73-85.
- Loppacher, L.J., Kerr, K.A. & Vliet, V. (2004). The BSE crisis in Canada: A trade

- perspective on sanitary barriers, *Estey Center for Law and Economic in International Trade*. Available online at: http://www.esteycentre.ca/BSE_Crisis_in_Canada.pdf (accessed 12 January, 2008).
- MacLachlan, I. (2001). *Kill and chill: The restructuring of Canada's beef commodity chain* Toronto: University of Toronto Press.
- Mauro, I. & McLachlan, S.M. (2008). Farmer knowledge and risk analysis: Post release evaluation of herbicide-tolerant canola in western Canada. *Risk Analysis* 28: 463-476.
- Mauro, I. & McLachlan, S.M. Farmer experiences and attitudes towards risks associated with genetically modified crops in Manitoba, Canada. *Agriculture and Human Values* (accepted).
- Mitura, V. & Pietro, L.D. (2004). Canada's beef cattle sector and the impact of BSE on farm family income: 2002-2003. *Statistics Canada*. Available online at: <http://www.statcan.ca/english/research/21-601-MIE/21-601-MIE20044069.pdf> (accessed 3 December 2007).
- Muhr, T. (1991). ATLAS/ti – a prototype for the support of text interpretation. *Qualitative Sociology* 14: 349-371.
- Mufson, S. (2008) Oil closes at over \$100 for 1st time. *Washington Post*, February 20, Page D01.
- (NFU) National Farmers Union, Canada (2005). *The Farm Crisis and Corporate Profits*, November 30. Available online at: http://www.nfu.ca/new/corporate_profits.pdf (accessed 15 February 2008).
- Neufeld, D.M. (2008). Brooding over the next generation of prairie farmers: Making

- space for practical-minded youth. *Canadian Center for Policy Alternatives*,
Winnipeg, MB
- Nikiforuk, A. (2006). *Pandemonium: Bird flu, mad cow disease and other biological plagues of the 21st century*. Toronto: Viking.
- O'Brien, K., Leichenko, R., Kelkar, U., Venema, H., Aandahl, G., Tompkins, H., Javed, A., *et al.* (2004). Mapping vulnerability to multiple stressors: Climate change and globalization in India. *Global Environmental Change* 14: 303-313.
- (OIE) Office International des Epizooties. (2006). Number of reported cases of bovine spongiform encephalopathy (BSE) in farmed cattle worldwide. *OIE Paris*,
Available online at: www.oie.int/eng/info/en_esbmonde.htm (accessed 18 February 2008).
- Page, A.N. & Fragar, L.J. (2002). Suicide in Australian farming, 1988-1997. *Australian and New Zealand Journal of Psychiatry* 36: 81-85.
- Phillips, N., Bridgeman, J. & Ferguson-Smith, M. (2000). *UK BSE inquiry: The report, Vol. 10: Economic impact and international trade*. London: The Stationary Office.
- Pingue, F. (2008). Loonie ends above parity on jobs data. *The National Post*, Friday, February 8.
- Pollard, B. (1985). Resume from suicide. *Farm Journal* 109: 35-37.
- Powell, D. & Leiss, W. (1997). *Mad cows and mother's milk: The perils of poor risk communication*. Montreal: McGill-Queens University Press.
- Qualman, D. (2001). The Farm Crisis and Corporate Power. *Canadian Center for Policy Alternatives*, April.
- Raude, J., Fischler, C., Setbon, M. & Flahault, A. (2005). Scientist and public responses

- to BSE-related risk: A comparative study. *Journal of Risk Research* 8: 663-678.
- Ramsey, D. & Everitt, J.C. (2001). Post-crow farming in Manitoba: An analysis of the wheat and hog sectors. Pp. 3-21 in R. Epp and D. Whitson (Eds.) *Writing Off the Rural West*. Edmonton: University of Alberta Press.
- Rance, L. (2006). Weathering the perfect storm in farming. Pp. 10-13 *Yield Manitoba 2006*, supplement to *The Farmers' Independent Weekly*.
- Renn, O. (1998). Three decades of risk research: Accomplishments and new challenges. *Journal of Risk Research* 1: 49-71.
- Roppel, C., Desmarais, A.A. & Martz, D. (2005). Farm women and Canadian agricultural policy. Canada: Status of Women.
- Rude, J., Carlberg, C. & Pellow, S. (2007). Integration to fragmentation: Post-BSE Canadian cattle markets, processing capacity, and cattle prices, *Canadian Journal of Agricultural Economics* 55: 197-216.
- (SMCI) Serecon Management Consulting Inc (2003). Economic implications of BSE in Canada. Available online at http://www.animalhealth.ca/bse_info.htm (accessed 23 October 2007).
- (SSC) Scientific Steering Committee of the European Food Safety Authority (2000). Report on the assessment of the geographical BSE-risk of Canada. Available online at: http://europa.eu.int/comm/food/fs/sc/ssc/out113_en.pdf (accessed 1 June 2008).
- Shaw, A. (2004). Discourses of risk in lay accounts of microbial safety and BSE: A qualitative interview study. *Health, Risk and Society*, 6: 151-171.
- Shaykewich, C., Holliday, N, Jeffrey, S, Kennedy, A., Mooney, S. & Woodbury, B. (1994). Weather, climate and prairie agriculture. Pp. 31-48 in J. Elliot, I. Morrison,

- I. and D. Kraft (Eds.) *Sustainability of Canada's agri-food system: A prairie perspective*. Winnipeg: International Institute for Sustainable Development.
- Smith, A.P., Young, J.A. & Gibson, J. (1999). How now, mad-cow? Consumer confidence and source credibility during the 1996 BSE scare. *European Journal of Marketing* 33: 1107-1122.
- Smith, P.G. & Bradley, R. (1998). Bovine spongiform encephalopathy (BSE) and its epidemiology, *British Medical Bulletin* 66: 185-195.
- Smithers, P. & Johnson, P. (2004). The dynamics of family farming in North Huron County, Ontario, Part 1: Development trajectories. *The Canadian Geographer*, 48: 191-208.
- Stark, C., Gibbs, D., Hopkins, P., Belbin, A., Hay, A. & Sevaraj, S. (2006). Suicides in farmers in Scotland. *Rural and Remote Health* 6. Available online at: http://e-jrh.deakin.edu.au/publishedarticles/article_print_509.pdf (accessed 3 June 2008).
- Statistics Canada (2007). Agricultural perspectives from seven censuses, Canada and provinces. Ottawa: Canada. Available online at: <http://www.statcan.ca/english/freepub/95-632-XIE/2007000/histmenu-en.htm#ii> (accessed 10 February 2008).
- Statistics Canada (2004). Farm outstanding debt: Agriculture economic statistics. Ottawa: Canada. Available online at: <http://www.statcan.ca/english/freepub/21-014-XIE/21-014-XIE2004002.pdf> (accessed 19 February 2008).
- Stone, G.D. (2002). Biotechnology and suicide in India, *Anthropology News* 43.
- Tacke, V. (2001). BSE as an organizational construction: A case study on the globalization of risk. *British Journal of Sociology* 52: 293-312.

- Wheaton, E., Wittrock, V., Kulshreshta, S., Hoshida, G., Grant, C., Chipanshi, A. & Bonsal, B. (2005). Lessons learned from the Canadian drought years of 2001 and 2002: Synthesis report for *Agriculture and Agri-Food Canada*. Ottawa: Canada.
- White, E. (2005). Connecting the dots, *The Western Producer*, February 10.
- Wilesmith, J.W., Wells, G.A.H, Granwell, M.P. & Ryan, J.B.M. (1988). Bovine spongiform encephalopathy: Epidemiological studies. *Veterinary Record* 123: 638-644.
- Wilson, B. (2005). Science-based rules? What about other applications? *The Western Producer*, January 20
- Wynne, B. (1996). May the sheep safely graze: A reflexive view of the expert-lay knowledge divide, in S. Lash, B. Szerszynski, and B. Wynne (Eds.) *Risk, environment and modernity*. London: Sage: 44-83.
- Yang, J., & Goddard, E. (2008). How media information affected Canadian consumers' risk perceptions on BSE and rally behaviour for Canadian beef cattle producers. Paper presented at the *PrioNet Annual Conference, February 21, 2008, Toronto, ON*.

CHAPTER IV

The landscape has changed: Shifty government policies, BSE-related impacts and farmer-led responses in the Canadian prairies



Photo taken near Biggar, Saskatchewan – August 2006

“The current food system isn’t an arrangement dropped out of the sky. It’s a compromise between different demands and anxieties, of corporations pushing for higher profit, of government concerned with social unrest or, occasionally, a drubbing at the polls, and of urban consumers. Written out of this story are the rural communities, who seem to be suffering silently. And yet it is they who are leading the way in forging a new and different food system. They do it out of necessity, for they are dying.” – Patel, 2007 (p.35)

Chapter Summary

Food system restructuring through neoliberal policies has occurred around the world. However, the recent emergence of risks such as bovine spongiform encephalopathy (BSE), and resulting crises are symptomatic of the growing weaknesses and vulnerabilities of that system. This study examines the role of government policies in facilitating this restructuring and thereby contributing to risk as experienced by farmers in western Canada during their recent BSE crisis and also examined the ways in which farmers are able to respond within the current politico-economic paradigm, looking more specifically at agricultural co-operatives. Results indicate Canadian government policy; trade liberalization and selective deregulation priorities favour the largest players in the food supply chain. Yet they are undesirable and problematic for most farmers and contributed to the impacts of BSE and undermined the abilities of farmers to respond in co-operative ways that have been historically effective.

Introduction

Impacts of and responses related to the restructuring of the global food system are becoming more evident worldwide as witnessed by the emergence, global spread, and devastating impacts of animal and livestock disease. In times of crisis, the most vulnerable elements of these food systems as well and the ways in which they respond to and confront those changes become exposed. These crises represent such an opportunity to better understand the nature of the global food system and indeed its impacts on and responses of farmers and the fabric of their communities. Strategic changes in

governmental policy have enabled economic restructuring and global enmeshment through globalization and free trade agreements, and arguably contributed to heightened risks associated with these diseases and the food system as a whole (Tacke 2001; Beck 1999).

Global food system restructuring

Over the last three decades, the world's largest institutions have been successfully lobbying governments around the globe to adopt policies that encourage trade liberalization and declining state intervention in the marketplace as to increase market competitiveness, efficiency and profitability (Watson & Winson 1993). Agribusiness corporations have been at the forefront of this lobbying, many of which operate on a transnational level (Norberg-Hodge *et al.* 2002) and food systems have unquestionably played an important role in and been influenced by this restructuring.

The restructuring of food systems has largely occurred since World War II. This building of a new 'food regime' focused on entrenching economies in the Global South into the global economy through trade liberalization, privatization and governmental deregulation (Patel 2007). Food, and the exceedingly powerful institutions that control it, has enabled these institutions to access substantial wealth and power (McMichael 2000), as have capitalist countries in the North. Thus, the US has long used production surpluses as food aid to strategically leverage open foreign markets in the Global South, thereby driving down global grain prices and, importantly, lessening the importance of subsistence agriculture in these aid-receiving countries (Friedmann 1992). Global institutions such as the International Monetary Fund (IMF), the World Bank and more

recently the World Trade Organization (WTO) have further galvanized trade and investment-friendly economic and political climates in these regions once foreign aid and financial dependence were established (Patel 2007). Food producers have, in turn, become ever more specialized and commodity- and export-oriented (Sumner 2005).

Agribusiness has benefited immensely from this new industrial agro-food system. Previously local and short food supply chains have become much longer, with value added and profits extracted at every link by global corporations (Desmerais 2007). Norberg-Hodge *et al.* (2002) assert this global food system is “characterized by large scale, highly mechanized, monocultural and chemical-intensive methods, with production oriented toward distant and increasingly global markets” (p. 3). The average North American meal now travels 3,000 km from farm to fork (Hill 2008), with value often being added in ever more distant and centralized processing industries (Patel 2007). These changes have, in turn, been enabled by research and technology as well as supportive regulatory regimes, all in the name of added ‘efficiency’ (Sumner 2005). Risks arising from this restructuring are clearly illustrated by the incidences of disease that are now dispersed around the world.

Viruses and prions: Zoonotic disease risks gone global

Rapid and widespread movement of people, livestock and food products has transformed largely contained disease risks into ones that operate as epidemics at the global sphere. Recently emerging global zoonotic disease risks include the highly contagious avian influenza (HCAI) in poultry and fowl and bovine spongiform encephalopathy (BSE), which both occur in ruminant livestock, are examples. Recent

outbreaks of these diseases illustrate the risks that plague the global industrial food system, which by intensifying and commodifying production and by increasing economic efficiency, have helped create new risks or amplified the severity of those that already exist (Greger 2007).

The discovery of BSE in the UK in 1986 and subsequent realization that it crossed species barriers thus affecting humans, as new variant Creutzfeldt-Jakob disease (vCJD), has had enormous economic and health implications. Since 1987, 184,561 cases of BSE and (OIE 2008) and 110 human deaths associated with vCJD have been reported in the UK (UKDH 2006), and culminated in \$8 billion (USD) in economic losses (Roberts *et al.* 2000).

Importantly, the decade-long denial of these risks by the UK government contributed to the widespread dissemination of the disease around the world (Powell & Leiss 2004). To date, BSE has been found in 24 other countries across three continents (OIE 2008), resulting in substantial downstream economic losses, these largely emerging from the resulting trade bans (Blayney *et al.* 2006) and declines in public beef consumption (Verbecke & Ward 2001).

Although the large-scale impacts of BSE are well documented, little is known about the implications of these diseases for farmers and rural communities, especially for family and small-scale operations. This in part reflects a preoccupation with the health risks associated with these diseases, that small-scale impacts are difficult to document, that they interact with other stressors and are cumulative in nature (Stozek & McLachlan submitted). Moreover, there has been little attention placed on underlying governmental

policies and the role that they play in contributing to both the emergence of and impacts resulting from such zoonotic disease.

Restructuring and risk in Canada

The agrofood system in Canada has undergone dramatic structural changes in recent decades, having substantial implications for farmers and rural communities. Government policies have helped entrench the food supply chain into the global economy (e.g. FTFA 1969; FAIT 2006), as witnessed by the signing of the Canada-US Free Trade Agreement (CUSTA) in 1989, which became the North American Free Trade Agreement (NAFTA) in 1994, with the inclusion of Mexico in the treaty (Desmerais 2007). This agreement removed state control mechanisms (e.g. tariffs, ‘single-desk’ marketing boards), liberalizing trade and establishing a North American trading bloc (Brownlee 2006), these changes long advocated by the agribusiness community in Canada (McBride 2000). The stringent NAFTA rules restrict how governments might influence policies guiding economic development (Brownlee 2006), leaving farmers to rely more on the open market and encouraging market-driven agricultural practices (Klein & Kerr 1995). It is becoming clear that the agri-business community has benefited most from this restructuring – arguably at the expense of individual farmers and rural communities.

In Canada, a shift has occurred from more subsistence-oriented agricultural production such as small-scale family labor farms towards an export-oriented and capital and technology intensive production (Smithers & Johnson 2004). Once diverse agricultural regions have become highly specialized and oriented towards regionalized, comparative advantage production (Lyson 2007). The shift in Canada’s beef slaughter

sector to the west was, in large part, facilitated by dismantling the Crow Rate subsidy in the mid-1990s, which had offset the costs of grain transportation to distant coastal ports. The loss of this subsidy made the feeding of that grain to livestock more lucrative and the grain-abundant west subsequently developed into the highly concentrated livestock feeding and processing hub of Canada that it is today. Over 60% of Canada's beef cattle herd is now located in the three prairie provinces; 80% is located in Alberta's highly specialized and large-scale industrial feedlots, some of which house upwards of 40,000 head of cattle (MacLachlan 2001). Furthermore, 80% of slaughter capacity is located in Alberta and owned by three companies, two of which are US-owned (i.e. Cargill, Tyson Foods⁶), that have an oligopoly on the meatpacking sector (Rude & Carlberg 2007).

There have been clear winners and losers from this agricultural policy model. Whether it be fuel and fertilizer, seeds and genes, machinery and bank loans, storage or transportation, retailing or distribution, profits within these sectors have reached record highs (Qualman 2006). In turn, farms have become larger, more specialized, mechanized and increasingly consolidated. Although these changes have resulted in increases in production, these have been matched by an equivalent rise in production costs such that farm financial returns have remained largely unchanged or indeed declined. Canadian farmers thus find themselves amidst a crisis (Boyens 2002) resulting in a steadfast decline in farmer population of approximately 5% per annum since the 1970s (Statistics Canada 2003) and corresponding decline of rural population, infrastructure, and services.

⁶On June 25th, 2008, Tyson Foods announced they would be selling their entire Alberta-based beef business, Lakeside Farm Industries, located in Brooks, Alberta which includes slaughtering and processing facilities, a cattle feeding operation and retail fertilizer and farming to an expanding processing company based out of Saskatchewan, XL Foods Inc., a subsidiary of Neilson Bros. Group (Nunes 2008).

Whereas farms were once the economic centers of rural communities, they now focus on commodity production for distant global agribusiness corporations (Lyson 2007). This decline is less an inevitability of the input and technology intensive agriculture than a systematic shift in government policy priorities, and the outcome of a market system that has failed farmers in Canada (Schulz 2006).

Global food system restructuring and related emergence and the spread of zoonotic disease risks and their resulting impacts undoubtedly represent a serious crisis for indigenous people, farmers, and rural communities worldwide. Yet the emerging and widespread dissatisfaction with the global food system and the fear surrounding these diseases are contributing to alternatives and a re-forging of social networks among farmers and between farmers and similarly concerned consumers. Although organics has had and continues to have important voice in these “alternative” food systems (Raynolds 2000), other actors include fair trade schemes that give rise to more equitable relationships between the North and South, a reinvigoration of culinary traditions (e.g. Slow Food), local food initiatives such as farmers’ markets and community-shared agriculture that promote the importance of responsible and informed consumers (Constance 2008), and global peasant and farmer solidarity movements (Desmerais 2008). These initiatives have the potential to create more just and diverse food systems and to access market power in the face of a food system increasingly dominated by powerful global agri-business companies and the associated related risks (e.g. Norberg-Hodge *et al.* 2002; Desmerais 2008). Yet little is known about how these farmer-driven initiatives are affected by disease-related crises.

Farmer-driven responses to food system restructuring

Indeed, a long history of farmers responding and successfully adapting to challenges and adversities exists for western Canada, much of which was located in a vibrant and successful cooperative movement in the first half of the twentieth century.

Grain shipping and storage became rapidly concentrated in the 1920s and farmers pooled their human and economic resources together in order to more effectively compete with concentrated agribusiness. They established agricultural coops in large part to access better prices for their produce, more market control and power (Doyon 2002). The collective purchasing of grain storage terminals and establishment of grain grower coops were among the most successful of farmer-owned co-ops in Canada and served as a vehicle by which market and political mobilization was achieved (Sinclair 1975; Watson & Winson 1993). This movement led to the creation of such beneficial subsidies and farmer organizations as the Crow Rate Subsidy, the Western Grain Transportation Act and the Canadian Wheat Board (ibid.), the latter of which continues to advocate for farmers over seventy years later.

Yet the political and market power of farmers in western Canada has dramatically changed over the last century. Farmers comprised over 30% of the population in 1931, which now has decreased to just over 2% (Statistics Canada 2001), and the associated decline in influence has, some would argue, been accompanied by a change in rural culture, from one located in cooperation to one of individualism and competitiveness (Schulz 2004). Yet, recent hardships have resulted in a renewed cooperative movement, especially for the beef industry. Unlike their historical counterparts, these “new generation” coops (NGCs) issue shares based on delivery rights and obligations, afford a

degree of member equity that is often proportional to investment, and often restrict membership to designated shareholders (Cook & Chaddad 2004). Although this sudden interest in farmer-led co-ops became a clear response to the recent documentation of BSE in Canada, little is known about the implications of this disease for these initiatives, and what role government played in these outcomes.

The BSE crisis in Canada

Bovine spongiform encephalopathy (BSE) was discovered in a dairy cow in western Canada on May 20, 2003. Therein, 28 countries immediately imposed trade bans on all live ruminant animals and related processed products (CFIA 2006). The economic impacts on the sector were devastating, and early estimates of these costs exceeded \$3 billion (CAD) (SMCI 2003). These assessments do not factor in the many spillover economic and social costs that rippled through the farm and rural fabric following this severe market disruption (Stozek & McLachlan submitted). Impacts from extreme dependence on foreign markets (Grier 2005) were compounded by large-scale droughts, (Stozek & McLachlan submitted). Farmers responded to these challenges either by exiting agriculture altogether, persisting in the face of adversity, or by responding in innovative ways, the latter including direct marketing (Anderson & McLachlan 2008), Holistic Management (Yestrau 2008), or by developing cooperative processing plants (MacLachlan pers. comm. 2008). This crisis provides an opportunity to explore the role that government policies played in shaping the impacts of BSE on farmers and rural communities, to help us identify how effective new generation cooperatives were in mitigating these impacts and rural decline as a whole, and to assess how these

cooperative responses and the socioeconomic and political context in which they operate have changed over the last century.

Methods

Study region

Alberta (AB), Saskatchewan (SK) and Manitoba (MB) are all provinces that comprise the Canadian Prairies Ecozone. Comprising over 520,000 km² (Laycock 1972), most of the land cover in the southern portion is dominated by agriculture (Shaykewich *et al.* 1994). The zone is characterized as sub-humid to semi-arid, with average temperatures ranging from -9.4°C (AB) and -18.3°C (MB) in the winter to 16.1°C (AB) and 19.7°C (MB) in the summer (ESWG 1996). Mean annual precipitation is highly variable, ranging from 250mm in the more arid southeastern AB and southwestern SK to 700mm in the Lake Manitoba Plain (*ibid.*).

Crop cover is dominated by cereal and oilseed production, whereas livestock production largely consists of beef cattle, sheep, bison, elk and goats. Although some operations are characterized as “mixed farms”, most farm production systems have adopted a more intensive approach and specialize in either grain or livestock (Shaykewich *et al.* 1994).

This region has undergone much structural economic and social transformation in recent years, in particular a change from grain towards livestock production (Ramsey & Everitt 2001). The latter has since increased substantially in the prairies, and now comprises >77% of the beef cattle and >74% of the slaughter cattle herds in Canada

(MacLachlan 2001, p. 21). Slaughter facilities have also relocated from eastern Canada to

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AB, which is now home to three federally inspected slaughter facilities, accounting for 80% of the national beef slaughter capacity (Rude *et al.* 2007), whereas SK and MB are each home to an additional facility.

Research approach

I employed a mixed methods approach, combining both qualitative and quantitative approaches to research, making use of mail-out surveys and both individual and group interviews. The research design, data collection and analysis have been premised on constructivist, grounded theory whereby the researcher acknowledges realities are multiple and subjective and that they are constructed by both researcher and research participants. This participatory approach to research at once affirms the experiences of farmers and allows for theory to emerge from rather than drive the research process, important when dealing with socially sensitive subjects (Roppel *et al.* 2005).

In December 2005, group interviews were conducted with farmers from two distinct regions in Manitoba. General questions were asked about the ways in which participants had experienced the BSE-related risk and impacts on their farms and communities. The primary purpose of these interviews was to learn how farmers and communities were affected by BSE as well as to receive feedback about possible mail-out survey designs.

A random stratified approach to subsequent sampling was taken, these strata being density (i.e. low and high) of cattle production and proximity (i.e. close and far) to the nearest federally inspected slaughterhouse. Low and high cattle production classes

were defined as 0-21 cattle km⁻² and 22-65 cattle km⁻², respectively whereas close and distant classes were defined as <150 km and >150km to the nearest slaughterhouse, respectively. Two census districts (CDs) were randomly selected from each of the four strata for each of the three provinces (n=24). All post offices consisting of less than 80 farms, as defined by Canada Post, were identified for each CD and post offices randomly selected from this list until 400 farms had been selected from each CD (n=9600).

The questionnaire was eight pages in length and consisted of both Likert-scaled and open-ended questions. Using broad themes identified from the initial group interviews with farmers, the first half focused on perceptions and experiences that could be filled out by any rural resident. These included direct and indirect impacts related to BSE, additional risks to farmers and rural communities, attitudes towards Canadian agriculture policy, agricultural structural changes and government responses to BSE. In contrast, the latter half focused on perceptions and experiences of farmers as well as BSE-related impacts on farm equity and assets, farm and ranch expenditure changes, adaptive responses, and any implications for environmental and animal health.

On March 7, 2006, the surveys were distributed using an unaddressed 'ad mail' mailing option to all those who had self-identified as 'farmers' in the selected postal regions. This use of ad mail was unavoidable since mailing lists are unavailable for farmers in MB and SK. A reminder letter and finally a condensed four-page version of the original larger survey were sent out at one-week intervals after the initial mail-out (Dilman 1978). The shorter survey was sent in order to provide an additional opportunity for busy farmers to participate in the research, anticipating that some would have lost or discarded the original questionnaire (ibid.).

In total, 1,473 completed surveys were returned for an absolute response rate of 15.3%. These response rates are typical of large-scale mail surveys conducted in rural areas and reflect a trend of declining mail survey response rates in natural resource-based sectors (Connelly *et al.* 2003). Potential non-response bias was assessed by telephoning 10 farmers in each of the test CDs (n=240), five of whom had already responded to and five of which had not responded to the questionnaire. All were asked five questions selected from the questionnaire and, for the non-responders, why they had not responded. No significant ($p=0.6758$) differences in response among these two groups and the written responses from the former groups were evident.

Overall, the majority of survey respondents were male (90.9%), with an average of 52.9 years of age and managing cattle herds averaging 195 head. Other respondents included larger cow-calf producers, feedlot operators, grain and oilseed farmers, retired farmers and a wide range of other rural residents (e.g. truck drivers, school teachers, meat packing plant workers). Once the survey data had been analyzed in a preliminary manner, group interviews were conducted in communities within each of the 10 remaining sample strata between August-November 2006. Respondents to the survey whom had indicated that they wished to participate further in the research were identified, contacted and invited to attend group interviews, and overall, 93% of those contacted agreed to participate. Participants were diverse, ranging from primary producers in the livestock and grain sectors, community business owners and employees, and those who self-identified as community leaders and agriculture experts. Most (85%), however, identified as ‘cow-calf’ farmers that raised cows for their calves and to maintain a viable herd, this higher than the 76.3% of respondents to the questionnaire that were cow-calf operators.

Age of the group interviewees ranged from 24 to 75 (53.3 yoa average) and were dominated by men (85.3%), this generally comparable to the questionnaire respondents (52.9 yoa and 90.9% male).

Data analysis

A mixed methods approach was taken to data analysis in this study (Creswell 1998). Data arising from open-ended questions in the survey were entered and from the group interviews were transcribed in their entirety. These data were systematically analyzed and coded using ATLAS/ti™ software and any emerging themes were identified and explored (Muhir 1991). Although responses from both questionnaires and interviews occurred in each theme, survey respondents were more inclined to share personal and emotional experiences than interviewees. This is likely due to the ability to remain more anonymous and distanced from the researcher (Dilman 1978). Quantitative Likert-scale data from the mail-out surveys were entered and descriptive statistics for questions related to impacts were recorded using SPSS™ v16.0.

Factor analysis (varimax rotation) was used to identify participants' perceptions and attitudes towards government policies and policy outcomes (SAS 2003). Any loading on a factor that was at least 0.400 was assigned to a factor. The alpha coefficient was calculated to test the reliability of the Likert scale (Cronbach 1951), any alpha values >0.60 considered satisfactory for internal consistency of a scale and appropriate for variable reduction (SAS 2003). Results of the factor analysis indicated that five factors could be extracted from the 16 policy-related variables, these being Neoliberal Policies

(factor one), Exclusivity (factor two), Corporatization (factor three), Government Intervention (factor four) and Laissez-faire (factor five).

RESULTS

The BSE crisis: Farms, ranches and rural communities

International trade embargoes on beef and live cattle related to the discovery of BSE in Canada precipitated severe and long-lasting impacts on family farmers and rural communities across western Canada. While US markets partially resumed importation of processed beef products from beef cattle under thirty months of age (UTM)⁷, full trade embargoes on all other live beef and ruminant livestock UTM persisted for 26 months and, for those over thirty months of age, 54 months, until the border fully reopened to livestock of all ages on November 2007. The impacts were devastating, especially for those most dependent on these livestock for their incomes:

“The economic effect on farm families was horrific. There is nothing worse than going from an almost secure income to having no funds coming in but still needing to feed livestock, which becomes almost impossible” (801S).

Many even compared these impacts to those experienced during the Great Depression.

Declines in livestock market prices accounted for much of the economic loss during the crisis:

“Cows sold for \$200-\$300 during BSE and \$1200 before. This is a 400% drop in our net worth!” (603S).

⁷ In August 2003, the US and Mexico lifted trade restrictions on boneless, ‘boxed beef’ from cattle under thirty months of age (O’Neill 2005).

Direct impacts were largely attributable to losses in farm income from declines in herd equity and the subsequent need to borrow more, to draw from savings, to access more off-farm income, or to cut down on expenditures. The impacts extended beyond the beef sector to other ruminant livestock sectors such as sheep, bison, elk and goats. The financial impacts also led to much emotional and psychological distress, which in turn had spillover effects on others in their communities:

“When primary producers have a difficult time, whether BSE or drought, the local supply chain has to bear the brunt of the reduced income to farmers. The psychological effects are directly related to stress added at every level of a community and accumulate through any crisis” (1448S).

The crisis was aggravated by other factors. Many described being confronted by severe weather conditions, such as the drought of 2001-2002 or early frost of 2005. Others described additional economic stressors, including rising farm production costs (e.g. fuel, fertilizer, farm machinery) and declining commodity prices (e.g. grain and oilseed crops) as having a compounding effect on the impacts directly associated with BSE. Importantly, many expressed that BSE was a transient risk that emerged out of a longstanding farm crisis:

“Things were starting to go bad before BSE. Rising inputs, recovering from drought and low commodity prices compounded the effect of BSE. Many people seem more depressed and seem to just want out of agriculture. Things are bad in the cattle industry” (614L).

These many converging factors amounted to a “perfect storm” in agriculture.

Underlying policy risks

Many expressed great concern about the changing shape and direction of agriculture and rural communities and linked much of this decline to the corresponding changes in government policies. The role these policies in this decline separated out on five underlying factors.

One group of respondents, separating onto factor four, included those that felt that farmers needed to become even more efficient, productive and less dependent on government intervention (Table 3.1). They felt that it was possible to adapt to BSE-associated risks through more effective farm management, and by becoming more productive and diverse:

“You can diversify your market and diversify your income streams and make it through these things (i.e. BSE). We sold some hay, some dairy hay in the states and made some good money at that and marketed some grass through custom grazing and yearlings for other guys” (FGMB1).

They further felt that any government intervention was risky. This sentiment reflects the current agriculture policy in Canada, one characterized by a ‘laissez-faire’ attitude that largely allows the market to determine the shape and direction of the agriculture and food sector. However, this group represented a minority view, such that only 30% at least somewhat agreed to the statement ‘supply management needs to be abandoned’ and only 36% somewhat agreeing that ‘NAFTA has benefited Canadian farmers’. In contrast, the other four groups of respondents were critical of existing governmental policies.

One group, separating out on factor one, perceived that neoliberal policies had contributed to undesirable changes in agriculture and rural communities (Table 3.1).

Table 3.1 *Farmer attitudes towards government agriculture policies and resulting changes in farming and rural communities, ranked in order of factor grouping (n=800)*

	\bar{x}	SE	Alpha	Factor				
				1	2	3	4	5
A meat packing industry owned mostly by foreign corporations places Canadian farmers at risk	6.14	.044	.519	.573				
Canadian agriculture is too dependent on export markets	5.58	.053	.510	.788				
Free trade has given foreign interests too much control over domestic markets	5.53	.051	.616	.615				
Increased dependence on international markets is a risk to farmers	5.31	.050	.519	.694				
Government must consult more with farmers about risk policy	5.73	.043	.543		.694			
Lack of government foresight about BSE placed farmers at risk	5.48	.055	.546		.750			
The government is willing to stand up for an independent livestock industry	5.48	.055	.607		-.685			
A concentrated livestock industry with declining numbers of farmers	5.41	.052	.558			.770		
Intensive livestock operations place family farms at risk	4.84	.064	.522			.782		
Harmonization of Canadian standards with those of the US is a risk	4.30	.064	.539			.511		
Producers must become more efficient to compete in the global market	4.45	.074	.579				.591	
Supply management should be abandoned	3.88	.063	.510				.618	
NAFTA has generally benefited Canadian farmers	3.59	.067	.616				.633	
Elimination of the Crow Rate subsidy is risky	5.66	.052	.545					.643
Agriculture subsidies should be increased	5.45	.057	.543					.717
People spend too much time blaming other countries for our problems at home	4.69	.059	.521					-.565

^a Respondents could rank between 1 ('strongly agree') and 7 ('Strongly disagree'); ^c Only factor loadings higher than 0.40 are presented; Factor interpretations: (i) *neoliberal policies*; (ii) *exclusivity*; (iii) *corporatization*; (iv) *government intervention*; (v) *laissez-faire policy*.

They were most concerned about the agricultural sector being entrenched in and guided by corporations and the role free trade-related government policies had played in these changes. Indeed, the majority of respondents held this sentiment, such that 86% at least agreed that ‘increased dependence on export markets places farmers at risk’. An even greater majority (91%) agreed that ‘a meat packing industry owned mostly by foreign corporations places Canadian farmers at risk’ and (79%) felt that ‘free trade has given foreign interests too much control over domestic markets’. These policies were seen as having facilitated an imbalance in market power to the point where farmers could no longer compete with the internationally-owned and operated beef slaughter, commercial feedlot and grain companies:

“Free trade and foreign ownership are a big risk. You look back and there were no Cargills, there were no Tysons before free trade was introduced” (FGAB3).

The great majority (91%) also felt strongly that ‘a meat packing industry owned mostly by foreign corporations places Canadian farmers at risk’, recognizing that government policies enabled these companies to take full advantage of the depressed livestock prices during BSE, recording record profits during what was otherwise a crisis situation for farmers and rural communities.

Another group, these respondents separating out on factor three, were more concerned about the ‘corporatization’ of agriculture and the way that these changes had placed farmers at risk (Table 3.1). Most (78%) agreed that ‘a concentrated livestock industry with declining numbers of farmers is risky’, reflecting a dissatisfaction with the shift from an agriculture characterized by family farms towards one more industrial and corporate in nature. Observing the increase in farm size and associated rural

depopulation, some saw this as representing a risk to the future of agriculture and, indeed, to larger society, a risk that the government was doing little to mitigate:

Farmer 1: *“We sat around just a few nights ago with the neighbours and we tried to look within a twenty mile radius and we tried to figure out just that question, what the average age was. And the nearest we could come down to was about 54. And there ain’t no young guys.”*

Farmer 2: *“It’s becoming the corporate farm. If you look around at all your neighbours and you look back fifteen years ago and take who’s left in the area, you can see that.”*

Farmer 3: *“What I would like to be around for is when everybody at this table and everyone around is all retired and you’ve got the big corporate farms, where they can and will be setting the prices, and the people in the cities will be doing a little bit of crying, ‘Oh why the hell didn’t the government do something earlier?’”*
(FGABI).

Others identified corporate consolidation and market concentration as another major risk to their livelihoods and one, again, that the government was doing little about:

“BSE was the cause but isn’t the problem. The killing capacity was the reason there was a continuous problem with cow market price. With only two major killing plants [in western Canada], there is no competition in the business. Government let this happen. Now the only way farmers can pay the bills and keep going is with subsidies” (I389S).

This market concentration had negative implications for both producers and consumers, allowing the slaughter facilities to more easily dictate the prices offered to both. Indeed, the BSE crisis generally accelerated this change:

“Now more and more of the beef industry is in fewer and fewer hands. BSE has given the Big Packers such a control of the industry that I think they can pretty much pick and choose what the price is going to be” (FGMB3).

Another group of respondents, these separating out on factor two, were the most critical of current agricultural policy and how it was constructed (Table 3.1). They were dissatisfied with the lack of consultation with producers when designing risk-related policies especially those related to BSE risk management. Some suggested the government had recognized a decade before the first indigenous case was discovered that BSE would indeed emerge in Canada and many, in turn, recognized the lack of foresight and transparency on the part of both governments and scientists had placed their livelihoods at great risk:

“I don’t know a farmer that would feed animal byproducts to animals but our scientists and others had no problem getting our governments to agree to this practice. But when the cart went off the rails, the lowly primary producers had to take the fall for BSE. Not a civil servant, scientist, politician as much as lost an hour’s pay, vacation or their jobs for their wrong risk assessment” (423L).

Had they been notified that BSE was even a risk in Canada, many expressed that they would have taken mitigative measures by changing their feeding practices or indeed reducing their dependence on ruminant livestock.

Another group of respondents, separating out on factor five, were proponents of proactive and farmer-centered government policy intervention, and. Thus, the loss of agricultural subsidies, such as the abandonment of the Crow Rate subsidy in the mid-1990s were seen as placing farmers at risk:

“The loss of the Crow here devastated us; our freight rate went from \$4000 in 1996 to \$38,000 overnight. That was our bottom line and there’s no looking back. That’s where you had the money for the down payment for operating loan and such. Now they’re trying to do other things too, like take the Wheat Board on us. Then we are going to be in deeper trouble” (FGSK2).

Attitudes towards the government response to BSE

Table 3.2. *Farmer attitudes towards the government responses to the BSE crisis in Canada by province, ranked in order of importance (n=800)*

Item	\bar{X}			SDev			SE		
	AB	SK	MB	AB	SK	MB	AB	SK	MB
Government compensation programs were more complicated than they needed to be	5.33	5.78	5.65	1.62	1.38	1.66	.113	.087	.095
There was too much focus on reopening the border	4.22	4.47	4.46	1.98	2.07	2.01	.138	.129	.114
Government compensation programs were adequate in dealing with BSE-related impacts	3.08	2.74	2.91	1.86	1.85	1.92	.130	.120	.109
The government responses to the BSE crisis were adequate	3.05	2.82	2.60	1.86	1.83	1.69	.110	.110	.081
The government spent enough on helping farmers during the BSE crisis	3.03	2.54	2.45	1.77	1.72	1.66	.124	.078	.095

Scores were derived from a 7-point scale, with 1 indicating ‘strongly disagree’ and 7 indicating ‘strongly agree’; ° Only factor loadings higher than 0.40 are presented; Respondents could rank between 1 (‘strongly agree’) and 7 (‘Strongly disagree’).

Attitudes towards government responses to BSE and assistance to farmers during the crisis were similar across all three provinces (Table 3.2). There was slightly less

dissatisfaction in Alberta, reflecting the greater level of provincial support. Some were supportive of their provincial governments, although most were critical of the federal response:

“I think the provincial government helped us cattle producers as much as they could but the federal government should be ashamed of themselves. How could they be so ignorant and not help in such a major crisis” (521L).

Yet most (68%) respondents were dissatisfied with both provincial and federal government support. This was especially true for those in the non-beef livestock sectors:

“I think the federal and provincial governments came to the aid of the cattle farmers in a fairly decent way, but left the rest of us so called livestock producers out in the cold” (1238S).

For many dealing with stress and reductions in income and having financial debts from past crises, government assistance was unavoidable. Others explained the humiliation involved in seeking financial assistance:

“My neighbours and myself have invested a great deal of time and our life savings on our herds. However we had no say on the outcome of the prices of our cattle. To this day, cull cows are still worth ¼ of what they were worth. My family and neighbours felt stressed and worthless. Applying for government help felt like applying for welfare” (711S).

The majority (80%) of survey respondents and focus group participants regarded assistance packages in general as needlessly complex and ineffective.

Some described the procedures for applying as being so complicated that they required the help of a professional accountant, one female participant indicating:

*“Farming these programs has become my fulltime and primary job on the farm”
(FGMB1).*

Moreover, additional time and resources were required to apply for these programs, without any guaranteed success, effectively placed these much-needed funds out of reach for many. The outcomes were uncertain at best:

“Filling out CAIS [Canadian Agriculture Income Stabilization⁸] is just like gambling. You have no clue when you collect or not!” (271L).

And many indicated that the compensation that they received was far from adequate and did little to make up for their losses.

Some of the compensation programs were BSE-focused (e.g. BSE Recovery Program) whereas others such as CAIS were more generic and proactive in approach. The latter was especially unpopular. Federally administered, it was designed so that farmers could contribute funds in good years and draw support in bad ones. For many, this assistance took the shape of a loan that just delayed the inevitable:

“We have received a bill asking us to repay an assistance payment sent to us for our losses. I have lost about \$85,000 and now the damn government expects me to pay back the money they sent me? What kind of assistance is that?” (629S).

The resulting debt loads would likely contribute to additional long-term hardship:

⁸ The Canadian Agricultural Income Support (CAIS) evolved from the Net Income Stabilization Agency (NISA), which was designed so that participating farmers could contribute to a pool of funds in more abundant years and withdraw from it during times when additional income was needed. Funds from this pool are only available upon a measurable decrease in production margins relative to a previously established production margin reference point or average from prior years. Claims can be made to make up the difference and is shared by producers and government (Grier 2005, p.83).
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“The BSE crisis, in some respects, is just starting and will devastate the industry in the next few years as producers try to pay back loans taken out in the last 2 years” (1432S).

Ultimately, the inadequate government assistance during this extreme crisis led to much resentment and animosity, leaving many to fend for themselves during these times of crisis.

Another widespread concern was the level of assistance allocated towards the largest and most powerful players in the beef industry such as commercial feedlots and meat packers:

“Too often government dollars flow in huge amounts to large operations. These businesses often could survive quite nicely without the payments. This tendency reduces the money in any program that is available to smaller producers” (507L).

Although these funds were supposed to ‘trickle down’ towards those at the primary production level, this rarely occurred. Indeed, this support actually exacerbated the impacts experienced by farmers:

“Government aid was a disaster for all cattle producers. The large feedlots and slaughter facilities received millions of dollars while cattle producers got the crumbs. This allowed the cattle buyers for the feedlots and slaughter facilities to purchase our cattle at rock bottom prices, be it cull animals or calves. These buying practices led to further depletion of our incomes while allowing their profits to increase multiple times” (633L).

Desired government responses

We also asked farmers to identify how the government might have better responded to their needs during this crisis, focusing on a wide diversity of health and market policies (Table 3.3). The highest ranked response were ‘removal of specified risk material (SRM) prior to rendering’ communicating the importance of more stringent measures that would help mitigate the further spread of BSE. Other highly desired government responses focused on changing the nature of the markets.

Table 3.3. *Farmer perceptions of desired government responses to BSE in Canada, ranked in order of importance (n= 800)*

Item	\bar{x}	SE
Removal of specified risk material (SRM) prior to rendering	6.19	.046
More alternative international markets for ruminant animals	6.20	.039
Tighter regulations on meat packing industry	5.71	.056
More market driven testing	5.64	.051
More subsidies towards local slaughter expansion	5.29	.071
BSE testing all ruminant animals prior to slaughter	4.74	.073
Implementation of a food tax to help farmers	4.43	.080

Scores were derived from a 7-point scale, with 1 indicating ‘strongly disagree’ and 7 indicating ‘strongly agree’

The great majority (95%) saw that conducting business with companies and markets beyond those of the US as very important in mitigating future risk:

“We still only sell to US or through US companies. We need new markets, or new marketing companies. Japan must have a plant in Canada so they can buy and process meat from their own markets. Same for Mexico, Europe, the Pacific Rim, etc.” (226L).

Many (84%) further emphasized the importance of market-based testing when opening these new markets:

“We should test all animals if that is what it takes to get foreign markets.” (363L)

They further described how various levels of government, especially the Canadian Food Inspection Agency (CFIA), had quashed market-testing options. The CFIA was and remains adamant about the need for ‘science-based’ regulatory guidelines that dictate industry standards, including animal disease testing, processing and marketing:

“CFIA states that BSE testing is not required for all animals over 30 months age due to ‘science’. If the beef was 100% tested, there were many international markets open to Canadian cattle over 30 months age within 3 months of May 20, 2003, Canada bowed to the USA again and made her own producers suffer extreme hardship by not allowing producers to full a customer’s need” (732L).

Many (76%) further identified the role of expanded local slaughter capacity in reducing the dependence on the US. This would, in turn, inject much-needed competition into the otherwise monopolized slaughter sector. Indeed many were critical that the governments had not helped establish additional slaughter facilities while spending on subsidies towards the existing meatpacking corporations:

“There was much talk (among cattle producers) to develop a in Canada solution. Canadian processing plants run by Canadians, a marketing strategy by Canadians. After the dust settles still we have American processing plants controlling the producers stock with old stock worth nothing this is going to have long lasting negative impact for communities” (1458L).

Regardless, a large number of these slaughter facilities, many established as new generation coops were initiated in direct response to the BSE crisis.

The Peace Country Tender Beef Co-op: A case study

Shortly after the discovery of Canada's first BSE case and in response to the decrease in prices, a group of farmers in northwestern Alberta (Table 3.4) began developing new generation cooperative (NGC)⁹, the Peace Country Tender Beef Co-op (PCTBC), in order to expand local livestock slaughter capacity:

"Some of the cattlemen were hurting badly and the sheep were getting hit harder than the cattlemen. Right in the Peace country, right now, of the sheep farmers I know I'd say at least 55% of them have quit and I'm one of them. I've gone from 1000 head and I'm going to be out this year. So we figured, let's do something about it. That's how it started" (PCTBC member4).

The Peace region was one of those most adversely affected by BSE crisis, in part because of its relative isolation to commercial feedlots and slaughterhouses, which are located in the more southern regions of the province. Drought conditions, rising fuel costs and the need for off-farm income also contributed to these impacts.

Table 3.4. *Summary of proposed Peace Country Tender Beef co-op characteristics*

Inception date:	March 2003
Location:	Berwyn, Alberta
Structure:	Farmer-owned (new generation) co-op
Slaughter capacity:	500 head/week; 30,000 head/year
Animal types:	Beef, sheep, bison, elk
Markets:	Local, national and international
Market niche:	100% BSE testing, animal traceability, hormone free, boxed and specialty packaged cuts, specialty sausage

⁹ Similar to traditional forms of agricultural co-ops, with investment being proportional and restricted to members/owners, in new generation co-ops (NGCs), ownership rights are in the form of tradable and appreciable delivery rights and members are expected to purchase delivery rights based on expected patronage (Cook & Chaddad 2004).

The PCTBC was constructed as a radical alternative to the existing and dominant agricultural supply chain, which they felt was clearly not working for farmers and rural communities. Importantly, it was designed as an agricultural co-operative:

“The selling points of this new generation co-op were: guaranteed supply, cause it’s a two way commitment – the co-op commits to buy what members produce, but you also commit to deliver every year. So we could say to the meat buyers, ‘this is how much we have per week, period’” (PCTBC member2).

The founding members envisioned that the co-op would simultaneously provide access to markets and empower members and their families and communities. Farmer-run, it would help provide a fairer and more consistent price for animals. This would be achieved, in part, by seeking out more direct ways of marketing to the consumer:

“The closer to the consumer you could get the better share of the pie the producer would get and a co-operative was the way to do that” (PCTBC member1).

It would also be achieved by obtaining a premium for their products. The use of a urine test that could evaluate live animals for the presence of the BSE-causing, prion, agent, would enable them to market their meat as ‘100% BSE free.’ Moreover, all members would have to comply with hormone-free farm management in order to further cater to niche markets that were more concerned about food safety. Essentially they planned on providing products that were healthier and safer while also contributing more to farmer well being:

“We’re going to show the world that we can run a business with honesty, integrity and ethics and we’ll make a good damn profit while we’re doing it. We don’t have

to beat down the producer, we don't have to screw the consumer on pricing, we don't have to poison the meat, we can raise a good quality safe product, sell it for probably a lot less to the consumer and still make good profit for the farmers, but also put profit back into the communities" (PCTBC member2).

But members soon discovered the many barriers that would be presented by government, industry and those most concerned with maintaining the status quo.

Once the Alberta government was approached with a detailed business plan and for financial support the members experienced their first major obstacle:

"The government response from Alberta to us was, 'we don't help independent businesses or individual businesses'" (PCTBC member3).

It had been assumed that the Alberta government would be supportive, especially since it was the location of 80% of the nation's cattle industry. Without access to these funds, the PCTBC needed to raise the funds required to purchase a facility, equipment, licensing, to say nothing of marketing and distributing their products. The co-operative legislation in Alberta requires that 80% of the shares be member-owned, in order to prevent a majority of shares being sold to consumers or investors. Attracting members to buy into the vision and model was far less difficult than raising the significant amount of funds required to actualize their vision, especially with many farmers still reeling from the effects of the BSE crisis.

The PCTBC then discovered that the federal government was unwilling to certify their newly purchased processing plant as a federally inspected facility, in large part because their market-based approach to testing conflicted with the government's 'science-based approaches. While federally inspected plants can market their products

anywhere, their provincial counterparts can only access within-province markets. This was a huge setback for PCTBC given that they had attracted the attention of many markets in other provinces, territories (e.g. Nunavut) and countries (e.g. Japan, Europe). The only available alternative was to at least get a provincially inspected facility operational:

“If we can’t get CFIA to co-operate and help us get that Berwin facility into a federally approved thing...screw them, we’ll do it provincially. But it does limit our markets because we have some really good markets” (PCTBC member1).

The board of directors (BOD) embarked on several successful funding and membership drives throughout the Peace region in 2003 and 2004, finding many producers keen to invest in this initiative, despite the extreme hardship that was experienced throughout this region.

The next (unforeseen) difficulty was the establishment of an adequate share price:

“If we would have asked for more from them, producer money would have been enough to go and get the bank loans and continue on our own” (PCTBC member2).

Other barriers reflected the extreme concentration of the industry. Although the PCTBC received much support from local retailers wanting to supply and market their product line, they were generally unable to commit to providing their names and information for use in the business plan out of fear that their existing corporate suppliers would find out and retaliate by cutting off their current supply:

“The industry is not going to tolerate small plants shaping up in the Peace River country or Northern Alberta as far as I am concerned. The wholesalers could

shutdown a small packing plant in one week (how?) by blacklisting them. You take their meat in and we won't supply them. That is what happened to Grande Prairie packers" (PCTBC member4).

At the time of my interviews, the PCTBC had recently obtained access to a facility in the small town of Berwyn in the central part of the Peace region. Berwyn, recognizing the need to explore ways to adapt to the many stressors being experienced in the volatile rural climate welcomed the opportunity to bring potential long-term stable employment opportunities and were highly receptive to the vision of the PCTBC. At this point, funds for site development have yet to be raised. The provincial government remains relatively unsupportive and acquiring funds from other sources problematic; especially since the US trade embargoes have now been fully lifted for all Canadian ruminant livestock products.

Still the PCTBC members were determined to continue their efforts to establish this much-needed slaughter facility both to ensure their own livelihoods and the future of their communities:

"This is the best way to keep the industry viable so you keep young people in it, keep your heritage in it so you keep your traditions going and also to breathe life back into small towns in Alberta because small town Alberta and small town Canada is where your morals come from, where your values come from. Those are the people that fight the wars; those are the people that make the sacrifices; those are the people that build nations. A nation that doesn't have the small town any more, that doesn't have an agriculture base and doesn't have a strong moral fiber, it doesn't exist. History repeats it's self time and time again with that. If you

look at all of the major empires that have fallen it's from decay from within and it usually starts in a rural setting. Once the rural setting decays it falls apart" (PCTBC member2).

The Future

Many respondents felt that the great majority of the risks associated with BSE had been borne by the producers, and this reflected inadequate governmental policies such that, *"Farmers and ranchers pay the price for someone else's mistake"* (222L).

Importantly, many felt that these risks would extend far into the future: The Canadian cattle industry remains for the most part structurally unchanged and will continue to be vulnerable to severe market disruptions like the international trade embargoes that catalyzed the BSE crisis:

"The lasting result of BSE may not be the tough boat we found ourselves in, but in the ship we still can't steer" (1448S).

In recent months, international trading, especially with the US, has resumed. But many feel this represents a return to the status quo and that the dependence on foreign, especially US, markets is risky. Incidentally, very little has been accomplished to increase local or domestic slaughter capacity:

"After the dust settles still we have American processing plants controlling the producers prices with old cows still worth nothing. This is going to have long lasting negative impact on farmers and communities" (1458L).

That many were unable to access assistance at all while those who did, incurred additional debt resulted in much cynicism:

“When you finally realize that governments really don’t give a damn about our family farms, then hope is also something which is fast disappearing in our farm community. In some cases this has already led to despair” (222L).

Even five years after the documentation of the first BSE case, livestock prices remain lower than prior to the crisis, while farm input costs such as fuel, fertilizer and machinery continue to increase.

The state of farming and rural communities continues to be precarious. Many are concerned about the potential future impacts of climate change, increased international market volatility and the further dismantling of agricultural supports like the Canadian Wheat Board:

“The current Conservative government is intent on destroying the Canadian Wheat Board. That will be the straw that breaks the farmer’s back. It will mean both my husband and I will quit farming and our son will not be taking over our own family farms. I am not hopeful” (92L).

Most feel measures need to be taken soon, before family farmers become a thing of the past:

“Our rural communities and lifestyle are being eroded to the point of extinction. We need our family farms, small towns, the elevators that are still remaining. All of these things are a large part of our heritage, symbols of the past, present and future. We do not need corporate farming on an epic scale with large corporations setting prices. We also do not need to be so bogged down in paper work relating to rules and regulations so that we have no time to be producers” (633L).

Importantly, many expressed the urgent need for educating the public about the ongoing rural crisis in order to begin finding real long-term solutions and to mitigate future risk:

“We have to educate the people in the cities too, what happened in Europe when the people went hungry then the farmers became important, I don’t want to see people go hungry but I think we have to educate them; because the kids today don’t even know where milk comes from” (FGAB3).

It was widely recognized that decision-makers would need to play a leadership role in these responses, and that these policy and risk management initiatives should be inclusive and farmer-centered in approach.

Discussion

Winners and losers

My findings indicate that shifts in government policies and the associated structural changes to the food system over the last three decades contributed substantially to the impacts of BSE on farmers across the prairies. Those at the primary production level of the agro-food chain were most adversely affected by the BSE crisis, especially small and medium-sized scale family farmers involved in ruminant livestock production. These impacts interacted with concomitant climatic change and rising production costs and affected entire communities (Stozek & McLachlan submitted). Underlying government policies rooted in market liberalization and government deregulation were at least in part the reason for these impacts and vulnerabilities leading up to and during the BSE crisis.

Although some were supportive, most respondents were highly critical of government policies oriented towards trade liberalization, often explicitly indicating that these changes had put farmers and rural communities at risk. Indeed, over-dependence on foreign markets, namely the US, largely accounts for the severe market disruption that ultimately occurred following the discovery of just one case of BSE in the national herd. In contrast, the US industry was much less affected. In part because it was far less reliant on foreign markets, exporting only 10% of its total beef production (Mitura & Pietro 2004), the US also has a much larger and more diverse processing sector, insulating it from the international trade embargoes arising from BSE (O'Neill 2005).

Respondents were often highly critical of free trade agreements, specifically the North American Free Trade Agreement (NAFTA), which has more deeply entrenched the Canadian food system into that of the US since its inception in 1994. Many attributed corporate concentration and consolidation throughout the Canadian food chain to the trade liberalization, government deregulation and privatization arising from NAFTA. Indeed, 80% of the total slaughter capacity in Canada is controlled by three multinational companies (Rude *et al.* 2007), a degree of consolidation many felt contradicts notions of a 'free market' or 'free trade'. Further, these companies have been allowed to vertically integrate in the marketplace, and also have a presence in the beef cattle feeding and fertilizer sector, enabling still more market power. Many respondents felt that the associated decline in competition in the marketplace further depressed prices they receive for their livestock.

These attitudes reflected a broader discontent towards governmental policies as a whole, many feeling that their interests were undermined by an overly bureaucratic and

expert-driven regulatory framework that is far too distant from the realities experienced by and needs of farmers. Most felt that government needs to intervene in the marketplace, both in order to reduce the influence of corporations in agriculture as well as to ensure the survival of rural livelihoods whether reflected in the support for important agricultural supports such as the Crow rate, supply management bodies and marketing boards such as the Canadian Wheat Board (CWB). In contrast, agriculture has been increasingly deregulated in Canada or, in many cases, enabled further concentration and industrialization of agriculture where interventions have acted to support larger-scale farms and agri-business corporations.

Government responses to BSE

Overall, most respondents were critical of government assistance programs administered in the wake of BSE, especially the Canadian Agriculture Income Stabilization (CAIS) and the BSE Recovery Program. They were largely seen as inadequate in mitigating the effects of BSE, as too difficult to access and as insensitive to individual needs. Those who failed to qualify for support felt that they were *ad hoc* in nature and did little to anticipate or prepare for subsequent crises. Most recognized that government assistance rapidly flowed to the largest players in the beef industry such that the \$520 million BSE Recovery Program designed to reimburse those feeding cattle for slaughter, inevitably targeted the largest beef producers in the industry – the commercial feedlots. This was ostensibly rationalized under the assumption that trade bans would be lifted much sooner, that the funds would need to be administered quickly to those who needed it most urgently (Le Roy *et al.* 2006) and assistance to those at the top of the beef

industry supply chain would ‘trickle down’ to farmers further down the production chain (e.g. to cow-calf producers) (Ostercamp 2006). Those that were most vulnerable did generally not receive these funds, particularly the small and mid-sized producers (Alam *et al.* 2007).

Described by respondents as yet another example of corporate welfare, it is now clear that the largely US-owned meatpacking sector benefited the most during the BSE crisis. The three largest meatpackers in Canada – i.e. Cargill Ltd., Tyson Foods and X-L Meats – demonstrated consolidation, expansion and market concentration during this period. In 2004, Cargill purchased the Better Beef slaughter plant in Guelph, Ontario and in 2005 the Calgary-based XL Beef purchased slaughter plants in Idaho and Nebraska (Ostercamp 2006) and, in 2008, purchased Tyson Foods entire beef industry in Alberta, which included their slaughter and processing facilities, cattle feeding and fertilizer production operations (Nunes 2008). Vertical integration and international operations undoubtedly allowed these corporations to offset the impacts of BSE. They were further able to capitalize on the government assistance programs and low prices for beef cattle throughout the crisis. Most respondents felt these meat packers exploited the depressed markets, buying high quality cattle cheap and selling at regular market prices. Indeed, meatpackers in Alberta had exorbitant increases in profits of 281% during this period (Grier 2005).

Respondents also identified how the provincial and federal governments should have responded during the crisis. Interestingly, many advocated a radical shift away from the current industry status quo. Rather than focusing on short-term assistance while attempting to reopen the US border to resume trade (O’Neill 2005), more proactive

measures should have been taken to mitigate future risks to the beef and ruminant livestock industries. Many advocated for the adoption of market-based testing as well as live testing in order to better access international markets other than the US, especially in southeast Asia. Farmers also felt that the government should have taken substantial steps to expand local slaughter capacity. In retrospect, our results indicate that the most proactive responses were taken by the farmers themselves in trying to establish farmer-run slaughter facilities.

PCTBC trials and troubles

There was much interest among farmers in developing cooperatives to help mitigate an over reliance of the livestock industry on foreign markets and to reduce the dominance of multinational packers in Canada. Of the 22 attempts to expand on local slaughter capacity that took place across Canada, 20 were either new generation co-ops (NGCs) or otherwise farmer-led initiatives and 18 were located in the Prairie provinces. Unfortunately, these initiatives were most notable in their inability to persist. Indeed, all but three of the “peoples’ packers” have disbanded (MacLachlan pers. comm. 2008). Although lack of leadership, internal divisions, and the insolvency or skepticism on the part of rural communities played an important role in these outcomes, these initiatives were also plagued by uncertain governmental support.

The attempts of the Peace Country Tender Beef Coop (PCTBC) to develop a NGC as a direct response to the impacts of the BSE crisis were confronted by political and economic challenges. Yet it is one of the few remaining operational farmer-led local slaughter capacity initiatives in Canada, perhaps because it was much more alternative in

approach than the other initiatives, which in turn made them more distinct from the existing players in the marketplace.

PCTBC members were also motivated by the longer-term farm crisis within which BSE had occurred and which their vision and co-operative model was also designed to address. In particular, they viewed the consolidation, vertical integration and overwhelming market and political power of the multinational meatpackers as a substantial threat to farmers and rural communities in Canada. Their motivations for developing this NGC were aimed at empowering farmers and rural communities with an alternative that was more equitable and sustainable, thus not dissimilar in motivation to that of past agricultural co-operatives in western Canada (Konings 1998; Rice & Lavoie 2005). Their highest priority was to ensure member farmers were paid fairly for their livestock, something most farmers are unable to achieve within current market conditions. What distinguished them from many of the other initiatives was their desire to depart from the Canadian government's science-based testing protocols and standards prescribed by the Canadian Food Inspection Agency (CFIA) and instead to implement market-based testing. In 2004, PCTBC gained access to a European live testing technology that can detect prions based on urine samples (Gabizon & Shaked 2003), which would have enabled them to more readily access to markets that desired complete testing and BSE-free beef and to provide the much-desired assurance of markets within other Canadian provinces and territories (e.g. Nunavut) that had also expressed interest in PCTBC. These alternative markets were seen as representing a viable niche that would have enabled them to distinguish themselves from the multinational packers.

Diversifying the slaughter and processing sectors seems to be a reasonable response to the BSE crisis. Yet, the overly rigid and bureaucratic post-BSE government regulatory framework represented a seemingly impenetrable barrier to PCTBC. Inspection regulations are designed for and benefit large-scale operations and there was little if any flexibility to accommodate smaller endeavors. A small-sized processing plant such as the PCTBC slaughtering 1,000 head per week that sought to obtain licensing as a federally inspected plant would have to abide by the same regulations and protocols as a plant slaughtering 50,000 head per week. That the CFIA rejected the use of 100% BSE urine testing technology and indeed all market-based testing fundamentally compromised these initiatives. These responses further highlight the selective nature of government intervention, which ultimately acts to maintain the status quo. Though the PCTBC is still operational, they have only been able to access processing facilities that operate under provincial inspection, thus enabling them to only market their products within Alberta.

Now that the BSE crisis has subsided and BSE-specific government assistance has ceased, the structure of the beef and ruminant livestock industry has changed little, and farmers are arguably no less vulnerable to similar severe market disruptions than they were prior to BSE. Virtually no additional domestic slaughter capacity has been established and Canada is as dependent on US import markets and US-owned meatpacking companies as it has ever been. If anything, the vulnerability has increased by the consolidation and market power within the meatpacking during the crisis, this aggravated by the concomitant increases in feed grain prices and land values, and decline in agricultural co-ops.

The loss of farmer-controlled co-ops was among one of many impacts associated with globalization and neoliberalism in the Canadian agricultural sector. Although there were still four grain handling co-ops in 1988, none remain today. The percentage of dairy processed by co-ops has nearly halved from 60% to 35%, arguably an outcome of NAFTA (NFU 2005). There has also been a recent pressure to dismantle single-desk agricultural marketing boards that act to bolster commodity prices for farmers, this successful with respect to pork in Manitoba (Tait 2003). More recently and most visibly, the federal Conservative government attempted to dismantle the Canadian Wheat Board against the wishes of most farmers, which has also acted to create deep fissures within rural communities (Pugh & McLaughlin 2007), further illustrating the political commitment to deregulation.

Conclusion

The changes in structure to and disparities in equity and power within the Canadian agro-food chain resulting from the current agricultural policy were ultimately aggravated by the BSE crisis. In short, policies readily accommodated the most powerful players in the industry, at once helping mitigate the impacts of BSE or even facilitating capital gains for some while the less influential saw little restitution.

The restructuring of the Canadian agro-food system has at once benefited big business and compromised the well-being of family farmers and the rural communities they comprise. While they are often characterized as victims of these changes, farmers and rural communities have actively demonstrated their willingness and ability to

confront these challenges in ways that are frequently at odds with increasingly powerful, global interests and institutions. The global nature of the conventional agro-food system provides a fundamentally different context for these local responses and resistance that ultimately distinguishes them from similar responses in the past. Although the cooperative movement was motivated by similar concerns regarding and ultimately successful in responding to the concentration of corporate power over the last century, there was no equivalent success during the recent BSE crisis. In part, this reflects a decline in the influence of agriculture and rural concerns in Canada; in 1930, over 30% of the population farmed whereas only 3% currently farm (Statistics Canada 2007). Although rural concerns have much less influence on governmental policies, farmer-centered grassroots movements that act to confront the industrial agro-food system have arisen around the world.

Organic and fair trade and local food movements have all become important vehicles for farmers wanting to explore alternatives to the current agro-food system (Raynolds 2000; Sage 2003; Allen *et al.* 2003; Fieldhouse 1996). The most influential of these, the organics movement, had fundamentally changed the way agriculture is practiced and increased consumer confidence in farmers and farming around the world, although some argue that this promise has since been “conventionalized” by the dominant global food system (Stewart *et al.* 2000). Fair trade and local food movements have likewise emerged and are again challenging the dominant food system paradigm by forging stronger linkages and trust between producers and consumers (Shreck 2005; Fieldhouse 1996). These responses may very well be subverted by the systems they seek to replace unless the inequities of the larger food system are confronted. The latter can

arguably be achieved, in part, by community-based organizing and political involvement through movements such as MST and La Via Campesina, which have become highly effective means by which farmers around the world are challenging and politicizing the discourse surrounding the corporate food system and its alternatives (Robles 2001). If they continue to grow, these alliances with consumers and other farmers may act to support local grassroots initiatives such as the PCTBC and other co-operatives and their visions for a responsible and sustainable agriculture. It is in these broad coalitions among farmers and between farmers and consumers that the hope for an alternative and co-operative agriculture ultimately lies.

Literature Cited

- Alam, M. & McLachlan, S.M. (2007) Socio-economic impacts of the BSE crisis in rural communities in western Canada. Presented at the *PrioNet Annual Conference, February 17, 2007, Calgary, AB.*
- Allen, P., FitzSimmons, M., Goodman, M. & Warner, K. (2003). Shifting plates in the agrifood landscape: The tectonics of alternative agrifood initiatives in California. *Journal of Rural Studies* 19: 61-75.
- Alston, M. (2004). Who is down on the farm? Social aspects of Australian agriculture in the 21st century. *Agriculture and Human Values* 21: 37-46.
- Anderson, C.R. & McLachlan, S.M. (2008) Farm-level and collective responses to the BSE crisis and the future of Canadian agriculture. Presented at the *PrioNet Annual Conference, February 3, 2008, Toronto, Ontario.*
- Beck, U. (1999). *World risk society* Cambridge: Polity Press.
- Blayney, D.P. Dyck, J. and Harvey, D. (2006). Economic effects of animal diseases linked to trade dependency. *Amber Waves* (April): 23-29.
- Bonanno, A. (1998). Liberal democracy in the global era: Implications for the agro-food sector. *Agriculture and Human Values* 15(3): 223-242.
- Boyens, I. (2002). *Another season's promise: Hope and despair in Canada's farm country.* Toronto: Penguin Canada.
- Connelly, N.A., Brown, T.L & Decker, D.J. (2003). Factors affecting response rates to natural resource-focused mail surveys: Empirical evidence of declining rates over

time. *Society and Natural Resources* 16: 541-549.

Creswell, J.W. (1998). *Qualitative inquiry and research design: Choosing among five traditions*. Thousand Oaks, CA: Sage.

Cook, M.L. & Chaddad, F.R. (2004). Redesigning cooperative boundaries: The emergence of new models. *American Journal of Agricultural Economics* 86 (5): 1249-1253.

Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika* 16: 297-334.

Desmerais, A.A. (2008). The power of peasants: Reflections on the meanings of La Via Campesina. *Journal of Rural Studies* 24: 138-149.

Desmerais, A.A. (2007). *La Via Campesina: Globalization and the power of peasants*. Halifax: Fernwood Publishing.

Dilman, D.A. (1978). *Mail and telephone surveys: The total design method*. New York: Wiley.

Doyon, M. (2002). An overview of the evolution of agricultural cooperatives in Quebec. *Canadian Journal of Agricultural Economics* 50: 497-509.

(ESWG) Ecological Stratification Working Group (1996). A national ecological framework for Canada. Ottawa: Agriculture and Agri-Food Canada, Research Branch, Center for Land and Biological Resources Research; and Ottawa: Environment Canada, State of the Environment Directorate, Ecozone Analysis Branch.

Easter, W. (2005). *Empowering Canadian farmers in the marketplace*. A report by the Honourable Wayne Easter, MP for Malpeque Parliamentary Secretary to the

- Minister of Agriculture and Agri-Food. Available online at:
http://www.agr.gc.ca/farmincome_e.phtml (accessed 4 June, 2008).
- (FAIT) Foreign Affairs and International Trade Canada (2006). *Opening the doors to the world: Canada's international market access priorities*. Ottawa: Canada.
- (FTFA) Federal Task Force on Agriculture (1969). *Canadian Agriculture in the Seventies*. Ottawa: Canada.
- Fieldhouse, P. (1996). Community shared agriculture. *Agriculture and Human Values* 13(3): 43-47.
- Friedland, W.H. (2003). Agrifood globalization and commodity systems. Paper presented at *The Globalization of Agriculture and Food at the Agriculture and Human Values Society annual meeting, Austin, Texas, June 2003*.
- Friedmann, H. (1982). The political economy of food: The rise and fall of the postwar international food order. *The American Journal of Sociology* 88: 248-286.
- Friedmann, H. (1992). Shaky foundations of the world food economy. *Third World Quarterly* 13(2): 371-383.
- Fulton, M. (1995). The future of Canadian agricultural cooperatives: A property rights approach. *American Journal of Agricultural Economics* 77(5): 1144-1152.
- Gabizon, R & Shaked, G.M. (2003). A Urine Test for the Diagnosis of Prion Diseases. European Patent #EP1328813.
- Grier, K. (2005). Analysis of the cattle and beef markets pre and post BSE: Final report to the competition bureau. *George Morris Centre*. Available online at:
<http://www.competitionbureau.gc.ca/epic/site/cb-bc.nsf/en/01311e.html> (accessed 10 May, 2008).

Hendrickson, M.K. & Heffernan, W.D. (2002). Opening spaces through relocalization:

Locating potential resistance in the weaknesses of the global food system.

Sociologia Ruralis 42(4): 347-369.

Hill, H. (2008). Food miles: Background and marketing. *ATTRA National Sustainable*

Agriculture Information Service. Available online at: www.attra.ncat.org

(accessed 2 July 2008).

Jackson-Smith, D. & Gillespie Jr., G.W. (2005). Impacts of farm structural change on

farmers' social ties. *Society and Natural Resources* 18: 215-240.

Kneen, B. (1999). Restructuring food for corporate profit: The corporate genetics of

Cargill and Monsanto. *Agriculture and Human Values* 16: 161-167.

Klein, K.K. & Kerr, W.A. (1995). The globalization of agriculture: A view from the farm

gate. *Canadian Journal of Agricultural Economics* 43: 551-563.

Konings, P. (1998). Unilever, contract farmers and co-operatives in Cameroon: crisis and

response. *Journal of Peasant Studies* 26(1): 112-138.

Laycock, A.H. (1972). The diversity of the physical landscape. Pp. 2-32 in P. J. Smith

(Ed.) *Studies in Canadian geography: The prairie provinces*. Toronto: University of

Toronto Press.

Leiss, W. & Nicol, A. (2006). A tale of two food risks: BSE and farmed salmon in

Canada. *Journal of Risk Research* 9(8): 891-910.

Le Roy, D., Klein, K.K. & Klvacek, T. (2006). The losses in the beef sector in Canada

from BSE. *Canadian Agricultural Trade Policy Research Network* commissioned

paper.

- Lyson, T.A. (2007). Civic agriculture and the North American food system. In C. C Hinrichs and T. A. Lyson (eds) *Remaking the North American Food System: Strategies for Sustainability*. Lincoln: University of Nebraska Press.
- MacLachlan, I. (2001). *Kill and chill: The restructuring of Canada's beef commodity chain*. Toronto: University of Toronto Press.
- Marsden, T. (1998). Economic perspectives. Pp. 149-163 in B. Ilbery (ed.) *The geography of rural Change*. London: Addison-Wesley Longman.
- McBride, S. (2001). *Paradigm shift: Globalization and the Canadian state*. Halifax, Fernwood Publishing.
- McMichael, P. (2000). The power of food. *Agriculture and Human Values* 17(1): 21-33.
- Morgan, K., Marsden, T. & Murdoch, J. (2006). *Worlds of food: Place, power, and provenance in the food chain*. New York: Oxford University Press.
- Muhr, T. (1991). ATLAS/ti – a prototype for the support of text interpretation. *Qualitative Sociology* 14: 349-371.
- (NFU) National Farmers Union Canada. (2005). The farm crisis and corporate profits. A report by *Canada's National Farmers Union*, November 30. Available online at: www.nfu.ca (accessed 2 June, 2008).
- Norberg-Hodge, H., Merrifield, T. and Gorelick, S. (2002). *Bringing the food economy home: Local alternatives to global agribusiness*. Halifax: Fernwood Publishing.
- Novek, J. (2003). Intensive hog farming in Manitoba: Transnational treadmills and local conflicts. *The Canadian Review of Sociology and Anthropology* 40(1): 3-27.
- Nunes, K. (2008). XL foods to acquire Tyson's Canadian beef business. *Meat and Poultry*. Available online at:

- http://www.meatnews.com/feature_stories.asp?ArticleID=94609 (accessed 17 July, 2008).
- (OIE) International Office of Epizootics (2008). Geographical distribution of countries that reported BSE confirmed cases since 1989. OIE Animal Disease Data. Available online at: http://www.oie.int/eng/maladies/en_alpha.htm (accessed 8 July, 2008).
- O'Neill, K. (2005). How two cows make a crisis: US-Canada trade relations and mad cow disease. *The American Review of Canadian Studies* 35(2): 295-319.
- Ostercamp, C. (2006). The trickle down illusion: The plight of Canada's cattle producer three years after BSE. A report by Beef Initiative Group. Available online at: <http://beefinitiativegroup.com> (accessed 12 June, 2008).
- Patel, R. (2007). *Stuffed and starved: Markets, power and the hidden battle for the world's food system*. Toronto: Harper-Collins Publishers Ltd.
- Powell, D. & Leiss, W. (1997). *Mad cows and mother's milk: The perils of poor risk communication*. Montreal: McGill-Queens University Press.
- Pugh, T. & McLaughlin, D. (2007). *Our board our business: Why farmers support the Canadian Wheat Board*. Halifax: Fernwood Publishing.
- Ramsey, D. & Everitt, J.C. (2001). Post-Crow farming in Manitoba: An analysis of the wheat and hog sectors. In R. Epp and D. Whitson (Eds.) *Writing Off the Rural West*. Edmonton: University of Alberta Press.
- Raynolds, L.T. (2000). Re-embedding global agriculture: The international organic and fair trade movements. *Agriculture and Human Values* 17: 297-309.

- Roberts, B.C. (2002). *Past, present and how we can survive for the future in the beef cattle business*. Pomeroy, WA: Self-published.
- Robles, W. (2001). The landless rural workers movement (MST) in Brazil. *Journal of Peasant Studies* 28(2): 146-161.
- Roppel, C., Desmarais, A.A. & Martz, D. (2005). *Farm women and Canadian agricultural policy*. Canada: Status of Women.
- Rude, J., Carlberg, J. & Pellow, S. (2007). Integration to fragmentation: Post-BSE Canadian cattle markets, processing capacity and cattle prices. *Canadian Journal of Agricultural Economics* 55: 197-216.
- SAS (2007). *SAS OnlineDoc 9.1.3*. Cary, NC: SAS Institute. Available online at: <http://support.sas.com/onlinedoc/913/docMainpage.jsp>. (Accessed 12 February 2008).
- Sage, C. (2003). Social embeddedness and relations of regard: Alternative 'good food' networks in south-west Ireland. *Journal of Rural Studies* 19: 47-60.
- Schulz, H. (2004). *Betrayal: Prairie agricultural politics in the fifties*. Calgary: University of Calgary Press.
- Shaykewich, C., Holliday, N., Jeffrey, S., Kennedy, A., Mooney, S. & Woodbury, B. (1994). Weather, climate and prairie agriculture. Pp. 31-48 in Elliot, J., Morrison, I. & Kraft, D. (Eds.) *Sustainability of Canada's agri-food system: A prairie perspective*. Winnipeg: International Institute for Sustainable Development.
- Shreck, A. (2005). Resistance, redistribution, and power in the fair trade banana initiative. *Agriculture and Human Values* 22: 17-29.

- Sinclair, P. R. (1975). Class structure and the populist protest: The case of western Canada. *Canadian Journal of Sociology* 1(1): 1-17.
- Smithers, J. & Johnson, P. (2004). The dynamics of family farming in North Huron County, Ontario part one: Development perspectives. *The Canadian Geographer* 48(2): 191-208.
- Statistics Canada (2007). Agricultural perspectives from seven censuses, Canada and provinces. Ottawa: Canada. Available online at:
<http://www.statcan.ca/english/freepub/95-632-XIE/2007000/histmenu-en.htm#ii>
(accessed 10 February 2008).
- Statistics Canada (2001). Farm data and farm operator data (full release) for the 2001 *Census of Agriculture* plus selected historical data. Available online at:
<http://www.statcan.ca/bsolc/english/bsolc?catno=95F0302X> (accessed 8 July 2008).
- Stewart, L., Lyons, K. & Lawrence, G. (2000). Constructing “green” foods: Corporate capital, risk, and organic farming in Australia and New Zealand. *Agriculture and Human Values* 17: 315-322.
- Stozek, T.E. & McLachlan, S.M. More than cows at the table: risk and BSE for farmers and rural communities in western Canada (submitted).
- Sumner, J. (2005). *Sustainability and the civil commons: Rural communities in the age of globalization*. Toronto: University of Toronto Press.
- Tacke, V. (2001). BSE as an organizational construction: A case study on the globalization of risk. *British Journal of Sociology* 52: 293-312.

- Tait, F. (2003). Pork politics and power. Pp. 39-58 in A. M. Ervin, C. Holtslander, D. Qualman and R. Sawa (Eds.) *Beyond factory farming: Corporate hog barns and the threat to public health, the environment and rural communities*. Saskatoon: Canadian Center for Policy Alternatives.
- (UKDH) United Kingdom Department of Health (May 2006). Monthly Creutzfeldt-Jakob disease (CJD) statistics. *DH News Release*.
- Verbecke, W. & Ward, R.W. (2001). A fresh meat almost ideal demand system incorporating negative TV press and advertising impact. *Agricultural Economics* 25: 359-374.
- Watson, A. & Winson, A. (1993). *The intimate commodity: Food and the development of the agro-industrial complex in Canada*. Canada: Peter Saunders.
- Yestrau, M. 2008 *Holistic management: A western Canadian perspective* (Masters dissertation, University of Manitoba).

CHAPTER V

Final discussion, future research directions and personal reflections



Photo taken in southwestern Saskatchewan, off HWY 1 – July 2006

“Liberation is a praxis: the action of men and women on their world in order to transform it” – Paulo Freire

Chapter Summary

In this final chapter, I briefly summarize and explore the major outcomes, contributions and wider implications of this study through personal reflection. I conclude with an excerpt from a personal research log I kept throughout the course of the project.

Research Outcomes

1.) Holistic understanding of the BSE risk across western Canada

The BSE crisis greatly affected farmers, ranchers and rural communities throughout the Canadian prairies – Alberta, Saskatchewan and Manitoba. Most attention had been focused, on and perhaps distracted by, the more tangible and quantifiable aggregate economic impacts resulting from the international trade bans imposed on Canada and its beef industry. While these impacts were significant, with billions in economic losses being reported even within the first year (CAHC 2003), this study demonstrated that there is a complex socio-economic, cultural and political context in which this crisis unfolded. This context was essential for understanding the nature of the resulting impacts and implications, present and future.

The most important component of this research was that it was designed and carried out in a way that was inclusive and holistic in nature, thus enabling the thesis outcomes. This approach helped me understand that the impacts experienced by farmers were diverse in nature and not all directly attributable to BSE. For instance, droughts, floods, grasshoppers, rising fuel and feed costs and a strengthening Canadian dollar all contributed to economic impacts that were explicitly related to BSE. So-called spillover

impacts on farmers and communities such as emotional stress and even the loss of future generation of farmers were also important. This is not to suggest that BSE was insignificant. Rather, it is important to understand that farmers are faced with numerous stressors, some of which extend far into the past, compounding and accumulating as present day and indeed future impacts.

Further, Chapter III highlighted the interconnectivity of rural communities, namely that impacts experienced by producers and subsequent responses cannot be examined in isolation, as other parts of their communities are also inevitably affected. Nor could these impacts be reduced to mere economics. Rather, when the BSE crisis is located in the larger social contexts of rural communities, the combination of effects equate to something much more severe than was ever acknowledged in other studies. Some participants identified rural stress, less participation in volunteerism and community events and generally less money flowing through the rural fabric as indirect impacts related to BSE. Others were more concerned about the future, namely the further erosion of rural infrastructure and population as a result of those who exited from farming, taking off-farm jobs or, in the case of youth, leaving permanently. These broader implications were entirely overlooked by other studies, likely because they are not easily measurable or quantifiable. I believe this is a real injustice, as these, to many, were described as the most severe and long-term impacts experienced by farmers and rural communities during the BSE crisis. The combined social and economic fallout of the crisis redefined with this in mind allows for a more accurate and meaningful measure of the cumulative impacts of the next crisis, whatever it might be.

2.) *Government policies contributed to BSE risk*

Another major contribution of this research was gaining an understanding of how entrenched and influential larger economic and political forces are in Canadian agriculture and how this broader, indeed, global, policy framework, affected farmers' ability to respond during BSE. Agro-industrialization has been occurring and transforming Canadian agriculture for over three decades. More recently, the entrenchment of the Canadian food system into the global marketplace by embracing neoliberal policies has led to a great disparity in prairies agriculture. The government seems committed to sustaining a 'bigger is better' and corporate-driven agriculture, as was highlighted in Chapter IV in the ways they responded to BSE, providing the most meaningful assistance to the largest farms and agribusinesses in the beef industry rather than already stressed smaller and family producers. I believe this is undermining the potential for working towards agriculture and rural sustainability. Smaller-scale farms and farm families play an essential element in land stewardship and maintaining healthy and vibrant rural communities in western Canada (Sumner 2006; Roppel 2006). Agriculture policies are evidently narrow, short-sighted and even undemocratic, motivated by short-term economic and political gains and catering to the minority elite. The recent attempts by the Conservative government to dismantle the Canadian Wheat Board against the will of most farmers highlights this arrogance (Pugh & McLaughlin 2007).

This dominant paradigm is further propped up by the ways in which risks are understood and policies developed. Again, more substantial and meaningful engagement with those at "ground zero" would cultivate a better understanding of the experiences of

most farmers and facilitate the development and delivery of policies that encourage longer-term rural sustainability – economically, socially and environmentally. Of course this would require a departure from the more distant and conventional ‘science’, technology, and ‘expert’ driven regulatory framework.

3.) Future implications and vulnerability

Since May 20, 2003, 11 additional cases of BSE-infected cows have been confirmed in the Canadian herd (Statistics Canada 2008). For some, the crisis ended after the US border opened to live cattle and beef products under thirty months of age in July 2005. This was evidently the case for both federal and provincial governments, who ceased supporting farmers with BSE-related assistance programs at this point. Or, for the larger public, the crisis arguably ended after the US border fully re-opened, allowing live cattle and beef products over thirty months of age in November 2007. But farmers in this study indicated that economic and social fallout from BSE continues and will likely persist for many years to come. Who knows better?

While the impacts of BSE linger on as increased debtloads and uncertainty, persisting precarious financial circumstances such as those caused by rising production costs prevail at the farm and community levels. Yet BSE has fallen off the public radar. But what will be the next emergency that places agriculture and farming back in ‘crisis’ mode? Perhaps it will be climate change and food shortages? While the recent rise in global grain prices has temporarily cast a hopeful light on Canadian agriculture, this has not come without its costs, especially in the livestock industry. Rising grain prices translate into increased animal feeding costs. Further, likely in response to recoup losses

associated with BSE, many livestock producers are plowing up their longstanding pastures, shifting into what is currently a more lucrative grain production. But if and when the grain boom busts, what then? Most of those pastures were developed over the course of numerous decades and cannot be instantly switched back into livestock production when the global market shifts again. Other animal disease crises unfolding around the world such as or foot and mouth disease (FMD) in the United Kingdom, avian influenza spreading through southeast Asia, Russia and Europe, undoubtedly have many farmers on edge. Indeed another prion disease, chronic wasting disease (CWD), has begun to spread across the prairies, the potential impacts of which remain are frightening (Arnot & Unterschultz 2008).

With this in mind, it is baffling as to why so few proactive measures were taken to help mitigate future risks in response to this most recent BSE crisis and why there was such a quick return to the status quo. In part this reflects the “shoot, shovel, and shut up” mentality of many of the decision makers. Regardless, farmers and rural communities are now no more prepared for the emergence of and impacts resulting from similar future risks than they were five years ago. No additional local slaughter capacity has been established in western Canada and the beef industry is still no less dependent on shipping across the finicky US border (Loppacher & Kerr 2004). It is likely that whenever it is that the next agricultural risk-turns-reality, farmers and rural communities will again bear the brunt of this inertia.

An analogy used by many farmers in describing BSE in a larger, longer term Canadian agriculture context is that it was “just another nail in the coffin.” For some individuals it was the final ‘nail’, many indicating they had already or would soon exit

from agriculture altogether. But there is also optimism for better times ahead. Indeed for some, BSE represented new opportunities or even gains. Farmers were not simply waiting around for government handouts and are unwilling to work towards building a more sustainable future for agriculture and rural communities. Indeed, as Chapter IV demonstrated, the farmer-driven initiatives were arguably the most proactive measures taken in response to the BSE crisis, especially in the numerous efforts to establish additional farmer-owned local slaughter capacity. And far from being supportive, government and industry actually represented the biggest barriers to their success.

The seemingly endless and fruitless efforts have resulted in much disappointment, cynicism and a more general sense of hopelessness throughout the region. Many are concerned that the next generation of family farmers might be replaced by agribusiness corporations, which in turn will contribute to a decline of land stewardship or and healthy rural communities. Perhaps this is the greatest future risk of all – the loss of hope in these landscapes.

Personal hopes

I hope that if something positive came from the BSE crisis in Canada, it is that it brought to wider public attention the larger struggles of farms, farm families and rural communities. After all, it took the widespread and devastating 2001 foot and mouth disease outbreak in the UK to bring public attention to the declining state rural communities there (Taylor 2003). BSE arguably contributed to a growing public concern about food safety and the desire to access more socially and environmentally responsible, often locally grown food (e.g. Smith & MacKinnon 2007). Hopefully this will translate

into mending the chasm between ‘eaters’ and ‘growers’ where eaters will better understanding and appreciate where their food comes from, and where they will become more willing to provide for a more sustainable food system.

There may be a gloomy irony in the making that has severe consequences for all of humanity. That this industrial agriculture and food model has been embraced in large part because of an underlying ‘cheap’ food policy may ultimately degenerate into a system that is far more *costly* in the long-term. Corporate consolidation in virtually every agro-food sector is now such that monopolies are commonplace. Furthermore, vertical integration into multiple sectors is also becoming the norm among agri-businesses. If this trend continues, and it seems it will, based on knowledge we have of corporate power and market oligopolies, the profit imperative may be a strong enough force that cheap food could soon become too expensive.

Let not the slow but steady erosion of family farms and rural communities remain a silent crisis. Top-down, expert-driven research and governmental decision making has effectively silenced the farm and rural voice and has perpetuated the lack of understanding of the complex ways in which risks unfold. It is due time for a new, more inclusive and participatory risk analyses, management and policymaking paradigm and a more sustainable food system.

Future Research Considerations

Rural-urban interface

The ongoing interactions with farmers throughout this research provided me with the currency of the BSE issue and larger problems happening in farming and rural

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communities, which played a crucial role in my own analysis. However, it was challenging to define what should become research data.

Farmers have approached me on numerous occasions during my research to “look at this” or “consider talking to...” Those I have interacted with have been thrilled by the nature of the project, that it was inclusive and relatively participatory in nature and rooted in a ‘ground up’ approach. They were eager to contribute their experiences and ideas. Indeed many farmers and rural people feel very isolated, underrepresented, and are thirsting to participate in meaningful research, wanting to work proactively towards a more sustainable food system. It would be interesting and beneficial if future research would take a hard look at underlying reasons for the disconnect between the larger public and their food sources and if this research could identify ways in reversing this trend. In times where the decline in rural populations has inhibited farmers from having an influential political voice, I firmly believe building better bridges and solidarity between rural and urban people on local and global scales will be an important part of working towards a more just and sustainable food system.

Protecting the public interest

Research ought not to be designed and executed to serve the interests of the gatekeepers of the economy. It seems we have forgotten about the importance of the public interest in much of the inquiry that is carried out in universities and other institutions. Further, as increasingly cash-starved universities succumb to the pressures of obtaining private or otherwise corporate funding, the scope of research carried out becomes more limited to where those funds are allocated and conflicts of interest arise as

is evidenced in the ‘corporatization’ of agricultural research communities (Klein & Kerr 1995). Research in the arts and humanities has also become affected and even undermined by this trend. This is highly problematic. As the outcomes of this study highlighted, the social sciences have an important role in examining the rapidly changing nature of modern risks in society. It is in the public interest for these trends and issues to be critically examined, brought to light; a priority that many farmers in this study expressed interest and concern about.

Action-oriented for social transformation

Likely due to the large prairie-wide scope of this project, I was more limited than I would have liked to have been in the degree to which I could actively engage with the participants and involved communities. I have been inspired by the nature and outcomes of other concurrent research being facilitated and centered on agriculture and rural risks in the prairies, including GM crops (Mauro & McLachlan 2008), direct marketing (Anderson *et al.* 2008) and empowerment of farm women (Roppel *et al.* 2006). These projects are all laden with explicit action outcomes, such that the social transformation being advocated by the participants are embedded in the projects (Greenwood & Levin 2005). When the research community more actively embraces more inclusive and empowering research methodologies, not only will the public interest be better served, but progress towards social and environmental justice will also be made.

Final Reflections: Local Knowledge and Rabbit Snares

In qualitative research, personal reflection is an important process that enables critical thinking and synthesis of ideas and understandings (Charmaz 2005). For these purposes, I kept a research log throughout the duration of this project. I felt it was important for me to conclude this thesis on a more personal note, so below is an excerpt from my research log that I believe provides relevant closing remarks to this thesis.

A journal entry: Winter 2008

In October 2007, I decided to act on an opportunity to move out to a small family farm outside of Boissevain, Manitoba to begin writing up my thesis. These folks had been friends of mine for several years, understood that I needed a space that would enable me to focus on my writing but also encouraged me to engage with the everyday farm activities in whatever capacity I felt was fair. In exchange for room and board, I humbly offered up some of my time and labour each day. Though I did not finish writing up my thesis over the winter as planned, I received invaluable experience and insights, many of which greatly added to the depth of this study.

The Neufeld-Andres farm, “Room to Grow,” is located on a quarter-section approximately ten miles southwest of Boissevain and is nestled up against the north side of the Turtle Mountain Provincial Park. These are not ‘conventional’ farmers by any means; that being, they do not fall within the parameters of what would be considered a typical Prairie grain, livestock or mixed farm. David operates a greenhouse, from which he grows and markets native Prairie herbs and other bedding plants to local and urban

markets in the spring and summer months; Magdalene, works as a resource teacher for the local school division; and with the exception the youngest still in highschool, their four children are out finding their way in the world. Their livelihood is largely based on the land, so they are farmers by my definition. Like many other Prairie farmers I have gotten to know, they have found innovative ways of generating an income by using the land they live on in creative ways. Further, they have raised an amazing family with good values and who also grew to appreciate the simpler, finer things the country life can offer, like working in the garden, canning fruits and vegetables, identifying and exploring the wonders of local plants and animals, fixing up old trucks and cars saddling up horses for a Sunday afternoon ride, volunteering and participating in the community events; things that require a certain stewardship, respect, patience, care, and indeed, knowledge.

Though I never grew up on the farm, I was born and raised in the rural Prairies, in Dauphin, MB. After living in an urban setting for nearly ten years, I, like so many others who leave rural areas, have strongly felt the pull back to wide open spaces, especially during the latter half of my Masters project, as I began reflecting on some of the fundamental underpinnings of all the farm-related research and analysis I had been doing. Concepts like the importance of exploring and engaging farmer experiential knowledge because the decision-making experts in cities who develop and implement agriculture policies and risk management are messing up so badly. After having the opportunity to interact with thousands of farmers throughout this project, affirming that it would be a different process we were embarking on and that we were going against the risk analysis status quo by being more inclusive of farmer voices, I still found myself returning to the city. It seemed a bit of a paradox and a strange irony. I knew that I could not adequately

comprehend or understand notions of ‘farmer knowledge’ and all that entails in terms of writing about it without overcoming the seemingly metaphorical wall that existed between myself in the city, where the ‘expert’ decision makers reside, and the farmscape, where the real experts live – everyday agrarian folks.

After settling into my new home on their farm, I began to discover a much deeper meaning and appreciation for local knowledge and real expertise. David and Maggie welcomed me into their family, encouraged and empowered me to engage with the land and lifestyle in many exciting ways. Having an interest in animals, I decided to take on the responsibilities related to looking after the three horses on the farm. I soon realized that this was no easy task. But with good guidance from David and determination to learn, I soon gained the trust (and maybe even respect) of the horses, enough to be soon riding them. Beyond that, I learnt a countless many little practical skills during my stay there: how to use and service a chainsaw properly, make a good stack of logs or firewood, drive and operate a tractor, set up a successful rabbit snare trap-line in the woods. And beyond the physical act of learning-by-doing came a far more profound appreciation for what it is knowledge is and the importance of these livelihoods and communities. In my brief six-month stay at the farm, I began to comprehend the vast knowledge and understanding of their land, livelihoods, families and communities and indeed the inner-workings of the larger rural economy and social fabric. These are the real experts the research community and, more importantly, those charged with making policies that affect these people and communities need to be more adequately and meaningfully engaging with. This is why we, individually and collectively, need to ensure the well-being of family farmers and their communities.

Literature Cited

- Anderson, C.R., McLachlan, S.M. & Stozek, T.E. (2007). Poster Presentation at *PrP Annual Convention, February 15-18, Calgary, AB.*
- Arnot, C. & Unterschultz, J. (2008). Current and potential economic impacts of Chronic Wasting Disease on the Alberta elk and deer farming industry. A poster presentation at the *PrP Annual Convention, February 3, 2008, Toronto, ON.*
- Brook, R. & McLachlan, S.M. (May 2006). Elk – agriculture interactions in the greater Riding Mountain ecosystem: Final report to Parks Canada. *Environmental Conservation Lab*, University of Manitoba.
- (CAHC) Canadian Animal Health Coalition. (2003). Economic implications of BSE in Canada, 2003: Final report. *Serecon Management Consulting Inc.*, Edmonton, AB.
- Charmaz, K. (2005). Grounded theory in the 21st century: Applications for advancing social justice studies. Pp. 507-535 in N. K Denzin and Y. S. Lincoln (Eds.) *Sage handbook of qualitative research* (3rd edition). London: Thousand Oaks.
- Greenwood, D.J. & Levin, M. (2005). Reform of the social sciences and of universities through action research. Pp. 33-42 in *The sage handbook of qualitative research* (3rd edition). London: Thousand Oaks.
- Loppacher, L.J., Kerr, W.A & Vliet, V. (2004). The BSE crisis in Canada: A trade perspective on sanitary barriers, *Estey Center for Law and Economic in International Trade*. Available online at: http://www.esteycentre.ca/BSE_Crisis_in_Canada.pdf (accessed 12 January, 2008).
- Mauro, I., & McLachlan, S.M. (2008). Farmer knowledge and risk analysis: Post release evaluation of herbicide-tolerant canola in western Canada. *Risk Analysis* 28: 463-

476.

Pugh, T. & McLaughlin, D. (2007). *Our board our business: Why farmers support the Canadian Wheat Board*. Halifax: Fernwood Publishing.

Roppel, C., Desmarais, A.A., & Martz, D. (2006). *Farm women and Canadian agricultural policy*. Ottawa: Status of Women Canada

Smith, A. & MacKinnon, J.B. (2007). *The 100-mile diet: A year of local eating*. Toronto: Vintage Canada.

Sumner, J. (2005). *Sustainability and the civil commons: Rural communities in the age of globalization*. Toronto: University of Toronto Press.

Taylor, I. (2003). Policy on the hoof: The handling of the foot and mouth disease outbreak in the UK 2001. *Policy and Politics* 31(4): 535-546.

Appendix 1

Chronology of BSE incidences in Canada and the US (as of November 2007)

<p>May 2003: A cow in Wanham, Alberta is confirmed to have BSE. The U.S. bans all imports of Canadian beef</p> <p>December 2003: The first case of BSE is found in a cow in the U.S. Many countries including Japan, South Korea, and Brazil ban imports of American beef. The cow is later confirmed to have been born in Canada</p> <p>December 2004: U.S. announces that it will open its borders to live Canadian cattle aged 30 months or younger beginning in March 2005. A second case of BSE is found in a cow in Alberta</p> <p>January 2005: Third case of BSE is found in a Alberta cow</p> <p>March 2005: U.S. District Judge imposes a temporary injunction to stop reopening the border to Canadian cattle</p> <p>June 2005: Second case of BSE found in the US</p> <p>July 2005: US Court of Appeals overturns the temporary injunction banning import of Canadian cattle. Imports of live Canadian cattle 30-months-old and younger to the U.S. begin</p> <p>January 2006: Fourth case of BSE found in a Alberta cow</p> <p>March 2006: Third case of BSE found in the US</p> <p>April 2006: Fifth case of BSE found in Canada, in British Columbia cow</p> <p>July 2006: Canada's sixth case of BSE is found in a cow in Manitoba. A seventh case is found in Alberta</p> <p>October 2006: Eighth case of BSE found in a Alberta cow</p> <p>November 2006: USDA submits a rule to allow the import of all Canadian beef and live cattle born after March 1, 1999, including cattle older than 30-months, for review</p> <p>February 2007: Ninth case of BSE in Canada found in a Alberta cow</p> <p>May 2007: Tenth case of BSE found in Canada in British Columbia cow</p> <p>November 2007: The U.S. opens its border to all Canadian beef and live cattle born after</p> <p>December 2007: Tenth case of BSE found in Alberta cow</p> <p><i>*Source: Canadian Food Inspection Agency (CFIA). 2008. Available online at: www.inspection.gc.ca/english/anim/animae.shtml</i></p>
