Getting Behind the Grain: the Politics of Producer Opposition to GM Wheat on the Canadian Prairies

By

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A thesis submitted in conformity with the requirements for the degree of doctor of philosophy

Graduate Department of Geography

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Abstract

On May tenth, 2004 Monsanto announced that it would discontinue breeding and field level research of transgenic Roundup Ready (RR) wheat. This decision was heavily influenced by the widespread rejection of RR wheat by Canadian prairie producers who voiced their opposition through a diverse coalition of rural and urban organizations. With six of the nine member organizations representing rural and farm groups, this research departs from the most common representation of anti-GM movements as being urban and European-centred.

This dissertation contrasts the general acceptance of Monsanto’s Roundup Ready canola just five years earlier (in the mid 90s) with the widespread opposition amongst prairie producers to RR wheat. It uses an updated version of the agrarian question and the production of nature thesis to show how capitalist relations are differentiated across place and commodities. The research finds that producer resistance to RR wheat hinged on the specificities of local histories and institutions, cultural conceptions of worth and economic fair treatment, and the character of wheat as a commodity with particular biophysical properties. The research is also concerned with the ways in which producers articulated their resistance with and through discourses of consumption, while at the same
time rejecting the attempts made by proponents of RR wheat to relegate them to consuming subjects, who would best register their dissent by voting with their dollars on the market. For many prairie farm organizations, the fate of the family farm is tied up with the future of wheat farming and the capacity of farmers to collectively market their wheat in international markets. Monsanto’s vision for the future of prairie wheat crossed moral and cultural boundaries for producers and organizations that understood themselves as active subjects.
Acknowledgements

Thanks go first and foremost to the participants in this research who gave up their precious time to this project and answered difficult questions from a probing outsider. My mom (Valerie Veillard) and my father (Bob Eaton) provided me with a home and access to a car during my fieldwork and are significantly responsible for my successes in the field.

Scott Prudham has played a huge role in this dissertation and in my intellectual development more broadly. He has given me so much time, support and engagement. He has also been a great friend, one I hope to maintain over many years to come. His supervision has been self-reflexive, rigorous and generous. Most importantly, he has provided precise and brilliant feedback on written work. I am also grateful to my supervisory committee -- Deborah Leslie, Michael Bunce and Emily Gilbert -- and my external examiner -- Gavin Bridge -- for the important feedback and guidance they have given me.

I had a wonderful community of friends during my work at the University of Toronto and I have benefited immensely from the reading, socializing, analyzing, debating and organizing we have done together. You are friends and colleagues I hope to always be close to no matter where we all end up. Amy Siciliano, Vanessa Mathews, Jen Ridgley, Patrick Vitale, Roger Picton, Jaume Franquesa, Marion Traub-Werner, Lisa Freeman, Paul Jackson, and Suzanne Mills it has been wonderful having you in my life.

Zsolt Szekely is an exceptional partner who has shared so much love. He brings to our relationship a great combination of humanity and humour that has had much to do with my success in the PhD. I owe him a great deal.
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Introduction

On May tenth, 2004 Monsanto announced that it would “discontinue breeding and field level research of [transgenic] Roundup Ready wheat” (Monsanto Company, 2004) a drastic decision since it had already invested many years and resources in breeding, field trials and advancing this product through the Canadian and American regulatory systems. Widespread politicization of Roundup Ready (RR) wheat in the US and, especially, in Canada led Monsanto to anticipate a drastic reduction in “business opportunities” for this product and discontinue its development. Interestingly, active and adamant opposition to RR wheat contrasts with the fact that there was very little public opposition to transgenic herbicide tolerant canola varieties (including RR) before or after their introduction in Canada in 1995. In fact, prairie farmers had quite readily adopted these varieties, and by 2005 transgenic herbicide tolerant canola accounted for 78% of all canola grown nationally (Beckie et. al, 2006: 1244). Thus, when in July, 2001 a broad coalition of farm, consumer, environmental, health, and industry organizations joined forces to publicly voice their opposition to RR wheat the biotechnology industry and Canadian regulators were somewhat taken aback (interviews, Agwest Bio, CFIA, and Croplife Canada).

The discrepancy between widespread adoption of RR canola, on one hand, and strong opposition to RR wheat on the other is the central problem that has animated my

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1 Roundup is the brand name of a Monsanto herbicide, which is composed mostly of glyphosate. Roundup ready crops include corn, cotton, soy and canola. They are genetically engineered to be resistant to roundup.
research and this dissertation. Initially I turned to the cost benefit analyses of agricultural economists for insight into this question (see for example Grey, 2001). Such analyses impressively considered a wide range of factors including the potential damage of herbicide-tolerant weeds, losses due to the contamination of non-GM crops with GM material, and corporate concentration in the biotechnology industry. Over the course of my research I found that much of this analysis proved accurate, but I also became aware that the decision to adopt GM wheat amongst producers was not reducible to a hypothetical cost-benefit analysis. In fact, in this dissertation I argue that the seemingly abstract economic decisions being made by farmers actually hinged on the specificities of local history, cultural practices and the character of wheat as a biological entity.

Unlike the consumer-driven anti-GM movements that have received much academic and popular attention (see for example Reisner, 2001; Roff, 2007; Schurman, 2004), the coalition at the centre of this dissertation was composed primarily of rural and agricultural groups (six of the nine organizations – see table one at the end of the introduction for a list of the organizations and their positions on GM wheat). In Canada, producer-led activism was key in keeping RR wheat at bay, especially in the provinces where wheat has dominated the agricultural landscape, both historically as a frontier crop, and today as an important part of most farmers’ rotations. In these provinces, especially Manitoba and Saskatchewan, social struggles over the organization of the farm sector and the extraction of surplus from agriculture have been central questions since the settling of the land in the late 1800s.

Given the history of farm organizing on the prairies (some of which I summarize in chapter two: The Historical Political Ecologies of Wheat and Canola) I was interested
in understanding the contemporary politics of GM wheat in the context of these earlier rounds of farm struggle. How have farmers framed their struggle against GM wheat? Have they mobilized the history of farm struggle in forging their opposition? What importance have farmers ascribed to the extraction of surplus from farm labour in their positions against GM wheat? These are questions that are variously addressed in all of the chapters of this dissertation. Chapter four: Contesting the Values of GM Wheat on the Canadian Prairies engages these questions most directly.

In addition to the relationship between current and past rounds of struggle, this dissertation attends to the wider variety of tactics and arguments used by and against the coalition against RR wheat. Chapter three, for example, examines the importance of concerns over market acceptance, environmental risks and democratic and transparent process to the coalition. Chapter five probes the discourse of consumer choice that was used by proponents of GM wheat in an attempt to thwart the collective struggle of producers. In this way, this dissertation is concerned with the singularities of a particular struggle and not with agrarian movements more generally or with the wider debate over genetic modification. Yet, this research still contributes to these broader literatures. While much of the story of GM wheat in Canada is rooted in local histories and ecologies, farmers around the world are dealing with similar processes and threats from global capital(ists) like Monsanto. An understanding of the specific struggle of producers in Canada can be useful in comparing and contrasting with others. Moreover, the findings of this research suggest that closer attention be paid to the particularities of place in any discussion of genetic modification.
More than fifteen years after its introduction, there is still widespread disagreement amongst academics, activists, scientists, regulators, and others about how best to understand genetic modification, what the possible negative and positive effects of the technology are and will be, and with which arguments to formulate the best critiques. Variously positioned social movement groups in a wide diversity of geographical locations have emphasized one or more concerns including the moral imperatives of ‘playing god’ or patenting life forms, the safety of foods derived from genetic modification, the ecological impacts of introducing novel plants into the environment, the loss of the ability of farmers to save seed, the colonial practice of ‘biopiracy’ (Shiva, 1997); and the control that biotech companies are gaining over agriculture, science and regulatory apparatuses. Despite this extremely wide-ranging set of issues, public and academic debate seem to coalesce around either pro or anti-GM discourses. In investigating the politics of opposition to GM wheat in Canada it became clear to me that these abstracted narratives that posit genetic modification as a single coherent category were not applicable to the specificities of my empirical case. In fact, this research questions the possibility of a singular and coherent global movement against GMOs. If future opposition movements want the support of producers, this research suggests that they will have to take into account the particularities of livelihood making and the specificities of biological organisms.

The wide variety of concerns and interest groups that have been articulated by movements against genetic modification can be understood as both strengths of and challenges for a more global politics of GMOs. On one hand, the diversity of resistance provides multiple points for attack and engages many perspectives and people in the
movement. In the case of the Canadian campaign against GM wheat the coalition credits part of its success to the unusual alliance between farm organizations and environmental organizations like Greenpeace. Because of the expertise that each organization had already established in their particular field, the coalition was able to criticize the introduction of GM wheat on multiple grounds, making it more difficult for regulators and politicians to discredit the coalition. On the other hand, the plethora of concerns mobilized by movements against genetic modification make it complicated to carve out space for a nuanced opposition or to link up the discourse of opposition to GMOs with other global movements around agriculture. In the case of opposition in Canada, many of the organizations were not actually against GMOs. Instead, they were opposed to a particular modification in wheat (and not in other crops) because of the specific agronomic and economic challenges it might have posed. Moreover, organizations that believed that the problem with genetic modification was its corporate control would have likely found greater affinity with other movements challenging global capital. It is not at all clear how organizations with categorical fears about frankenfoods can engage in a common struggle with groups that want to harness the potentials of genetic modification through public and accountable institutions in order to develop a more socially and ecologically just agriculture.

The contingencies associated with individual crops, and local histories and cultures of livelihood-making combined with the multiplicity of arguments and organizations against genetic modification mean that anti-GM campaigns are likely to continue to spring up temporarily around particular modifications in specific locales. In the interim, movements will need to rely on the ongoing work of organizations and
movements on issues such as the increasing corporate control in agriculture and the movement away from publicly funded accountable agricultural research. While anti-GM campaigns will be necessarily specific and local they will also need to mobilize these broader concerns in order to secure long-term viability and strong opposition.

**Research Context**

Before I begin the story of the struggle against RR wheat in Canada it is worthwhile providing some background on Monsanto and its RR crops, the organizations involved in the coalition, and the importance of wheat production and marketing on the Canadian prairies. Roundup is the brand name of a broad spectrum herbicide produced by Monsanto. Its active ingredient, glyphosate, is effective against a range of broadleaf and grass plants including perennial weeds. Monsanto always faced competition for this herbicide from companies such as Bayer Crop Science that also produces a broad spectrum herbicide called Liberty. Competition has been even greater since Monsanto’s patent on roundup expired in Canada in 2001. Anticipating these difficulties Monsanto was able to isolate a gene that was resistant to roundup and began genetically engineering this gene into corn, cotton, soy and canola seed. In the early 1990s, the first roundup ready crops became available for sale to farmers in North America. These crops are genetically engineered to be resistant to the roundup herbicide, allowing a new patent to be attached to the gene rather than the herbicide. A farmer must enter a legally binding technology use agreement (TUA) and pay a per acre fee in order to purchase and use roundup ready seed. This controversial agreement, among other provisions, prevents farmers from saving their seed in subsequent years and gives Monsanto licence to inspect and copy farm records and documents.
Monsanto is an American based multi-national corporation that was founded by John Queeny in 1901 in St. Louis Missouri. Initially the company produced saccharin (an artificial sweetener) for Coca-Cola and soon expanded to other industrial chemical precursors that it provided to various chemical companies. By the 1960s Monsanto was manufacturing several of its own widely-used and toxic chemicals including polychlorinated biphenyls (PCBs) and Agent Orange, a defoliant used by the US army in the Vietnam War. Although it was not the only producer of Agent Orange, Monsanto’s solution was found to have higher concentrations of dioxins than others, resulting in more devastating effects amongst those exposed (CBC digital archives, 1999). Monsanto also became an important promoter of plastics, Astroturf being its most successful product. In the 1980s Monsanto started to shift its focus to biotechnologies and invested heavily in biotech research and development. It was one of the first companies to invest heavily in biotechnology. Around this time it bought up several seed companies around the world. In 1996 the corporation split in two, spinning off its chemical operations into a new company called Solutia and focusing its remaining operations around the life science industry. It now boasts of itself as an agricultural company “invest[ing] almost $1.5 million a day to look for and bring to market the innovative technologies that our customers tell us make a difference on their farms” (Monsanto Company, 2009). The company claims to now be focused in four main areas: genomics, biotech transformation, seed, and chemistry (centred on Roundup). All liabilities associated with its industrial chemical past are carried by Solutia.
**Coalition members**

The farm organizations involved in the coalition against RR wheat comprised the vast majority of farm groups on the prairies. Notably absent from the coalition was the Wild Rose Agricultural Producers, the general farm organization from Alberta, since its equivalents in the two other prairie provinces were quite actively involved\(^2\). The Saskatchewan general farm organization, the Agricultural Producers of Saskatchewan, is a newer organization (founded in 1999) and has been somewhat less stable than its Manitoban counterpart the Keystone Agricultural Producers. While membership figures for farm organizations were generally not available and not released to the public, these farm organizations likely represent the largest number of farmers in their provinces. The National Farmers’ Union (NFU) represents fewer farmers, but has been a longstanding and outspoken feature of agricultural politics since its founding in 1969 and before that through its predecessors: first the United Farmers of Canada and then provincial farmers unions. The NFU, thus, has roots in the radical populist organizing of the first half of the 20\(^{th}\) century that resulted in cooperative grain elevators, political alliances with labour, and pools for wheat. The Canadian Wheat Board, which played a central role in the coalition, was one of the products of this early organizing and was supported by the vast majority of the farming population. In recent years, it has been marred by controversy

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\(^2\) Populist farm politics in Alberta have taken on a more conservative undertone. This is partly the result of diverging political histories in the prairie provinces with Alberta following a less progressive set of policies and stances including vehement opposition to the federal government and widespread belief in small government more generally. It was no secret that the Alberta government supported the introduction of RR wheat, and this may have had some effect on WRAP’s decision to not join the coalition. More generally, wheat farming is of less importance in Alberta (as shown in table 5) than in Manitoba and Saskatchewan and WRAP advocates that farmers produce less of it in favour of value added products. Finally, although neither APAS nor KAP can be considered particularly progressive organizations, a perusal of WRAP’s website reveals more support for ‘research and innovation’, a strong denunciation of government involvement in the Canadian Wheat Board, and a more pro-market approach.
over its monopoly and governance. Finally, the Saskatchewan Organic Directorate (SOD) is a relatively new group (founded in 1998) that has an increasing membership due to the growth of organic farming in Saskatchewan. Despite representing a minority of producers it has received much media attention (because of its pursuit of a class action against Monsanto and Bayer for the contamination caused by GM canola) and provincial state recognition and support.

As will become clearer in chapter three, the coalition struggled with its internal coherence. Not only were farm and rural groups reluctant to work alongside urban environmental and health groups like Greenpeace and the Council of Canadians, but the great diversity of farm organizations involved in the coalition also posed a challenge for organizing. More mainstream farm and rural organizations like APAS, KAP and SARM understood themselves as representing the vast majority of conventional prairie farmers, while the SOD and the NFU were often painted as representing more non-conventional farmers and taking more marginal and radical positions against GMOs. Despite the discordant reasons for their opposition (see table 3), there was a high degree of consensus on a few key issues that are taken up most centrally in this dissertation.

Of course organizations were also internally fractured. The SOD, in particular, continues to struggle with its connection to the wider organic movement that espouses principles such as local food, small-scale intensive agriculture and mixed farming. Its

---

3 The CWB has a long and complex history. Initially established in 1935 as a voluntary government agency for the marketing of wheat, during the Second World War its mandate was extended to the monopoly marketing of all Canadian grains. In 1949 its purview changed again and the CWB became responsible for only wheat, oats and barley. Oats were removed from CWB jurisdiction in 1989. Importantly, in 1998 the CWB Act was changed to allow ‘shared governance’ between farmers, who elect ten of the fifteen members of the Board of Directors, and the federal government, that appoints the other five, including the President and CEO. The CWB monopoly has faced increasing attack in recent years especially since the election of the minority Conservative Party government in Canada in early 2006.
membership is drawn from producers who strive to incorporate these wider principals and from farmers who are mainly driven by niche markets, who perform to the minimum organic standards and who are not particularly committed to the philosophy of the wider movement. Representing the largest number of farmers, organizations such as KAP and APAS have tended to focus on issues that are least divisive, for example, securing better support programmes for farmers from provincial and federal governments. While internal fissures and disagreements must have certainly played a part in the negotiated positions reached by the organizations and the coalition, these were not subjects that my respondents wanted to discuss. My observations at farm meetings provided a certain level of insight into such cleavages, but this discordance was largely beyond my access. While I do not wish to underplay the contested nature of inter-organizational politics, all the organizations I interviewed stressed the overwhelming support amongst their membership on their positions of opposition to RR wheat.

Some commodity organizations took vocal positions of support for RR wheat, and these tended to be organizations with some corporate involvement. Of those supporting RR wheat, the Canola Council of Canada likely represents the largest number of farmers. This organization draws its membership not only from producers, but also from processors, agro-chemical and seed companies, and other corporate actors. The Canola Council supported RR wheat because of the commercial success of GM canola varieties. The Western Barley Growers Association was also a very vocal supporter of RR wheat and is comprised of producers, industry and end-users. This organization and the Western Canadian Wheat Growers Association have pushed for uninhibited functioning of free markets in all areas of Western Canadian agriculture. Membership figures for
these organizations were not available, but the Western Canadian Wheat Growers Association is not thought to represent a very large number of farmers, especially given that it disbanded for a short period and re-established its operations in early 2004. The Grain Growers of Canada represents a number of these commodity associations at the national level and has also involved itself in fighting for market liberalization.

**Wheat production and markets**

The possibility that Canada’s wheat markets could be jeopardized by the introduction of GM wheat in Canada became a crucial argument for the coalition against RR wheat (more on the politics of this in subsequent chapters). It is therefore useful to present some data on the significance of wheat exports and the major importers of Canadian wheat from the outset. Much of the data I present below is focused around the year 2001 so as to give a sense of wheat production and markets around the time that the coalition against GM wheat announced its opposition in July, 2001. The first figure (below) shows the distribution of wheat growing in Canada with the greatest area planted to wheat on the Canadian prairies, and a smaller concentration in Southern and Eastern Ontario. Figure two seems at first glance perplexing since the provinces that grow the most wheat have the worst yield ratios. This can be explained by the inverse relationship between aridity and protein content. Arid lands produce lower yields but higher protein content, a quality characteristic that is highly valued by flour millers (Varty, 2004). The Canadian Wheat Board is the monopoly marketing agency for the export of wheat and for domestic human consumption in the three prairie provinces and a small portion of British Columbia. While the rest of the data below is given for Canadian wheat as a whole, it
provides a good representation of prairie wheat realities since the bulk of wheat in Canada is produced in the prairie provinces.

Figure 1 Map of wheat area distribution in Canada

\[4\text{ This map is reproduced from the United States Department of Agriculture’s Production Estimates and Crop Assessment Division of the Foreign Agricultural Service. It uses data from the agricultural division of Statistics Canada http://www.fas.usda.gov/remote/Canada/can_wha.htm}\]
Figure 2 Average area harvested and average tonnes per hectare by province

This chart is reproduced from the United States Department of Agriculture’s Production Estimates and Crop Assessment Division of the Foreign Agricultural Service. It uses data from the agricultural division of Statistics Canada http://www.fas.usda.gov/remote/Canada/can_wha.htm
Figure three shows that Canada is one of the world’s major producers, producing roughly four percent of the world’s total wheat. This is significantly less than what is produced by the United States (roughly 10%) and by the EU as a whole (roughly 21%) but more than other major wheat producers like Argentina (2%) and Australia (3%). More significant is Canada’s share of the world wheat trade (see figure 4). Controlling 15% of the world wheat trade, it is clear that wheat is more important for Canada as an export crop; relatively little of its total production is reserved for domestic consumption.
Major Wheat Producers (% of world production totals 2003-07)

- EU: 21%
- U.S.: 10%
- Others: 59%
- Australia: 3%
- Argentina: 3%
- Canada: 4%

Figure 3 Major wheat producers

---

This graph is reproduced from the Canadian Wheat Board’s 2007-08 Annual Report
World Wheat Trade (Market share July/June 2003-07)

Australia 12%
Argentina 9%
Canada 15%
EU 12%
U.S. 26%
Others 26%

Figure 4 World wheat trade

7This graph is reproduced from the Canadian Wheat Board’s 2007-08 Annual Report
Table one shows the most significant importing countries of Canadian wheat in the 2000-2001 crop year and over ten years ending in 2001. Significant to the story of GM wheat was Japan’s importance as an importer of Canadian wheat. The threat of losing Japan as an export market for wheat because of its rejection of genetic modification was potentially devastating for the wheat industry. Western Europe was another region that threatened to reject GM wheat and while it accounted for only 8.8% of Canadian wheat exports in the 2001-2002 crop year (table 2), it tended to buy high quality, high priced wheat and has been a key importing region since Canada began exporting wheat. Figure five shows the monetary value of Canadian exports to prominent importing countries and figure six gives the total monetary value of Canadian wheat exports from 1998-2008.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>1 406</td>
<td>1 346</td>
</tr>
<tr>
<td>United States</td>
<td>1 079</td>
<td>1 207</td>
</tr>
<tr>
<td>Mexico</td>
<td>1 158</td>
<td>687</td>
</tr>
<tr>
<td>Iran</td>
<td>1 532</td>
<td>1 636</td>
</tr>
<tr>
<td>China</td>
<td>17</td>
<td>2 643</td>
</tr>
<tr>
<td>Others</td>
<td>7 875</td>
<td>7 909</td>
</tr>
<tr>
<td>Total</td>
<td>13 067</td>
<td>15 427</td>
</tr>
</tbody>
</table>

Table 1 Major importers of Canadian wheat (thousands of tonnes)\(^8\)

---

\(^8\) The data for this table is compiled from the Canadian Grain Commission’s publication titled Canadian Grain Exports crop year 2001-2002 available at http://www.grainscanada.gc.ca/statistics-statistiques/cge-ecg/annual/exports-2002-e.pdf
<table>
<thead>
<tr>
<th>Region</th>
<th>Tonnes</th>
<th>Percentage of total</th>
<th>biggest recipient(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western Europe</td>
<td>1 378 399</td>
<td>8.8</td>
<td>Italy (562 261)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>UK (361 301)</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>33 342</td>
<td>0.21</td>
<td>Poland (33 342)</td>
</tr>
<tr>
<td>Africa</td>
<td>3 013 496</td>
<td>19.25</td>
<td>Algeria (800 158)</td>
</tr>
<tr>
<td>Asia</td>
<td>5 484 013</td>
<td>35.02</td>
<td>Japan (1 370 636)</td>
</tr>
<tr>
<td>Western Hemisphere</td>
<td>5 706 118</td>
<td>36.44</td>
<td>USA (1 899 084)</td>
</tr>
<tr>
<td>Oceania</td>
<td>45 459</td>
<td>0.29</td>
<td>New Zealand (45 459)</td>
</tr>
</tbody>
</table>

Table 2 Exports by country of destination for wheat, durum wheat and wheat flour (2001-2002 crop year)⁹

---

Figure 5 Monetary value of Canadian wheat exports by country 1999-2008

Graph is compiled from data provided by Industry Canada’s Trade Data Online Database “Trade by Product”. http://www.ic.gc.ca/sc_mrkti/tdst/tdo/tdo.php#tag
Total Canadian wheat exports (Billions of current Cdn dollars)

Figure 6 Monetary value of total Canadian wheat exports 1999-2008

Graph is compiled from data provided by Industry Canada’s Trade Data Online Database “Trade by Product”. http://www.ic.gc.ca/sc_mrktd/tstd/tdo/tdo.php#tag
Data specific to the prairie provinces follows in chapter two including the area seeded to wheat in the prairie provinces, the percentage of farms growing wheat and the average farm price of wheat.

Before I get to the heart of my research I want to give the reader a sense of my theoretical debts and the methodologies I used in approaching my research. Both are constitutive of my findings and of the way that I have framed these for the reader. I begin the next chapter with a review of the literature on the agrarian question and specify the direction I am taking this question in my study. Central to this research and to the literature on the agrarian question is an understanding of family farms as productive units employing the majority of their farm labour from within the family. This was the model upon which agriculture was based in the Canadian prairies, but there has been a movement away from the family labour farm as the necessity of economies of scale has grown. Unfortunately, Census Canada’s definitions and classifications of ‘census farms’ rely exclusively on gross farm receipts and tell the researcher nothing about the organization of farm labour. In the Canadian Census of Agriculture the classification ranges from farms with gross receipts under $25,000 to farms with gross receipts over $1 million. Recent data has shown that from 2001 to 2006 the number of large farms (defined as having over $250,000 in gross annual receipts) has increased 17.8 percent while farms with annual receipts under $250,000 have declined by 10.5% (Statistics Canada, 2008). Such data gives a sense that farms are consolidating, but it does not give a good indication of the allocation of labour on Canadian farms. In the next chapter I also give a description of how I went about my research, including how I understand the
nature of the interview as a method. Smaller and more substantive literature reviews accompany each chapter.
Table 3: Organizations Involved in the July 31, 2001 Coalition to Stop the Introduction of Round-up Ready (RR) Wheat

<table>
<thead>
<tr>
<th>Name of Organization/date of founding</th>
<th>Type of Lobby</th>
<th>Main complaint(s) about RR wheat</th>
<th>Proposed action</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Farmers’ Union (NFU)/1969</td>
<td>Left-wing farm organization formed to unite provincial Farmers Unions that led radical farm organizing since WW1</td>
<td>Loss of control of the food/seed system to multinationals, threat to profitability and autonomy of family farm</td>
<td>Moratorium on all GMOs. All GMOs must be subject to democratic control, collective ownership and not-for-profit distribution</td>
</tr>
<tr>
<td>Saskatchewan Association of Rural Municipalities (SARM)/1905</td>
<td>Advocate of rural municipalities to senior levels of government</td>
<td>Loss of markets, secrecy of field trial locations</td>
<td>Ban GM wheat until segregation and detection systems, tolerance levels, markets &amp; changes to regulatory system are established</td>
</tr>
<tr>
<td>Saskatchewan Organic Directorate (SOD)/1998</td>
<td>Producer controlled umbrella org. for producers, processors, buyers, traders, certifiers &amp; consumers</td>
<td>Liability in cases of contamination and loss of ability to farm organically</td>
<td>Complete ban on all GMOs since contamination is inevitable.</td>
</tr>
<tr>
<td>Agricultural Producers Association of Saskatchewan (APAS)/1999</td>
<td>SK. general farm organization with rep. from all rural municipalities</td>
<td>Market impact, agronomic issues – effects on zero till,</td>
<td>All GM wheats must be approved based on merit (markets, agronomy)</td>
</tr>
<tr>
<td>Keystone Agricultural Producers (KAP)/1984</td>
<td>Manitoba general farm organization</td>
<td>Market impact, agronomic issues, segregation</td>
<td>Prevent registration until consumer acceptance</td>
</tr>
<tr>
<td>Organization</td>
<td>Description</td>
<td>Position</td>
<td>Action</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Canadian Wheat Board (CWB)/1935</td>
<td>Western Canadian single-desk marketing organization jointly governed by producers and the federal government</td>
<td>Loss of markets (80+ % of customers are concerned about GM wheat.)</td>
<td>Add cost/benefit analysis to regulations. Do not release RR wheat at this time</td>
</tr>
<tr>
<td>Canadian Health Coalition (CHC)/1979</td>
<td>NGO primarily concerned with public health care</td>
<td>GMOs may have negative health impacts. Regulatory system is anti-democratic and serves life-science industry</td>
<td>Regulatory system must be overhauled and serve the public</td>
</tr>
<tr>
<td>Greenpeace Canada/1971</td>
<td>International environmental NGO that began in Canada</td>
<td>GMOs will harm the environment and may have negative health impacts. Life should not be patented</td>
<td>Stop all GMOs, reform the regulatory system</td>
</tr>
<tr>
<td>Council of Canadians (CoC)/1985</td>
<td>Multi-issue nationalist NGO</td>
<td>Consumers don’t want GM wheat. Long-term impacts on health and the environment are unknown</td>
<td>Stop all GMOs until labelling, long-term studies and regulatory reform</td>
</tr>
</tbody>
</table>
Chapter One: Specifying the Agrarian Question and Methodological Approaches

Since it was first laid out by Kautsky in 1899, the agrarian question has been an ongoing source of lively political debate and productive and interdisciplinary scholarship. While many scholars have emphasized the increasing intrusion of capital in agriculture, others have specified the obstacles that have discouraged capital from entering certain agricultural processes and products. Attention to the character of agricultural producers has preoccupied still other authors, including those who have examined peasant and family farmers’ class positions, their abilities to persist as petty commodity producers, and their relationships to markets. Despite the ways that capital has increasingly worked its way into and alongside agriculture, most seem to insist that the dynamics of capital and class in agriculture are different from other industries. The consensus is that these differences matter.

In this chapter I want to review different approaches to the agrarian question and ask what difference place and nature make to the specificity of agriculture as an industry and to the relationship of capital to agriculture. My point of departure in specifying the agrarian question for the purposes of this dissertation is Neil Smith’s (1984) production of nature thesis wherein the appropriation of nature through (agricultural) labour is at once the process of the production of space. I then want to argue that what is produced through the process of agricultural labour is actually place; i.e. it is space loaded with meaning. These meanings hinge on specific cultural, institutional and agronomic histories that vary not only between places, but also between commodities. In other words, the unevenness of capital relations (i.e. the process of differentiation) pertains not
only to time and space, but also to particular commodities because of their biophysical, cultural, political, and economic histories. The history of meanings attached to different commodities may contribute to the success or lack of success for capital relations in each particular agricultural commodity in its place. In order to take the cultural and moral economies of production seriously I propose an update to the agrarian question and a particularization of the question to the Canadian prairies. In the last section of this chapter I discuss the methodological approaches I took in this study.

**Agrarian questions**

The debate over the agrarian question can be characterized as comprising two opposing poles: those who emphasize the continual expansion of capital relations into and through agriculture, and those who insist on the specificity of agricultural production and its necessarily incomplete absorption by capitalism. Kautsky and Lenin were the firsts in the cannon of literature on the agrarian question. Writing at nearly the same time, both authors emphasized the development of agrarian capitalism and the decline of the peasant class.

Lenin (1967) in particular was at pains in *The Development of Capitalism in Russia* (written in 1899) to show how the process of differentiation works alongside the process of capitalization in the countryside and creates two new classes of rural inhabitants resulting in the disappearance of peasants as a distinct class. On the one hand, he argued that competition would lead to the rise of the rural bourgeoisie comprised of independent commercial farmers who employed wage workers and performed little farm work themselves and owners of commercial and industrial establishments who were involved in combining commercial agriculture with industrial
activity. Lenin estimated this class of rural capitalists to comprise around one fifth of the total number of rural households at the turn of the 20th century, but to account for the majority of agricultural production. On the other hand, was the emergence of a rural proletariat composed of poor peasants – primarily allotment-holding labourers of all types, but also landless workers. Lenin estimated that half the total peasant households in Russia belonged to this group. This was particularly worrisome because rural proletarians suffered worse conditions than their urban counterparts, since they were tied to their allotments and, thus, less mobile. Furthermore, because they derived some of their subsistence from farming small plots of land, rural wages tended to be particularly meager. According to Lenin, the process of differentiation that resulted in the formation of the two classes would drive towards completion, obliterating the middle class of subsistence producing peasants and laying the ground for socialist revolution.

Also stressing capitalist transformations in the countryside, Kautsky’s (1988) *Agrarian Question* contemplated the best agricultural programme for the Social Democratic Party of Germany. He argued that the proletarianization of the peasantry should not be celebrated, but nor should it be impeded from progressing. At the very least, proletarianization freed peasants from the land, and the consolidation of large capitalist farms led to impressive productivity. Unlike Lenin, however, Kautsky identified a number of characteristics about peasant farming and peasant subjectivity that made the development of agrarian capitalism tenuous. For example, he recognized the tendency among small farmers to overwork and under-consume stating “[s]mall farms have two major weapons to set against the large. Firstly, the greater industriousness and care of their cultivators, who in contrast to wage-labourers work for themselves. And
secondly, the frugality of the small independent peasant, greater even than that of the agricultural labourer” (110). Furthermore, Kautsky pointed to the greater difficulty of employing machines in agriculture versus in industry because of the unevenness of nature (for example, the uneven terrain and the seasonal nature of production). Finally, Kautsky characterized the small holder as inhabited by “two souls”: the peasant and the proletarian. Conservative parties had an interest in protecting the peasant ‘soul’ who is the owner of his/her means of production and has the capacity for entrepreneurialism. Social democrats, Kautsky argued, should support the proletarian ‘soul’ whose interests are the social development of society (324).

Writing against Lenin, Chayanov (1966a and 1966b) insisted that the middle peasantry was not a disappearing class in Russia and that peasants would continue to persist because of the unique logic of peasant economy. Where Lenin estimated the ‘middle peasantry’ to comprise around 30% of the late 1800s rural population, in 1925 Chayanov estimated that “Ninety percent of the total mass of peasant farms are pure family farms” (1996b: 112). These were farms that relied only on family labour, even if their members were also engaged in handicrafts and commodity production. According to Chayanov, the family labour farm organized its production so that equilibrium was reached between the drudgery of labour and the satisfaction of the consumptive needs of the family. It follows that peasant families had been able to resist differentiation precisely because they would work longer and harder and pay more for certain factors of production (for example for the renting and buying of land) than would capitalist firms/farms. It is not that social differentiation was absent in the Russian countryside, but Chayanov explained much of it as a product of the cycles of demographic change within
families. Farms expanded and bought up more land when they were large and comprised of dependent children; when children moved away they contracted.

Chayanov’s insights about the particularities of peasant economy were taken up with new fervour in the late 1900s. Friedmann (1980), for example, showed that the differentiation and capitalization of the countryside identified by Lenin and Kautsky as inevitable had not taken place in all parts of the world. In fact, the frontier wheat economies of the United States and Canada based on family units of production were outperforming capitalist wheat farms in Europe by the time that Lenin and Kautsky were writing. During the early 1900s household production of wheat continued to grow and by 1935 production based on family labour accounted for the vast majority of wheat on international markets. Friedmann explains the outperformance of capitalist farms by household production as a product of the different requirements between the two forms of production. Drawing on Chayanov she shows that the net product of household production is structurally identical with the fund for familial consumption and reproduction – there is no necessity for a surplus product like there is with capitalist production. Thus, households will make their production decisions based on family needs and desires. Some members may also engage in wage labour to ensure the reproduction of the farm. The emphasis in this work is on the capacity for family farm production to resist both destruction and absorption by capital.

On top of the household organization of production, Mann and Dickinson (1978) have identified nature as an obstacle to the development of capitalist agriculture. Taking their inspiration from Marx’s discussions of labour time, production time, and the time during which agricultural products grow, Mann and Dickinson advanced the thesis that
capitalism develops in those spheres in which the gap between production time and labour time can be reduced. Thus, nature presents certain barriers to the development of agrarian capitalism, the biggest of which being the period after planting and before harvest when the crop is maturing through natural processes and labour is relatively idle. Whereas in industry nature is an input, in agriculture it acts as the factory itself. In the Mann-Dickinson thesis the agrarian question takes a geographical turn. The materiality of nature takes centre stage and crops are distinguished from one another based on their turnover times, their seasonalities, and the degree of unity in their production and labour times. In a subsequent work that reaffirms the Mann-Dickinson thesis, Mann (1990) shows how capitalist development varies by commodity. Extensive crops, for example, tend to have a higher composition of capital (that is they employ more non-living inputs like machinery relative to labour) and be organized as family production units rather than capitalist farms. Furthermore, crops that take longer to mature are more likely to resist capitalization.

The Mann-Dickinson thesis, where nature acts as an obstacle to capital, has been met with much criticism. Goodman et. al. (1987), for example, emphasize the capacity of industrial capital to get around the ‘problem of nature’ through practices of appropriationism and substitutionism. Appropriationism is the processes of industrial appropriation of activities related to farm production and processing; industrial capital expands into and takes over rural activities and labour processes (7). Initial examples of appropriationism were in the realm of farm labour (mechanization), then in the chemical properties of the soil (fertilizers), and next in the actual production process itself (hybrid seed). Here, elements of the production process that used to be firmly within the control
and economy of family labour get siphoned off by industrial capital. Substitutionism is a set of processes that replace agricultural products with industrial substitutes thereby eliminating the rural production process in that commodity (58). Examples include the industrial manufacturing of powdered milk, aspartame, margarine, dyes, and rayon. For these authors, agriculture is the residual activities that have resisted transformation by industrial capital; but the tendency is toward increasing substitutionism and appropriationism. According to Goodman et. al., these processes result in the ‘freeing’ of production from land and natural processes and the reduction of agriculture to the production of raw materials and biomass for industrial processing.

In his study of the commodification of seed through hybridization and genetic modification, Kloppenburg (2004) has also emphasized the ways in which obstacles posed by nature in agriculture have been overcome. In order to successfully wrestle the reproduction of seed away from public institutions and individual farmers, Kloppenburg argues that two simultaneous routes needed to be pursued by industry. First, a technical strategy was developed wherein the scientific practices of breeding and later genetic manipulation were used to strip seeds of their natural properties of reproduction, and thus make them more amenable to commodification. Second, industry pursued changes in legislation that would allow the expansion of private property, thus, negating the legal right of farmers to harness the reproducibility of seed. In the story of plant breeding in the United States (and indeed all over the world) capital relations have thoroughly entered into and transformed agriculture without totally displacing the class of non-wage labourers whose production is based in the family.
For Henderson (1999) it is not only that capital has found ways to get around the obstacles that nature presents for agriculture, but that these same obstacles that confront industrial capital paradoxically serve as opportunities for the circulation of financial capital. The disunities of production and working time and the seasonality of crops elaborated by Mann and Dickinson result in the need amongst farmers for loans and credit to cover the periods of idleness and the gap between planting and harvest. Credit is, thus, a method of extracting value from agriculture without, necessarily, the development of wage labour and capitalist farms (although in the case of California, which is at the centre Henderson’s book, most farms were not organized around family labour). In fact, Henderson argues that agriculture became an outlet for the capital that was already amassed in Californian cities because of rapid urbanization and a boom in mining. The flow of financial capital into agriculture helped enable the transition to intensive agriculture in the late 19th and early 20th centuries through investments in irrigation and through land speculation. The increase in the price of land meant that farmers of all kinds had to take out large mortgages, further perpetuating the extraction of surplus by financial capital.

What can be made of the prolific work on the agrarian question? Is it still an important question, or should it finally be put to rest? Despite very different emphases, with some attending to the ways in which agriculture has resisted being incorporated by capitalism and others insisting that capitalism is wholly entrenched in agriculture, there is a common consensus among these authors that agriculture is a somewhat exceptional industry. While capitalism might have successfully taken hold of more and more agricultural processes and found methods of extracting surplus value without the ubiquity
of wage labour, it is clear that it has had to take unconventional routes in order to do so. For example, the development of capitalism in agriculture has necessitated the rearrangement of property rights, the application of a great deal of technology, and the development of alternative capital circuits including the ability to switch between them (for example from industrial to financial capital). Furthermore, we have seen that many of the arguments about the exceptionality of agriculture revolve around its routedness in natural and biophysical processes – from the reproducibility of seed, to the seasonality of production.

The unevenness of nature across space and across different crops/commodities implies that the agrarian question can also be specified as a geographical question. From the work of geographers Harvey (1982) and Smith (1984) we know that goods/commodities are not the only products of economic processes; nature and space are also fashioned through the social relations of production. From this perspective, nature may indeed pose obstacles to the development of wage labour and the penetration of industrial capital in agriculture, but these barriers are constantly being reproduced with the relations of production. In what follows I illustrate what such a conception of natural barriers might bring to bear on the agrarian question. I also want to engage the production of nature/space thesis with the geographical work on place since the subjective experience of the production of space/nature must also result in the production of place. I want to suggest that the routedness of particular commodities in productions of place, including their cultural, institutional, and political histories, result in the unevenness of the development of capitalism across commodities. This is an aspect of
the agrarian question that needs more attention and that explicitly fashions it into a geographical question.

The Production of Space, Nature and Place

The production of nature thesis is credited largely to Neil Smith and is laid out systematically in his 1984 book *Uneven Development*. The main thrust of this work was to establish a theory of society and nature that did not succumb to bourgeois philosophies and ontologies wherein nature is at once universal (implying that human nature is composed of behaviours that are natural, and thus unchanging) and external (referring to that part of reality that is not human and exists outside of society). Countering this bourgeois conception of society, Smith posits nature as inside the realm of human relations (including economy, society, culture, etc.) and shows that human-nature relations are historically determined.

While there may have once been something that can be considered first nature, Smith (1984:18) is emphatic that it no longer makes sense to speak of nature as unaltered and separate from humans, since the only nature known to humans is that with which we are in relation. Even in pre-capitalist societies, humans went about producing their means of subsistence (use-values) and, thus, appropriating, altering, and *producing* (i.e. constructing and fabricating) their various environments. In this way, the production of nature refers not only to industrial capitalist production processes, but to production in general, i.e. to all forms of appropriating use-values for the reproduction of society (53-53). For example, what Europeans found when they stumbled upon America was not pristine wilderness, but landscapes produced by the labour of Aboriginal peoples through their fostering of certain plants and animals and their production of use values.
In this perspective nature is always produced, but its production varies historically and according to the organization of productive relations. Smith highlights three different bases of the social organization of production which he correlates with historical stages of development. In societies where production is oriented primarily around use values, i.e. it is oriented around the appropriation of nature to fulfill immediate human needs, there is a direct relationship with nature through the process of labour. Here the labour process involves changing the form of materials appropriated directly from nature and the laborers’ consciousness reflects the reality of his/her material life (35-36).

Production for exchange is the second form of production identified by Smith and emerges only once surpluses are a regular occurrence. Instead of each producer metabolizing nature for his/her own consumption, use values are produced in order to be exchanged – this marks the introduction of commodities. Where production is oriented around exchange value “the appropriation of nature is increasingly regulated by social forms and institutions, and in this way, human beings begin to produce more than just the immediate nature of their existence” (40). The development of social institutions and urban form make for a realm of relations (second nature) that appears separated from (first) nature. It is also with the rise of surplus production that social classes begin to develop and unequal access to nature arises (41). In exchange societies the division of labour sharpens and the individual, by necessity, begins to become alienated. Although he/she is still working directly with nature, she/he becomes alienated from the product of his/her labour (43).

Under capitalist production the effects associated with relations oriented around exchange deepen. The labourer becomes estranged not only from the product of labour,
but also from the means of production, and nature is appropriated as a means of 
production on a world scale (48-9). While the production of nature is not unique to the 
capitalist stage of development, its production at the world scale is. Under capitalism, 
nature as a totality is produced. Even where labour has not been applied purposefully to 
transform it (for example in the production of air pollution) nature remains a product of 
human activity. In this way, it becomes difficult, even fruitless, to distinguish between 
nature and artifact; first nature appears to be produced out of second nature.

[with the production for exchange, the difference between first and second nature 
is simply the difference between the non-human and the humanly created worlds. 
This distinction ceases to have real meaning once the first nature too is produced. 
Rather, the distinction is now [under capitalism] between a first nature that is 
concrete and material, the nature of use values in general, and a second nature 
which is abstract, and derivative of the abstraction from use-value that is inherent 
in exchange-value (55).

In this perspective, rural landscapes and the raw materials for production are as much a 
part and product of the built environment as cityscapes. Since production organized 
around capitalist relations is driven by exchange value, nature is produced not with the 
priority of fulfilling human needs, but in order to fetch a profit.

Smith’s thesis of the production of nature leads logically to the understanding of 
space as also produced through relations of production and as ontologically tied to the 
production of nature. In fact, a conception of space as an abstract concept had to prized 
apart from its unity with nature alongside the development of the social relations of 
production. According to Smith, in earlier human societies, space, substance, and 
meaning were not experienced as different from one another (69). Indeed, the abstract 
concept of space had no relevance, since the practice of everyday material activity 
involved the direct production of use-values and happened in specific places imbued with
social meaning. The concept of abstract space only emerged alongside production for exchange, or in other words, alongside the development of a second nature perceived as a realm of social relations and institutions separated from first nature. Concurrent with the development of social institutions is the necessity to create a socially produced space that, paradoxically, seems aspatial because much of its production and social reproduction is ‘freed’ from the land. Democracy and liberty emerge as universal principles that defy spatial referents; yet, at the same time state power is concerning itself more and more with (the expansion of) territory and borders.

Under capitalist production, space is increasingly produced as a commodity. This is the result of the development of abstract labour as the source of all value. While all concrete labour happens in specific places, under capitalism value is constituted by the abstracted category of necessary labour which removes all specificity. In this context, space is produced to facilitate the realization of abstract labour value; transportation and communication networks, places of production, and the reproductive needs of the laborer are all arranged for this purpose (82). The integration of all of these absolute spaces into national and international economies produces a change in their relative locations. The drawing together of absolute spaces and sites in a relative way ensures that value continues to circulate and be realized.

At the same time as productive relations become emancipated from absolute space and relative space becomes of greater importance (as described directly above) the realization of value cannot proceed without a whole host of newly created absolute spaces. There is an abstraction away from the absolute spaces of natural, direct production toward humanly produced absolute spaces including fixed capital (85-88).
Following Marx, Smith identifies fixed capital as that portion of capital employed as the means of production that is not used up in one production process, but without which production could not continue. Through the production of fixed capital, absolute space is internally differentiated since it is immobilized in the landscape over relatively long periods in the form of buildings, machines, transportation infrastructure, etc (88). This focus on economic development through internal differentiation rather than absolute expansion necessitates continual scientific advancement for the revolutionizing of fixed capital.

What do Smith’s theses on the production of nature and space do for the agrarian question? First, this perspective makes patently clear that nature is in no way external to society and can, therefore, not act as an external limit. Instead, human-nature relations are historically specific; thus, what appears as a limit at one time may be overcome by changing relations of production, changing technologies, etc. A society’s relationship with nature is a product (but not only the product) of its relations of production. In this way, nature cannot be understood as an unchanging obstacle to capitalist penetration and authors such as Goodman et. al. (1987) and Boyd et. al. (2001) are right to highlight how nature itself is being refashioned in order to allow for increasing capitalist control. Through conventional breeding and/or genetic engineering the very biology of plants and animals has been reshaped so as to minimize the effects of seasonality and shorten the time needed for a crop or animal to reach maturity. It is not that the ‘problem of nature’ identified by Mann and Dickinson (1978) is no longer relevant for capitalist agriculture, rather, the nature of the problem itself is changing. The problem of nature is being reproduced in constantly changing material forms.
Such a perspective on the problem of nature should in no way negate the important work that has been done on the materiality of nature. Indeed, there is much room within the production of nature thesis to consider the ways in which nature actively participates in the process of its production. For example, Smith argues that the produced character of nature does not mean that non-humans are immune from certain forces and biological processes such as gravity, biological interaction and physical pressure (47), or that every facet of nature’s materiality is thoroughly produced by humans. Instead, insights from a proliferating scholarship on the agency of nature (much of it inspired by Callon (1986) and Latour (1993)) show how ‘things’ are not simply screens onto which society projects itself, nor are they so ‘hard’ that they determine the structure of society. Castree (2002) argues that inspiration from a weakened version of actor-network theory (ANT) can be taken into account in a relational Marxism so that the incapacity of humans to fully predict and control the non-humans that co-produce reality is recognized. Indeed, Swyngedouw (1999) has modified Smith’s production of nature thesis in his work on the Spanish waterscape to include some of the insights from ANT, maintaining the unity of “socionature” as a process. The point here is that the materiality of nature does shape the ways in which it is produced; in this sense it can be understood as a full participant or agent in its production (more on this in the chapter that follows). However, nature’s materiality is not external and unchanging, it is constantly being reproduced in changing ways as the result of specific social relations of production (see for example Bakker and Bridge, 2006).

The second and related lesson to be gleaned from Smith in relation to the agrarian question is that both the processes of equalization and differentiation are simultaneously
characteristic of the production of space under capitalist relations. From this dialectical perspective both sides of the debate around the agrarian question are correct. There is at once a tendency for capitalist relations to penetrate agriculture more completely and evenly and at the same time to produce barriers that make for a differentiated landscape. In order to highlight the process of equalization, Smith (1984: 115) uses the propensity for capital to produce nature as the “universal appendage of capital” and for competition among capitals to smooth out the productivity of labour across industries and space. In agriculture, the process of equalization has been highlighted by those reviewed above that stress the ways in which capital is reshaping agriculture. For example, recall that Goodman et. al. (1987) show precisely how substitutionism and appropriationism reduce the variety of rural inputs needed for agriculture and reshape rural nature as industrial inputs.

Differentiation, on the other hand, is, for Smith, the result of the division of labour and of the economy into different sectors. Space is further internally differentiated as the production of fixed capital becomes all the more important. In agriculture, the agrarian question has highlighted differentiation among different commodities and between subsistence production, family labour farms and capitalist farms. Interestingly, these last three categories overlap significantly with Smith’s three part typology that includes direct production of use-values, production for exchange, and capitalist production. For Smith, the production of nature and space are shaped by value relations. Family labour farms share many aspects in common with Smith’s category of production for exchange. For example, family farmers are engaged in producing commodities for global markets, and in this respect they are concerned with the exchange value of their products; the direct
use value of their product is its value as exchange. But such farmers do not operate under fully capitalist relations of production since they are neither proletarians nor capitalists – they generally own the means of their production and increasingly purchase them in the marketplace but do not employ wage labour. Furthermore, family farms operate with sophisticated fixed capital (like combines, sprayers and irrigation infrastructure). It is not so clear whether the specific socio-natural and socio-spatial relationships that Smith describe as being part of production for exchange can be applied to a small subset of family producers operating in the context of global capitalism, or whether Smith saw the three different categories as historical stages only. Once the majority of productive relations are capitalist, the concrete and specific labour on individual farms is disciplined by the predominant logic.

If the specificity of the organization of production in family farms does matter, and production for exchange is not just a historical stage, then family farmers occupy a middle ground where production involves working directly with nature, but where the product of labour is alienated. As Smith makes clear (55), the relationship between first and second nature under such relations appears as the difference between humanly and non-humanly created worlds. Social institutions constitute this second nature and are important in mediating the production process. At the same time, the division of labour between manual and mental labour deepens under exchange relations so that “certain aspects of nature are available to some classes only as conceptual abstraction, not as physical partner or opponent in the work process” (Smith, 1984: 42). What difference do forms of production that are not fully capitalist make in the process of differentiation?
Here I am not suggesting that such forms of production should be understood as outside of capitalism; instead, they are some sort of internal other.

Differentiation across commodities is also widely recognized in literature on food and agriculture. Indeed, commodity specific approaches have been *de rigueur* in the field beginning in the 1970s (Jackson et. al, 2006) and there has been vigorous debate about the best method for such analyses (see for example Cook and Crang, 1996; Hartwick, 1998; Leslie and Reimer, 1999; Castree, 2004). Commodity chain analyses of various traditions including circuits, networks, systems of provision, *filières*, and global commodity chains are used to trace the stages, processes and agents through which a commodity passes (eg. input vendors, growers, packers, transporters, value-adding, distributing, retailing, shopping, food preparation). By tracking the paths travelled by a single commodity, researchers have gauged the processes that lend the most added-value (often through supply-chain management studies), assessed the relations of power including the capacity of agents at one site to shape relations across the whole chain, highlighted the effects of a commodity’s particular material form on the character of sites or whole chains (see for example Murdoch, 1997; Goodman, 2001; Prudham, 2005), analyzed the meaning-making associated with different processes and commodities (see for example Cook and Crang, 1996; Reimer and Leslie, 2008) and considered the knowledges that circulate alongside the commodity (see for example Hughes, 2000; Freidberg, 2003). The *filière* tradition, for example, has been used to analyze food systems (typically revolving around separate commodities such as cocoa, coffee and cotton) and to influence economic policy in France’s ex-colonies (Raikes et.al. 2000: 403-04). In this tradition, particular attention is given to institutional agents and to the
legacies of public institutions and the regulation of marketing, trade, and consumption in producing differences between commodities.

While the importance of differentiation in the field of food and agriculture has been regularly studied through the specificities inherent to different commodities and forms of farm organization, the production of nature thesis leads also to the importance of meaning-making in the uneven development of capitalism. Although Smith devotes little space to the production of meaning in *Uneven Development*, he certainly takes the position that the production of nature and space also necessarily involves more than just physical constructions: “While the emphasis here is on the direct physical production of space, the production of space also implies the production of the meaning, concepts, and consciousness of space which are inseparably linked to its physical production” (77). This means that the production of space and nature is also necessarily the production of place. But these meanings, concepts, and consciousness are tied in important ways to the relations of production and the process of labour.

The concept of place has played a central role in the discipline of geography. In fact, one might even argue, as has Cresswell (2004: 1) that human geography is the study of places. While there have been a wide variety of approaches to the study of place, there is consensus among geographers that meaning is essential to its constitution. Tuan (1974 and 1977) and Relph (1976), for example, have approached the meaning of place through an examination of the experiential modes of knowing and constructing reality including sensory perception, practical knowledge, and being-in-the-world. This humanistic approach that emphasizes subjective experiences and the affective bonds that people develop to the sites in which they carry out meaningful activity marked a new movement
in the field of geography. In the 1950s and 1960s, geographers had been primarily occupied with advancing a positivistic spatial science that isolated the physical aspects of space and location in order to develop spatial models and laws independent of human experience and social and political processes. The humanistic approach, thus, opened up space in the discipline to consider more than just the description of what makes places different from one another and which locations are best suited to particular activities. Thanks to the humanists, we know that people develop strong bonds with particular landscapes and value places differently from one another.

Social practice has also been emphasized as fundamental to the way that people make and experience place and reality. Following Thrift (1996), places are made, in part, through peoples’ embodied interactions; people do certain things in certain places. In fact, according to Thrift, people regularly experience and communicate thought and meaning through action. Representation is, thus, part of presentation; it does not mediate or come prior to practice (7). Certainly Thrift’s non-representational approach to the question of practice is at social theoretical odds with the historical materialist method of Smith. For example, Thrift understands practice as neither systematic nor rational; rather it emerges out of bodily competences such as emotion, memory and the performance of language (Thrift, 1999: 314-15). While Thrift speaks of “the materiality of place lives [as] inscribed in our bodies” (314), Smith details the concrete abstractions of value and gives much more emphasis to providing a rational systematic account of capitalism as it relates to space. Nevertheless, Thrift’s work gives weight to the notion that the very practical, material and embodied aspects of the production of nature and space are at once the production of place; that meaning must be the product of practices of labour. This
basic insight is not at odds with Smith’s production of nature thesis, though it demands attention to much more local and embodied scales. The scholarship on place reviewed above makes clear that labour is not the only process through which place is constructed, but, as Smith emphasizes, it is one important site of its production.

The production of place as an inevitable result of the production of nature/space logically contributes to a differentiated agricultural landscape. On family farms, where production tends to be especially rooted in space, decisions about what to produce, which inputs to buy and much more can be influenced by local and familial cultures, histories and familiarities. However, such ties to place should not be celebrated as what Tuan (1974) describes as topophilia (love of place). Instead, local and familial cultures, histories and familiarities might also be constraining and exclusionary. Social institutions, or what Smith identifies as second nature under production for exchange, are also part of the production of place and can contribute to the uneven development of capitalism. Institutions such as marketing boards, cooperatives, breeding laboratories and intellectual property law can either hasten or speed up the process of capitalization producing differentiation between places or among commodities.

By examining the agrarian question through the lens of the production of nature new possibilities are opened up for understanding the unevenness of capitalism across agricultural space/nature/place. While this dissertation focuses primarily on processes of differentiation, illustrated by the willingness of farmers to oppose Monsanto’s genetically modified wheat but not canola, it is important to remember that this is just one side of the dialectic. There is a tendency for capital to expand and penetrate agriculture more evenly, at the same time as barriers are being produced from within agricultural
production. Through the production of nature perspective barriers to the penetration of capitalism in agriculture must be understood as within the realm of social relations and as constantly reproduced in changing material forms. In this perspective, the materiality of nature is part of this reproduction.

The unevenness of capitalism in agriculture pertains not only to ‘natural’ barriers, but also to the production of meaning and place that necessarily accompanies the production of space/nature. While family farmers might be disciplined by the broader social relations that are based on abstracted labour value, within the family unit labour is concrete and production involves working directly with nature. The process of labour produces more than just space and nature -- meanings are produced alongside the physical product. Place is, thus, an important aspect of the production of nature/space and might play a role in accelerating or slowing down the process of differentiation. Social institutions and political and cultural histories are also constantly being reproduced as barriers and vary between places and among commodities.

The Current Agrarian Question on the Canadian Prairies

The fact that family farming still exists in significant proportion on the Canadian prairies suggests that the agrarian question is still relevant. Yet, the agrarian question has changed along with the dynamism of social relations and, therefore, aspects of its framing are in need of updating and specifying to the realities of the Canadian prairies. The struggle over GM wheat points to quite different visions for the kinds of natures that will be produced on the Canadian prairies and for the ability of farmers to participate in the control of production systems and in their insertion into the wider political economy of food. Capitalist relations can no longer be understood as intruding into agriculture from
the outside, yet such relations are uneven across space, place and commodities. Much of this unevenness has to do with processes that were not registered in the classical agrarian question such as the embeddedness of food and agriculture in moral and cultural relations.

The classical version of the agrarian question was economistic to the extent that it concentrated itself almost uniquely on the social relations of production and the development of social classes. For example, the classical question understood food only on the basis of its price, tracing the impact of price on class identity and patterns of accumulation (McMichael, 2008). A more recent literature that concerns itself with the cultural and moral aspects of food as an ‘intimate commodity’ (Winson, 1993) clearly demonstrates that food embodies a much wider set of relations. Through food, eaters practice their identities and moral commitments (Raynolds, 2002; Goodman and DuPuis, 2002); they distinguish themselves as belonging to certain classes, ethnicities, genders, and subcultures (Miller, 1998; Bourdieu, 1984); they search for authenticity (Cook and Crang, 1996); they construct imaginative geographies about the origins of their food (Goodman, 2004; Duruz, 2005); and they fixate on safety, nutrition and body image (Guthman and Dupuis, 2006; Freidberg, 2004). An updated agrarian question certainly has to move beyond price to consider and revalue the cultural and symbolic aspects that produce food as a particularly meaningful commodity.

The cultural symbolism and economy of food has not only to deal with consumers, even though a focus on consumption has been predominant in scholars’ attempts to address the social lives of food commodities. As Mansfield (2003: 179) suggests, too narrow of an association of culture and meaning with consumption
threatens to obscure the cultural economy of production. Workers themselves are cultural beings that produce meaning alongside their economic output. For example, studies on business culture (see du Gay, 1996; McDowell, 1997; Halford and Savage, 1997) have shown that particular work places foster certain cultural practices, and that workers fashion their identities in part through the work that they do. Moreover, cultural signification associated with a particular production process and its history might come to occupy a prominent place in local, regional and national discourses and representations. Or as Mansfield (2003) shows, the production of new cultural as well as material forms were necessary in the manufacturing of imitation crab such that the product had to be distanced from both its material history as fish and its social history as a Japanese food in order to be resignified as an appropriate substitute for a food delicacy in North American markets.

The intertwining of production and cultural signification is congruent with the production of nature thesis as I have laid it out. It seems obvious that the production process would simultaneously involve the production of meaning for those involved, yet cultural signification routinely gets associated with only certain industries (usually the ‘creative’ industries) and the site of consumption. Work on moral economies (reviewed in chapter 4) further contributes to the notion that “economic activities of all kinds are influenced, structured and legitimized by moral sentiments, values and norms” (Sayer, 2008). Production is, then, doubly inflected by culture; it is structured by moral and cultural values and it generates cultural signification and identity. Production is a fully cultural category.
As I will show in the chapters that follow, the cultural significance of wheat as a commodity, of wheat farming, and of place were central to the struggle around RR wheat. An updated prairie agrarian question must, therefore, take into account the moral and cultural production of wheat as a fully cultural and moral process and product to both producers and consumers. On the prairies, wheat is more than an agricultural and food product, it is part of the story that prairie folk narrate about where they have come from and who they are (more on this in the chapter that follows). This centrality of wheat in agricultural production and prairie history mean that wheat occupies a significant position in the prairie agrarian question. If the family farm is going to persist, many organizations argued that wheat will need to continue to be produced at high standards of quality for human consumption, in viable rotations with other crops, and with some level of producer control over agronomic practice, including the capacity to save and reproduce seed. These are moral expectations around the cultural economy of production that are particular to wheat and that mediate the importance of monetary valuation.

Interestingly, the farm organizations at the centre of this research seek to maintain a cultural economy of wheat based, largely, on mass production and international marketing rather than a so called ‘post-productivist’ (Ilbery and Kneafsey, 1998) agrarian path. This has much to do with the relatively small and dispersed populations on the prairies that cannot provide the local and niche markets to absorb the province’s farm output, even though local and alternative food procurement and organic production are growing (with much of the latter directed to export markets). With only a few large urban centres and declining small-town populations, most prairie farmers also lack incentives to move into the business of rural amenities and tourism or sell their land in
expanding urban fringes (see for example Crump, 2003; Darling 2005). International commodity markets are likely to remain important to prairie producers even as they develop the capacity to market smaller amounts of product to particular buyers through identity preservation. Producers have cultural economic expectations about their presence on global markets which reference, for example, the experience of marketing their grain collectively through the Canadian Wheat Board.

The struggle over RR wheat highlights different visions for the future of farming on the prairies and draws attention to the capacity of producers to act as collective and individual subjects that shape their history. Though agrarian dreams varied amongst the producer organizations involved in this research, the groups agreed that Monsanto’s proposed RR wheat economy was inconsistent with the capacity of small farms to continue persisting. Being a particularly important crop for prairie producers, they could not afford to risk losing control over the production, reproduction and marketing of wheat. The rest of this dissertation fleshes out the moral and cultural economy of wheat on the Canadian prairies and the ways in which the coalition against RR wheat pursued their resistance to its genetic modification. It uses the production of nature thesis as specified here along with an updated prairie agrarian question giving the materiality of nature and the meaning-making practices of prairie farmers their due prominence.

**Methodological Approaches**

I began my research on the politics of GM wheat on the Canadian prairies more than two full years after Monsanto had discontinued its breeding and field research on roundup ready wheat in Canada and the United States. Having followed the politics around RR wheat’s introduction through the media for the preceding 5 years and having
read what academics had said about Canadian biotech policy and regulation I had not thought twice about using words like ‘politics’ and ‘struggle’ when presenting my research interests to potential participants. The initial interviewees for this research embraced these terms and set out to convince me of their positions of opposition. It seemed natural to begin my interviews with representatives from the organizations that were formal members of the coalition against RR wheat that announced itself at a press conference in Winnipeg in July of 2001. From these interviews, and from an examination of all articles pertaining to genetic modification in Western Canada’s most prominent weekly farm newspaper from 2000-2006, I learned that a number of other actors were essential to the story of RR wheat. I expanded my field of research to include interviews with actors from all sides of the debate including plant breeders, scientists, biotech lobby groups, industry organizations, the Canadian Biotechnology Advisory Committee, a representative from Monsanto, a representative from Saskatchewan Agriculture and Food, and farm organizations that publically supported the introduction of RR wheat.

I became aware of just how political the controversy over GM wheat had been when I began arranging interviews with agencies and employees of the Canadian state. Some scientists at Agriculture and Agri-Food Canada (AFFC) replied to my messages indicating that their positions as federal scientists meant that it would be inappropriate for them to comment on the politics of GMOs. Federal scientists, I was told, did not enjoy the same academic freedom as their counterparts at universities. Others at AAFC generously accepted the invitation to participate in my research but they all shied away
from my questions about how research agendas are determined and especially about how science might be understood as a contested domain.

Getting an interview from anyone at the Canadian Food Inspection Agency (CFIA) (the agency charged with the environmental regulation of plants with novel traits) proved to be the most challenging and frustrating part of the research. Over and over I heard that the CFIA regulates based on sound science; therefore, no one at that organization would have anything to say about the politics of GMOs. More than once, an interview was cancelled because it had not received clearance by the interviewee’s supervisor. My consent form was sent to the CFIA’s legal department, and when I finally managed to get anyone to speak with me they would not sign their consent or allow the interview to be tape-recorded. It should be noted that these difficulties were encountered in trying to recruit interviewees at all levels of the hierarchy from field inspectors to those in charge of the Plant Biosafety Office.

I use the story of my research experience to show that interview subjects are influenced in all sorts of ways that affect how they interpret and account their experiences to a probing outsider. The core epistemological assertion that allows for the justification of the interview method -- that humans are competent reporters of both their past and present attitudes, beliefs, behaviours, relationships and interactions (Ackroyd and Hughes, 1992: 103) -- is far from an uncontested premise. In fact, common caution given by introductory research methods texts is that respondents cannot always be trusted to tell the “truth, the whole truth, and nothing but the truth” (Weiss, 1994: 149) about their experiences. This type of concern reflects a positivist understanding of reality where there are believed to be objective truths about what people think and do and how they
interact. For positivists, the collection of data through interviews can be problematic as it is difficult to know which statements made by an interviewee are true, and which are manipulations of reality. Respondents may have cultural or strategic reasons for presenting information about themselves and others in a particular light, and may leave out or distort some information.

Another epistemological critique of the interview as a method has been mounted by postmodernists, who have no faith that interviews reveal the ‘truth’ about the actions, transactions and beliefs of respondents (May, 1993: 108). While postmodernists have been successful at deconstructing positivist and realist commitments to objectivity and truth, they contend that interviews tell the researcher nothing beyond the accounts that people give (May, 1993: 108). From this position, interviews are a topic for social research, rather than a method of conducting social research. A post-modernist may engage in an analysis of an interview as text or discourse, but would disagree that that discourse is representative of anything (idea, practice, or belief) beyond itself (Dant, 1991: 235). For a post-modernist, the interview is not necessarily an effective means to gain insight into people’s beliefs and motivations since it tells us little beyond that encounter (Dant, 1991: 209).

In light of these two critiques of the epistemology of the interview method, I wish to qualify how I have pursued my own research. I understand the interview as both a text that can be read as a topic of research, and also as a vehicle for revealing and generating knowledge beyond the text. I think these two epistemological positions must not be mutually exclusive. Similar to the postmodernist, I am interested in the discourses of my participants and the ways in which they have accounted their experiences (I take this
approach in the chapters *The Limits of Choice* and *Articulating the Politics of Production through Discourses of Consumption*. Unlike the postmodernist, I am taking the position that a link can be made between what a participant says they do and think and what they do and think in practice (or in situations and spaces beyond our interaction). This link, rather than being an objective ‘truth’, is interpreted and presented through a subjectivity (the interviewee) and received and (re)interpreted through a second subjectivity (myself as researcher). This is the sense in which the interview is an inter-subjective production where meaning is not objective, but rather an ongoing interpretive accomplishment (Fontana and Frey, 2000). Therefore, I have strived to understand the subject positions of both myself and my research participants (this is reflective of the multiple themes that have emerged from the interviews). This is not to be suspicious of my participants’ motivations and accounts, but rather to pay special attention to how they have presented their opinions and practices to me as a subject that is situated differently than others with whom they may interact. Thus, I am not concerned that my respondents have left out or manipulated aspects of their stories, but rather with why they told me their stories in certain ways, and how they represented their practice to me (who may be seen to varying degrees as a friendly or unfriendly other).

In this project I have followed what is commonly understood as a ‘weak’ constructivist position (see for example Schwandt, 2000; Longino, 1990 and 1993). From this perspective it is irrelevant whether an independent and objective external reality exists since humans have no way of accessing it except through thoughts, understandings and structures of meaning. In this sense, reality can only be known through subjective mediation, which has the effect of shaping it. However,
acknowledging that reality is socially constructed does not need to result in relativism – where any interpretation is as good as any other (Schwandt, 2000: 199) – nor does it mean that humans are unconstrained by the materiality of the world (Castree, 2001; Demerrit, 1998). Instead, I have strived to present the most coherent interpretations possible by taking multiple sources into account and considering the varied perspectives of my respondents.

I take the position that not all explanations are equally compelling and that the researcher has a duty to differentiate among them with the knowledge that a single coherent truth is unattainable. For example, when I heard a similar explanation from a wide variety of participants while conducting interviews, I knew that that explanation was likely to have been important to the way that the politics of RR wheat played out. Whether or not it was a ‘true’ reflection of reality was less important than the fact that it was doing real work for my participants. However, a researcher must not blindly accept all prominent explanations. In chapter five, I examined a prominent discourse – that the market is the best mechanism to decide the fate of RR wheat – but I linked it to the wider practice of neoliberal governmentality, a phenomenon at the heart of much academic work. Here I employed an iterative process, moving back and forth between interview data and established literatures in order to understand what work the prominent discourse of markets was accomplishing for my research participants. This is the sense in which it is important to take into account that research participants and the researcher herself are differently positioned and that all are enrolled in wider discourses and relations of power. I also used a number of written documents including press releases, policy statements and farm newspaper articles in order to gauge the importance of particular interpretations and
explanations. Here again, it was important to consider these texts as authored by particularly positioned individuals who are part of larger webs of power. Thus, in order to differentiate among possible explanations, I used a combination of criteria including the frequency of the account, the extent to which it was reproduced across differently positioned actors and data sets, and explanations found in academic bodies of knowledge. I worked through an iterative process across all of these criteria while keeping in mind the context under which different data were produced.

Employing the interview method meant that I was not in the position to observe how my respondents came to adopt their discourses, or what their long-term experience had been. Thus, I was careful to acknowledge that knowledge about the past is always refracted through the lens of the present (Ackroyd and Hughes, 1992: 112). For example, in many cases it was difficult to unravel which ideological commitments and discourses served as the motivating factors for adopting a public position in political struggles and which were added or learned through the process of being involved in the struggle. For this reason I used press releases and policy documents to characterise organizations’ public positions. These written documents were usually the outcome of a collaborative effort and were artefacts of particular moments in time. Since almost all of my interviews were one-on-one interactions it was important to consult such written documents to establish the negotiated public positions of the collective.

I performed semi-structured in-depth interviews with forty-three participants and loosely followed an interview guide – the questions I asked of participants changed significantly based on their involvement in the public debate. For example, with scientists I questioned how they became interested in genetic modification and how they
determined their research agendas. With organizations supporting and denouncing GM wheat I asked about their previous involvement in other public debates and with other organizations. In all cases I was centrally concerned with why participants and their organizations had come to their public positions, what their central message was, and what the differences for them were between GM wheat and GM canola. I always interviewed participants as representatives of their organizations, yet participants often used their personal experiences to answer my questions. Furthermore, farmers often represented their experiences as common to farmers more generally. Interviews varied in length but most were between one and one-and-a-half hours. I spent several months transcribing the interviews in their entirety and coding them based on my interests going into the research and on emergent themes arising out of the data.

Another important source for this research was Western Canada’s largest weekly farm newspaper The Western Producer. I examined every article pertaining to genetic modification between the years 2000 and 2006. This source allowed me to piece together important events in the debate over GM wheat, gauge the weight of the different arguments for and against GM wheat, and follow up on the accounts of my interview participants where needed. Unlike a content analysis I was not concerned with how the newspaper was representing the issue, nor did I approach the text with a preconceived set of terms for which I wanted to search (Forbes, 2000). Instead, I bookended my research with these newspapers -- I used them at the beginning to familiarize myself with important players and debates and at the end to compare what I was finding in my interviews with journalistic accounts. The framings employed in the newspaper articles
entered my interviews to the extent that I brought my interpretations of them to the encounters.

Finally, I observed at five farm meetings. Although none of these meetings was directly on the topic of genetic modification, each meeting gave me a sense of some of the long-lasting effects of Monsanto’s decision to abandon GM wheat. At these meetings it was patently obvious that the issue of genetic modification had not left farmers’ minds and that they were carefully considering how, for example, proposed changes to the regulation of grain in Canada would affect the introduction of new GMOs. The information I gleaned from these meetings served mostly as context – I did not apply any rigorous method to the analysis of my notes from them since they were not meant to be forums for debate about GMOs.

There are definitely things I would have done differently given the opportunity to return to the research armed with what I have learned along the way. The writing that follows reflects the questions that animated my research and I am sure I glossed over a number of equally interesting avenues of inquiry. I hope the reader finds the themes I have chosen engaging and that they resonate with a broader politics around agriculture and food.
Chapter Two: The Historical Political Ecologies of Wheat and Canola on the Canadian Prairies

Before the controversy over GM wheat heated up in Canada, prairie producers had been relatively quiet on the politics of biotechnology. Meanwhile, their counterparts in the milk producing regions of Quebec and Ontario alongside consumer and health advocates were engaging in a fairly public campaign to oppose the regulatory approval of Monsanto’s recombinant bovine growth hormone, which Health Canada ultimately rejected in early 1999. In the late 1990s urban health and consumer movements had also been involved in a campaign for mandatory labelling of GM foods, which, despite highly politicized debates in the House of Commons, was ultimately unsuccessful. It was not as if prairie farmers had been left out of the biotechnology ‘revolution’; an increasing number of them had been growing genetically engineered herbicide tolerant varieties of canola since 1995, and a number of private companies and public research programmes were aggressively pursuing genetic modifications to a whole spectrum of prairie field crops. Why then was it not until the threat of RR wheat hitting the market that prairie farmers publicly voiced their opposition en masse?

While the answer to this question is complex, in this chapter I contend that the contemporary and historical political ecologies of these two crops provide insights into the diverging politics that surround their genetic modification. The chapter uses a comparative approach to narrate the unique political, institutional, ecological and cultural characters of wheat and then canola. The narrative relies on both secondary sources including accounts of agrarian politics on the prairies and primary sources collected during my field work from May 2006 to May 2007. The chapter provides a fairly
Canadian and prairie-centric analysis despite the role played by international consumer markets and forces in Canadian opposition to RR wheat. I engage the issue of international markets in subsequent chapters, but the dissertation is primarily concerned with domestic producer opposition.

**The Coproduction of Humans and Nonhumans**

In detailing the unique political, institutional, ecological and cultural histories of wheat and canola I have found it important not to over-socialize the narration. It is true that both wheat and canola have been thoroughly transformed by humans. For example, Busch et. al (1991: 129) claim that “[i]t would not be an exaggeration to say that the present-day wheat plant has been “socialized””. However, any narrow focus on the ways in which humans have transformed wheat and canola neglects the ways in which wheat and canola have participated in the process of transformation and how humans have also been shaped through their relationships with these plants. In order to avoid an over-socialized account of the histories of wheat and canola, attention needs to be given to nature’s materiality and/or agency.

Throughout her many works, Donna Haraway has been centrally concerned with the role of non-humans in ‘social’ life and the ways that humans represent the non-human others that co-habit the world. In this spirit, much of Haraway’s work is devoted to developing representations (or figurations as she calls them) of hybridity with the goal of deconstructing binaries such as object/subject, organism/machine, and nature/culture. For example, she uses a coyote or trickster figure to represent nature as active subject(s) capable of subverting human intention (1991: 199-201). In this conception, nature is neither the sole production of humans, nor is it pre-existent and unchangeable. Rather, it
is a co-production in which non-humans play an important part, and are not simply objects to be manipulated by humans. In this way, the coyote figure is an explicit disruption of “nature/culture ontologies”; it requires a treatment of nature as active subject (Haraway, 2004: 328).

Haraway is not unique in her insistence on attending to the materiality and/or agency of nature. In fact, nature’s materiality is now a significant focus of social theory and social scientists and it is well recognized that the ‘hard’ material form and properties of objects of nature constrain and shape the ways in which they are worked up by humans (see for example Boyd et. al, 2001; ). More controversial has been the theorization of nature as active agent, inspired largely by scholars of science and technology studies (see for example Callon, 1986; Latour, 1992; Latour, 2000; Law, 1991). Cleverly referencing Gayatri Spivak’s (1988) essay Can the Subaltern Speak? in which she problematizes the nature of subaltern subjectivity, Mitchell’s (2002) study of techno-politics in 20th Century Egypt begins by asking “can the mosquito speak”? This is an attempt by Mitchell to foreground the ways in which human intentionality and agency depends on attaching itself to or redirecting non-human energies and logics (29). In this case, the mosquito was a key actor in shaping the disaster of 1942-44 in Egypt. Drawing on the work of science and technology studies scholars, geographers using actor-network theory have similarly posited non-humans as potential agents. For them (see for example Murdoch, 1997; FitzSimmons and Goodman, 1998; Whatmore, 2002; Goodman, 2001) agency is relational and arises out of the interactions or associations of a plurality of humans and non-humans. In this perspective, agency and power are radically decentred and it becomes just as important to attend to microbes, technologies, and corporealities as it
does to institutions and capitalists. In this respect neither nature nor society is ontologically prior (FitzSimmons and Goodman, 1998).

The radical decentring of agency and power at the heart of actor-network theory has been criticized by political economists. Kirsch and Mitchell (2004), for example, suggest that ANT ignores the differential capacity of actors to shape networks; in other words, not all actors are equally effective in their attempts to enrol and enlist other actants and therefore shape socionatural relations. In fact, they suggest that power is properly understood as concentrated in particular institutions and relations of exploitation and that a radical decentring ignores the structured relations of capitalism. For these authors, the rejection of intentionality at the centre of actor network approaches to agency is detrimental to understanding how power operates. More optimistically, Castree (2002) believes that political economy and ANT can be synthesized so as to yield an approach to studying human-nature relations that maintains a focus on capitalism but takes into account a greater variety of actors and rejects binaries. In order to strike this balance, Castree proposes a weakened version of ANT and a relational Marxism following Smith, Harvey and Swyngedouw (of the kind I reviewed in the last chapter).

Haraway does not identify as an actor-network theorist; instead, she understands herself as contributing to the field of feminist technoscience. Her approach nicely balances attention to the agency of non-humans and a focus on structural relations of power. Importantly, Haraway also balances attention to material relations with an emphasis on the symbolism that is ascribed to human and non-human entities. According to Haraway (1991: 200), all subjects and objects (including nature) are constituted by both semiotic and material dimensions. In this way “[t]here is no gap between
materiality and semiosis; the meaning-making processes and the materiality of the world are dynamic, historical, contingent, [and] specific” (1995: 509). On the one hand the notion of material-semiotic actor highlights that objects/actors/subjects have a ‘real’ physicality or materiality, while on the other hand, it recognises that objects are in part constructed through boundary-making processes in social interaction and that symbolism and representation do important work in the operation of power. Furthermore, the insight insists that conceptual and material construction must be analysed together as relational processes.

In this chapter, wheat and canola are understood as both material and semiotic, and as playing some sort of active role in constraining and enabling human action. Haraway’s more recent (2004 and 2008) figuration of companion species is also useful in thinking about the material and semiotic histories and co-constitutionalities of wheat, canola, and people. Using human-dog relationships, Haraway (2008) digs into the long history through which humans and dogs came to live with one another. She shows how this process involved a co-evolution in which both dogs were domesticated, but humans were also thoroughly changed. The book is concerned with the whole history of human/dog co-evolution, from the domestication of dogs from wolves to contemporary US dog culture. Here Haraway is keen to show how science, including veterinary science and genetics, has been instrumental in shaping dog-human relationships and developing and defining breeds, both semiotically and materially. At the core of all of Haraway’s figures is an attempt to think through an ethics that involves non-human others. Haraway’s experience going through training with her dogs has taught her that it is thoroughly possible to love and attend to a being one cannot know. The ethical practice
here is to learn to live with another and pay attention to who and what are the products of this co-constitution.

Although Haraway uses the dog as her example, companion species also include “such organic beings as rice, bees, tulips, and intestinal flora, all of whom make life for humans what it is – and vice versa” (2004: 302). It is, thus, perfectly reasonable that wheat and canola might be considered companion species of Canadian farmers and eaters. Through the examples which follow it is quite clear that the histories, identities, and biologies of Canadians, of eaters, and of prairie farmers are tied up in the history of wheat and canola and vice versa. As I will show, though wheat and canola can be both successfully understood as companion species, they are radically different companions embodying specific materialities and semiotics.

**Wheat**

“Wheat is 14% protein and 86% politics” – source unknown (cited in Thomas, 2006)

**i. Organizing the frontier**

The colonial settlement of the prairie provinces of Canada, beginning in the late 1800s, was predicated upon the establishment and growth of a wheat economy (Britnell, 1939; Fowke, 1957). During this time, prairie ecology and society was almost completely (re)arranged around the household production of wheat for export. Millions of migrants were attracted to the provinces of Manitoba, Saskatchewan and Alberta by the promise of 10 dollar homesteads (160 acres)\(^{12}\) and the prospect of profitable

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\(^{12}\)Homesteads were provided through the Dominion Lands Act of 1872 for a registration fee of ten dollars. In order to keep the quarter section (160 acre) homestead, by the end of three years the settler had to have lived on the land for at least six months of every year, have erected a shelter and have successfully broken the soil and begun farming crops on 15 acres (Warnock, 2004). Aboriginal people and women who were not the sole head of a family were ineligible to apply (Waiser, 2005: 104).
participation in the emerging global wheat economy\textsuperscript{13}. From a combined total of 419,512 in 1901, the population of the three prairie provinces grew to 1,328,121 in 1911, broke the 2 million mark by 1926 and continued to grow with less fervor after that (Fowke, 1957: 72). The vast majority of these new migrants did indeed settle on farms. In 1931, for example, agriculture accounted for more than 60% of direct employment in Saskatchewan, 50% in Alberta and 34% in Manitoba while the national average was only 28.73% (Britnell, 1939). Furthermore, as shown in table 4, wheat accounted for the majority of field crop production in the early 1900s, ranging from 55 to 68% of seeded acreage. During this period wheat served as the primary cash crop, while other grains were grown to feed farm animals. Despite a more diversified contemporary farm economy, wheat still accounts for a considerable portion of production (over one third of all seeded area in 2007, see table 4) and is grown on roughly half of all prairie farms (see table 5).

\textsuperscript{13} According to Friedmann (1978) the word wheat market began to emerge after 1873 and was a significant factor in the capitalist production of wheat giving way to household production of the kind driving the growth of the wheat economy on the Canadian prairies.
<table>
<thead>
<tr>
<th>Year</th>
<th>Total principle field crops seeded (acres)</th>
<th>Total wheat seeded (acres)</th>
<th>Wheat as percentage of area seeded</th>
<th>Total canola seeded (acres)</th>
<th>Canola as percentage of area seeded</th>
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<td>7 867 400</td>
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<td>16 841 200</td>
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<td>23 960 000</td>
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<td>27 750 000</td>
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<td>26 382 000</td>
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<td>20 820 000</td>
<td>37.2</td>
<td>14 450 000</td>
<td>25.8</td>
</tr>
</tbody>
</table>

**Table 4 Seeded area (acres) in the Prairie Provinces**

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Data compiled from Statistics Canada. *Table 001-0017 - Estimated areas, yield, production, average farm price and total farm value of principal field crops, in imperial units, annual, CANSIM (database), Using E-STAT (distributor).*
<table>
<thead>
<tr>
<th>Year</th>
<th>Manitoba</th>
<th>Saskatchewan</th>
<th>Alberta</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total # farms</td>
<td>Growing wheat</td>
<td>Total # farms</td>
</tr>
<tr>
<td>1991</td>
<td>25 706</td>
<td>63%</td>
<td>60 840</td>
</tr>
<tr>
<td>1996</td>
<td>24383</td>
<td>51%</td>
<td>56995</td>
</tr>
<tr>
<td>2001</td>
<td>21071</td>
<td>45%</td>
<td>50598</td>
</tr>
<tr>
<td>2006</td>
<td>19 054</td>
<td>38%</td>
<td>44 329</td>
</tr>
</tbody>
</table>

Table 5 Percentage of farms growing wheat in the prairie provinces\textsuperscript{15}

The development of the prairie wheat economy was not only essential to the settlement of the prairies, but it was also central to the 1879 National Policy that sought to develop an integrated national economy in the newly established confederation. As Fowke (1957:71) explains in his highly regarded analysis *The National Policy and the Wheat Economy*, “[t]he prairie provinces constituted the geographic locus of the Canadian investment frontier in the first three decades of the twentieth century. The dynamic influence of the frontier permeated and vitalized the Canadian economy and extended far beyond.” Specifically, the settlement of the pairies and the establishment of the wheat economy necessitated huge amounts of capital that the National Policy through the ‘Tariff’ ensured would be produced in and supplied by central Canada. The Tariff served to build and protect a spatially concentrated, highly subsidized manufacturing economy in central Canada. In this policy context, the settling of the prairies would

\textsuperscript{15} Data compiled from: Statistics Canada. 1991, 1996, 2001 and 2006 Census of Agriculture, data by province, Census Agricultural Region (CAR) and Census Division (CD) (database), Using E-STAT (distributor).
provide domestic markets for agricultural machinery, tools, hardware, home furnishings and textiles since each individual prairie household production unit necessitated several pieces of farm equipment, and materials for building a house, barn, granary etc. Furthermore, new industries in grain handling, flour and baking, and meat packing required more railway routes, the development of trade centres, warehouses, elevators, and much more.

Populist political organizing began on the Canadian prairies as it was settled and contested the ways in which the national economy was being built and the position of the yeoman farmer within that system. Prairie farmers located their exploitation in two main areas. First, they were particularly upset about the Tariff, which forced them to buy machinery, farm inputs and household supplies in protected markets and sell their grain in open international markets. Second, they blamed the capitalist economic system for monopolies in the railroad, elevator, grain and banking industries and for international cartels in the fertilizer/agro-chemical, grain handling, flour mill, and farm machinery industries. For example, railways and elevators colluded so that producers were forced to deliver to their only local elevator which assigned dockage, grades, weights, and prices that cheated the farmer (Lipset, 1950; Eissler, 2006; Warnock, 2004). In short, farmers felt that they were barely able to meet the minimum capital requirements for reproduction of their farms and personal (familial) consumption. Any potential surplus was being

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16 Friedmann (1978) argues that between 1873 and 1935 household production of wheat began to out-compete capitalist production (based on wage labour) that had dominated in wheat producing regions prior to 1873. This was precisely because households did not require a normal rate of profit, and were able to restrict personal and productive consumption in ways that capitalist production could structurally not accept. Even in the extreme situation of pioneer prairie farmers, as explained above, households continued to produce, though they did get politicized.
completely siphoned off by input and credit suppliers upstream or grain merchants, elevator companies, and the railway downstream.

Despite their relative atomization on distant homesteads, farmers began to organize collectively against the extreme extraction of surplus from farming. Immigrants from Britain and the United States brought with them experience in populist and cooperative organizing and they put this to work on the Canadian prairies. Political organizing was decidedly anti-big business, but intent on keeping private ownership in the means of farm production – including land (Warnock, 2004: 132). Early unrest sparked the first royal commissions on grain handling and led to the establishment of the Manitoba Grain Act in 1900. This regulatory framework established a legal basis for farmers to bypass the unfair treatment they received from elevators and railways; it required railroads to supply cars directly to producers and elevators to establish platforms from which farmers themselves could load their grain. In 1901 producers organized the Territorial Grain Growers’ Association (renamed the Saskatchewan Grain Growers Association in 1905 with the establishment of that province), which became an active and powerful voice for farmers. In fact, according to the association’s first president W.R. Motherwell, farmers were quite close to becoming a violent force in the early 1900s that could not be ignored by either provincial or federal politicians (Fairbairn, 1984: 3). The Grain Grower’s Association was adamant that the Manitoba Grain Act be enforced and, in a highly publicized trial, it fought a Sintaluta, Saskatchewan station agent for not granting farmers’ railcar orders in 1902. This farm organizing was happening in the context of broader politicization around work in Canada. Especially in Western Canada, immigrants from Central and Eastern Europe were drawing on social democratic and
socialist traditions from their home countries to fight the exceptional exploitation they were experiencing from their employers and from Anglo workers in the early 1900s (Avery, 2006).

Much of the early farm organizing on the prairies took the form of building producer cooperatives in the grain handling industry including cooperative elevator companies in Saskatchewan and Alberta and a prairie wide marketing agency established in 1906 called the Grain Growers’ Grain Company (GGGC). For a short time the GGGC opened an office in Winnipeg and traded on the Winnipeg Grain Exchange until it was displaced for breaking the rules of the exchange by returning patronage refunds to its members. Despite this setback, the GGGC was considered very successful and popular with farmers; as many as 9,000 were marketing their grain through the company in 1910 (Eisler, 2006: 62). Despite incomplete coverage in Western Canada the GGGC marketed over 16 billion bushels of wheat in the 1909-1910 crop year, which accounted for 15% of the total wheat crop in that year (Lipset, 1950: 66). Meanwhile, the Saskatchewan Grain Growers Association was demanding the socialization of elevators in Saskatchewan. After a commission examined the issue, the Saskatchewan government ultimately decided against a government owned elevator system, but came out in favour of cooperative ownership with the backing of low interest capital from the Province (Eisler, 2006). This served as the model for the establishment of the Alberta Farmers’ Cooperative Elevator Company in 1913 (Fairbairn, 2005). As Paul Sharp (1948: 24) highlights in The Agrarian Revolt in Western Canada “...though the grain growers’ societies considered themselves “non-partisan, non-political, non-trading,” they were
class-conscious organizations and concerned themselves with marketing problems from the beginning.”

The struggle to organize and maintain pools in wheat was another great success for prairie producers. They had had a taste of the power and effectiveness of pooling in wheat when a short-term government board was given monopoly power during the First World War. This provisional board was created in order to deal with increased demand from Europe and the uncertainties inherent to the Winnipeg Grain Exchange as prices in wheat rose and the futures market took off. After the war, farmers called for the continuation of this board, but decided to take matters into their own hands when the federal government returned wheat to the open market. In the early 1920s, through large-scale and labour intensive drives that involved going ‘door to door’ to convince farmers to sign contracts promising that they would pool their wheat, the Manitoba, Saskatchewan and Alberta Wheat Pools were established. In Saskatchewan it took two attempts to enrol 50% of the total wheat acreage, below which contracts were invalid, while Manitoba and Alberta went ahead with less than 50% of the total wheat acreage in 1923 and 1924 respectively (Fairbairn, 1984: 38). In 1924 a central selling agency was established by the three Pools and soon after the Pools began building and buying elevators and port terminals through which to conduct their business. Fairbairn’s (1984) biography of the establishment of the Saskatchewan Wheat Pool claims that:

At its birth SWP was a radical almost revolutionary, attempt to replace the existing order. Pool founders did not want to improve the Grain Exchange; they wanted to eradicate it. They did not want to become respectful, influential members of the traditional free-enterprise system; they wanted to create a cooperative alternative to that system. Regardless of whether cooperation was considered as the highest form of free enterprise or as some moderate form of socialism, the ultimate goal was to see co-operation spread through society (241-2).
When international grain prices collapsed in 1929 and the great depression began, the Pool’s Central Selling Agency found itself in huge financial difficulty, owing substantial sums to banks, and having already given out initial payments for the 1929 crop that international grain prices could not support. Farmers’ demands to bring back a national, state-operated central selling agency and pool for wheat (which had been a temporary measure during the First World War) were finally heeded. In 1935, by an act of Parliament the Canadian Wheat Board was re-established as a voluntary marketing agency for wheat. The provincial pools continued to operate their cooperative grain handling systems allowing farmers to by-pass the private grain companies. Cooperatives were also used to fight against banking monopolies; credit unions and cooperative insurance began to be organized in the late 1930s.

The narrative I have provided here certainly glosses over many of the nuances of a dynamic and complex history. Indeed, dozens of manuscripts exist on each of the significant events and processes described above. Furthermore, important political distinctions were beginning to develop between the different provinces’ approaches to cooperation and struggle, but interested readers will have to seek these out elsewhere. The point here is to highlight that wheat occupies a prominent place in Western Canada’s political history and the stories Western Canadians tell about their pasts. First, a major thrust of the political economy of Canada was oriented toward opening up the West to settlement and participation in the wheat economy, the legacy of which continues to shape current politics and economy in the prairie provinces. Second, wheat was the crop around which producers organized cooperatively in order to curb the extreme extraction
of surplus from farming by large corporate players. Wheat became both a powerful material expression as well as a symbol of a strong independent class of farmers.

**ii. The industry: monopoly, breeding, and private divestment**

Western Canadian agriculture is structured around the specific political, institutional, ecological and cultural characteristics and histories of particular crops. The wheat industry, for example, has a unique historical and institutional character that presents certain opportunities and constraints for the future. Perhaps most prominently, the political organizing outlined in the previous section resulted in the establishment of a single desk government marketing agency for wheat. The Canadian Wheat Board is premised on maximizing returns to producers and continues to play a powerful role in wheat commodity chains. The wheat industry is also characterised by the historical investments made by the Canadian state in breeding and research, which, as my research participants noted, are currently being eroded. As a low value commodity with a history of public investment and relatively unrestricted access to seed and seed saving, wheat, unlike canola, has received less interest and investment from private capital. It is to these particularities of the industry that I now turn.

The pooling of wheat, which has taken place on the prairies since the early 1920s (first through the provincial Wheat Pools and then through the Canadian Wheat Board (CWB)) has allowed producers to have some influence in the wheat industry and to manage the marketing of wheat for their collective economic interests. Originally established in 1935 as a voluntary, government agency for the marketing of wheat, the Wheat Board gained increasing clout and influence as it was called on to smooth over tumultuous economic and political crises. During World War II, for example, the CWB
mandate was extended to the marketing of all Canadian grains. It was also during World War II that the government granted the CWB monopoly power, requiring producers to deliver to the board. Rising prices due to the war in Europe were tempting producers to sell to private grain merchants who could offer spot prices that exceeded the initial payments of the CWB (Canadian Wheat Board, 2007). Thus, if wheat was going to continue to be marketed for the collective good, even during times of relative prosperity, delivery to the CWB would have to be compulsory. In 1949 the CWB’s mandate was narrowed from the marketing of all grains to a monopoly of wheat, oats and barley.

In the last 50 years the scope of the CWB has been further narrowed; it now maintains a monopoly on the export and internal marketing of all western Canadian wheat and barley destined for human consumption. Importantly, in 1998, the CWB Act was changed to allow ‘shared governance’ between farmers, who elect ten of the fifteen members of the Board of Directors, and the federal government, which appoints the other five, including the President and CEO. Despite a narrowed jurisdiction, the CWB continues to play a very influential role in the Canadian wheat industry, conducting business for 70,000 Western Canadian farmers (Canadian Wheat Board, 2007). Indeed, the CWB is involved in influencing breeding agendas at Agriculture and Agri-food Canada, in developing knowledge and technologies that are useful for advancing quality characteristics of interest to wheat processors through the Canadian International Grains Institute, in consulting regularly with the Canadian Food Inspection

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17 The minority Conservative Party federal government that came to power in early 2006 opposes the monopoly character of the CWB. In March, 2007 it conducted a plebiscite on the marketing of barley asking Western Canadian farmers whether barley should be removed from the mandate of the CWB. While the government would like to move forward on removing barley from the mandate of the CWB, there is controversy about whether it can legally do so without changing the CWB legislation. In the meantime, barley remains under CWB authority.
Agency about any changes to regulations and variety registration, and in negotiating constantly with players in the grain handling and transportation industries. It has maintained close ties to government and is consulted in a meaningful manner about policy and other changes to the wheat industry. In this way, the CWB ensures that farmers’ interests are represented throughout wheat commodity chains and that the organization retains a central role in the industry.

The wheat industry is also characterised by the Canadian state’s involvement and investment in breeding and research. A high rate of crop failure (due to drought, frost, disease, etc) and of abandonment of homesteads in the early years of settlement forced the federal government to ameliorate the conditions of production through initiatives such as experimental farms meant to experiment with new plant and animal crops and breed varieties suited to local climatic conditions. At the first of such farms, established at Indian Head, Saskatchewan in 1887 (Waiser, 2005: 123), and at other stations, researchers focused their efforts on wheat and developed and tested new methods to control pests, disease, and weeds and began experimenting with breeding to find an earlier maturing variety. By 1907 the breeders at Indian Head had introduced the famous Marquis variety. This early maturing, high protein wheat was much better suited to the Canadian prairies and allowed for the spatial expansion of wheat production.18

In her 2002 analysis of changing federal agricultural research agendas and practice in Canada, Moore emphasizes that, until recently, the federal Canadian state has been the dominant actor in agricultural research with the goal of increasing production

18 As Varty (2004) documents, an antagonism exists between protein content and aridity of the growing region such that the spatial expansion enabled by early maturation into less arid regions of the prairies had the effect of reducing protein content in wheat in those regions. High protein content, although not explicitly factored into the grading system, was demanded by flour millers as it made for ‘better’ bread.
capacity amongst farmers and ensuring a profitable agri-food sector. Early research at regional stations addressed the needs of and problems experienced by farmers, while later (by the late 1960s) federal scientists focused on efficiency in production. According to many of my research participants, this history of public investment and the prominence of non-capitalist organizations like the CWB in the wheat industry has resulted in less private investment in wheat than in other crops. For example a representative from the Western Barley Growers Association, an organization that is publicly opposed to the CWB’s monopoly, explains that:

> When you look at the wheat industry itself it’s in decline. Wheat used to make up 80%, you know back in the 60s, wheat made up 80% of the farm cash receipts and it’s down below 20 right now. And the world population is growing, I think the market is growing for wheat, but yet our share of that is going down. Our regulatory system and our lack of innovation, our regulatory system which includes the Canadian Wheat Board, by the way, has stifled...innovation [Interview, Western Barley Growers Association, 20].

Moore (2002) identifies significant changes to the federal approach to and investment in agricultural research post 1980. Most significantly, the Research Branch of Agriculture and Agri-Food Canada (AAFC) has begun to orient its research to the needs of the agri-food industry, and has suffered from budget cutbacks. Moreover, scientists from AAFC suggested that private firms have given much less attention to wheat than they have to other crops, especially at the level of breeding:

> ... if you compare what’s going on in soy bean and corn and cotton, they’re all huge, and canola, a lot of private industry and capitalization. In wheat nobody can make money doing it, you can’t make money selling wheat so it’s basically left to the public institutions to do the work. And, uh you know if you look in Canada I think you have, there’s about really seven spring wheat breeders in Canada. But if you looked at the number of breeders in Western Canada doing canola, there’s a lot more, I can’t tell you how many, but it is a lot. And why is that? Well you can make money selling canola seeds, and you know make rights to 50 cultivars a year, in wheat we don’t do many 5, 8. Eight’s a big year [Interview, Agriculture and Agri-Food Canada, 6].
In the context of both public and private divestment, farmers have begun to fund producer-centred research programmes at AAFC through mechanisms such as check-offs. The Western Grain Research Foundation, established in 1993, is an example of a non-profit organization that funds research and breeding in wheat and barley through producer check-offs.

Low commodity prices in wheat, compared to newer higher-value crops, have also resulted in less willingness and ability to pay amongst prairie farmers for corporate wheat seed. Furthermore, farmers have had a long history of fairly easy and relatively unrestricted access to wheat seed through public breeding and distribution programmes and seed saving:

And in some of our crops particularly cereal crops in Western Canada, the farmers who save seed is quite large, only about 15% of all our cereal grains in Western Canada are sold as certified seed. Over 80% of it there’s no royalties being paid on it. So if your royalty level gets really high farmers are very happy to go and grab a few bushels of it for a high royalty, grow it on his farm and sell that [Interview, Agriculture and Agri-Food Canada, 9].

Indeed, seed saving in wheat was practiced by all of the farmers that I interviewed, even if they did not save seed from other crops. Thus, despite the introduction of Plant Breeders Rights in Canada in 1990, private firms fear that a culture of seed saving and low market prices for wheat will not leave enough opportunity for private accumulation.

Significant changes to the structure and character of the wheat industry are likely over the next few years. While public divestment of the nature described by Moore (2002) is likely to continue, new avenues for private accumulation may be in store. For example, as biofuels gain increasing prominence both domestically and internationally, new opportunities in processing wheat for biofuel and changes to breeding agendas and variety registration will open up new areas to private investment. Furthermore, if the
current federal government remains in power, the monopoly character of the CWB will come under increasing threat. The legacy of public investment and the involvement of non-capitalist organizations in the wheat industry will continue to structure the speed and manner that private interests engage with wheat. Public programmes and the monopoly of the CWB will have to be actively undone and it is sure that struggle will continue to take place in these areas.

iii. **In the fields:**

Wheat has certain biological and agronomic characteristics that have made it a crop that is particularly attractive to prairie farmers. While seemingly innate and fixed, these properties are co-produced by the farmers, scientists and organisms that are involved in the breeding and cultivation of wheat. In other words, breeders have selected the traits they have found most beneficial, literally shaping the biology of wheat, and farmers have adapted wheat to particular cropping systems, and their agronomic practices to the needs of wheat plants. Specifically, public investment in wheat breeding since the late 1800s has produced varieties that are particularly well-adapted to the short and dry growing season of the Canadian plains. Furthermore, the farmers who I interviewed as part of this research report using wheat in their rotations to break cycles of disease. Finally a variety of fairly inexpensive pesticides have been introduced to effectively control weeds in wheat crops. For these reasons wheat continues to be a very important part of rotations and prairie farm economies even though farm prices for wheat are low compared to other field crops like canola, lentils and peas. While wheat no longer
dominates production like it did in the early 1900s, it still remains a widely planted crop among farmers.

It was not a coincidence that Canada’s hinterland economy was developed almost singularly around wheat. Importantly, wheat was in demand the world over; but as significantly, “[i]ntense specialization in wheat relative to other grains on the semi-arid plains [was] a result of the great drought-resisting capacity of wheat and the extremely high quality of the wheat produced (Britnell, 1939:48). While wheat yields were, and still are, higher in moister and warmer parts of the country (for example in Southern Ontario) the prairies continue to dominate in the production of wheat. This is because wheat is one of the few crops that is easily grown on the prairies at very high quality standards, and because the more fertile regions of Canada are able to grow a greater diversity of more lucrative crops. As I have suggested in the previous section, a long history of public plant breeding programmes in wheat has made the crop even more adapted to the prairie environment and has allowed for the extension of the wheat growing area19. Since weather and climatic conditions continue to be a great source of risk for prairie producers, many grow some wheat every year in hopes that it will survive in the case that other crops fail.

Representatives of farm organizations who participated in this research characterised wheat as a valuable crop, despite the fact that it commands a relatively low price. Wheat is valuable to farmers because of what it does in the fields and the possibilities it enables in terms of crop rotations. For example, this producer, whose

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19 Breeding programmes in wheat have also revolved heavily around increasing yield and on quality characteristics that are of interest to the milling, baking, and processing industries including protein content, colour and baking strength.
experience was echoed by many others that I interviewed, places more importance on wheat’s agronomic value than he does on its economic value:

Wheat is the one crop that we grow, we grow it hoping to make money; we usually break even in years like this. It breaks the disease cycle; you can grow wheat after wheat and not have too many disease problems. But if you grow canola after canola you could very easily and likely lose the crop. So we need to grow some wheat and other crops to break the cycle, cereal crops break the cycle of weeds [Interview, Keystone Agricultural Producers, 2].

While a staple in nearly every farmers’ rotations, wheat is especially important to organic farmers. This representative of the Saskatchewan Organic Directorate explains that wheat is “a key crop to us. It’s easy to grow, relatively easy to grow. It’s weed resistant, it’s usually easy to market, there’s a whole host of reasons why it’s a good crop. It’s something that every organic farmer pretty well grows...(Interview, Saskatchewan Organic Directorate, 15).”

Agronomy and biology are also fundamental to the work of plant breeders and companies developing agro-chemicals and agricultural biotechnologies. The possible biological selections, manipulations and chemistries are limited by the actual agronomic practices of farmers across space. This tension between what is biologically or chemically possible and what is agronomically practical has taken on a more overtly political form in the debate around genetic modification. For example, what is considered an acceptable modification in one crop may not be suitable in another. One scientist working at a public university explained that the insertion of ‘risky’ traits into organisms that are highly out-crossing (like corn and canola) raises uncertainties that may be unacceptable to farmers and the general public. For example, if an herbicide tolerant canola were to cross with a wild relative and transfer its resistance farmers would have to contend with a very difficult weed. Since wheat has a much lower incidence of
outcrossing\textsuperscript{20}, the main concern regarding the interplay of biology and agronomy, in this case, has centred on the utility of traits such as herbicide resistance in a crop that is already effectively managed by farmers. Even plant breeders who supported the introduction of herbicide resistance in canola publicly voiced their opposition to its insertion in wheat for precisely this reason:

\begin{quotation}
...[I]f weeds were a real problem in cereals and we didn’t have the herbicides that would effectively and cheaply control this then I would have said ok, Roundup Ready[herbicide resistant] wheat is a good idea. But the fact of the matter is that we have some very good chemicals for cereals that are uh, relatively cheap and uh relatively benign and so it’s not essential that we have round-up in it [Interview, Agriculture and Agri-Food Canada, 14].
\end{quotation}

The examples above serve to illustrate how the biology of prairie wheat is shaped by human processes. This is not to suggest that the biology of wheat is completely determined by social processes; rather, the point is to show how biological processes cannot be separated from the social. As I have shown in this section, wheat is co-produced through the agronomic, scientific and ecological practices of farmers, scientists and plants. These co-productions are thoroughly political and involve value judgements about what is agronomically, socially, and economically useful and desirable. Farmers and scientists have an attachment to wheat because of the way it acts in the fields (among other reasons outlined in this chapter). The behaviour of wheat plants in the fields is, in part, the product of years of manipulation and adaptation of genetic structures and farm practice.

\textsuperscript{20} Wheat is understood by plant breeders as a much less promiscuous plant than canola or corn. It typically self-pollinates although as much as 5\% out-crossing has been reported in the case of stray pollen (Symko, 1999).
iv. Nationalism and the cultural politics of wheat

Canada is known the world over as a major exporter of high quality wheat. This reputation has been reinforced at home by state support for the wheat industry with special attention to the development of quality characteristics, and by the historical importance of wheat to the overall economy of the nation. As a staple food, wheat also enjoys a cultural significance to consumers who understand it as a basic of modern, historical and religious life. Thus, a strong cultural attachment to wheat exists in Canada despite the fact that the crop has begun to lose its importance to the national economy and despite an urbanizing population with weaker connections to agricultural heritage. Those working to stop the introduction of genetic modification in wheat found that, as a culturally significant food, wheat was very easily and widely politicized. The symbolism and meaning of wheat became an important surface of struggle and a means through which to engage consumers in debate.

Discourses of wheat nationalism abound in the documents and websites produced by the Canadian and prairie provincial states and in popular culture including songs and visual art by Canadian artists and festivals celebrating wheat and bread. The reputation of Canada as a ‘breadbasket’ has been eagerly projected to the world and Canada is internationally recognized for its high quality, protein-rich wheat. Indeed, Agriculture and Agri-Food Canada’s latest (2004) profile of the wheat industry indicated that Canada is the largest producer of high-protein milling wheat and still vies with the United States for the world’s largest exports of wheat. While not nearly as significant to the overall Canadian economy as it once was, wheat still earns the most foreign exchange of all

With an increasingly urban population and a declining number of family farms, it can be expected that the cultural importance of wheat to the nation has waned. Yet, wheat still maintains a symbolic importance on two fronts. First, and especially in the prairie provinces, stories about the wheat economy and the back-breaking labour of settlers, who lived in relative isolation without services such as running water and electricity, maintain a prominent position in official cultural histories reproduced by the provinces. For Eisler (2006), this is one of the myths that has produced the sense of belonging and the emotional and psychological bonds of an imagined provincial community like Saskatchewan. Of course, this construction of community is also highly exclusionary to groups that were not part of the pioneering history and erases the violence done to indigenous peoples who were forced off the land in favour of wheat and settlers. Nevertheless, as an imaginary of a shared past the wheat economy remains fundamental to many aspects of modern prairie society. Not only that, but the wheat economy places the prairies in Canadian national narratives; through wheat the prairies make a claim to national belonging.

Second, wheat has maintained its cultural importance as a food that is widely consumed in all parts of the country. Echoing Winson’s (1993) insight that food is a particularly intimate commodity this participant explained that:

...food is cultural and emotional, and canola isn’t an emotional food, it’s a cooking oil. So it’s a cooking oil, you can buy it, you don’t have to. But milk is something everybody gives to their babies, to their kids. Milk has an ENORMOUS sort of emotional cultural position, as does wheat for bread [Interview, Saskatchewan Organic Directorate, 9].
Part of wheat’s emotional and cultural appeal is also its connection to religious life and historical and communal traditions such as ‘breaking the bread’. This was a theme that arose frequently in interviews. Specifically, in mobilizing against the introduction of genetically modified (GM) wheat this participant expresses that the manipulation of the biological organism may also be experienced as a manipulation of religious symbolism:

> And we connect [genetic modification] very sincerely and very clearly to the loaf of bread. And in...the seminary we talk about...breaking the bread. Is it GMO bread you’re breaking? And sort of integrate, try and open people’s minds to the idea that this deep symbolism, this sacred symbolism is also then being manipulated [Interview, National Farmers Union, 15].

Those working to politicize urban consumers around the topic of genetic modification in wheat found that bread was a food with which urbanites easily identified and behind which they easily rallied:

> But yeah wheat was so culturally significant that it really made a difference and people know what wheat is, people didn’t know what canola was, or urban consumers didn’t know what canola was, they didn’t know what it looked like [Interview, Canadian Biotechnology Action Network, 7].

Not only is wheat a culturally significant food, but it is also ubiquitous in manufactured food products. Thus, if wheat were genetically modified, it would be very difficult for a consumer to avoid eating GM material. As this campaigner for Greenpeace summarized:

> ...bread, or wheat products are on almost everybody’s table. It’s something that people can really understand and it’s something that the manufacturers of food products knew would be very, very tricky to take the chance on there being a consumer reaction against their products. So when wheat is used SOO pervasively in so many products that people buy on a daily basis or consume on a daily basis...Like with canola for example it’s far more obscure, it’s used in ingredients within products kind of thing, canola oil or something like that that people aren’t even thinking about when they’re consuming a certain food in which it’s one of the ingredients. When it came to wheat it’s just far more in the face of the consumer [Interview, Greenpeace, 6]
Those campaigning against GM wheat were, thus, able to mobilize a diversity of ways in which wheat is still culturally important to the public, including peoples’ identifications as Canadians, prairie folk and consumers. As I will show next, the populism associated with wheat’s political, institutional, biological and cultural histories does not exist with canola. Instead, canola is associated most strongly with technological progress and scientific innovation.

**Canola**

1. *From machine grease to edible oil*

Canola is a much more recent companion species of prairie farmers than is wheat. Rather than a frontier crop, canola (at that time rapeseed) was first grown commercially on the Canadian prairies during the Second World War to replace usual oil imports (both rapeseed and others) from Europe and Asia. Although rapeseed was a regularly-consumed dietary oil in countries such as China, Japan and India, it was not considered suitable for human consumption in Canada due to its high concentration of erucic acid, which made it particularly high in saturated fat. Instead, rapeseed was employed in Canada for industrial purposes such as machine grease for steam engines and other war machinery. Facing the supply shortage during WWII, it was soon discovered that rapeseed grew quite well in parts of Ontario and the prairies; and in 1943 the Forage Crop Division of the Canada Department of Agriculture imported 18,640 kilograms of the species *B. Napus* from the United States and distributed it to farmers (Kneen, 1992: 28).

The geopolitical context of blocked oil imports led policy-makers to perceive Canada’s dependence on foreign oilseed for both industrial and dietary purposes as a
national weakness. Self-sufficiency in oilseed became a concern of the Canadian Defense Board and the idea of modifying industrial rapeseed into edible oil emerged as a priority (Busch and Juska, 1997: 697). A scientist at Agriculture and Agri-Food Canada (AAFC) who was a participant in the process of transformation remembers it in this way:

...before the war and during the war Canada imported over 90% of its edible oils and didn’t have one of its own. And the early workers Sallans and Bill White and others recognized that rapeseed, although it was originally grown as an essential war commodity to keep the steam engines running, was going for industrial purposes, that it had the potential to be Canada’s oilseed crop. And so that was also in the bag, you know in the policy area that Canada should have its own edible oil [Interview, Agriculture and Agri-Food Canada, 4].

Public plant breeders, thus, began working to transform rapeseed with two main objectives. First the erucic acid content would have to be diminished if rapeseed oil were going to be consumed widely. Second, glucosinolates would also have to be reduced in order to establish a productive use for the by-product of the oil:

... the main problem was with the meal. Presence of the glucosinolates which are, when they break down, goitrogenic [i.e. they suppress the function of the thyroid gland]. And so in non-ruminant animals, the swine and the poultry, the animals that were fed above you know 5 or 10% rapeseed meal did not do well. And they had a problem there of poor efficiency in weight gain and feed efficiency. And so this really put a limit on how much rapeseed you could process because you could only get rid of so much of the meal [Interview, Agriculture and Agri-Food Canada, 4].

It was not until 1974 that the first ‘double zero’ (zero erucic acid and zero glucosinolates) variety of rapeseed was registered by Canadian scientists and the crop’s name was changed shortly thereafter to canola (derived from Canadian oil, low acid).

The process involved significant cooperation between scientists across several different disciplines at numerous institutions including Agriculture Canada, universities, and the National Research Council’s Prairie Regional Laboratory. For example, a new technology named gas-liquid chromatography (GLC) was developed in order to test the
oil properties of increasingly smaller amounts of seed. An early breakthrough in this area was made at the Prairie Regional Laboratory in 1957 and was shared with other labs across Canada. This enabled Keith Downey and his team at the Dominion Forage Lab of Agriculture Canada to perfect the technique and by 1962 they were using GLC to test half-seeds (Phillips and Khachatourians, 2001:16-17). This meant that the other halves with desirable traits could be successfully grown out and used in breeding.

While the scientific work described above was being spurred on by the objective of national self-sufficiency, the reality in the fields was stagnation. Although rapeseed was relatively well adapted to the environment and production methods of prairie farmers, it took quite some time to get producers to grow it with much enthusiasm. From 1943 to 1949 the area under rapeseed production in Canada increased from 1300 to 32,400 hectares with the incentive of a price support programme. However, production declined sharply thereafter with only 200 hectares in production in the 1950/51 crop year when the price support ended (Kneen, 1992: 15). The end of the War induced a sharp decline in demand, especially because of the conversion from steam to diesel engines, and the Prairie Vegetable Oil crushing plant, built in 1945 in Moose Jaw Saskatchewan, almost disappeared. It was not until the 1955/56 crop year that the production of rapeseed recovered to its wartime levels. This was due primarily to the enthusiasm of scientists and plant breeders who had just registered the first all-Canadian rape variety and were promoting it to farmers. As the aggressive breeding agendas continued, production increased and soon (from 1956-1968) a domestic oilseed crushing and extraction industry emerged (Khachatourians et. al, 2001: 38). Still, much of the early and contemporary production was exported as unprocessed seed to countries such as Japan.
The development of canola was not only driven by the goal of national self-sufficiency in edible oil, but there was also a great deal of hope amongst those involved with agriculture that the crop would help to diversify the prairie farm economy and cushion the uncertainties associated with volatile wheat markets. From the beginning, canola was viewed as a high-value cash crop and farmers could generally sell it at a much higher price than the highest grade of wheat (often close to double per bushel or tonne, see tables 2 and 3). Although canola involved more risk than wheat, as the following farmer explains, the gamble paid off just often enough:

Yeah canola inputs are really high in terms of it uses a LOT of nitrogen...the chemicals to spray on it aren’t cheap, you can get flea beetles, and diamondback moths and armyworms in canola and the price lately hasn’t been the best. When it was eight dollars a bushel everybody was making money. When it’s down around five dollars a bushel I mean you’ve got to be growing some pretty amazing crops. So the inputs for canola are pretty high but the risk reward traditionally is better with canola, even if the inputs were higher, whereas wheat’s pretty static...your inputs are a little bit lower, chemicals are a little bit more predictable, but the price stays the same [Western Canadian Wheat Growers, 8].

For this reason, among others that follow, political organizing around canola never coalesced as it did around wheat. Furthermore, by the time canola was being grown in any significant amount, a political movement away from the welfare state was well underway at regional, national and international scales. For example, it was not until 1978 that canola reached 10 percent of all acres seeded to grain on the prairies (see table 4). This happened during the final stage of a broad political consensus that saw relatively stable funding and supports for agriculture, both provincially and federally, including cooperative enterprises, plant breeding, transportation subsidies etc. The production of canola continued to gain momentum as provincial and federal states began to adjust to and promote neoliberal strategies of governance that saw state supports for agriculture
slashed (this happened around the same time as widespread cuts in other industries and social services). In this policy context political organizing amongst farmers revolved around maintaining the status quo and canola became a cash crop that could buffer the economic hardships that accompanied international recessions and declining domestic supports.

<table>
<thead>
<tr>
<th>Year</th>
<th>All Wheat (dollars/bushel)</th>
<th>Canola (dollars/bushel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1910</td>
<td>0.78</td>
<td></td>
</tr>
<tr>
<td>1920</td>
<td>1.58</td>
<td></td>
</tr>
<tr>
<td>1930</td>
<td>0.47</td>
<td></td>
</tr>
<tr>
<td>1940</td>
<td>0.57</td>
<td></td>
</tr>
<tr>
<td>1950</td>
<td>1.52</td>
<td>2.5</td>
</tr>
<tr>
<td>1955</td>
<td>1.37</td>
<td>1.77</td>
</tr>
<tr>
<td>1960</td>
<td>1.57</td>
<td>1.63</td>
</tr>
<tr>
<td>1965</td>
<td>1.68</td>
<td>2.41</td>
</tr>
<tr>
<td>1970</td>
<td>1.42</td>
<td>2.33</td>
</tr>
<tr>
<td>1975</td>
<td>3.62</td>
<td>5.09</td>
</tr>
<tr>
<td>1980</td>
<td>5.59</td>
<td>6.38</td>
</tr>
</tbody>
</table>

**Table 6 Average farm price in the prairie provinces**

<table>
<thead>
<tr>
<th>Crop Year</th>
<th>#1 Western Red Spring Wheat (dollars/tonne)*</th>
<th>#1 Canada Canola seed (dollars/tonne)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985-86</td>
<td>160.00</td>
<td>301.79</td>
</tr>
<tr>
<td>1990-91</td>
<td>135.00</td>
<td>287.70</td>
</tr>
<tr>
<td>1995-96</td>
<td>263.60</td>
<td>432.29</td>
</tr>
<tr>
<td>2000-2001</td>
<td>230.06</td>
<td>289.91</td>
</tr>
<tr>
<td>2005-2006</td>
<td>230.10</td>
<td>277.10</td>
</tr>
</tbody>
</table>

**Table 7 Producer payments*/average farm price**

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21 Data compiled from Statistics Canada. *Table 001-0017 - Estimated areas, yield, production, average farm price and total farm value of principal field crops, in imperial units, annual, CANSIM (database), Using E-STAT (distributor).*

22 Canola seed data was compiled from the cereals and oilseeds review of Statistics Canada. Wheat data was compiled from Canadian Wheat Board website: [http://www.cwb.ca/public/en/farmers/payments/historical](http://www.cwb.ca/public/en/farmers/payments/historical). Note that farmer payments made by the CWB are not completely commensurable with average farm prices. Farmer payments represent what
ii. The industry: private investment and innovation

Although the development of canola was decidedly a state project that required massive investments across several public institutions, the canola industry soon became characterised by its high level of private investment and the absence of institutions such as the CWB that hinder the operation of free markets. A national trade association (initially named the Rapeseed Association of Canada and later renamed the Canola Council of Canada) was founded in 1967, and producers were invited to participate as just one of the many commercial stakeholders that dominate this organization. Tellingly the canola council’s (CCC) current mission is “to foster a regulatory, policy and business climate based upon innovation, resilience, and creation of superior value for a healthier world; allowing the industry to grow 15 million tonnes of market demand and production by 2015” (Canola Council of Canada, 2005). This section traces the shift in canola from an object of public investment to an industry dominated by private agendas in plant breeding, input supply, processing and marketing.

As I have already shown, in the initial stage of the transformation of rape scientists at various public institutions collaborated in order to assemble the necessary set of technologies and knowledges needed to produce a new ‘double zero’ variety of rapeseed. During the first stage of this process (1944-66) virtually all investment (85%) was public with only 15% coming from private sources (Grey et. al, 2001: 89). Private players had little incentive to invest in research on rapeseed since plant breeders’ rights
had not been instituted and because most of this initial research investigated the basic properties of the plant and was not easily applied to commercial products.

Beginning to see the potential benefits of a growing domestic oilseed industry and the results of a first round of public plant breeding and rapeseed promotion, the Rapeseed Association of Canada (RAC) formed in 1966 in order to pool the resources of all those with a stake in the canola industry with the purpose of investing in its commercial growth. The RAC had two initial objectives (as outlined by Kneen, 1992: 18). First, the association worked on trade development in order to ensure that producers would have an expanding market for their crops. Second, funding was channelled into research in the areas of plant breeding, animal feed and improving quality. For example, the RAC provided monetary resources to Agriculture Canada and public universities for their work on double low varieties, while the National Research Council maintained its control over and coordination of the collective (industry-wide) research agenda (Grey et. al, 2001: 92). Meanwhile, the RAC worked more actively on public relations, marketing and with growers to ensure that they were rapidly adopting new varieties. Producers began to form provincial associations under the RAC umbrella in the late 60s to better influence rapeseed policy, agronomy and production. This was a period during which most of the RAC members were relatively small, domestic players and during which consensus across the wide variety of actors was possible, as this representative of the CCC emphasized to me in an interview:

Canola in Canada, probably, is one of the best examples of a value chain that works together... There’s a long history of it right from creating canola itself and working towards marketing that domestically and internationally right though to issues like what you’re working with on commercialization of GMs where the whole value chain had to sit down at the table and agree that the pros and cons
were gonna be acceptable to everyone in the game [Interview, Canola Council of Canada, 1].

Once the first double zero variety had been registered in 1974, private interest in the canola industry and in canola research began to grow. Private investment was especially spurred on by the 1978 negotiation of a new International Union for the Protection of new Varieties of Plants agreement and the domestic buzz that Canada would soon adopt Plant Breeders Rights (PBR) (Grey et.al, 2001: 95). Private companies began to contribute more to the CCC’s research funding programme and the balance within the organization began to shift more toward private companies, especially those associated with agricultural inputs and processors, which were beginning to be bought out by international players. The CCC’s funding programme, in turn, began to have more sway over public research agendas since it was able to contribute more financially. However, the industry as a whole, was still working to promote canola oil as a healthy edible oil and to receive the necessary approvals in markets such as the United States. Thus, research and plant breeding remained tightly coordinated between private industry, public institutions and the CCC (Grey et. al, 2001: 94-95).

When Canada adopted PBR in 1990 private investment in canola really took off. PBR enabled the expansion of legal property rights to the practise of plant breeding that had previously been regulated through non-market arrangements and, according to the six public breeders and researchers who were part of this research, a culture of collaboration across institutions and breeders. As Kloppenburg (2004) explains in the case of corn, PBRs were the social solution to breaking open a new arena of capital accumulation for private business. Once PBR were legislated and made legally enforceable, those aspects of plant breeding that could yield profit could be successfully enclosed for private gain.
Growing private investment in breeding and research was also being promoted by federal and provincial governments that faced budget constraints and began pulling funding for agricultural research. In this context, public research dollars became oriented to complementing the work of private firms, essentially financing the work that was not perceived as profitable. As the following public scientist emphasized, this has often meant that public dollars are used in the early stages of research and subsequently these efforts are turned over to private firms for commercialization:

...there is still public breeding in the cereal area, but there isn’t any public breeding to speak of in rapeseed and canola. There’s public breeding in Manitoba, but it’s specialty, it’s the high erucic type. And Alberta had an agreement with the Alberta Wheat Pool for quite a few years and I’m not just sure where that sits at the present time... Here the government won’t let us breed a variety. Uh, it’s very frustrating for a plant breeder to do all the work then turn it over to somebody else to exploit [Interview, Agriculture and Agri-Food Canada, 10].

Indeed, from 1990-1998 only 39% of the total investment in canola research was made by the public sector (recall this number was 85% from 1944-66) and 59% came from the private sector (recall 15% from 1944-66). More tellingly, the private sector took ownership of 86% of varieties, and 80% of the technologies resulting from this research (Grey et. al, 2001: 89).

While consolidation and privatization has been characteristic of the post-1990 canola industry, this has not meant that public institutions have been totally shut out. Rather, as Phillips (2001) shows, private seed and breeding companies rely on the knowledge and ‘basic’ research performed at public institutions and they regularly enter into collaborations or joint ventures with them. In particular, Phillips argues that the development of ‘know-why’ knowledge (which he seems to understand as early stage basic inquiry) is undertaken almost exclusively by the public sector since this research
has not yet been applied to a commercial product. Furthermore, public institutions, because of their long history in breeding and research are vast repositories of ‘know-who’ and ‘know-how’ knowledge. Phillips (2001:119) describes these types of knowledge as “the non-codified knowledge that holds things together” and as involving human relationships and outcomes that are not possible to patent. Private agro-chemical or breeding firms have been often willing to provide minimal profit-sharing for access to this knowledge. Nevertheless, public sector roles in plant breeding and research have shifted away from proprietorship and the setting of research agendas towards supporting private industry and its agendas. This shift has taken place within the context of private concentration and coordination of research supply chains and the appropriation of extension services by private companies as part of their marketing divisions (Grey et. al., 2001).

The story of plant breeding and research in canola illuminates some important differences not only between canola and wheat, but also between canola and other crops that have received much private investment and attention, for example, corn in the United States. For Kloppenburg (2004), the socio-legal establishment of property rights was just one of two main processes that forced open corn breeding and research to private accumulation. A technological solution that involved scientific manipulation was additionally necessary to overcome the biological reproducibility of corn seed. The development of hybrid corn seed allowed for a technical challenge to the farm practice of seed saving and replanting. Hybrid plants were bred to yield sterile seeds so that farmers would have no choice but to enter the market every year for their seed. Interestingly, as I showed in my earlier discussion about wheat, seed saving remains a culturally significant
practice in wheat and has contributed to the lack of private investment in breeding and research. Grown by many of the same farmers who save their wheat seed, canola seed, on the other hand, is regularly bought by prairie farmers:

Interviewer: And there’s more of a tradition as well in saving seed in wheat
Participant: Well that’s why you can’t do as many [referring to not being able to produce as many new wheat varieties every year as canola]. And it’s difficult to demonstrate the value of certified seed over saving your seed in cereals. Now with something like canola it’s fairly easy to demonstrate the value because it’s canola. I guess canola’s trickier, it’s much more sensitive probably to loss and injury [Interview, Agriculture and Agri-Food Canada, 7].

The development of hybrid varieties in canola has certainly furthered the practice of buying, rather than saving, seed. The first hybrid canola variety became available in 1989, and now around 55% of the Canadian seed market is hybrid, and this percentage will likely grow (Interview, Canola Council of Canada, 2006). However, Canadian canola producers seem to be willing to enter seed markets even when their seed is still biologically able to reproduce. Canola boosters have told me that this is due to rapid innovation in canola breeding such that each new year brings several new varieties that promise to outperform the last in areas such as yield, weed control, and uniformity. In the section that follows I show how the specific agronomic and biological characteristics of canola in the fields also contributes to the culture of seed buying and to a human-environment relationship that is quite different than the one I sketched for wheat.

**iii. In the fields**

Canola has certain biological and agronomic characteristics that have made it a great commercial success and a crop that is particularly amenable to private investment. When contrasted with wheat, the biological and agronomic properties of canola are
perhaps more transparently co-produced by the farmers, scientists and organisms that are involved in its breeding and cultivation. In other words, canola is more popularly conceived as the product of scientific innovation and is more intensively managed by farmers than wheat. Specifically, the crop’s weed and disease-prone disposition in farmers’ fields has meant that farmers are very interested in new technologies (including production systems such as ‘zero till’ and genetic modification) and chemicals for weed management. Because of these agronomic difficulties, canola is only feasibly grown in a four year rotation, and, thus, canola is less amenable to the practice of seed saving. Finally, and with particular relevance to the case made by opponents of genetic modification, canola is relatively promiscuous and will outcross with other canola plants and with wild relatives.

The variety of canola grown most extensively on the Canadian prairies, *B. napus*, is a cool-season crop that is well-adapted to a variety of soils. However, canola is a much more difficult crop to grow than wheat. First, it is not as drought-tolerant as most cereal crops; but most importantly, canola is highly affected by weeds, pests and disease. For example, since canola is relatively slow growing and slow to cover the ground, it faces much competition from its many wild relatives (such as mustard and peppergrass) in its early stage of growth (Canadian Food Inspection Agency, 1994). Insects such as the flea beetle and root maggot also challenge the production of canola; and controlling such pests requires care so as not to damage honeybees or other beneficial pollinating insects. Finally, canola is susceptible to serious disease, especially in areas of intense production and under poor management practices. For these reasons, canola producers have been much more willing to pay for technologies and products that will reduce the risk of loss
than they have been for a crop like wheat. Thus, canola has been particularly amenable to private investment and accumulation.

Private involvement in plant breeding and research has in turn shaped the biological and agronomic character and possibilities of canola production. This recursive relationship has been concentrated around finding more effective chemical controls for weeds and disease, and agronomic practices that encourage the use of inputs. For example, the practice of zero-till is now widely used in canola and is touted as a method of soil conservation since the seed can be ‘drilled’ into the previous year’s stubble and residue, eliminating the need to till. Yet this practice increases the susceptibility of the crop to weeds and disease. It is now recommended that canola not be grown more than once every four years on the same fields in order to prevent the build-up of weeds, insects and disease. Furthermore, the practice of zero till relies on the genetic modification of canola so that it is resistant to herbicide. Rather than a modification that would require less dependence on agricultural inputs (for example, the engineering of drought resistance), herbicide resistance actually reduces the range of management options available to farmers and increases the susceptibility of canola to weeds and disease. This has made the crop even more difficult to imagine growing organically, since organic growers are restricted from using herbicide:

Now admittedly it’s going to be tough for the organic growing BUT, and this is what most people don’t realize or understand is that it’s very, very difficult to grow canola organically because you’ve got insects and you’ve got weed populations…and disease that can wipe that crop out in nothing flat, unless you’ve got something there to protect it. And flea beetles in particular; two years ago I don’t think there was an organic crop that survived [Interview, Agriculture and Agri-Food Canada, 13].
In the case of conventional growers, the fact of a four year rotation has further reduced the incentive to save and replant canola seed.

The introduction of genetic modification in canola has opened up certain aspects of its biology and agronomic practice to political concern and contention. These concerns surfaced especially during the contestation that surrounded Monsanto’s attempts to introduce Roudup Ready wheat in Canada in the early 2000s. By this time, farmers were experiencing unanticipated headaches dealing with herbicide tolerant canola varieties in their rotations, and scientific studies showed that it would be virtually impossible to grow canola on the prairies without contamination from herbicide tolerant varieties\(^\text{23}\). Such difficulties were the result of the biological properties of canola, such as its promiscuous nature in the fields, and the policies of importing countries not to accept GM material. Suddenly, the rate of out-crossing in canola (which is the same in GM and non-GM varieties), and thus the spread of GM material across the prairies became a political and practical concern for farmers, regulators, and the canola industry as a whole:

...canola has a lot of weedy properties, weedy characteristics such as seed shatter at or before harvest. Of course it’s highly, it’s significantly out-crossing, volunteers can persist in the seed bank for five years or more. So in that respect it was, it was crop that was of chief interest to us because of these weedy characteristics and how you combine that with the transgenic traits, how would that impact volunteer control, how would that impact the spread of these transgenes in the environment? Corn, for example, even though it’s also very highly out-crossing, the acreage in Canada is much less than say canola, canola is

\(^{23}\) Studies conducted by Agriculture and Agri-food Canada (Downey and Beckie, 2002) and by University of Manitoba plant scientists (Friesen et al., 2003) found that even pedigreed seed lots for conventional canola had been contaminated with herbicide resistant traits at levels above 0.25% (the threshold above which pedigreed seed cannot be certified).
over 5 million hectares, whereas corn is say half a million hectares in primarily Eastern Canada [Interview, Agriculture and Agri-Food Canada, 5].

The genetic modification of herbicide resistance in canola concerned farmers not only because of the flow of GM genes across the prairies, but also because this canola was difficult to manage in rotation. Seed that had shattered before harvest could remain in the soil for several years and then emerge as a (volunteer) weed in other crops. These plants would then be difficult to control because of their resistance to widely used herbicides. The experiences farmers have had with GM canola, thus, politicized its biology in new ways. This politicization was somewhat unexpected given, as I explain in the next section, the cultural legitimacy of canola as a product of scientific manipulation.

**iv. Nationalism and the cultural politics of canola**

The development of canola through extensive collaboration across disciplines and institutions has been a source of pride for Canadian scientists. In fact, in 1982 Canadian public sector institutions were responsible for all of the six cultivars actively being grown in the world (Phillips, 2001: 107). Despite that the private sector has subsequently taken over the process of registering and commercializing new canola varieties, Canadian scientists and the Canadian state still understand their involvement in canola research as an arena of competitive advantage *vis à vis* other crops and countries, and as a great example of Canadian innovation. In fact, innovation pervades the discourse around canola not only in the labs, but also in the fields where canola growers are commonly posited as innovative, forward-looking and entrepreneurial subjects. As a food, however, canola is not very culturally important to eaters. It carries none of the religious and historical significance that is associated with wheat.
For Canadian scientists, growers, and agricultural policy makers there is a lot at stake in the continued success of canola. Canada has its reputation as the founder of and leading scientific innovator in the crop to protect. This was a theme that I heard time and again during the interviews I conducted with scientists, the Canola Council of Canada, Saskatchewan Agriculture and Food, farmers, and even regulators at the Canadian Food Inspection Agency. With the increasing prominence of private investment in canola research and breeding, keeping internationally competitive in canola has meant supporting research agendas and directions that will derive profit. Monsanto’s decision to divest from all wheat after it faced resistance to its genetically modified variety (thus compromising a major source of current and future investment in wheat) was often mobilized by interviewees as an example of why public policy, science, and producers could not discriminate between GM and non GM innovations. This was especially true in canola because any rejection of new innovations would be understood as a change of course:

I would say biotechnology, innovation in general and biotechnology specifically have been a really big part of success for canola and as an overall industry I think we’re still very supportive of innovation and new traits, new products. You know the ability to service new customers or introduce more, more efficiently, I think that’s always been, and still is, a really key value for the Council. And so if it’s a value for the council that’s because it’s a value for the entire value chain right?...[It]’s because there’s agreement amongst the stakeholders of the industry that this is an important thing for canola, for the commodity [Interview, Canola Council of Canada, 8].

The identity of canola and innovation was so strong amongst the participants in this research that one scientist stressed that a certain level of arrogance exists around the crop such that the scientific community understands canola as its “baby” and, thus, fully under its direction and care. Brought into existence locally through scientific labour, scientists
saw no need to secure public legitimacy for subsequent innovations such as genetic modification [Interview, University of Saskatchewan, 11].

Innovation in the canola industry is now understood as one of Canada’s competitive advantages vis à vis other countries and other crops. Especially in a province like Saskatchewan, with a peripheral history and economy, policy makers have been eager to support agricultural research that might compete with programmes in the U.S. and Europe. In Saskatchewan this has meant supporting canola research and genetic modification:

We looked at the strength of the research capacity that we have at the University of Saskatchewan and at that time we had scientists who were and still are at the leading edge of genetic modification technology in plants so we bolstered that and invested in that science...as opposed to taking our research funding and putting it into areas where we don’t have capacity... we thought long-term we need to be competitive and the way we’re competitive is to make sure that we keep pace with our competitors...we look to markets in the United States and Australia and Europe and we try to keep pace with that in terms of our research investment...[Interview, Saskatchewan Agriculture and Food, 3].

The canola industry’s embrace of genetic modification is touted as evidence of its forward looking attitude. Interestingly, this discourse also applies to the farmers that grow canola. They have adopted new technologies such as genetic modification and new farm practices such as zero till which makes them innovators and risk takers. Moreover, they must market their crop independently without the knowledge and help of institutions like the Wheat Board, which lends them an entrepreneurial spirit:

So canola was introduced and there [were] improvements made to varieties, and then herbicide tolerant canola was produced, and now hybrids, and now modified products, lots of different opportunities for farmers within that crop to find the things that best suit their farm. Whether that’s where their farm is located, whether that’s how they want to manage the cost of production, whatever. So I think that’s really appealed to a certain entrepreneurial and innovative spirit. I mean that’s a big part of what keeps guys going out there to grind away in the field. And again I think it really appeals to people with a very innovative
entrepreneurial kind of spirit and you know I’ve even heard farmers talk about that they feel proud about canola from a health aspect. That, you know, they’re making the world a healthier place through growing this oil [Interview, Canola Council of Canada, 9-10].

While a strong cultural nationalism associated with innovation exists within the canola industry (including scientists and farmers) a popular culture of canola as a food is relatively weak. I do not wish to suggest here that a popular culture of food is necessarily reliant on nationalist discourses. Rather, consumers attach little meaning at all to canola as food. Whereas wheat carries with it historical and religious symbolism, canola has very little significance to consumers. If anything, eaters identify canola as a Canadian product and as a healthy oil because of aggressive marketing campaigns that had to transform it from machine grease to edible oil. This interviewee, who had advocated against genetic modification in canola found that, in contrast to wheat, canola lacked the cultural identity that could galvanize a popular campaign:

Yeah, so all those cultural and I guess even religious people were kind of brought in to the picture with bread, the GMO bread issue. And I think, like canola doesn’t have those kinds of associations and canola itself is kind of a new product. Like we didn’t have canola 50, 60 years ago. And canola oil had been touted as a healthy product, but that whole demand for canola was also kind of constructed through marketing and stuff. It didn’t come from a deep cultural place, and there’s other oils. And if you don’t wanna use canola oil, well use olive oil or sunflower oil or something [Interview, Saskatchewan Organic Directorate, 5].

Canola and wheat are, thus, differently produced through nationalist and cultural discourses that do distinct work. The discourses of innovation and competitive advantage that are reproduced in canola, contribute to the fashioning of farmers, agricultural policy and scientific work, but provide a weak ground through which to galvanize consumers. On the other hand, discourses of heritage and spirituality that are reproduced through wheat have the capacity to animate consumers. In the case of Monsanto’s RR wheat,
cultural and nationalist discourses associated with wheat translated into a strong articulation of opposition and a robust sense of identity as prairie farmers and Canadian consumers.

**Conclusion**

By now it should be clear that both wheat and canola can be understood as companion species of prairie farmers, but in radically different ways. Haraway’s material-semiotic actor and companion species have helped me narrate this chapter in ways that, I hope, show the co-constitutionality of both wheat and people and canola and people. While it is true that the biologies of wheat and canola have been thoroughly altered by human manipulation and science, it is also true that farmers have adapted their practices and politics to the behaviour of the two crops. Furthermore, eaters and prairie people have also been constituted by the semiotics of wheat and canola. Consistent with Haraway’s treatment of dog culture, it is important to understand the material-semiotics and co-constitutionalities of wheat, canola, and people as part of their political economy.

In this chapter I have shown that both wheat and canola have a particular and real materiality that constrains and enables certain practices and relationships, yet this materiality is not unchanging and fixed, and it is certainly not apolitical. Instead, the particular biological difficulties associated with the production of canola were harnessed as opportunities for private accumulation; and the production systems accompanying new varieties and technologies have further weakened producers’ abilities to re-use canola seed or grow the crop organically. This contrasts strongly with the case of wheat, which has seen relatively little private investment and is particularly important to organic
growers. Wheat, in relation to canola, is easily managed by farmers and its seed is customarily reproduced outside of the market.

The two crops also have diverging political and institutional histories, which have shaped the characters of the two industries and influenced the meanings of the two crops for producers, scientists, industry players and the consuming public. For example, the struggle for pools and regulations in wheat have meant that producer-centred organizations like the CWB still hold much clout in the wheat industry and are able to influence breeding and research agendas. The canola industry, on the contrary, is characterised strongly by private investment and an industry organization, the CCC, that must weigh the interests of producers with other (more powerful) players in the industry.

For the Canadian scientific and agricultural communities, canola is a powerful symbol of Canadian innovation and competitive advantage. It is a relatively new crop that is understood as a product of scientific manipulation. This contrasts strongly with the cultural politics that surround wheat. Wheat has historical and religious symbolism for Canadian eaters and for farmers, whose agricultural heritage is strongly associated with the crop. While I have not comprehensively outlined the ways in which these attributes have contributed to the diverging politics of genetic modification in the two crops, I hope this chapter provides the context needed for engaging this question in the chapters that follow.
Chapter 3: Articulating the Politics of Production through Discourses of Consumption: Producers Make their Case against GM Wheat

In July, 2001 a broad coalition of farm, consumer, environmental, health, and industry organizations joined forces to publicly voice their opposition to RR wheat in Canada. While six of the nine organizations involved in the coalition were rural and farm organizations, the prospect of Monsanto receiving environmental and health approval for and commercializing RR wheat in Canada allowed for the articulation of a broad set of concerns and claims and a diverse and unusual alliance between actors – including farmers working with Greenpeace activists and other urban and consumer NGOs. The struggle over RR wheat in Canada has articulated more traditional questions (such as the extraction of surplus and control from farmers) with issues such as democratic process, consumer knowledge, environmental and health risks and much more. In many ways, these were issues behind which it was possible for all the groups involved to rally. All groups in the coalition could agree about the lack of transparency and democracy in Canadian biotech policy and regulation, and the unresponsiveness of government departments and organizations to such claims.

This chapter looks at the ways in which producer concerns (including both practical attention to agronomic viability and access to markets, and more longstanding questions about how to keep profit and control on the farm) became articulated with and through issues and discourses that are often characterised as consumer-driven. For example, the refusal of Europe and Japan to accept GM material in their food imports became the strongest argument against the introduction of RR wheat, one that farmers advanced by reciting claims about the supremacy of the consumer. Furthermore, criticisms about the lack of democracy and transparency within the
regulatory apparatus and Canadian biotech policy were used by all groups to point to the ways that corporate interests had come to outweigh issues such as health and environmental wellbeing, and public control over the seed and food systems. In this way, the movement against RR wheat on the Canadian prairies provides an interesting contrast with other anti-GM movements in the Global North that have been described most prominently as consumer rejections of frankenfoods. I argue that such readings, at least in this empirical case, erase the ways in which producer questions are still central to political struggles.

I begin this chapter by reviewing the literature on anti-GM movements. I go on to highlight the three main claims that came to dominate the discourse of opposition to RR wheat in Canada. Next, I show that producer interests were quite central to the GM wheat debate and that these were articulated through and alongside discourses of consumption, environment and democracy. The chapter concludes by reflecting on the durability of the main arguments that framed the opposition to RR wheat. As regulations around GMOs change at the international and EU levels and as the Canadian state begins to more routinely include public consultations before regulatory change and make more information available to producers and consumers, how will production-centred questions be articulated in future biotech battles?

This chapter draws mostly from interviews with representatives from the organizations involved in the coalition against RR wheat, and from the press releases and policy documents of these groups. However, I have certainly been influenced by what I have learned from my other interviews with scientists at Agriculture and Agri-food Canada and at public universities; representatives from the Canadian Food Inspection Agency; farm (industry) groups that were publicly supportive of GM wheat including the Western Canadian Wheat Growers Association, the Western Barley Growers Association, the Grain Growers of Canada, and the Canola Council
of Canada; biotech lobby groups such as Croplife Canada; and a representative from Monsanto Canada. In this chapter, press releases, policy documents, and testimony to the Senate and Parliament Standing Committees\textsuperscript{24} provide the best insights about the relative importance of the different arguments against GM wheat for each organization. Interviews with members of these organizations provided me with a more dynamic sense of how they came up with the positions they did and how these changed over the course of debate. Interviews also afforded insights into the internal debates within organizations and into the ways in which they understood their articulations with other organizations and other issues. These are the sources of evidence that have allowed me to argue (in this particular case) that producer interests were central to the anti-GM wheat campaign.

**Producing and Consuming Opposition to GMOs**

The issue of genetic modification has provided fertile ground for academics in the past few decades, especially since it has erupted as a hotly contested political issue in diverse geographical contexts, across multiple scales, and animating a number of issue areas from the environment and food safety, to the corporate control of seeds and agriculture and much more. On top of the proliferation of academic interest in the regulation of GM foods at various scales (on international regulation see Clapp, 2003; Kleinman and Kinchy, 2007; Mbengue and Thomas, 2005; Newell, 2004; on Canadian regulation see Andree, 2002; Hartley and Skogstad, 2005; Prudham and Morris, 2006; Turner, 2001) there is now a growing body of work.

\textsuperscript{24} The agriculture standing committees of the Senate and House of Commons held hearings on the issue of RR wheat as the debate heated in Canada, in late 2001 and mid 2003 respectively. A crisis of legitimacy in the Canadian regulatory apparatus (including Health Canada, Environment Canada, and the Canadian Food Inspection Agency) was sparked after the Royal Society of Canada’s expert panel on the future of food biotechnology released its report in early 2001. The panel condemned the regulatory system as lax and riddled by conflicts of interest. This report and the vocal opposition of the anti-RR wheat coalition at the centre of this chapter meant that the approval of RR wheat and the conditions of its commercialization were very much in the political limelight.
that examines social resistance to GMOs (see for example Hall and Moran (2006); Heller, 2006; Magnan, 2007; Muller, 2006; Purdue, 2000; Reisner, 2001; Roff, 2007; Schurman, 2004; Schurman and Munro, 2006). Much of this work focuses on movements in the Global North where resistance has achieved a level of success, for example, by pressuring sub-national, national and European levels of authority to implement moratoria on the production and/or importation of GM crops and foods.

Of particular note in academic writing about anti-GM movements in the Global North is the analytical attention given by authors to market-based action and consumer fears about food and environmental safety. For example, Schurman (2004) examined the successes of the European anti-GM movement’s attacks on big food retailers, supermarket chains, and Monsanto. While this movement cannot be understood only as a consumer movement (since its main proponents were parties and organizations such as the German Green Party, Greenpeace-Switzerland, the UK Green Alliance, the UK Genetics Forum and the Intermediate Technology Development Group in the U.K.), it was directed at consumers and mobilized primarily consumer fears about potential environmental and health risks associated with GM foods. In fact, in another essay that traces the development of the anti-GM movement more broadly, Schurman and Munro (2006) highlight that casting GMOs as an issue of consumer rights involving risks to health, ethics, culture and the environment was a particularly successful achievement of European activists. Buttel (2005) agrees that discourses of environmental risk have been at the centre of anti-GM movements, but, unlike Shurman and Munro, argues that this framing is a strategic mistake since it side-steps issues such as the corporate control of agriculture.
Purdue (2000) has provided an in-depth overview of the emergence of the anti-GM movement through extensive fieldwork (primarily) in Britain. Purdue has been most interested in the movement’s claims and actions with regard to the patenting of life forms and the crisis of natural and agricultural biodiversity and, thus, included a wider range of NGOs in his sample including those working on peasant and agricultural rights. However, his analysis showed that most of the NGOs advocating agricultural and seed rights were focused on solidarity with peasants and peasant organizations in the Global South. Despite the leadership of such organizations, the most common framing of the problem of GMOs was around environmental risk (60), and one of the most important effects of the anti-GM campaign was to renew Northern environmental movements (135). In Scotland, Hall and Moran also (2006) found that anti-GM activists’ conceptions of the risks posed by GM crops were primarily related to the environment and human health, even though there was some variation across gender and rural/urban lines.

In North America, scholars have similarly pointed to the prominence of discourses of consumption and consumer rights. This has been the case even when “food and agriculture groups” were included in the analysis. For example, Reisner (2001: 1392-3), considered food and agriculture groups including “organic consumers’ associations, sustainable agriculture advocates, and consumer advocate groups” as a category of resistance in her analysis of the fight against GMOs in the U.S. and argued that these groups posit GM foods, first and foremost, as embodying unknowable health risks to consumers. Roff (2007), also focusing on the U.S. movement, affirms that non-GMO activist groups have framed their opposition in terms of ‘consumerist’ discourses and have chosen to pursue individualist consumer action as their primary method of resistance. However, unlike those reviewed above, Roff criticizes such
tactics arguing that they constitute a neoliberalization of activism that will have little success in achieving social and ecological justice in agriculture and food.

What can be made of the analytical focus of scholars on the politics of consumption including health and environmental risk with regards to anti-GM movements? Is it the case that producers have not been able to adequately intervene with their concerns in debates about genetic modification? Have producer interests such as the ability to save seed and maintain farm profitability and control not been attractive to media and scholars? Or alternatively, have farm organizations felt it necessary to articulate their grievances by mobilizing and appealing to consumers and consumption?

The above questions are particularly enigmatic given that a growing literature exists about producer attitudes to GMOs, the incentives to adopt GM crops, and the economic costs and benefits of adoption (see for example Berwald et al, 2006; Bullock and Nitsi, 2001; Fulton and Keyowski, 1999; Goldsmith, 2001; Hall, 2008). Producers are, thus, recognized as actors that can influence the commercial success of GM crops, yet they figure only marginally in accounts of political opposition. Notable exceptions include the work of Magnan (2007) and Muller (2006) who both focus on the same producer-led movement at the centre of this research. Heller (2007) provides a last exception with her account of the role of the Confederation Paysanne, a well-known union of small farmers, in the French debate over GMOs. The author shows how French farmers were successfully able to engage and mobilize the discourse of quality that has come to characterise post-industrial agriculture in order to cast GM foods as antithetical to quality and culture. In this account, farmers are involved in shaping popular discourse around GMOs and do so by articulating their concerns in terms that mobilize public interest in the preservation of French food culture.
Heller’s attention to ‘quality agriculture discourse’ as a form of governmentality in Western Europe points to an empirical trend that may also be partially responsible for scholarly attention to discourses of consumption and consumer action in movements against GMOs. In fact, geographers studying food and agriculture suggest that consumers (especially in the Global North) are demanding foods with qualities such as local, organic, ecological, and ethical because of the failures of industrial, productivist food systems in providing food safety, environmental sustainability, and public accountability (Murdoch et al., 2000). These empirical turns to ‘quality’ production (that include the increasing prominence and/or resurgence of phenomena such as farmers markets, fair trade networks, organic production, slow food movements, and various labelling initiatives -- see for example Marsden and Smith, 2005; Renting et al., 2003) are shaping and being shaped by broader economic shifts away from regimes of accumulation based on mass-production and consumption. For example, Ilbery and Kneafsey (1998) chart a post-productivist re-orientation in European agriculture starting in the mid 1980s. For them, post-productivism in agriculture includes a shift in production from quantity to quality, growing environmental regulation of agriculture, movement to more sustainable farming practices, increasing international competition, and declining state supports. In this context, alternative food networks and quality production offer new strategies for development in rural (Ilbery and Kneafsey, 1998) and more recently urban (Donald and Blay-Palmer, 2006) areas that have suffered from the effects of the abandonment of Keynesian organization of production across space, and increased competition from trade liberalization. This empirical turn to quality food has opened up space for a politics of consumption that producers can (and have) exploit(ed).

The analytical prominence of consumer concerns in anti-GM movements might also be explained by what Goodman and DuPuis (2002) identify as increasing academic interest in the
politics of consumption and the influence of actors that are closer to the consumption end of commodity chains (such as consumers and retailers). They explain that this expansion of interest to the realm of consumption is partly the result of a broader ‘cultural turn’ in social theory. For example, authors such as Cook and Crang (1996) assert the potential of consumers as knowing and capable agents who might be involved in resisting the images constructed around commodities through strategies such as “radical passivity”. In this way, commodity fetishes (which have been understood as veils concealing underlying social and ecological relations by those more concerned with production) are recast as political surfaces prone to both mundane and strategic rupture (Cook et al, 2004). Such was the case in Freidberg’s (2004) analysis of the NGOs and popular media that forced British supermarkets into ‘ethical’ reforms of their global supply chains through media savvy consumer campaigns.

There is, thus, good reason that little has been written about producers’ engagements in anti-GM struggles. An empirical shift to quality production has been demanded by consumers who are disgruntled with the impersonal quality of productivist agriculture and made uneasy by recent food scares. In this context, consumers have been highly responsive to activist claims about the potential health and environmental risks associated with GM foods. Furthermore, the ‘cultural turn’ has heightened academic awareness to the productivity of popular culture and the politics of consumption. However, these empirical and theoretical trends do not mean that producer interests and concerns are of little importance to anti-GM movements. Instead, as I go on to show in the next sections, in the Canadian debate around RR wheat producers were successfully able to mobilize their concerns and interests through and alongside a politics and discourse of consumption. In asserting the analytical importance of the politics of production I do not wish to suggest that there have been no meaningful changes associated with transitions
from industrial to post-industrial economies or that producer issues and interests have remained objective and unchanging over time. Rather, contemporary prairie producers face a different set of challenges than those engaged in struggle in different times and places. In fact, new opportunities have been opened up to producers to articulate their vulnerable positions in the political economy of agriculture through discourses and grievances that have wider appeal and the potential to engage consumers in the politics of agriculture.

Working Coalitions

There was a huge news conference in Winnipeg where we had this table and we had Greenpeace and the Farmers Union and the Wheat Board and you know on and on, and I think it got sort of neck-snapping attention from government and Monsanto and everybody else because they were really surprised by the diversity of the resistance to this stuff [Interview, National Farmers Union, 4].

Yeah, well it wasn’t just to take the position...we already had the position, as did the wheat board. So joining the group though was how can we sit down at the table with Greenpeace and the Council of Canadians for example? [Interview, Keystone Agricultural Producers, 3].

So it was like a coalition behind closed door type-of-thing. And send an email to them [the Canadian Wheat Board], we’re gonna do this on such day...and then they would coordinate it that way. But they couldn’t afford to come up because their members would never forgive them being aligned with groups like Greenpeace and Council of Canadians because we’re the crop pullers [Interview, Council of Canadians, 6-7].

In July, 2001, while Monsanto was conducting the necessary field trials for its application for unconfined release of roundup ready wheat in Canada, a coalition of farm, consumer, health, environmental and industry organizations came forward and announced the varied reasons for their opposition to it at a press conference in Winnipeg. As the above quotes indicate, working in coalition against the introduction of RR wheat in Canada was both highly effective and tenuous for the groups involved. As the members of this nine group coalition (summarized in table 3) emphasized to me, their strength came largely from their multifaceted and
comprehensive attack on the logic behind RR wheat including criticisms that focused on implications for the environment, health, consumers, agronomics, markets, democracy, transparency, and corporate power. At this press conference each group stressed what it knew best from a domain in which it already had some legitimacy. For example, Greenpeace spoke about the environment, farm organizations about agronomics, the Canadian Wheat Board about the potential loss of markets, and the Council of Canadians about consumers not wanting to eat GM foods.

Despite the strength that the coalition drew from its breadth, its cohesion was precarious. Members of the mainstream farm groups were highly sceptical of (being seen to be) working with consumer and environmental groups like Greenpeace and the Council of Canadians. They understood these organizations as potentially threatening to conventional agriculture and disliked their tactics of protest. As one farmer representing the Agricultural Producers Association of Saskatchewan (APAS) (whose sentiments I found echoed in many of my interviews) described to me “if they [Greenpeace] would grandstand that press release that we were having down in Winnipeg we would pull out, meaning some stupid Greenpeacer was climbing a tower or something like that you know we were out” [APAS, 3]. Farm groups were, however, reluctantly ready to set aside their differences with urban environmental and health activists because they recognized that the issue of GM wheat was not only a farm issue and, thus, they could not stop it alone.

Not only was it rare for farm groups to work with environmental and health activists, but cleavages across farm organizations also came into play. For example, the NFU was understood

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25 For example, on the issue of mandatory labelling of GMOs (which was under consideration, but eventually defeated) in the late 1990s in Canada, the Council of Canadians and Greenpeace had been big proponents, while most of the general farm organizations supported only voluntary labelling arguing that the cost of mandatory labelling would be downloaded onto them.
as having a more radical position on GMOs, one from which general farm organizations wanted to distinguish themselves. However, despite the NFUs consistently structural criticisms of many aspects of farm policy and reality, it also had a long-established reputation of cooperating and strategically allying with other groups in the farm community on issue-specific bases. Farm groups were familiar with the NFU, and its more radical stance against GMOs was accommodated by the coalition. More problematic for many of the mainstream farm organizations was the SOD’s presence in the coalition. With the rapid growth of organic agriculture on the prairies in the last decade came a certain degree of hostility from so-called conventional farmers who were being asked by their organic neighbours to, for example, modify their spraying practices so that neighbours’ fields would not be contaminated. The SOD’s categorical rejection of all GMOs was seen among some in the conventional farming community as an insensitive position.

While the groups each approached the topic, at least initially, from different perspectives and strategically used the legitimacy they had already secured in their separate fields of expertise, a few key issues came to dominate the discourse of opposition to GM wheat. Despite struggles over internal dynamics, there was a great degree of consensus about many of the grounds for the coalition’s opposition. Most convincingly, the groups argued that RR wheat should not be introduced in Canada because it would threaten existing export wheat markets. This claim was rendered particularly legitimate and forceful because of the active engagement of and mobilization done by the Canadian Wheat Board (CWB), Western Canada’s single desk marketing agency that has a monopoly in the export of wheat and barley. The CWB was able to quickly gather information from its buyers and quite early on in the debate announced that over two thirds of its customers would have reservations about buying Canadian wheat if Canada
were also growing RR varieties. As a representative of the CWB told me in an interview, concerns about market acceptance were sparked in the late 1990s by customers who, amid introductions of GM soy and canola, began to question whether other crops were also being modified. When the CWB looked into the research being done on wheat and discovered that Roundup Ready was in the pipeline they consulted farmers through focus groups in order to establish a position on GM wheat.

Because at the time we thought, well yeah maybe customers are saying they don’t want it, but farmers, there’s really something in it for farmers and maybe the cost benefit swings in farmers’ favour. So we went out to the farmers and said, with some focus group meetings “are you interested in GM wheat, and what in particular?” And we heard mostly was that yeah, maybe if there was a disease resistance they might be interested, but roundup ready wheat was not something that was required. So then it got us thinking a bit more about the farmer voice and then led into the coalition work we were doing [Interview, Canadian Wheat Board, 2].

In December 2001, the CWB convened a group of farmer, grain industry, technology developer, customer, and federal government representatives (from, for example, Agriculture and Agri-Food Canada and the CFIA) to form the Canadian Grain Industry Working Group on Genetically Modified Wheat. This group was not entirely against genetic modification; rather, they produced a document listing the necessary conditions for the introduction of GM wheat, which included appropriate market acceptance, adequate segregation systems that would keep GM and non-GM wheat separate, more information on how potential agronomic challenges would be dealt with, and a positive cost-benefit for farmers.

It was not only the grain industry and farmers that placed so much importance on the market argument. The Council of Canadians (CoC), the Canadian Health Coalition (CHC) and Greenpeace Canada also emphasized that consumer polling in Canada showed that the majority

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26 This statistic increased as the CWB did more consultations with buyers and as the debate heated up. By early 2003 the CWB was announcing that over 80% of Canada’s customers for Canada Western Red Spring Wheat would not buy from Canada if it were also growing GM wheat.
of Canadians would choose not to eat GM products if they had the choice. The CoC began their testimony to the Senate Standing Committee on Agriculture and Forestry in November 2001 on precisely this point:

Genetically engineered foods were introduced into our food supply without our knowledge or consent. Today, they account for up to 70 per cent of processed foods found in our grocery stores. Though Canadians have expressed clear concerns over the lack of proper testing of these foods on public and environmental health, this government seems determined to continue releasing new GE products, such as GE wheat, into our food supply. Poll after poll\textsuperscript{27} has shown the growing unease and bafflement at the fact that we are being forced to consume foods that could potentially be harmful to our health.

Being an international organization with coordinated campaigns across several countries, Greenpeace mobilized both domestic and international market opposition to GMOs and placed the market non-acceptance of GMOs at the front and centre of its campaign. In fact, the market argument became so strong that all groups involved in the coalition used it very frequently and prominently in their policy statements, press releases and public discourse.

A second argument that articulated both producer and consumer concerns centred on the potential environmental impacts of unconfined release. Here the coalition was concerned with both the possibility of completely unknown and unknowable environmental risks, and a set of more familiar and predictable impacts that were based on experience with RR canola. The general farm organizations APAS and Keystone Agricultural Producers (KAP) were particularly keen on showing how the introduction of RR wheat could threaten the environmental benefits associated with the practice of “zero-till” agriculture that has been adopted quite widely on the prairies. Ironically, it was the introduction of RR canola that spurred on the practice of zero-till in which farmers “drill” their seed into the ground through last year’s stubble. Instead of tilling

\textsuperscript{27} For example, an Ipsos-Reid Corp. poll of market trends and food choices found that 58% of Canadians thought that using GMOs was a negative trend in 2002. This indicated an increase in consumer weariness of GMOs since in 1998 only 45% identified the use of GMOs in food as negative (Duckworth, 2004).
to knock down weeds, roundup is applied to “burn off” weeds and volunteers from previous rotations. A second roundup ready crop in rotations, they argued, would threaten the viability of the practice of zero-till because volunteers would be roundup resistant and, therefore, require the application of a second herbicide or the need to till.

But round-up ready wheat does not work in Western Canada because we use zero till and that explains it right here [reading from his written comments to the House Standing Committee on Agriculture and Agri-food]. “We conserve moisture with zero-till, we reduce fossil fuel consumption, we improve soil quality, we reduce soil erosion”. Now I don’t know if you’re old enough to remember, when we used to drive down the roads in this province, the dust storms we had... You know the whole bloody province would have looked like the dirty thirties eh? And realizing how we’re saving the soil with zero till [Interview, Agricultural Producers Association of Saskatchewan 5-6].

Not surprisingly, Greenpeace also highlighted ecological disruption as one of their main concerns with RR wheat. They echoed many of the ecological impacts raised by the various farm groups and added that RR wheat could have deleterious effects on biodiversity and on soil biota. Specifically, Greenpeace was concerned with the consequences of increased reliance on glyphosate, which a second roundup ready crop would engender. Biodiversity would be negatively impacted by the increased use of a herbicide that kills everything other than RR crops, and although roundup had been scientifically shown to have little toxic effect on animals, Greenpeace was concerned about its effect on fish and marine ecosystems through run-off (MacRae et.al., 2002). Two studies on the effects of glyphosate on soil biota (King et.al., 2001 and Kremer et al, 2000) also allowed Greenpeace to argue that glyphosate disrupts soil organisms in a way that increases agronomic challenges on the farm.

The Saskatchewan Organic Directorate (SOD) was also key in spreading the discourse of environmental harm during the debate over RR wheat. Being committed to farming practices that exclude agricultural herbicides like roundup, the SOD made strong arguments about the trait selected for modification being roundup resistance. Furthermore, the directorate attracted a lot
of media attention because of their attempts at the certification of a class action against Monsanto and Bayer (the latter is responsible for a different GM herbicide tolerant canola called Liberty Link) for the de facto loss of canola as an organic crop. Here, contamination through pollen flow or via wind (especially in winter when seed can blow long distances across snow-covered fields) has meant that the production of organic canola in most parts of the prairies is no longer possible. On top of the risks associated with pollen flow and blowing seed, it is nearly impossible to get GM free seed.28 Thus, the SOD was successfully able to publicize and draw attention to the threat that the genetic modification of field crops (and particularly of wheat because of its prominent position in most organic and non-organic farmers’ rotations) poses for the viability of organic farming on the prairies.

The third argument that came to dominate the discourse of opposition to GM wheat revolved around the lack of democratic and transparent process in the development of biotech policy and regulation in Canada. The number of arguments that I heard and unearthed during my research that fit into this category are simply too many to summarize here, but the few that I do address were the most prominent. In their policy documents and presentation to the House Standing Committee on Agriculture and Agri-food in 2003, the Saskatchewan Association of Rural Municipalities (SARM) listed the secrecy of the field trial locations of RR wheat as their number two concern, following only the possible loss of markets. By 2003 farmers had been denied by the CFIA their request to know the locations of the 45 Monsanto field trials across three provinces (CFIA, 2002). They were worried that their own fields might become contaminated with GM material if they were too close to the secret test sites. Because of their

28 Studies conducted by Agriculture and Agri-food Canada (Downey and Beckie, 2002) and by University of Manitoba plant scientists (Friesen et al, 2003) found that even pedigreed seed lots for conventional canola had been contaminated with herbicide resistant traits at levels above 0.25% (the threshold above which pedigreed seed cannot be certified).
experience with GM canola, which had, by the early 2000s, thoroughly contaminated the canola seed supply and handling system producers knew that outcrossing and the spread of GM wheat seed by wind were real possibilities. In a 2003 memo to then Agriculture Minister Lyle Vanclief, Stephen Yarrow, head of the Plant Biosafety Office at CFIA, admitted that “The CFIA is caught between on the one hand wanting to provide information about its activities to Canadians and to protect their interests, and on the other hand protecting the business information of researchers conducting confined trials” (Wilson, 2003).

All the organizations involved in the July 2001 coalition highlighted in their press releases, policy documents, testimony to the Standing Committees, or in their interviews with me that no meaningful public debate had preceded the introduction of GMOs in Canada. Major stakeholders had not been consulted on individual modifications, and many even argued that consumers, farmers and the general public had been purposefully kept in the dark. For example, when I asked about why the release of GM canola was not highly politicized, my participants explained that it was not widely known that it was under approval, and that any information they did have about GM canola was from Monsanto’s pre-release promotions. Furthermore, the Council of Canadians, the National Farmers Union, the Canadian Health Coalition, the Saskatchewan Organic Directorate, and Greenpeace Canada all pointed to the failure of the Canadian state to implement a mandatory labelling scheme for food containing GMOs (which had been under consideration and before parliament but ultimately denied for vote in 2002). They argued that mandatory labelling was a necessary precondition for transparency and that the government’s intention was to silence consumers on the issue of GMOs by taking away their ability to discriminate between GM and non GM products.
Charges of secrecy and a lack of democracy were also applied to other branches of the Canadian state, including Agriculture and Agri-food Canada (AAFC) which was a partner in the development of RR wheat\textsuperscript{29} and was also involved in research about the ecological, agronomic and economic impacts of GMOs. In fact, for many of the groups opposing RR wheat, the only way to get their questions about AAFC’s relationship with the biotech industry, and even the results of AAFC’s scientific research, was through filing requests under Canada’s Access to Information and Privacy Act. Greenpeace and the Canadian Health Coalition collaborated in filing more than a thousand requests in the early 2000s (interview, Canadian Health Coalition); and farm organizations that had heard about an AAFC study about GM contamination in pedigreed seed lots were not provided with the data until they filed a request (interviews, NFU and SOD). In an interview with a scientist at a Canadian public university, the situation was summarized in this way:

The other unfortunate thing that we’ve seen in Canada is that, at least when the wheat situation was, is that Agriculture Canada scientists were given a gag order. I mean even if it had never been written on paper, when you talk to those scientists they have been told that they cannot make public comments on anything related to GM period. Scientists in public institutions, at least government institutions that have been told they can’t talk about this, even though they could have contributed to the conversation. So what did that leave? That left university people...And even amongst university researchers, if they happen to be under contract to do research for one of these private companies they were put in a position where they couldn’t comment. So there were very few people that could really provide a good balanced commentary on anything related to that. And that still exists in Canada today; I mean we still have that situation. So it’s very hard to get a really good balanced discussion on what needs to happen on the whole process around this technology.

\textsuperscript{29} Fittingly, the details of the contract between AAFC and Monsanto have never been released. It is known that “AAFC provided non-exclusive access to developmental germplasm so that the company could integrate its own proprietary technology” (Government of Canada, 2003). They also contributed scientists and lands for field trials and stood to gain marginal royalties once the technology was released (interviews, AAFC scientists).
As I will show shortly, issues of democracy and transparency were nearly always closely linked to claims that the Canadian state was not acting in the public interest, but instead reorienting research and regulation to favour private commercial interests.

**Production through Consumption**

So, if we cannot grow organic wheat, there cannot be organic farms or grain farmers. And if we can’t be organic grain farmers then there’s no organic food. Or, you know, like you lose the food supply, because we’ve lost the farmers. And I think that was the argument that was the strongest for us. It’s really, it’s our livelihood, it’s our way of life, it’s our history, it’s our future, it’s, you know, it’s all bound up in whether we can. If one of our primary crops is not available to us, you know, we basically die [Interview, Saskatchewan Organic Directorate, 5].

Well there’s producer interest narrowly and broadly. Narrowly, you know, just does this stuff really make you more profitable, but broadly...it is a question of who is going to control agriculture...the real struggle was who would control the food system, farmers or corporations? And the pivotal battle in that larger struggle was around seed. And the thing that was in play was wheat. You know, would wheat become the high priced patented seed that was sold and controlled by a few corporations or would it remain a seed that was largely farm saved and provided by farmers and controlled by farmers and reused at, you know, no cost. So, we were quite clear that this was a subset of a larger fight over corporate control of the food system [Interview, National Farmers Union, 3].

At first glance, the coalition to stop RR wheat seems to be a good example of a new social movement in a post-industrial agri-food landscape. In the coalition’s press releases and policy documents, testimony to the House and Senate Standing Committees, and in-depth interviews with me one can easily identify the increased need to think about consumers and their politics at sites of production, the prominent position of environmental concerns in current discourses of consumption and production, and a prioritizing of demands for more democracy over criticisms of capitalism. Yet, as I argue in this section, concerns over the extraction of surplus from agriculture and the control of food systems have not been totally erased, but rather have been strategically articulated through discourses of consumer sovereignty, environmental risks and democracy. In this way, the movement against GM wheat on the Canadian prairies
challenges academic characterisations of anti-GM campaigns as being driven by consumer and environmental politics.

The market acceptance argument was particularly successful for prairie producers because they could easily appropriate the discourse of “the consumer knows best” from various branches of the Canadian and provincial states in their extension services and recommendations about adapting to the future agrarian economy. The idea that farmers should spend more time and effort developing (niche) markets and thinking about the consumers of their products can be seen in the literature on quality in food networks that posits a more discriminating, knowledgeable and demanding consumer in the post-industrial world (see for example Murdoch et al, 2000). This was a discourse that I witnessed in action at the five farm meetings I attended during my field research and that applies even more strongly to organic producers who are part of an industry that is more consumer-driven than their conventional counterparts. Rather than producing “commodity” wheat for the bulk undifferentiated market, farmers were being instructed to get (or stay) competitive by developing their websites, reaching out to contractors, and growing specialty products that could be tailored to the exact specification of the buyer. Thus, when the CWB made public that over 80% of Canada’s export markets in wheat would not accept RR varieties, the producer organizations had found their silver bullet:

Farmers in Canada have been encouraged to be more responsive to the consumer and design their production for the marketplace demand. We need to be very sensitive to this demand….It is not reasonable to encourage producers within a country to cater to market demand and then register and release for production a crop that has no consumer acceptance [Agricultural Producers Association of Saskatchewan testimony to the House Standing Committee on Agriculture and Agri-Food, 2003].

Producers strategically mobilized the “consumer knows best” discourse in order to advance a concept of their own interests as precariously positioned vis à vis other actors in wheat commodity chains including powerful corporations such as Monsanto and empowered
consumers upon whom they were quite dependent in their successful opposition to RR wheat
(but upon whom they could not always expect to count):

Organics really is a consumer driven enterprise and if consumers of organic food decide
that they can accept a level of GMO contamination then, I mean, farmers will go along
with that. So right now our argument hinges quite a bit on the fact that the European
Union, or Europeans in general, the European market for organic food is very strong on
anti-GMO and if that changes...then that really knocks the props out from underneath our
argument here. Yeah, and I think it would be really unfortunate because I think it opens
up the door for all kinds of loss of control over our food system...So I think it’s quite a
pivotal struggle that’s going on right now [Interview, Saskatchewan Organic Directorate,
13].

Cloaked in the “consumer knows best” language, all producer groups demanded the addition of a
cost-benefit analysis to the regulatory approval process, which reinforced the notion that primary
producers have a legitimate and distinct economic stake in wheat commodity chains. Without
specific protection, producer interests would be undermined:

…and on the GMO wheat, by the time we got there then that argument around losing our
markets, our international market, customers not wanting it, it actually being no benefit to
farmers, it was strictly seen then as a corporate benefit. By then, by the time that came
along we were armed. And there was really very little discussion even in the Farmers Union
that we should back off, that we shouldn’t be so critical, that some of our members wanted
this stuff. By then nobody wanted it [Interview, National Farmers Union, 4-5].

Indeed, the opposition of producer interests to corporate interests can be found in the discourse
of all the groups involved, not just those with a history of radical agrarian politics. The SARM,
for example, clearly, described this opposition to the House Standing Committee on Agriculture
and Agri-Food (2003):

The reason we are in favour of a regulatory approach versus a volunteer approach is to
ensure that farmers’ interests are given adequate consideration in the process. A voluntary
approach that relied on a technology developer to withhold developments would not give
enough weight to farmers interests. Developers may not have the incentive to withhold
products from the market. It’s their development. They spend a lot of money. They want to
get it out there.
The fact that environmental issues came to occupy a position of significant importance in the debate around RR wheat also, at first glance, seems to position this struggle as characteristic of a consumer-driven anti-GM politics. Interestingly however, the arguments about environmental risk put forth by the coalition cannot be understood as underlain by a conception of nature as external (Smith, 1984), which Cronon (1995) has shown underlie the motivations of many conservation agencies. In this case, nature was not primarily understood as a realm separate from humans and social relations, as pristine, and in need of saving. Instead, all the groups involved connected genetic modification to specific agronomic implications and the risk of creating “new” natures with unintended consequences. Greenpeace trod most closely to the “nature as external” conceptualisation, for example, arguing at the Senate Standing Committee on Agriculture and Forestry in November of 2001 that:

Crop management responses to these problems [referring to the transfer of herbicide resistance to wild plants] such as increased fertilizer use, shortened crop rotation and shifts in pesticide use that increase toxic loads in the environment could have devastating effects on natural soils, terrestrial and aquatic ecosystems. For example, they could cause shifts in food sources and habitat for insects, soil organisms and birds and their predators. Or they could result in contamination of soil and groundwater from pesticides.

Yet, in this testimony and in other documents such as Against the Grain (MacRae, et al, 2002), Greenpeace discussed the prairies as produced natures and working landscapes. Thus, for Greenpeace, environmental risks included not only the possible impacts of farming on insects, soil organisms, etc., but also questions about what particular natures were agronomically practical and manageable for farmers.

The conception of the prairies as produced natures and working landscapes was an environmental discourse behind which even producers who had felt threatened by ecologists in the past could stand. It was also a discourse that they knew had significant potential for coalition building. Farm organizations could engage consumer groups and the general public by talking
about issues like invasive weeds and at the same time get the public to think about the nature of the work that farmers do. Weeds (including the potential increased weediness in wheat or the development of herbicide resistance in other plants through outcrossing or adaptation) became a central environmental concern for all groups involved and pointed to a conception of nature as inseparable from human values, intention and production, though neither completely controlled nor controllable. The production of new organisms was simply too risky because of the organization of on-farm socio-natural relationships including practices such as zero till.

The serious lack of democratic and transparent process in the regulation and policy-making around GMOs in Canada was another message that the Canadian media and public found compelling. Demands for more democracy and transparency were methods through which the organizations working in coalition articulated the conflicts of interests that they perceived between a Canadian state charged with both regulating and promoting GMOs and between public needs (in terms of, for example, consumer choice and the viability of family-farm production) and for-profit private industry. However, demands for more democracy and transparency were not only strategic methods for mobilizing producer questions, but also legitimate claims in and of themselves. Still, such demands most often appeared along-side arguments about who would lose and gain from the introduction of RR wheat; while arguments about the corporate control of food and seed systems were most often made with reference to the failure of the state to properly protect public interests.

Of particular interest to all the organizations involved in opposing RR wheat was the conflicting role of the state who is on the one hand responsible for the promotion and advancement of GMOs, particularly through Agriculture and Agri-Food Canada (AAFC), and, on the other hand, the regulation of GMOs, primarily through the Canadian Food Inspection
Agency (CFIA). As many of the groups pointed out the AAFC and the CFIA report to the same minister and work collaboratively on much of their policy and practice:

Well, the lines between regulation and promotion, and that. Other people have told you that probably, that it’s all sort of blurred in there. CFIA seemed to want to approve GM wheat...many, many people have said that the CFIA sees the corporations as the client and the citizens as somehow a nuisance. And we got that impression that they were there, you know, in the absence of easily identifiable proof of health damage or something like that, they were there to work with the seed companies to move their new GM products through the system [Interview, National Farmers Union, 11].

Not only that, but producers (from every organization that I interviewed) articulated that the state’s retreat from agriculture research through the AAFC, public universities, and at provincial levels has added to their vulnerability:

And I think the real tragedy is it’s to the detriment of good old fashioned publicly funded research in agriculture that both levels of government used to provide. And it was always seen as a social benefit across the board for all society...to have that publicly funded research. Unfortunately what’s happened is that government has decided that they’re gonna put tax payers money in funding biotech companies, chemical companies, and departments of agriculture at the university level and elsewhere have ended up being turned into avenues for using public money to fund private for-profit enterprise. Public money’s going in to line the pockets of the shareholders of companies like Monsanto and Bayer through the university departments of agriculture etcetera. So it’s a bad situation, yeah [Interview, Saskatchewan Organic Directorate, 7].

For producers the outright catering to biotech companies became even clearer when, in 2002, the CFIA removed the market test criteria that an advisory committee, through the prairie Registration Recommending Committee for Grains, could use when evaluating applications for the registration of new varieties. The market test was a mechanism that had fallen out of use, but that recommending committees were considering mobilizing in order to stave off GM wheat:

There’s a big push from CFIA to totally revamp the variety registration process, which is going to take the issue of GMOs out of our committee and give it to an advisory committee, and effectively it’s gonna muzzle my ability in that committee...to bring up this issue because they’re gonna say it’s a non-issue, they’re gonna deal with it. So who’s gonna sit on this committee? Who knows, are there gonna be any farmers on that committee? Probably not...it’s more rubber stamping than anything else, and here too a company like Monsanto submits data, CFIA reviews it, they don’t do their own
independent testing. And based on an evaluation done by a couple of people in an office maybe they’re gonna say yes or no, and there hasn’t been any nos. Every single genetically modified food crop in Canada...has never been rejected [Interview, Saskatchewan Organic Directorate, 17].

**Conclusion**

In response to the predominant academic focus on consumer and environmental activism around GMOs, this chapter has investigated how producers factored their concerns into the campaign to stop the introduction of RR wheat in Canada. At first glance, the arguments that came to dominate the discourse of opposition against RR wheat in Canada seem to be characteristic of a post-industrial politics of food wherein new actors (such as consumers), new issues (such as the environment), and new sites (such as state regulatory apparatuses and scientific laboratories) become politicized. However, as I have shown, discourses of markets, the environment, and democracy were almost always articulated alongside producer concerns about the profitability of agriculture and the control of food systems. In fact, arguments about market acceptance were used to expose the vulnerability of producers vis à vis other actors in the wheat commodity chain; claims about possible environmental risk were used to advance a notion of nature as produced and the prairies as working landscapes; and complaints about a lack of democratic and transparent process were entangled with charges of conflict of interest between a public sphere which is supposed to protect public (including producer) interests and for-profit corporations attempting to gain more control over food systems.

By mobilising the discourses of markets, the environment, and democracy, the coalition at the centre of this research was ultimately successful in pressuring the Canadian government and Monsanto to withdraw their application for unconfined release of RR wheat. However, opponents of biotechnology are unlikely to be able to use the same arguments in future biotech battles in Canada. The argument that galvanized the most support during the campaign to
prevent the introduction of RR wheat has been significantly weakened as the European Union has slowly approved more genetically modified food and crops (even while many member countries maintain their own bans). For example, the moratorium on GMOs ended in Europe in 2004 and in 2006 Dupont’s GM maize was approved for all food uses in the EU. Furthermore, research into modifications that would be more consumer-friendly (such as altered oil profiles in canola) are underway and could undermine consumer opposition to GMOs. In this context, producers will need to find alternate methods of advancing their claims to farm profitability and control.

Demands for more democracy and transparency are other claims that will be hard to sustain in future biotech battles in Canada. This is not because such issues have been resolved by the Canadian state, but because the CFIA has institutionalized mechanisms such as public consultations that provide a veneer of public accountability and transparency. In fact, the Canadian state is quite intent on changing the public perception of GMOs and has begun to fund pro-biotech education campaigns and large biotech research centres in public universities that require partnerships with private industry. Will social movement organizations’ claims about the conflicts of interest that characterise the Canadian state’s treatment of biotechnology policy and regulation continue to be perceived as legitimate if public consultations and commercially-driven research become routinized and normalized?

As Buttel (2005) has argued, the “environmentalisation” of the arguments put forward by movements against GM crops also present possible political ambiguities for the future. While the Canadian movement against RR wheat mobilized the environment in ways that linked it intimately to the work that farmers do and the negative reworking of agronomic practices required by RR wheat, it is possible that future modifications will provide real environmental
benefits. For example, Buttel (2005) suggests that most scientists trained in the last two decades see genetic modification as a research method with potential for breeding traits that could contribute to sustainable agronomic practices. In this case, anti-GM activists will want to develop allies in the research community so that they can ensure that research is done not for the private benefit of agro-chemical companies but with goals such as reducing producer risk and inputs such as water and agro-chemicals. In other words, producer interests, both narrowly and widely conceived in terms of keeping profit and control on the farm, rather than in the hands of companies like Monsanto, may not preclude the use of genetic modification tout court. Certainly, farmers will want to be driving the conversation about agricultural research agendas (including their environmental implications) whether these agendas include the use of genetic modification or not.

At stake in this debate are the consequences associated with what Friedmann (2005) has identified as an emerging “third food regime”. For Friedmann, this third regime is precipitated by a world food crisis, beginning in 1973, that called into question the organization of international and national relationships associated with the second regime including heavy state involvement in price-setting or direct payments to farmers, import controls, subsidized exports disguised as food aid, and the transnational industrial integration of commodity chains. Responding to the demands of social movements in dealing with these food crises, Friedmann suggests that a corporate-environmental regime is beginning to consolidate. This “third food regime” is led by corporate retailers that re-organize commodity chains to combine environmental politics with increasingly privatized governance systems such as labels and standards. On the one hand, national standards in food safety and quality are lowered through
international agreements to liberalize trade; while on the other hand a private set of more stringent standards is erected and valorized by wealthier consumers.

While the articulation of producer interests through discourses of markets, the environment and democracy were sufficient in (temporarily?) staving off RR wheat in Canada, it is clear that the control of genetic modification by large multinationals such as Monsanto has not been sufficiently challenged. Producers and consumers must think hard about which discourses and strategies can successfully push back the corporate environmental takeover of food systems, regulations and standards. The appropriate strategies and discourses will need to engage and mobilize consumers in the fate of food systems through and alongside the knowledge and experience that farmers have about keeping control and profit on the farm. Future battles over GMOs must name the set of social and environmental problems that accompanies private for-profit agricultural research and the ways in which regulatory standards, farm organization, and consumer “choice” are being handed over to corporate control.
Chapter Four: Contesting the Value(s) of GM Wheat on the Canadian Prairies

Having already established the three arguments that came to dominate the public discourse of opposition to RR wheat and how producers articulated their resistance through and alongside consumer discourses, this chapter uses the lens of value(s) to show why farmers opposed Monsanto’s RR wheat economy. In this chapter I highlight the value dimensions of many of the same arguments that I characterised as dominating the discourse of opposition to RR wheat in the previous chapter, but I do not limit the analysis to only those covered in the previous chapter. While producers certainly articulated their resistance alongside consumer discourses, they often justified their positions to me by mobilizing concepts of just values. In other words, the framing of producer interests as consumer discourses does not preclude that these same discourses reference concepts of value.

Early farm organizing on the Canadian prairies focused on the extraction of surplus value from the farm. Farmers understood input suppliers upstream, and grain merchants, elevator companies and railroads downstream as capturing part of the value that was produced and legitimately belonged on the farm and in the family. In much the same way that early 1900s input suppliers sought to ensure producer dependency on markets for their means of production, Monsanto’s contemporary attempt to introduce RR wheat can and should be understood as an effort to wrestle more surplus and control over agriculture away from farmers. Yet the claims put forward by the anti-GM wheat coalition at the centre of this research revolved around the production and circulation of values at additional sites including public scientific laboratories, consumer markets in Europe, and specific agronomic practices in farmers’ fields. Like the
previous chapter, this one emphasizes the multiplicity of sites and issues that came to characterize politicization around RR wheat.

The chapter begins with a discussion of the literature on value and of the practical inseparability of nominally economic and cultural values. The notion of commodities as sites of values helps to break down the divide between economic and cultural categories and to conceive of cultural values as always being produced and circulated alongside economic values. I then go on to show what role different categories of value (including surplus, exchange, use and cultural/moral values) played in understanding the politicization of RR wheat. For example, claims that I have characterised as pertaining to the extraction of surplus were used against Monsanto for their unpaid use of the labour of public scientists, whose surplus value was thought to belong legitimately in the public domain. Second, the circulation and realisation of value became politicized since prairie producers were sceptical that they would be able to successfully (or adequately) exchange their products for payment on wary consumer markets in Europe and Japan. Third, for producers, the use value of the roundup ready trait in wheat was small because of agronomic particularities. Fourth, cultural attachments to bread as a meaningful food and wheat as the crop with which the prairies were settled and around which early farm organizing coalesced meant that farmers and the public valued wheat for more than its monetary return on the market. In fact, producing wheat is a thoroughly moral and cultural practice for prairie producers. As I will show, the politicization of RR wheat brought into sharp focus producers’ expectations about their cultural-economic livelihoods. Monsanto’s proposed RR wheat economy crossed moral boundaries; it proposed uncertainty in the realms of exchange and use value, moved public value into private hands and infringed on cultural attachments to wheat.
The Moral Economy of Values

Marx begins his analysis of the political economy of capitalism in volume one of Capital by dwelling over the commodity form. Through an unpacking of the material commodity he introduces the concepts of use and exchange value as fundamental and simultaneous modes of existence of all commodities and develops his labour theory of value. In this chapter, I invoke the relational understanding of commodities and values as set out by Marx to argue that commodities can be properly understood as sites of value. Tied up in their production and consumption as use and exchange value, commodities also always embody cultural and moral values for their producers and consumers. Yet the social relations of capitalist production treat commodities as if only the quantitative aspects of their exchange value matter. This chapter is not an attempt to impose abstract conceptions and analyses of value onto a distinct empirical reality. Rather, the research starts with the experiences of producers and their practices of linking economy, morality, culture and exploitation. I argue that the introduction of RR wheat in Canada became contested because of the way that Monsanto’s GM wheat economy ignored the full content of values through which producers understand their involvement with wheat.

Even though Marx directed relatively little attention towards the type of producers about whom I am writing (i.e. those who do not sell their labour on the market nor routinely hire regular labour for their production), his labour theory of value (LTV) has been useful in conceptualising the feelings of economic exploitation that underlie contemporary and historical struggles over prairie agriculture. At the root of the LTV is an understanding that human labour is necessary to produce the conditions of existence (or the capacity of society to reproduce itself), and that any production above this minimum is a site of struggle over surplus. For the industrial worker, as Marx thoroughly explains in volume one of Capital, the struggle occurs between the workers and the owners of the means of production who extract value over and above what they
pay the workers. The capitalists, in effect, steal this surplus from the workers and use it to increase their own consumption and to expand production. In the case of petty commodity producers who own their means of production, the struggle over surplus value occurs through different relations. The surplus produced by a family farmer (i.e. the product of labour above what is necessary to reproduce family subsistence and the conditions of production) is often siphoned off by various actors who sell to or buy from the farmer, especially if these actors hold a monopoly in their trade. In volume three of Capital, Marx suggests that credit suppliers (usurers) and landowners are particularly exploitative in this regard, extracting virtually the entirety of the farmer’s surplus (Marx, 1981: 932). Credit, as explained by Henderson (1999), is necessary in agriculture where production and working times are disunited and turnover times are dependent on lengthy natural processes. In the case of Canadian prairie farmers (who rely primarily on family labour and are often not beholden to landowners) credit and input suppliers upstream and grain merchants and elevator companies downstream are of particular concern.

Whatever their relationship to the means of production and wage labour, family farmers produce commodities for the market and are increasingly dependent on markets in order to buy their factors of production. For Kloppenburg (2004: 33-35), this means that commodity relations are just as important in family farming as in other industries. It follows that a careful understanding of the commodity form is crucial to an analysis of agricultural production.

In the Limits to Capital (1982: 3-4), David Harvey argues that Marx treated value and commodities as relational categories and that linear interpretations have since oversimplified value theory by reifying exchange value as a fixed and immutable building block of that theory. Indeed, a close reading of Capital highlights the ways in which use value, exchange value and value are always contained as related moments in all commodities. While the farmer produces
the commodity with its exchange value in mind, it must embody a use value if it is going to successfully exchange on the market. Not only that, but a commodity’s exchange value is its use value to the producer. Thus, use and exchange value are relative to one’s position as buyer or seller. Generalized commodity production, the main feature of capitalism (Marx, 1976), occurs when all individuals embody both roles. Workers sell their labour power in the marketplace and buy their means of subsistence and capitalists buy both their means of subsistence and means of production and sell commodities.

The different moments of exchange and use contained in the commodity are central to the process through which value is realized and exchanged for money so that it can be reinvested in the expansion of production. In other words, the commodities produced by workers or farmers must be successfully distributed and exchanged on the market, and the different moments of their value as exchange and use literally facilitate their movement. This opens up opportunity to examine the political potency that consumers and actors closer to the consumption side of circulation can play. If capitalist relations presuppose the expansion of value, then any actions that slow down or redirect the process of exchange are potential sites of disruption and resistance (Cook and Crang 1996; Cook et. al. 2004). Whether these actions take on a collective or individual form and the extent to which they undermine capitalist relations is a matter for discussion in another place. What is sure (as I showed in the previous chapter) is that consumer resistance to GM food, especially in Europe and Japan, was a key argument for farmers in their defeat of GM wheat in Canada. Scholars of other anti-GM movements (for example Roff, 2007; Schurman 2004) have similarly noted the prominence of a consumer politics in struggles over GM food. Importantly, consumer movements can force changes in production practices; and as I
showed in the previous chapter, their actions and arguments can also be capitalized upon by producers.

The separation in time and space of buyers from sellers, of producers from each other and of consumers from each other that characterizes generalized commodity production introduces the phenomenon of commodity fetishism. This is an aspect of Marx’s analysis of capitalist political economy that has received much attention and continues to be a contemporary subject for research and debate. For Marx (1976: 163-176), the commodity form is a fetishized mode of the social uses of material things and is the result of at least two processes. First, products are produced in order to be exchanged on the market; thus, their exchange value becomes the greatest concern in production and their use values are alienated from their producers. Second, under generalized commodity production, average necessary labour measured in quantitative time becomes the value through which all products are made commensurable and, thus, exchangeable. For producers, the division of labour that is facilitated by the measuring of value as abstract labour means that they only encounter each other and the products of their own and each other’s labour in the market. Thus, “the relationships between the producers, within which the social characteristics of their labours are manifested, take on the form of a social relation between the products of labour...a relation which exists apart from and outside the producers (164-65)”. Producers are thus made into consumers from whom the specific relations of particular production processes are hidden.

While the process of fetishization prioritizes exchange value over use value and quantitative, abstracted labour over qualitative processes of concrete work, it is a mistake to suggest that the specific and qualitative aspects of work and use are obliterated through capitalist production. Instead, the abstract ideal of average necessary labour time, and the importance of
exchange value only gloss over a much more complex reality of concrete labour and diverse use values. A similar argument is taken up by Polanyi (2001) in relation to land, labour and money. For Polanyi, land, labour and money are not commodities because they are not produced for sale on the market, yet capitalist relations of production treat them as all other commodities. As these ‘fictitious commodities’ become increasingly incorporated into markets, and thus (mis)treated as commodities, countermovements arise in order to protect the rootedness of land, labour and money in natural, social and political processes. While Polanyi is specifically accounting for the fictitiousness of land, labour and money, the cultural, political and natural context from which and in which commodities are produced mean that all commodities contain more than just exchange value. This is consistent with Polanyi’s (2001) insight that across cultures and throughout time “man’s (sic) economy, as a rule, is submerged in his social relationships” (48), and that it is fictitious to treat commodities as things in and of themselves.

So while capitalism fetishizes commodities as sites of exchange value, a plethora of additional values are necessarily produced and intertwined with exchange value. Such values include material, but also symbolic and ethical worth and use. First, use values remain fundamental to the commodity for the consumer; there is no exchange if a consumer does not find the commodity useful for whatever purpose. Thus, use values are subjective; they vary across time and space and, for Marx, also with the ‘level of development’ of a society. For example, Canadian farmers find little use value in pineapple seeds since they cannot be grown in that climate, and communities without access to electric power will have no use for appliances such as computers. Moreover, use values relate not only to material necessity, but also to luxury goods and to aesthetic, emotional, psychological, symbolic and other needs (Guthman, 2002). For example, the consumer of a fine wine might find use value in the distinction it lends. In this
way, use values can be very locally distinct and are partly constructed through moral and cultural conventions – the very fact that a wine is understood as ‘fine’ implies a cultural construction of its worth. Second, and precisely because commodity fetishism obscures the social and cultural relations of production, marketers and consumers can engage in attaching new images and meanings to commodities that appeal to human desires (Kaika and Swyngedouw, 2000). In this sense, “commodities do not only carry their materiality but also the promise and the dream of a better society and a happier life” (Kaika and Swyngedouw, 2000: 123).

For Peter Jackson (2002) commodity fetishes are not veils that should be peeled back in order to reveal the social relations at sites of production. Instead, fetishes themselves are appropriate sites for research and it is important to engage the meanings and values that consumers and marketers attach to commodities. Consumers are not duped by the singular appearance of commodities as exchange value. Rather, they are moral beings that make political discriminations based on their deciphering of media images and on their personal identities and values (Jackson, 2002). But as Guthman (2002) points out, the meanings and values that consumers ascribe to commodities are not outside of processes of commodification themselves. In fact, in the case of organics, companies have invested in labels and conventions in order, precisely, to commodify feelings of mistrust among consumers and values such as ecological responsibility. Although they differ in their political analyses of commodity fetishism, both Jackson and Guthman affirm the perspective that commodities are sites of mutually constituted and inseparable economic and cultural values.

As described above, commodity fetishism pertains not only to sites of consumption, but must also be understood as the outcome of productive relations that treat workers and concrete processes of work as abstract necessary labour. Under capitalist relations of production labour
power is sold as a commodity. Therefore, it is subject to the same process of commodity
fetishism described above, where its quantitative exchange value comes to represent it as a
discrete thing. But this is an abstraction away from the multiple values that are in fact contained
in concrete labour. As Sunder Rajan (2006) describes it in his study of biocapital, the dialectic
relationship between forms of abstraction and forms of materiality underpins Marx’s
understanding of capitalist political economy. While abstractions such as labour power and
exchange value concretely structure capitalist political economy, they only exist because of the
work that is accomplished by their material others. Because all work is specific and concrete,
labour is embedded in moral and cultural values. Just like other commodities, labour is a site of
more than just exchange value.

Thus far I have shown how commodities (including labour power) can be properly
understood as sites of multiple values that are produced and circulate alongside exchange value.
This is a way of understanding the LTV as a set of relational processes that presuppose cultural
and symbolic specificity and distinctions and that help to break down the dichotomy between
culture and economy. A second method of undoing the culture-economy divide is being
practiced in a growing, but longstanding, body of literature on moral economies (Jackson et. al.,
2008; Sayer, 2003; Miller, 2008; Polanyi, 2001; Scott, 1976; Thompson, 1971). For example,
James Scott’s (1976) finding that peasants are more likely to rebel when their notions of
economic justice and proper treatment have been breached exposes the intimate way in which
economy and work are intertwined with culturally specific notions of fair treatment. More
broadly, contemporary scholars have been using the concept of moral economy to investigate
“the moral sentiments and norms that influence economic behaviour and how these are in turn
influenced, compromised, or overridden by economic forces” (Sayer, 2003: 341).
In this chapter I use a conception of injustice largely derived from Scott’s (1976) study of the moral economy of peasants. For Scott, injustice and exploitation can not be deduced from an abstract standard of equity; rather, they must be induced from the accounts, feelings and values of the “real actors” (160). While the LTV contains a fairly straightforward understanding of exploitation and injustice based on the capitalist’s appropriation of part of the value produced by the labourer, I use a concept of justice in this chapter that takes into account the feelings of economic and cultural mistreatment derived from my research participants. For my research participants injustice was the result of more than just appropriation of surplus value, even though the theft of surplus must also be understood as exploitation. In fact, research participants were much more concerned with the distribution of the cultural economic costs and benefits of RR wheat. Importantly, and as shown by Scott, producers have moral expectations about fair treatment that can not be captured by monetary valuations. They have expectations of reciprocity, the capacity to subsist, and, as I will show, about the use, exchange and cultural values of wheat.

There is in fact much room within the LTV to include analyses of moral economies. As I have shown, commodities are necessarily co-constituted by nominally economic, moral and cultural values. For example, farmers often have emotional and cultural attachments to their land, to specific crops and methods of production, and to their identities as farmers. Similarly, consumers may be fearful of certain technologies, have cultural affinities to particular foods, and practice a distinct ethic of consumption. Rather than contrasting these moral and cultural values with Marx’s political economy of value (see for example Miller, 2008) I go on to show how these are intimately connected. Extra-economic factors must not only be brought into the analysis of economy, but categories such as exchange, surplus and use value are themselves fully
constituted by moral and cultural relationships. The implications of a formally capitalist economy that prioritizes and orients itself almost completely around exchange value are profound, as can be gathered from the case of RR wheat. While all economic activity is embedded in cultural and moral practices and produces and consumes use value, the formal economy measures value only in terms of price. This method of measurement has the effect of disciplining economic actors in ways that contravene the fundamental embeddedness of value(s) in society.

In the next sections of this chapter I separate surplus, exchange, use and cultural value for analytical purposes. While these categories usefully distinguish between different processes, I also want to argue that they cannot be sustained without the others and that they are completely intertwined with one another. So while I hold the categories apart in order to speak to the different ways in which producers variously ascribed value(s), they should not be understood as self-sufficient and stable categories. Indeed, the reader will find that within the distinct categories, the analysis implicates the others.

**Surplus Value**

It is interesting to look at the politics of GM wheat in Canada through the lens of value since the extraction of farm value by large businesses has been a historical point of focus for agrarian politics and organizing. As I have recounted in chapter two, there is a long history of populist political organizing that began on the Canadian prairies as it was settled and that contested the ways in which the national economy was being built and the position of the yeoman farmer within that system. Purposefully bypassing the monopolies of large agricultural companies in railroads, elevators, banking, grain handling, milling and machinery, farmers
organized cooperatives and pools in wheat in order to take back some of the surplus value that was being appropriated by all-powerful companies both upstream and downstream.

Given this history, it is not surprising that the 2001 coalition made strong arguments about the production and circulation of value in their attempts to stop the introduction of GM wheat. Rather, what is surprising is that the arguments about the extraction of surplus value by Monsanto focused more strongly on their unpaid use of the dead and living labour of public scientists than it did on the capturing of surplus value produced by farm labour. This is not to say that the latter argument was completely absent. In fact, the National Farmer’s Union (NFU) was at pains to show that growing Monsanto’s GM wheat seed would dispossess farmers of (part of) their means of production in much the same way that Monsanto’s Roundup Ready canola currently forces farmers into the market every year to buy seed. Moreover, the highly publicized trial of Percy Schmeiser, a Saskatchewan farmer who had been taken to court by Monsanto for patent infringement, was under-way during the height of the GM controversy. Arguing that the Roundup Ready canola had arrived on his farm without his knowledge, there was much public sympathy for Schmeiser’s case and Monsanto was perceived as a corporate menace threatening the viability of family farming. Following this example, RR seed could have been easily cast as just another means through which a corporation like Monsanto could take hold of value produced by farmers’ labour. But while most of the groups involved in the coalition were aware of this framing of the issue, only the NFU used it prominently in their public discourse and literature and in interviews with me.

Rather than criticizing Monsanto for the extraction of surplus from agriculture through the commodification of seed, the coalition condemned the multinational company most strongly for its relationship with the Canadian state through Agriculture and Agri-Food Canada (AAFC).
In fact, since the terms of the contract between AAFC and Monsanto on GM wheat were never released to the public, the coalition spent considerable time and effort filing numerous requests under Canada’s Access to Information Act to uncover and publicize the exact nature of the relationship. According to the documents that these groups were able to obtain AAFC invested $850 million in the development of Roundup Ready wheat, provided facilities such as access to AAFC’s field test sites, and committed three wheat breeders to the project (CBC News, 2003). In return for these services and labour Monsanto would share 5% of the royalties on RR wheat with AAFC.

The Anti-RR wheat coalition was, indeed, successful at publicizing the relationship and at casting it as contrary to public interests (this is parallel to the argument about public accountability and democratic process that I made in the previous chapter). In fact, the use of public labour and facilities was an issue behind which all the groups in the coalition could stand. Importantly, it was attractive to the non-farm groups in the coalition and to the general tax-paying public in both rural and urban areas. The image of Monsanto as a corporate menace that was gaining ground through the Schmeiser case was no longer confined to the company’s relationship with farmers. For example, in their submission to the House of Commons Committee on Agriculture and Agri-food in 2003 and in their 2003 petition to the federal government Greenpeace highlighted as problematic:

- AAFC providing prime, publicly-owned germplasm to Monsanto to develop its RR wheat;
- AAFC carrying out Monsanto's variety registration field trials for the company on contract, trials that serve to facilitate Monsanto's bid to commercialize GE wheat rather than to achieve a biosafety objective;
- AAFC providing Monsanto with at least $800,000 in Matching Investment Initiative funding...

The popularity of this line of argument is demonstrated by the significant media coverage it garnered and by the fact that it was taken up by other organizations and lobbies that were not part
of the coalition. For example, the Canadian Broadcasting Corporation featured the details from the Access to Information Requests regarding the nature of Monsanto’s relationship with AAFC on its televised national news programme on July 11, 2003. Furthermore, on December 9, 2003 non-coalition NGOs such as the Polaris Institute, the Ecological Farmers of Ontario and the Sierra Club joined members of the coalition in a protest at the office of the then Minister of Agriculture Lyle Vanclief. At the protest and in their press releases the groups emphasized that public scientific labour and other resources should not be handed over for exploitation by private interests (Sierra Club of Canada, 2003). The concern of the coalition and the general public was thus two-fold. First, the coalition and its supporters insisted that contemporary labour and its product (surplus value), which was being paid for by public money, should not be made available to a private for-profit company. Second, they condemned the private use of the fruits of past (dead) public labour, for example, in the collection and maintenance of germplasm and field test sites.

Most notable about the coalition’s choice to criticize the surplus value extraction by Monsanto from public scientists rather than from farm labour was that this framing was not inconsistent with the interests and strategies of the very company in question. Setting aside the unpaid use of public labour and facilities, this representative of Monsanto was well aware of the benefits for the company of public scientific inquiry and knowledge creation more broadly:

...it’s a sign of a healthy country and a healthy economy if you have a good...public research engagement. They [public scientists] can ask all kinds of questions that you, they have the time to reflect on what are some long term implications. They’re not tied to delivering quarterly results to shareholders, so they can take the long view. They’re good at doing research that doesn’t necessarily have an immediate commercial outcome but is really imperative to the long-term success of a company like Monsanto or the industry as a whole. So, they get less and less funding all the time and that’s a big concern to me [Interview, Monsanto, 13].
Even if the coalition had had its way and AAFC had instituted a policy that saw no more collaboration with private companies, advances in basic and/or biotechnological science in the public sphere would still have served private interests as long as this knowledge was circulated widely through journals and conferences. In this way, the separation between public and private spheres and interests breaks down and the coalition’s claims that public labour and resources should not line the pockets of private companies loses coherence.

Perhaps if the coalition had known the long-term plans of Monsanto for its roundup ready trait it would have been more inclined to focus on the strategy of surplus extraction from farm labour. Indeed, it is no coincidence that Monsanto developed a trait like roundup resistance before focusing on more ‘consumer-friendly’ traits like anti-oxidant richness or low glycemic load. As I discovered during my interview with a representative from Monsanto, the roundup ready trait was perceived as the easiest and most effective mechanism of capturing rent for the company. In fact, Monsanto was unsure that food companies or consumers would be willing to pay a premium for consumer traits. Thus, the ‘second generation’ traits that the company was in the process of developing were to be stacked on top of the roundup ready gene. Farmers, Monsanto incorrectly reckoned, could be counted on to hand over the necessary surplus for the company to earn a profit:

Because of intellectual property...there’s just no way you can collect royalties on, it’s very difficult. Roundup ready allows [us], we could effectively offer a lot of things free of charge into the marketplace. In other words farmers would pay for their roundup ready but they’d get the benefit of growing something that a food company would really want but a food company will never pay for. So we could simply go to farmers and say ok, your risk management tool is roundup ready, so you’re paying us for that, but you should know that we know exactly where this wheat is going and the people who are buying our varieties for ethanol, they’re going to pay their portion of the ethanol piece. And by the way, because they’re paying for the backend portion of it we can substantially reduce on the roundup, in other words we can do a cost share. But without that, the roundup gene gave you all the traceability, so it’s a very simple to monitor etcetera, so
our whole intellectual property mechanism, for me it became far too difficult to think about tracking five different waxy rows...[Interview, Monsanto, 15].

Monsanto was particularly dependent on the roundup ready gene to extract surplus from agriculture, because, as the above quotation indicates, it was so practical. First, Monsanto had much experience with the gene in a variety of different plants. For example, RR canola now accounts for over 46% of all canola grown nationally (Canola Council of Canada, 2007) and it has been used in other plants such as cotton and soybeans for over a decade. Furthermore, the RR gene is easily traced and tested for – there are reliable markers on either side of the gene and one can easily test for its presence in live plants by applying Roundup. For these reasons Monsanto was going to continue relying on the surplus produced by farm labour to fund and profit from new modifications. Thus, when Monsanto announced that it would discontinue RR wheat a whole host of other modifications were, at least temporarily, put on hold. For the coalition, this was not the result of a convincing campaign about the extraction of surplus from agriculture. Rather, it was a fortuitous effect of a multifaceted attack on GM wheat which also included criticisms in the realms of exchange, use and moral values.

**Exchange Value**

Among the strongest arguments that the coalition advanced against the commercialization of RR wheat centred on the improbability that farmers would be sufficiently able to exchange their crops for payment on wary consumer markets. Here again, when contrasted with the almost singular focus on the extraction of surplus value from farm labour in the earlier part of the 20th century, the success of this argument represents the politicization of an expanded set of sites and processes. Indeed, the claims made by scholars and analysts of food and agriculture about the increasing role of consumer preferences and politics in the organization of food production (see for example Murdoch et. al. 2000; Marsden and Smith, 2005; Renting et. al., 2003) are well
supported by this empirical case. Analysts are right to claim that there would have been no widespread opposition to GM wheat in Canada had consumers, especially in Japan and Europe, not forced their regulators to prohibit the importation of GM foods. Yet, as I show in this section, this fact did not automatically result in an organized and widespread politics of opposition.

Evidence that existing export wheat markets would not continue to accept Canadian wheat if it were genetically modified was made to count because of the efforts of the Canadian Wheat Board (CWB) which was a vocal member of the anti-RR wheat coalition at the centre of this chapter. This quasi-state monopoly marketing board was the result of early 20th Century farm organizing. It continues to pool Western Canadian wheat and markets it in the interests of farmers. Because of its monopoly, the CWB was able to quickly gather information from its buyers and early on in the debate announced that over two thirds (this figure rose to over 80% as the campaign continued) of its customers would have reservations about buying Canadian wheat if Canada were also growing RR varieties. As a representative of the CWB told me in an interview, concerns about market acceptance were sparked in the late 1990s by customers who, amid introductions of GM soy and canola, questioned whether other crops were also being modified. When the CWB looked into the research being done on wheat and discovered that Roundup Ready was in the pipeline they set out to understand, through focus group meetings, whether farmers wanted to see the trait commercialized. They soon discovered that farmers were largely against its commercialization (see for example the quotation on page 116).

The idea that the politicization of wheat markets led directly to a widespread politics of opposition among farmers is complicated by the role of the CWB in the politics of RR wheat. First, as the representative from the CWB emphasized to me in an interview, the organization
would have been much less active against the commercialization of RR wheat had the modification been a trait that farmers perceived as useful (more on the use value of RR wheat for producers in the next section). Although dedicated to the marketing of wheat and barley, and thus spending a great deal of effort and time with the buyers of wheat and the idiosyncrasies of specialized markets, the CWB prioritizes the needs and interests of producers in its practice. As a representative of the National Farmers’ Union emphasized to me in an interview “[n]one of the corporations like Cargill, and ADM and Louis Dreyfus, they would never have released customer data like that, but the Wheat Board did [NFU, 10]”. Second, opposition to GM affects different commodities in uneven ways. Comparing the case of GM canola, which was introduced without much domestic opposition, with that of GM wheat, this interviewee from Croplife Canada (a national trade organization that represents agricultural biotech developers and distributors) explains:

[Canola] hasn’t been around for very long in terms of food quality canola, so we export into major markets but only about 7 or 8 major markets globally. Wheat we’ve been producing in this country since we’ve been producing food. So it’s sold into A LOT of global marketplaces around the world. And as you know, not all markets are accepting GM crops at this point, although again, I think that’s changing. So there were more concerns around market acceptance with wheat than there were with canola and trying to get approvals in all those marketplaces probably just wasn’t doable at that time. But I think the question is could we have facilitated both, so could we have segregated the GM wheat to keep it separate from conventional wheat? [Interview, Croplife Canada, 6]

The third point of contingency in translating wary consumer markets into opposition to GM wheat in Canada, revolved around the possibility of segregating GM and non-GM crops (as alluded to in the quotation above). While biotech proponents pushed for the establishment of a segregation system, which would have allowed for the “co-existence” of GM and non-GM wheat, the coalition worked to render strict segregation unimaginable. Importantly, the members

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30 Canada’s major markets for canola were/are Japan, Mexico and China. Only small amounts were being exported to Europe when GM canola was introduced
of the coalition mobilized their experiences with GM canola to argue that as biological
organisms seeds and their genes could not be contained once they were introduced to the farm
environment. In fact, the Saskatchewan Organic Directorate put this argument forth most
prominently in their attempts to certify a class action against Monsanto and Bayer Cropscience
for the de facto loss of canola as an organic crop. Here, contamination through pollen flow or
via wind (especially in winter when seed can blow long distances across snow-covered fields)
has meant that the production of organic canola in most parts of the prairies is no longer possible.
On top of the risks associated with pollen flow and blowing seed, it is nearly impossible to get
GM free seed.

The co-existence of GM and non-GM wheat was also made unimaginable by the
practicalities of grain handling systems on the Canadian prairies. Even supporters of GM wheat
(like the following representative of the Grain Growers of Canada) admitted that the existing
infrastructure would not be able to accommodate segregation:

Ironically, the system that would be able to help handle this problem would have been the
old wooden elevator system, because it was smaller and able to segregate more. But you
know in the 90s this thing rationalised, huge, and then these great big terminals go up.
Well that great big terminal... has to turn, I think, 14 times a year, the inventory of it, to
be a profitable terminal, so as a result you don’t want to have a product in there that sits,
it’s gotta turn...And so they were really hesitant as well, like to say geez if we introduce
this and the market says you gotta split it up what does that mean for the efficiency of our
assets, and that was you know one of the issues that seemed to come up from companies,
I mean it was a practical issue...grain starts segregated on the farm, it starts segregated,
and then the chain between the farmer and the customer is what jumbled it together
[Interview, Grain Growers of Canada, 9].

Despite these limitations with the handling system, the CWB does, in fact, segregate certain
varieties of wheat on a regular basis. However, purity rates above 95% cannot be guaranteed
[Interview, Canadian Wheat Board, 5] and export markets were not willing to accept up to 5%
contamination. Proponents of GM wheat argued that segregation should be sought, even if there
was no evidence that it could be achieved. They charged coalition members with purposefully attempting to destroy the market for GM wheat:

So I say well I don’t think your market is necessarily that, I think you’re the ones now with all the hype, that it’s sort of part of the mix to destroy your own market. Because basically what you’re doing is telling people that you can’t keep anything pure. And so if you can’t keep anything pure what does that do, what does that speak to of your own, you know HACCP, your own safety procedures on your farm...? [Interview, Monsanto, 10]

The discussion above points to the need to examine a proliferation of sites of contention around the circulation of value as commodity. That the perceived lack of exchange value for farmers on European wheat markets became the strongest argument advanced by the coalition points to the increased ability of consumers to influence food production. Yet, exchange between producers and consumers, or intermediary buyers, involves at least two parties and a process of translation from consumer needs and desires to farmers’ production practices. As I have shown, a number of contingencies including the mandate of the CWB to serve farmers’ interests, the large number of Canadian wheat buyers across several countries, the history that farmers already had with RR canola and the nature of grain infrastructure allowed consumers’ rejections of GM foods to translate into an effective opposition to RR wheat in Canada. I now turn to the question of the use value of RR wheat for producers, which also played an important role in the collection of claims against RR wheat.

**Use Value**

It is obvious that commodity values cannot be realized in the market without embodying a set of use values for their buyers. In the case of RR wheat, Monsanto was counting on a similar perception among farmers of the benefits of RR that had already been recognized in canola. Ironically, it was precisely because of the effectiveness of RR canola that farmers spoke out against RR wheat. A second RR crop grown in rotation with canola threatened to undermine
the agronomic advantages of using RR canola. Not only that, but the different biological properties of the two crops meant that RR was not a trait that was particularly useful in wheat. Cheap effective herbicides already existed in wheat and the crop was already quite easily managed on the farm. Monsanto did its best to counter producers’ claims that RR wheat was of little use by investing in agronomic research on the crop and promising not to introduce it until effective management options existed. Still, the company could not convince producers of robust use values in RR wheat and this gravely delayed its plans for the commercialization of the product. Citing shareholder impatience and increasing risks associated with a politicized debate around the crop, my key informant from Monsanto explained that the project had to be stopped.

The introduction of herbicide tolerant canola in Canada in the mid 1990s radically altered the way that canola was grown in the prairie provinces. Specifically, farmers began adopting the practice of “zero till”, which facilitates the sequestration of carbon, the decrease of fuel consumption and the conservation of soil moisture (Canola Council of Canada, 2001). Despite the criticisms of detractors of zero-till (which include the increased reliance on just one herbicide package, and the handing over of seed production and stewardship to for-profit corporations) by the time the debate about RR wheat heated up on the prairies the practice was widespread among transgenic canola producers (Canola Council, 2001). The introduction of a second RR crop into farm rotations was not welcomed by most RR canola growing farmers as the following representative of the Manitoba general farm organization explains:

We’ve grown the roundup ready canola, I don’t have any on the farm this year, we prefer the Liberty Link canola...The liberty Link canola can be killed by Roundup, so I can grow the Liberty Link canola this year, next spring I will do my pre-seeding burn-off, I’ll apply about half a litre of Roundup on the crop just before we seed or before the new crop emerges, and it will kill it all. If I had roundup ready wheat, I can’t kill the wheat unless I add a grass killing herbicide which will cost me about 15 dollars an acre and all it will kill is the wheat [Interview, Keystone Agricultural Producers, 3].
This fact encouraged fairly mainstream non-political farm organizations like the Saskatchewan Association of Rural Municipalities, the Agricultural Producers Association of Saskatchewan and the Keystone Agricultural Producers to join the coalition and argue against RR wheat. In fact, such organizations were not entirely against genetic modification. Rather, they contended that the use value of RR wheat was particularly low:

If for example there were a wheat that was totally resistant to fusarium head blight, just a devastating disease in wheat, growers would embrace that one quite quickly. And so would others because it downgrades, it’s not good in the flour, it’ll kill people if you eat enough of it from all the toxins and animal feeds, so I think it would be a, Council of Canadians would never buy into it, but it would be an event that more people would approve. And I think Europe is slowly breaking down the wall to roundup ready, or to GM and give them another five years, they might be buying canola again [Interview, Keystone Agricultural Producers, 6].

The anticipated problem of RR wheat acting as a weed in canola fields or vice versa was, indeed, a credible concern for prairie farmers. They already had years of experience dealing with RR canola volunteering in crops planted on the same fields in subsequent years and in adjacent fields via pollen flow or wind-blown seed. These volunteers would then be difficult to control since they would be resistant to commonly used herbicides. The biotech companies countered that such weeds could be easily killed with other chemicals, and indeed scientists at Monsanto were working with AAFC to better understand the effects of herbicide tolerant crops in rotations and establish best management practices. However, farmers reported to me in their interviews finding canola and other plants in their fields that were resistant to more than one herbicide. A scientist at a Canadian university confirmed that the farmers with whom she worked were also finding wild plants in their fields that were resistant to several herbicides. In this context, the addition of a second RR crop to rotations posed additional risks in dealing with volunteers and other weeds.
The second main reason that farmers perceived RR wheat to promise little use value was because of the nature of wheat as a crop and the already effective management options that existed. Wheat has been grown on the prairies for over 100 years and early specialization in wheat had partly to do with the suitability of the crop to the prairie environment (Britnell, 1939). Not only that, but wheat breeders have been working on new varieties and agronomic practices since the late 1800s and have produced relatively effective and cheap management options. Even plant breeders, such as the one quoted below, who were fervent proponents of RR canola, found the same modification in wheat to make little sense:

...[I]f weeds were a real problem in cereals and we didn’t have the herbicides that would effectively and cheaply control this then I would have said ok, Roundup Ready wheat is a good idea. But the fact of the matter is that we have some very good chemicals for cereals that are relatively cheap and relatively benign and so it’s not essential that we have round-up in it [Interview, Agriculture and Agri-Food Canada, 14].

Despite the efforts of Monsanto and its partners at AAFC to address problems with weed ecology and to tout the benefits of the roundup ready trait, farmers were unwilling to pay the hefty technology use fees for a trait they perceived to have little use value. As I explain in the next section, this proposed economy crossed moral and cultural boundaries.

**Cultural/Moral Values**

Thus far I have discussed surplus, exchange and use values as separate categories. Yet an understanding of commodities as sites of relational values suggests that the distinction between the different categories is unsustainable. In this section I foreground the moral and cultural values that are produced and circulate alongside the surplus, exchange and use values of wheat and give the reader a better sense of how these different moments of value are mutually constitutive. Returning to the discussion of commodity fetishism, it is apparent that Monsanto failed to recognize the full content of values that producers and consumers ascribe to wheat and
to its production. Through these omissions, I argue that Monsanto proposed a GM wheat economy that crossed moral boundaries.

There is no question that wheat is the most culturally significant crop grown on the prairies. Wheat was the crop with which the prairies were settled, and Canada is known the world over for its high quality wheat. The overall economic significance of wheat to the nation has declined over the last 50 years with a greater diversity of crops being grown, an increasingly urban population, and with the hugely successful (in terms of employment and economic growth) new prairie economies in oil and gas. Yet, wheat remains of symbolic importance for prairie folk. Stories about the wheat economy and the back-breaking labour of settlers, who lived in relative isolation without services such as running water and electricity, maintain a prominent position in official cultural histories reproduced by the provinces. For Eisler (2006), this is one of the myths that constructs a sense of provincial belonging including emotional and psychological bonds to other Saskatchewan residents. Of course, this construction of community is also highly exclusionary to groups that were not part of the pioneering history and erases the violence done to indigenous people who were forced off the land in favour of wheat and settlers. Nevertheless, as an imaginary of a shared past, the wheat economy remains fundamental to many aspects of modern prairie society.

The idea of wheat as historically and culturally important to prairie farmers abounded in my interviews with the various farm groups. As the following quotation suggests, this cultural attachment has manifested itself in the character of the wheat industry:

... all the old fellows will say this country was built on wheat and they still have control, hold pretty strong to any folks messing around with wheat....The culture of canola, the industry of canola is different from the industry of wheat. The industry of wheat tends to be more traditional, sentimental, and less into change, and that’s just the difference. Folks who grow, have embraced canola in a big way at the time were innovators and they continue to be, to push cropping in their farm. But producers of wheat...tend to be ones
who do what they always have, and are a little bit resistant to change [Interview, Western Canadian Wheat Growers 7].

Furthermore, early struggles over the extraction of value from farm labour described at the beginning of this chapter, revolved specifically around wheat. This has produced historical legacies such as the prominence of the CWB in the wheat industry, and it has also meant that farmers associate wheat with a history of activism. In this way, the cultural attachments of farmers to wheat are highly material. The long history of saving wheat seed is another example of this material connection and involves a very intimate relationship with the plant and its life cycles. Although the commodification of seed was not strongly mobilized as an example of Monsanto’s extraction of surplus from farm labour, the tradition of seed saving in wheat was presented as a cultural practice that was being threatened by Monsanto:

Wheat was different, farmers saved and reused their seed, this was a pattern that they used. And that was part of the resistance that farmers saw too. Canola takes small amounts to seed per acre and characteristically they bought seed on an annual basis...GM wheat would also sort of disrupt that pattern of seed use and the relationship with seed on a more fundamental basis of wheat, just because of the volumes required. So I think that that also was part of farmers’ resistance....along with the market concerns and the agronomic concerns [Interview, National Farmers Union, 8].

It is now clear that Western Canadian farmers have a particular connection to wheat that involves a set of relationships that exceed mere production for production’s sake. This is the result of the discrepancy between the lived experience of concrete labour and the abstraction of labour power as a commodity around which capitalist relations of production are organized. Monsanto’s GM wheat economy neglected the full spectrum of values that farmers associated with their concrete working relationships with wheat. For producers of wheat, their labour involved more than labour time; it also involved material relationships of familiarity with the wheat plants, and symbolic associations with tradition, and belonging. In addition, wheat narratives linked new generations with older generations and with a sense of historical struggle
and activism. These material and symbolic values are intertwined with the production of surplus, exchange and use values and are reinforced in an everyday fashion on the farm. This is especially apparent in my discussion of the use value of wheat as a RR crop. RR wheat was perceived as yielding little use value to prairie producers because of their already established material and agronomic relationships with the crop.

The values of consumers and the general public were also important in shaping exchange, surplus and use values in this story. For example, the focus of the coalition on the extraction of surplus from public scientific labour rather than farm labour was only possible because of a positive valuation of public goods among some in Canada. Furthermore, consumer preferences in Europe and Japan shaped the behaviour of European and Japanese grain buyers on international markets. Given that Monsanto planned for future modifications of wheat to involve ‘consumer friendly’ traits, it can also be reckoned that consumer responses to GM wheat were not only the result of perceived environmental and health risks, but might have also been the result of a perception of low use value among consumers of the RR trait. All of these examples show that exchange, surplus, use and cultural values can only artificially be separated from one another; they are all relational categories that implicate each other.

It is not only that wheat represents extra-economic relationships and feelings for prairie farmers, but also that the realities of surplus, exchange and use values are also organized in farmers’ minds around moral imperatives about what is just and fair. A wheat economy that asked the public to rent their scientists to a for-profit corporation, and demanded that farmers give up the practice of saving seed for uncertain exchange and use values was perceived as morally wrong and threatening to the future of family farm production. This sentiment was
expressed most strongly by organic farmers who had already lost canola as a crop because of widespread contamination with GM canola.

The amoral economy of GM wheat was also not lost on conventional GM farmers or more mainstream farm organizations. Indeed, such arguments came to the fore during the testimony of the various organizations to the House of Commons Standing Committee on Agriculture and Agri-food in 2003 when mainstream farm organizations voiced their frustrations with the fact they were being asked by extension agents and state representatives to be more responsive to consumer demands, yet the state was not willing to stop the introduction of RR wheat based on international consumer rejection (see the quote in chapter three, page 123). Even conventional farmers who had argued within their organizations that they should not take a position of opposition to GM canola found the proposed GM wheat economy untenable:

…and on the GMO wheat, by the time we got there then that argument around losing our markets, our international market, customers not wanting it, it actually being no benefit to farmers, it was strictly seen then as a corporate benefit. By then, by the time that came along we were armed. And there was really very little discussion even in the Farmers Union that we should back off, that we shouldn’t be so critical, that some of our members wanted this stuff. By then nobody wanted it [Interview, National Farmers Union, 4-5].

**Conclusion**

In this chapter I have used the lens of value to examine the ways in which the movement against RR wheat contested Monsanto’s proposed GM wheat economy on the Canadian prairies. It made sense to explore how the coalition against GM wheat contested the production and circulation of value because of the long history on the prairies of framing farm politics in terms of the extraction of surplus from the farm. However, the language of surplus, exchange, use and cultural values is what I have used to describe producer understandings of their economic, cultural and moral relationships of production. In this chapter I have shown that there has been a proliferation of sites of contestation over value from a fairly narrow focus on the extraction of
surplus from the farm in the early 1900s to the contemporary extraction of surplus from scientists, the role of politicized consumer markets and their impacts on exchange value, the importance of on farm concerns about agronomy to the use value of RR wheat, and the cultural significance of wheat to farmers and prairie folk.

If commodities are viewed as sites of values, as I have argued they should be, then the idea of separate economic and cultural spheres of reality is broken down. In fact, commodities embody a wide variety of values that arise out of their concrete relations with buyers, sellers, producers and consumers. Commodities simultaneously contain different values for these differently positioned actors, but this complex reality of values is obscured through the process of exchange where the value of the commodity is most easily measured and made commensurable by its quantitative, monetary worth. The disciplining function of an economy based on the measurement of value through capitalist exchange means that the multiplicity of cultural and moral values that underlie all economic activity is routinely erased. Economies organized around the mechanism of price are, in this respect, quite inhumane – they cannot properly deal with the complexity of social life. It is not a surprise then that surplus, exchange, use and cultural values were practically intertwined for prairie producers. That prairie farmers felt that Monsanto’s RR wheat violated cultural economic expectations of just treatment to the extent that they mobilized in opposition was less predictable.

I have argued that because of the concrete process of labour, farmers have a deeply moral understanding of farm economies and were willing to mobilize against the introduction of GM wheat because they understood Monsanto’s proposed GM wheat economy as unjust. Monsanto blatantly disregarded the multiplicity of values that farmers understand as constituting the production of wheat and, in this case, Monsanto’s ignorance was intolerable for producers. In
effect, Monsanto was proposing that farmers give up a level of autonomy and pay for a new technology that could promise neither increased use nor exchange value. This was a proposed economy that crossed moral boundaries.
Chapter Five: The Limits of Choice

...[T]here’s a lot of debate on how much benefit local farmers have had...in using [GM] Canola for example. Saskatchewan farmers, well they’ve readily adopted that technology right? And they have the choice. They don’t have to pay for that seed, they don’t have to use that technology, but they are. And they’re not stupid. So why are they using it? ‘Cause obviously they’re seeing a benefit to it right? [Interview, Agwest Bio Inc, 8]

...[M]odern individuals are not merely ‘free to choose’, but *obliged to be free*, to understand and enact their lives in terms of choice. They must interpret their past and dream their future as outcomes of choices made or choices still to make (Rose, 1999: 87).

Discourses of choice were abundant in the interviews I conducted with actors representing all relevant institutions and organizations supporting the introduction of RR wheat in Canada. This should come as no surprise, for if Rose (1999, as quoted above) is correct, subjects of advanced liberalism necessarily understand themselves and their relationships to the world around them as constituted by personal choices and the exercise of freedom. Under capitalism, economic relations, in particular, produce and depend on a form of formal freedom in production and consumption (Rose, 1999: 66). It follows, that the proper role of the state is to make individual choice the organizing principle of the economy. Indeed, this was one conception of choice that was well represented by proponents of GM wheat including biotech companies, trade associations and lobby groups, plant breeders, scientists, regulators and farm organizations. Often citing the success of RR canola and the widespread adoption of the technology amongst prairie farmers (as in the quote above), such advocates insisted that the only just method to decide the future of GM wheat was to introduce it into the market and let individual producers and consumers choose whether to buy it based on their own specific needs.

The purpose of this chapter is to examine this common-sense notion of the right of consumers and producers to market choice by juxtaposing it with the discourses of collectivity
advanced by anti-GM activists and by interrogating the political subjectivities associated with the
different articulations. The first conception of choice wherein consumers and producers
individually ‘vote with their dollar’ on the market forecloses options for collective action. For
example, it strips farmers of their common positionality as producers of food and shifts their
political agency to relations of individual consumption. In the realm of consumption, this first
discourse similarly pre-empts action beyond self interest, especially on issues whose
complexities markets cannot properly take into account. To counter the discourse of market
choice, anti-GM activists advanced notions of commonality. For example, by recalling their
history of collective action, representatives of farm organizations asserted their capacity to act as
an articulated unity31 in order to assert their interests in the production, marketing and
distribution of grain. Canadian consumer organisations, on the other hand, reinforced the idea
that the public should be able to choose to keep certain products and technologies out of the
market for enough time to make definitive conclusions about their safety and environmental
effects.

I begin this chapter by establishing my intellectual debts on the topic of choice and
political subjectivity. I then go on to flesh out the concept of individual market choice that was
front and centre in the reasoning of proponents of RR wheat. In that section I highlight the
hollowness of such a conception given what was available on the market, the potential and real
harm of GM crops to already existing production systems, and the fact that GM foods are not
identifiable in the marketplace. In the next section I bring to the fore the alternative articulations

31 The concept of ‘articulated unity’ seems to have originated with Hegel who understood philosophy as having
“the goal of understanding everything in an articulated unity, or system that preserves differences separating one
thing from another…but which, in relativizing these differences, also grasps what unifies them in a totality
(Rockmore, 2003: 123). The phrase also references the concept of articulation as it has been used by Laclau, 2005
of anti-RR wheat activists and discuss the political subjectivities associated with the discourses put forward by the two sides of the debate. I conclude by emphasizing the need for a non-neoliberal agency for meaningful social change. Highlighting collective forms of agency helps to denaturalize ‘voting with your dollar’ as the appropriate form of consumer agency.

Consumption and Agency

According to Guthman (2008: 1176) “[p]robably the most central organizing theme in contemporary food politics is consumer choice. That this seems to go without saying suggests the extent to which this notion has become taken for granted.” Indeed, food activists and scholars alike seem to be quite taken with the possibility that consumers might express their politics and identities by means of their consumption, and, through this practice of voting with their dollars, force meaningful social and environmental change in food systems. This section reviews some of the literature on consumption and agency and ties the notion of ‘voting with your dollar’ to an individualized practice of neoliberal governmentality. The purpose is not to deny the agency of consumers, but rather to clarify the characteristics of market agency and the relationship of the individual consumer to a broader community or society.

In this chapter I discuss individual market choice through the concept of neoliberal governmentality. Following Dean (1999: 16) governmentality “deals with how we think about governing…[and] emphasizes the way in which the thought involved in practices of government is collective and relatively taken for granted”. In this respect, neoliberalism can be understood as involving specific ways of thinking about government, where government is taken to mean the attempt to direct human conduct (Dean, 1999:11). I use the concept of governmentality rather than hegemony because of the pervasive nature of market choice as a principle or vocabulary through which subjects govern themselves. In many ways, Gramsci’s (1971) notion of common
sense gets at a similar reality where dominant ways of understanding the world are taken for
granted and reproduced without second thought. While both perspectives reinforce processes
of subjectification, including the ways in which specific relations of power are reinforced by
active individuals in their everyday capacities, the Gramscian perspective traces dominant ways
of understanding to class interests and historical blocs. By choosing to frame this chapter using
the perspective of governmentality, I am not suggesting that power is not centred in agrichemical
corporations like Monsanto, universities, and government agencies. In fact, I agree with
Andree’s (2005) identification of a transnational biotech bloc that “is spearheaded by a handful
of agrichemical corporations, but…also involves promotional and regulatory arms of
government and civil society institutions (such as universities), that have worked together to
realize a particular vision of genetic engineering in agriculture”. However, the notion of
individual consumer choice that animates this chapter is certainly not the invention of the biotech
bloc. Indeed, the notion of consumer choice seems to be a much more diffuse discourse that
shapes neoliberal subjectivity writ large. In this chapter I am not interested in tracing the larger
set of interests that are enabled and consolidated by the discourse even though it is clear that the
biotech bloc is one such benefactor. Instead, I am concerned with how the discourse of
consumer choice was reproduced and challenged by my interviewees.

The notion of consumers as active and free agents able of effecting social change is not
new. Lang and Gabriel (2005), for example, break the history of consumer activism in the West
into four waves, each with distinct values and methods of organization and collectivity. In the
next paragraphs I summarize their periodization in order to showcase a multiplicity of historical
forms of consumer activism. I am not suggesting that there are only four waves of consumer
activism or that the political economic context of the different waves does not play an important
role. Rather, the purpose of reviewing these waves is only to denaturalize the idea that consumer action is synonymous with ‘voting with your dollar’. The first widespread and organized consumer movement that these authors identify began in the early 1800s in Britain and was marked by its working class character. The Co-operative Movement sought to supply working class families with the basic consumer necessities of life at affordable prices that excluded profit. The principle of ‘self-help by the people’ motivated these producers to work together in the realm of consumption, and the goal was to organize outside of regular market imperatives including competition and profit-seeking.

Such consumer coops were also important in rural North America in the late 1800s and early 1900s and developed alongside the already successful producer cooperatives. Consumer coops helped consumerism take root in rural North America, but this consumerism was inflected with struggles about how rural people should modernize, including to what extent and how rural folk should engage with the market (Blanke, 2000). As Kline (2000) argues, the plurality made possible by consumer choice allowed farmers at once to adopt some elements of consumerism while maintaining their independence and fashioning new rural cultures and forms of rural modernity.

The second movement, named ‘value-for-money’ by Lang and Gabriel came into fruition in the 1930s, especially in the USA. This second wave publicized the growing power of food corporations that were increasing their market shares through combination. Organizations like Consumers Research Inc. were founded in order to research product safety and offer information so that consumers could be more effective in their market activity and pursue the best value for their money. However, in the early 1990s this form of consumer activism started to wane
because of the challenges of providing consumer information for niche markets and because of the emergence of multi-national retailing giants that offered rock-bottom prices.

Lang and Gabriel name the third wave of consumer activism ‘Naderism’ after Ralph Nader -- author, activist and presidential candidate in the U.S. 2000 election. In America this movement consisted most prominently of a network of organizations organized by Nader and his co-workers that sought to build grass-roots public pressure for stronger regulations and standards of conduct for corporations of all types from the health sector to automobile manufacturers. All levels of the state were called on to protect the individual as a citizen against corporate giants. Unlike the second wave, the idea was not to empower consumers in the market, but rather to constrain and limit the market through state regulation.

The last wave identified by Lang and Gabriel began slowly in the 1970s and gained strength in the 1980s and 90s. Now enjoying significant clout, and receiving much attention from academics and activists, ‘alternative consumerism’ addresses a variety of concerns through individual purchasing of green, fair trade, ethical, organic, and other products. Originating in Europe as part of the ‘green’ movement, alternative consumer activists deployed some of the same strategies as their second wave counterparts comparing the consumer products and practices of various companies and thereby encouraging producers to compete for (perceived) environmental soundness. Given earlier concerns in the green movement with reducing consumption, alternative consumption marked a break in environmental activism. Consumerism was no longer something to be curbed; rather, individual purchasing power was to be championed if used in conscious and strategic ways.

I start with this brief outline of consumer activism in order to show that the notion of ‘voting with your dollar’ is an historically specific form of consumer agency that naturalizes the
marketplace as the appropriate site and mechanism for social change. The notion of consumer choice that animates the fourth wave of consumer activism outlined above also serves more broadly as the basis for political decision-making theories in the field of political science. According to Dryzek (2000), rational and social choice theories\textsuperscript{32} are premised on the example of *homo economicus* pursuing his preferences and goals in the marketplace. Here, the choices of individuals behaving strategically and in their own interests can be aggregated to yield the optimal collective decision (Dryzek, 2000: 34). The market is, thus, the most democratic decision-making instrument because of its transparent capacity to aggregate private preferences. The challenge for social choice theorists is to find an equivalent mechanism for political voting that is not prone to corruption. In this perspective, the only just form of collectivity is one that has no effect on fully formed expressions of individuality.

Of course the underlying assumptions of rational and social choice theories have been subject to intense criticism by scholars in a variety of fields (see for example Barnes, 1988; Tsakalotos, 2004). Advocating for deliberative democracy, Dryzek criticizes these perspectives for their assumption that interests and preferences are individual and objective expressions of autonomous subjects. Instead, Dryzek understands preferences as socially constructed and individuals as being persuaded and persuading others through social and political interaction. This conception of inter-subjectivity leaves room for the possibility (even necessity) of collective decision-making and a public sphere. Furthermore, there exists the possibility that differently positioned individuals might engage in negotiated collective action.

\textsuperscript{32} Rational and social choice theories are not the same. Dryzek is careful to clarify that social choice theory does not make the behavioural assumption of rational choice theory, namely that individuals act strategically and in a goal-seeking manner. Social choice theory is more concerned with the mechanisms for aggregating individual preferences than the process through which preferences are made.
The argument that individuals can be persuaded to understand and act upon (or according to) a common good has been fundamental to notions of citizenship (including social, legal and political conceptions). This is a conception that sees citizens not only as exercising civil, political and social rights, but also as responsible to carry out the ethical obligations that accompany such rights (Rose, 1999: 134). For Johnston (2008) the commitment to a common good that characterizes citizenship practice is at odds with the discourse and practice of consumer choice. In her examination of the “citizen-consumer” hybrid, Johnston concludes that the ethics associated with shopping at the food retailer Whole Foods privileges the cultural-ideology of consumerism, denies the political-economic inequality between social classes and promotes a political-ecological message of conservation through consumption. Guthman (2003 and 2004) has made similar arguments with regards to the consumption and celebration of organic foods. Roff (2007) also comes to a similar conclusion in her analysis of anti-GM food activism. The strategy of encouraging consumers to choose non GM-foods, she argues, will not live up to the small-scale, localized food alternatives advocated by the same activists. Instead, focusing on individual consumption habits shifts responsibility away from the state and food manufacturers, opens up new markets for business, and does not challenge the increasing prominence of convenience and processed foods. While consumers might be making well-intentioned choices based on political commitments, Johnston and Roff show that the mechanism of ‘voting with your dollar’ results in narrow and less than ethical outcomes.

For this reason, it is concerning that scholars have noted a shift under neoliberal governance whereby people are no longer addressed as citizens; but rather, are understood, and being prompted to understand themselves, first and foremost as consumers. Slocum (2004) and Clarke and Newman (2007) have documented this shift in people’s engagements with their local
communities (in U.S. Climate Protection campaigns) and state services (in the U.K. public health system) respectively. Indeed, as Rose (1999: 141-142) emphatically shows, in advanced liberalism consumerism and the logic of choice extend themselves to all aspects of social behavior so that people are asked to use calculating economic behavior, previously reserved for the marketplace, in all interactions everywhere.

Recent work on neoliberal environmental governance supports the above characterizations regarding the pervasiveness of the logic of choice and calculating economic behavior. Indeed, the same policies that characterize neoliberal governance more broadly, including market-led economic and social restructuring; privatization, liberalization and the imposition of commercial criteria to sectors that were formally outside of market relations; and deregulation and flexibilization in private sectors (Jessop, 2002) are also features of the treatment of neoliberal nature (McCarthy and Prudham, 2004; Heynen and Robbins, 2005). The logic of neoliberalism draws on theories of rational choice to propose that markets are the most democratic methods of allocating environmental resources and services and, as long as all externalities are properly accounted for, of protecting the environment from over-use and/or exhaustion. In other words, government is no longer needed to regulate the use of nature or its contamination; instead, self-governing private networks (for example voluntary food labels (Guthman, 2007; Brown and Getz, 2008)), and new markets for both environmental ills (like emissions trading (Bailey, 2007) and environmental benefits (like ecosystem services (Robertson, 2004)) allow individuals to make the right choices in the market based on their own ethical preferences and on market prices.

What scholars of governmentality such as Rose (1999: 142) and Dean (1999: 57) contribute to the literature on consumer choice is careful attention to the ways that agency are
reworked in advanced liberalism for the consuming subject. With clear ties to the economic subject of interests (homo economicus) of 19th century liberalism, the neo-liberal subject is an entrepreneur of herself. The interests which she is expected to register on non-discriminating markets (as in rational choice models) are now expected to change based on her capacity of being influenced by her environment. She is continually engaged in acquiring new skills and making active choices that will influence all aspects of her future—psychic, material, social, etc. Calculating actions, weighing costs and benefits, investing in the future, and accounting for external contingencies characterize the neoliberal subject active in governing herself through the mechanism of choice. This is a subjectivity that draws on the assumptions of liberal subjectivity, but that intensifies expectations of flexibility and change.

Three main conclusions can be drawn from the above tour of the diverse literature on choice and consumerism. First, consumer activism has not always been confined to the individual practice of “voting with your dollar” on the market. Instead, consumers have organized in ways that challenge the very logic of the market and the individuality that characterize current consumer activism. While current consumer activism might claim to promote ethical outcomes, any means of acting collectively, especially those that challenge market logic, are clearly out of sight. In this sense (the second conclusion), current definitions of choice are narrow, and refer most often to acts of market consumption. Finally, this narrowly defined conception of economic choice has come to apply universally to widely varying realms including public service provision and community action. For this reason, individuals understand themselves as entrepreneurs of the self, obliged to navigate through, and demand, an ongoing series of choices that make them who they are. In the next section I show how precisely this logic animated the claims made by proponents of GM wheat. For them, the only just method
of dealing with the controversy was to introduce the product into the market and allow producers
and consumers to choose for themselves.

**GM wheat as a matter of individual market choice**

Despite the wide-ranging criticisms of GMOs that are, by now, commonplace in talk of
genetic modification, proponents of GM wheat almost totally avoided any engagement with them
in their interviews with me. For example, few felt it necessary to convince me that the health
and environmental risks associated with GMOs are overblown, or refute the criticisms of the
corporate control of such organisms. To the contrary, even the most vocal supporters of GM
wheat admitted that seed companies have their own interests in mind and do not produce the type
of traits that farmers would find most useful [interviews, Canola Council of Canada, 20;
Canadian Food Inspection Agency, 17]. When I encouraged them to comment, interviewees
would grudgingly acknowledge the criticisms of GMOs mounted by anti-GM movements, but by
and large proponents of GM wheat felt these were private matters that individuals had to weigh
against any possible benefits\(^3\). In short, GM wheat supporters believed they had a fool-proof
case for letting individual market action (rather than political movements, governments and
lobbies) decide the merits of genetic modification.

According to GM wheat proponents (including participants representing the CFIA,
Croplife Canada, the Western Canadian Wheat Growers, Agriculture and Agri-Food Canada, the
Grain Growers of Canada, Monsanto, the Canadian Biotechnology Advisory Committee, the
Canola Council of Canada, Saskatchewan Agriculture and Food and Agwest Bio), allowing

\(^3\) Promoters of RR wheat usually claimed the same benefits of RR wheat as farmers already enjoyed in RR canola
including easy management, the possibility of zero tillage, decreased dockage at elevators, increased yield etc. For
consumers, the only benefit that proponents identified was a possible decrease in the price of wheat based on
increased farm yields.
farmers and consumers to individually vote with their dollar in the marketplace was the fairest method through which to decide the fate of GM wheat. For example, in the following quotation a representative of the Grain Growers of Canada juxtaposes the voluntary and impartial approach attained through the mechanism of the market with government decision-making processes that were perceived as ineffective and biased:

...[S]ome were arguing “no, let the government take it on”, that they coordinate all the meetings and assign people to the topic and you know consult and blah, blah, blah and they were going to do it. So what our hope was, ironically, for them to say our policy is to pursue a voluntary option at this time, an industry driven approach [Interview, Grain Growers of Canada, 6].

Rather than a matter for public policy, the adoption of GM wheat was understood as an individual business decision to be left to those whose families and economic well-being depended on the profitability of their farms:

And then there’s others on the other side that say “hey, I’m a farm owner, I’m an independent business person, I have a family who may or may not want to stay on the farm in the future, you know, is this product gonna help me make my farm more viable or what?” And I can deal with it. And we were trying, our issue to frame it was such that this is just a business decision, no more, no less, and that’s it [Interview, Grain Growers of Canada, 3].

The NFU criticized Monsanto every opportunity they got. And I would bet...the NFU members were out there buying Avadex and Roundup ‘till you’re blue in the face. But the Wheat Growers’ approach was more working with those companies and seeing it as having solutions that producers may choose to utilise or not and that was a choice for farmers to make [Interview, Western Canadian Wheat Growers, 9-10].

The same logic -- that markets rather than political movements and government -- should decide the fate of GM wheat, was also applied to consumers. A representative from the CFIA explained that as long as any product passes the Agency’s health and environmental safety risk analysis34, wary consumers would have to register their concerns through the market. This same

34 The CFIA’s process of decision making regarding environmental and health safety is not without controversy. In February 2000 Environment Canada, Health Canada and the CFIA requested that the Royal Society of Canada (Canada’s senior national body of pre-eminent scientists and scholars) convene an expert panel on the future of
respondent elaborated that no consumer is being forced to buy GMOs and that it is always a consumer’s right not to buy what s/he does not want to eat. A member of the Canadian Biotechnology Advisory Committee provided further rationale for the consumer friendliness of the market mechanism by arguing that all the right incentives exist for a food company to regulate its own consumer safety:

Because at the end of the day it’s the companies that are liable, so there’s no incentive for them to produce a dangerous or ineffective product. If it’s ineffective it will die in the market, if it’s dangerous they’ll be sued…maybe not quite as aggressively or as quickly in Canada as in the U.S., but most of these are cross border products so any product failure, they’re not just betting the product line, they’re betting the company and so in fact they usually exceed the requirements of the regulatory regime, at least the big ones because they know there’s no tolerance for failure [interview, Canadian Biotechnology Advisory Committee, 8].

In fact, for supporters of GM technologies precluding the introduction of GM wheat onto the market would mean unfairly punishing companies and consumers who wanted to take advantage of any possible and individual rewards associated with genetic modification (and here the possibility of genetic modification increasing yields, and lowering consumer prices was always cited).

Closely related to the notion of markets as the only just arbiters of individual choice was the conviction that market dynamics support progress. Citing examples like the technological development from Betamax to DVDs, proponents of GM wheat argued against the use of market impact assessment by regulators in evaluating GM wheat. In these market enthusiasts’ views, the harm that would be caused to Canadian producers if European wheat markets were lost was not a legitimate concern for regulators:

food biotechnology. This panel evaluated the Canadian regulatory system and its capacity to cope with future products of biotechnology. It found, for example, that the regulatory approach that was in place (based on the principle of ‘substantial equivalence’) was not sufficiently precautionary and that the regulatory system was not adequately transparent and open to public scrutiny.
We don’t compensate people who are losing...When CDs, or VHS became the standard, we didn’t compensate the Betamax people who couldn’t get videos anymore, we didn’t compensate the movie theatres for the fact that they couldn’t sell seats anymore, those resources had to be reallocated. Similarly when DVD players came out, everybody’s stuck with a VHS player in their basement, we didn’t pay them for that. So...it’s just accelerated depreciation and then it’s a wash. So you didn’t get as much benefit out of it as you might have, that’s just the way the world works. That’s the mentality that we now have, and it has real power, because it pushes things forward [Emphasis added. Interview, Canadian Biotechnology Advisory Committee, 20].

The debate over market impact was brought to the fore in 2001 when AAFC scientists uncovered a clause in CFIA’s regulations that would allow Variety Recommending Committees to reject a new variety based on risks to existing markets (Warick, 2003). Farm groups immediately began lobbying Recommending Committees (that include producer participation and representation), asking them to use this clause in order to reject the introduction of GM wheat if it were to arrive at their Committee. Despite considerable support in the farm community for taking economic risks into consideration as part of the evaluation process for new varieties, the CFIA removed the clause in 2002. According to my informant at the CFIA, economic impacts were perceived as beyond the mandate of regulators, who were to ensure the food and environmental safety of a new variety and nothing else. In effect, this decision reinforced the idea that markets, rather than public policy, could best deal with the competing claims and interests amongst producers and between producers and industry.

Against the Market

The discourses of markets as just mechanisms for registering and ensuring the right of individual choice, as already encompassing the correct incentives to ensure food and environmental safety, and as motivating technological progress proved hollow at best. Opponents of GM wheat worked hard to convey this to the public by pointing to the limited options that were available on the market, the potential and real harm of GM crops to already
existing production systems, and the fact that GM foods are not identifiable in the marketplace. Indeed, proponents of GM wheat themselves often undermined their own arguments for free and just markets in their interviews with me. An interesting excerpt from an interview with a representative from Croplife Canada (a trade association representing numerous plant biotech companies) illustrates this well:

Right now canola is moving to hybrid crop, ok? So it’s moving from open pollinated, which is where farmers can save their seed…to hybrid seed because they get better yields and better return on their investment…[T]he choice is there, you can choose, a farmer can choose to grow an open pollinated variety, but increasingly hybrids are what the farmers are buying because they get better yields, they’ve got better traits because again the research and the development is going into the hybrids where the company can capture its investment that it’s made. So, just like you and I buying, you know, quality products or CDs or anything like that, if the artist doesn’t get the money back from what they’ve produced then they can’t produce anymore [Interview, Croplife Canada, 13].

Here the interviewee uses the example of hybrid varieties, instead of GM varieties (which was the topic of the interview) in order to make the point that farmers, through their market actions, are determining which varieties succeed and fail. In the initial section of the quotation this participant presents the planting of hybrid versus open pollinated seed as the individual choice of the farmer. However, in the next breath the participant goes on to explain how the existence of hybrid crops as a market choice is directly dependent on the concentration of resources and research on their development because of their potential to earn private profit. While farmers may have the opportunity to choose between the products on the market, their spectrum of choices is narrowly constrained to the capacity of new varieties to earn profit. In a breeding environment where patents on genes is increasingly the norm (see Chapter 2), products of genetic modification are top opportunities for the accumulation of private profit.

Another proponent of genetic modification, representing the Canola Council of Canada, was similarly contradictory in his enthusiasm for market choice:
So in canola there are, well there are really four systems available…so farmers absolutely have a choice about what chemistries they want to and don’t want to use on their farm. If they are relying very heavily on one product, whatever that product might be, they’re probably doing that because it’s the most cost-effective option for them [Interview Canola Council of Canada, 5].

On the one hand, this respondent asserts the importance of individual farmers choosing the production systems that best suit them and claims that plenty of agronomic options exist. On the other hand, the choice that he celebrates involves only four options controlled and marketed as complete management systems by four large agro-chemical companies. As the following farmer (who, in fact, supported the introduction of GM wheat and represents the same organization as the respondent in the above quotation) points out, the packages promoted by such companies actually preclude a plethora of agronomic options that might be helpful to farmers and that are normally funded by public research:

The difference is the commercial research looks for short term rewards…the herbicide tolerance, for example…whereas both the government publicly-funded and the farmer publicly-funded will look at long term issues, i.e. disease issues, sustainability of the crop, protein levels of wheat, the whole ethanol starch issue …[T]he commercial companies don’t have the patience to wait for those and then normally those output traits in a plant, the value is captured by the producer, whereas the outputs values of herbicide tolerance…can be captured by a commercial company. So…farmer driven, publicly driven research will look at input traits being housed in the seed, whereas the commercial companies will look at the traits being part of an agronomic package. And of course farmers are far more interested in the output traits in the seed because you don’t have to then drive to the local farm supply centre to buy 10 000 dollars worth of chemicals to do it [Interview, Canola Council of Canada, 20].

Directly in opposition to the industry’s insistence on market choice, farm organizations characterized this narrow set of GM seed varieties revolving almost singularly around herbicide resistance and marketed by just a few large companies as a lack of choice. In fact, this representative of the National Farmers Union points to the concomitant loss of knowledge that is the result of such narrow agronomic options:
Yields are improving at the moment with the introduction of hybrid varieties in canola from the conventional varieties, somewhat, but really there’s not much choice left for farmers in canola to buy seeds their retailers aren’t offering them. Many of them have actually been deskilled to the point where they’ve forgotten, although they could learn it relatively quickly, how to produce otherwise [Interview, National Farmers Union, 13].

In this sense, the lack of choice that exists currently in the market shapes future landscapes of choice. Once farmers have lost the ability and tradition of saving seed and selecting for characteristics that suit their local environments, future options are narrowed. Rather than a multiplicity of traits for which farmers select, herbicide resistance comes to dominate the market and professional breeding agendas.

A second argument with which opponents of GM wheat attempted to counter the discourse of individual market choice involved emphasizing the threats that GM crops pose to existing systems of production. The argument that GM wheat threatened current agriculture, and thus narrowed the landscape of choice for farmers, was advanced through at least two examples. First, as explained in other chapters, farmers and the Canadian Wheat Board felt that the introduction of GM wheat threatened existing wheat markets especially in Japan and the EU. In fact, the general public was quite sympathetic to AAFC and farmer efforts to invoke market impact assessment during the variety recommending process. Since I have already written about the politics of this market impact in other chapters (see chapters 3 and 4) I will not dwell on this here. This short extraction from an op-ed piece published in the Globe and Mail by four professors of agricultural economics and applied microbiology and food science summarizes the argument nicely:

It would seem logical to adopt a strategy of letting wheat farmers choose between growing GM and non-GM wheat, depending on market signals. For one thing, GM wheat will provide agronomic benefits to some wheat producers. As for the price of GM wheat - which we initially would expect to be lower than non-GM because of consumer resistance -- the market will sort out how much of each type is produced to best satisfy its requirements. The trouble with this strategy is that it depends on farmers’ ability to
segregate the two types of wheat. But farmers' experience with GM canola shows how tricky that can be. And there's virtual consensus in the scientific community that it would be costly and difficult to keep GM and non-GM wheat separate for long [Fulton et. al, 2003].

The second example of GM wheat threatening existing systems of production involved the possibility of maintaining wheat as an organic crop. Opponents of GM wheat, and especially those supporting and involved in organic production, pointed to the loss of canola as an organic crop through widespread contamination of seed stocks as evidence of the non-compatibility of GM and organic systems. Proponents, on the other hand, maintained that organic producers should bear the responsibility for keeping genetically modified material out of their crops since it was they who were reaping the price premiums of a niche market and self-imposing more strict production standards (interviews, Western Barley Growers Association, 3; Canadian Food Inspection Agency 13-14). Here again, proponents were mobilizing the rhetoric of individual market choice to argue that organic farming was a choice for which farmers accept individual responsibility in meeting the associated standards. But farm organizations fought back. The Saskatchewan Organic Directorate (SOD), for example, attempted to launch a class action lawsuit seeking compensation for the loss of canola as an organic crop and an injunction against the introduction of GM wheat (See previous chapters). In their view, the capacity to produce organically was not an individual choice, but rather the product of a longstanding movement under threat:

my feeling is that organic farmers were simply….had the ability and the tradition of being able to supply non-GMO crops and food to the public and that kind of ability goes back thousands of years to the dawn of agriculture. And when an upstart like the biotech companies come along and destroy that ability they should be held accountable. And I think the Canadian public should be outraged that their ability to choose to eat non-GMO food is being destroyed. And if the biotech companies have their way it will be destroyed forever, and I think that’s an outrageous situation. Biotech companies and even some organic brokers say “well, it’s a reality, we have to learn to accept a certain level of contamination of GMOs so lets set the contamination levels, let’s learn to live with it,
develop a segregation system that keeps it within those preset levels” But I think… it’s not acceptable, we’ve had this tradition, this history, this ability to eat non-GMO food and it’s like saying an oil company had a spill in this river, but you know the damage has been done, and so we’re just going to sit back and let a certain amount of damage happen every year because it’s already been done once and it’s just part of modern life, so suck it up [Interview, Saskatchewan Organic Directorate, 9].

The irreversibility invoked in this last quotation is, indeed, very real for farm organizations like the SOD. In consulting with Rene van Acker, an expert in plant agriculture at the University of Guelph, the same respondent explains that contamination of canola with GM material is, all things considered, permanent:

And we’ve had discussions with Rene about what do you think it would take, if it’s even possible to go back to a state where we get rid of GM canola and we’re back into a situation where we can grow pure canola again. He said “I don’t know if we could ever do that. First of all you’d have to ban everybody from growing canola period. No canola because if you grow some canola it’s going to end up getting re-contaminated by the residuals if it might be growing in the ditch or the bush or someone’s garden or whatever” [Interview, Saskatchewan Organic Directorate, 9].

Drawing on the expertise of scientists and the accumulated knowledge associated with widespread contamination of canola on the prairies, anti-GM wheat activists argued that the introduction of GM wheat would threaten the entire wheat industry and all wheat farmers.

The argument that gained the most traction against the championing of market choice revolved around the deliberate withholding of consumer labelling of GM products. Most importantly, for the market to perform as a just mechanism for individual consumer choice, consumers must have access to full knowledge about their choices. Thus, anti-GM activists pointed time and again to Canada’s rejection of mandatory labelling legislation for GMOs in order to support their claims that the fate of GM wheat should not be decided in the market:

We didn’t ask for any of this, what’s wrong with the food that we have now? Why do you want to use food as a vehicle for your chemicals and your drugs, what is that? I mean drugs, go to the pharmacy and get them, but when it comes to the food that I eat and I feed my family, none of your business in there. It’s not like there was a need for it...And, more importantly that it was introduced in the food supply without anyone
knowing about it…[L]ike did you know that 70% of what you eat has this stuff in it? And they didn’t even need to know whether or not this stuff is harmful, that’s not the point. What the hell is that doing in my food supply and why didn’t anybody tell me and more importantly why am I not allowed to choose whether or not I want to eat this? So what could you POSSIBLY respond to that? Nothing, nothing. There’s no argument, nothing to throw at us …so it was very easy for us to mobilize consumers and you know the average citizen on this issue. Not a problem [Interview, Council of Canadians, 3-4].

Indeed, mandatory labelling of GM products had widespread public support. For example, in 2003 the Consumers’ Association of Canada made public the results of a national poll that found that 91 percent of Canadian consumers wanted government-enforced labelling on all GM products (Wilson, 2003). This result flew in the face of the voluntary labelling standards upon which the Canadian General Standards Board had finally agreed just months before. The establishment of the voluntary standard was mired in controversy and took a full 4 years to negotiate. For example, consumer advocates such as the Consumers’ Association of Canada walked away from discussions because the possibility of mandatory labelling had been foreclosed from the beginning.

At the same time as the negotiations for voluntary labelling were taking place, Liberal Member of Parliament (MP) Charles Caccia introduced a private member’s bill requiring mandatory labelling in 2002. The bill gained considerable momentum in the House of Commons and looked like it might have gone to, and passed, a parliamentary vote under a newly agreed upon proposal that would have sent all private member’s bills worthy of House debate to a vote. Instead, a committee of MPs decided the bill would be debated, but not voted on, in December just a month before the new voting practice was to be implemented. The possibility of mandatory labelling was thwarted once again, and this seemed to confirm activist claims that the government was beholden to the biotech industry:
I mean there’s huge resistance for labelling on any of these things because there’s a tacit understanding that the marketability of these things will collapse if people can clearly see in what they’re buying that it’s a product of this process, of genetic modification. And government has resisted sensible labelling and industry has resisted labelling...[I]f they argue out of both sides of their mouth that they really believe in the market as having the ability to determine whether things go forward or not or fail, well they should be willing, if they believe in their advances and benefits so much, they should be willing to fully label it and indeed advertise it. [Interview, National Farmers Union, 18].

According to respondents such as this one, the market mechanism cannot be understood as a just arbiter of consumer preferences, especially when the information that consumers need to register their opposition to GMOs is withheld. Two strategic moves are plainly in view that quell any possibility for resistance. First, the mechanism for consumer agency was placed in the market rather than in the realms of public policy and social movements. Second, the possibility of opposing GMOs, even through market action, was squashed through the deliberate non-identification of GM products. It is likely needless to say that voluntary labelling has “failed to catch on” among food companies and retailers in Canada (Pratt, 2006).

**Political subjectivities**

In order to counter the discourses of consumer choice advanced by proponents of GMOs, anti-GM wheat activists highlighted their history of collective action in their interviews with me. This section reviews these discourses of collectivity and interrogates the political subjectivities associated with the two sides of the debate, i.e. ‘voting with your dollar’ in the marketplace and action as an articulated unity in order to assert particular interests. I use the phrase ‘articulated unity’ to draw attention to the process of articulation in which differently positioned and interested organizations were drawn together for a common purpose with a unified voice while still maintaining their different identities. What struck me immediately was the diversity of collective actions that my participants stressed. For example, it is not a surprise that some cast back to the first half of the 20th century when many of the cooperative institutions associated
with wheat were formed (as outlined in earlier chapters). What was a surprise was the way in which a few participants emphasized the case of coordinated industry action around the genetic modification of flax to contrast with the ‘let the markets decide’ approach to GM wheat. I outline the case of industry retraction of GM flax in this section to foreground the possibility of political subjectivities oriented around collectivity. It should be taken into account that the form of populist collectivity that characterised early 19th Century farm organizing was limited, primarily, to the realms of marketing and credit. Farmers remained vehemently protective of private property in land and the exploitation of their own (individual and familial) labour. Practices of collectivity were accepted and embraced only to the extent that they did not undermine the yeoman farmer -- master of his own domain. So while both examples of collectivity that I mobilize in this section are less than radical, they still do the work of denaturalizing the notion of agency as necessarily individual.

Talk of past rounds of collective action in agriculture usually surfaced during interviews with farmers when I asked questions about their involvement in farm politics and when I enquired into the lack of resistance around GM canola. A few participants emphasized that their families had roots in the cooperative movement or with the National Farmers Union and that they brought this inherited experience and understanding to organizing against GM wheat. The following participant thought it imperative to communicate that prairie farm history is a history of collective struggle and cooperation. Any attempt by contemporary farmers to understand themselves as individual entrepreneurial subjects is only possible by erasing the past and the institutional legacy of collective action:

...[T]his shift from farmers seeing themselves as having a collective interest into one where they really adopted a mythology about how they came and developed here as sort of entrepreneurs on the frontier rather than really having a lot of institutional things in place and a requirement for cooperatives and a requirement for governments and a
requirement for things like the Manitoba Grains Act and the weight of the Canadian Seeds Act and the whole CONSTRUCTION to allow them to prosper and the Canadian Wheat Board being one of them [Interview, National Farmers Union, 7].

This quotation begins with an explicit reference to farmers as having collective interests. Here it is not just that producers have the same interests; rather, their welfare is explicitly intertwined through common structures (for example Acts, marketing boards, etc.) and experiences. Such common interests are not the aggregation of interests and preferences at the individual level, as is assumed in the models of public and rational choice reviewed above. Rather, they are the result of interconnected practices where the conduct of one or many farmers affects the practice of others. For example, to the extent that a group of farmers sells their commodities below the market price, the bargaining capacity of all producers of those commodities is affected.

The above participant describes producers as being able to act as an articulated unity in order to build and secure institutional supports for their common good. Here agency can be understood as the product of relationships and inter-subjectivity. Subjects do not come to the public arena with fully formed preferences that can be sufficiently fulfilled through the market mechanism; rather, their preferences are forged in and through their social lives. In this sense, production is understood as fundamentally social, even if, as the participant describes above, a mythology exists about farmers as individual entrepreneurs tackling the frontier in isolation. Certainly, the spatial arrangement of production (with individual family units producing on separate homesteads) imposed certain barriers to collectivity. But producers did labour together: they often shared equipment and worked each others’ lands in teams, and they built and relied on cooperative marketing, distribution and credit structures.

A more recent and topically relevant example of collective action involved coordinated industry retraction of GM flax in the early 2000s. Interestingly, the industry’s rejection of the
herbicide-residue resistant GM flax (named Triffid) developed at the Crop Development Center at the University of Saskatchewan received very little press or social movement activity. Instead, deregistration occurred at the request of the flax industry itself through the influence of the Saskatchewan Flax Development Commission, the Flax Council of Canada and several farm groups. On one hand, some of the story of GM flax mirrors that of GM wheat. Most importantly for both cases, the widespread propagation of GM crops threatened export markets – especially those in Europe which constituted roughly 60% of Canadian flax exports (Warick, 2001). When European buyers announced, in the summer of 2000, that they would not be buying GM flax, farmers worked through their industry groups to come to a decision that the whole industry should abandon Triffid flax. Moreover, as the following participant explains, the particular variety of modified flax did not provide great agronomic benefits to growers (which was also a central concern with RR wheat):

... [Th]ere’s an inertia and philosophy, sort of a belief that well the market should decide all. And this sort of rightist philosophical inertia, as I call it, caused people to resist. First of all, that particular genetically modified flax was resistant to a herbicide that was largely never used, so it didn’t really serve much of a purpose per se. There was no problem with those that wanted to produce flax with the complement of herbicides available to production. It didn’t offer any yield advantage, it didn’t offer anything other than it was GM flax. I know when I was pushing the argument to push back and through various methods, it had to be done, though, on the purely economic market argument [Interview, National Farmers Union, 4].

On the other hand, the story of GM flax played out very differently from that of RR wheat. Unlike RR wheat, GM flax had already successfully emerged from the regulatory process (it was given approval by the CFIA in 1996) and was being reproduced for commercial sale by seed growers all over the prairies when it was deregistered. In fact, 200,000 bushels of seed worth $2.5 million had to be rounded up and crushed in order to destroy the possibility of the seed reproducing and contaminating the environment (Warick, 2001). Furthermore, in the case
of GM flax, farm and industry organizations were opposing a crop that was developed by a public institution, rather than a private company like Monsanto. Indeed, once the decision had been made amongst the producer organizations that Triffid flax had to be abandoned, the industry was able to put pressure on the developer to voluntarily deregister the variety. Given that the Crop Development Centre received producer check-offs for flax research from the Flax Development Commission, and understood itself as serving farmers, the Centre complied with the industry’s wishes. But there continued to be controversy surrounding one scientist’s subsequent promotion of Triffid flax to the general public. A strong proponent of genetic engineering, the scientist relocated to California not long after Triffid’s deregistration.

Participants felt that the Crop Development Center acted reasonably responsibly with regard to the industry’s non-acceptance:

But they were certainly responsible. Once the university and the breeder recognized the potential harm to the industry there was no question. I mean it had gotten to being released for multiplication within a seed company, and they too were responsible. I mean they had invested a lot of dollars into taking that product to commercialization. At the end of the day, you know, while they weren’t initially excited about doing it, they were certainly responsible. At the end of the day they did what was best for the industry [Interview, Canola Council of Canada, 5].

In both of the above quotations the participants use the case of coordinated industry action against GM flax to work against the logic of market choice. This is most obvious in the quotation from the representative of the NFU since he frames his discussion of opposition to GM flax as the practice of resistance against the ‘philosophy’ that says ‘the markets should decide all’. Although this participant emphasizes the limited discursive terrain upon which an articulated resistance had to be constructed (it had to be done ‘on the purely economic argument’) he, nevertheless, gives a sense of a negotiated and inter-subjective notion of collectivity. Similarly, in the last quotation the participant identifies a coherent unity (‘the
industry’), but this is a unity that is comprised of differently positioned and interested actors, including seed companies and farmers. The industry is clearly not the aggregation of individual fully formed interests and preferences. Instead, it is a site of struggle and contention that is always in the making. In order for GM flax to have been de-registered, farm groups had to make a case and represent their arguments as the economic interests of the industry. In other words, they had to agree and act on a ‘common good’.

The political subjectivities associated with coordinated industry action to deregister GM flax and with earlier forms of cooperative farm organizing present alternatives to conceptions of market-based agency. However, the two alternatives serve as radically different examples; the former working much more within broader systems of power relations, and the latter challenging the capacity for large corporations to extract value from farmers. Underlying both alternatives is an inter-subjective understanding of agency in the way described by Dryzek (2000) above. Here subjects have the capacity for collective action and negotiate their interests and preferences in a public sphere. The practice of political subjectivity is in this way social: it is oriented around the possibility of action that supports a negotiated, yet fraught, common good.

The notion of a common good (which underlays the collective action described above) contrasts sharply with the ‘let the market decide’ approach of GM wheat proponents. The political subjectivity associated with consumer choice posits agency as an individual calculation of costs and benefits. This is a subjectivity that is fundamentally asocial in the sense that what is best for the sum of individuals is best for society: there is no need for a public sphere, for negotiation, or for a conception of the common good. By advocating that the appropriate mechanism for registering opposition to GM wheat is to ‘vote with your buck’ in the market, GM wheat proponents effectively denied the common positionality of farmers as producers of
food. Importantly, in this understanding of agency only consumers can have their say, and there exists no possibility for a politics of production. While the farmer understands him/herself first and foremost as a producer, entering the market in order to buy the necessary factors of production, seed and fertilizer companies understand him/her chiefly as a consumer. In Grundrisse, Marx outlined exactly this process with regard to the industrial labourer vis à vis the capitalist:

What precisely distinguishes capital from the master-servant relation is that the worker confronts him as consumer and possessor of exchange values, and that in the form of the possessor of money, in the form of money he becomes a simple centre of circulation – one of its infinitely many centres, in which his specificity as worker is extinguished (Marx, 1973: 421) [emphasis in original].

While the relationship of input corporations to farmers is not one of capitalist to labourer (as it is in the quotation above) the implications in the two cases are similar. For biotech lobby groups, corporations like Monsanto, and other GM wheat supporters farmers are simply ‘centres of circulation’. They have agency only in so much as they make free choices in the market. Indeed, their specificity as producers/workers is extinguished.

Given Marx’ insightful observations in the 19th century there seems to be nothing new about the discourse of individual market choice advocated by proponents of GM wheat. However, those studying neoliberalism have shown that the imperative of market choice increasingly pervades more aspects of social life and has become central to the broader concept of freedom. That GM wheat supporters adopted the discourse of farmers as consumers (a very specific positionality of farmers vis à vis input suppliers) reflects the incursion of market choice into more and more aspects of social and political life. The capacity to choose through market action was represented as the practice of freedom itself. Here individuals understand themselves as entrepreneurs of the self obliged to navigate through, and demand, an ongoing series of
choices that make them who they are. As the quotation from the NFU representative above demonstrates, even past forms of commonality get reconceptualised through this lens. Farmers become individual entrepreneurs managing market choices in isolation. Their subjectivity as collective actors and producers is extinguished in both the past and the present.

Conclusion

This chapter has problematised the discourse of consumer choice that was front and centre in my interviews with proponents of GM wheat. I have shown how proponents emphasized the market mechanism as a more just method for deciding the fate of GM wheat than political movements, governments or lobbies. This discourse was bolstered by claims that markets fostered technological progress and already encompassed the right incentives to ensure food and environmental safety. In their opposition to the ‘let the markets decide’ approach, opponents of GM wheat highlighted the lack of choice that was offered in the market, the potential and real harm of GM crops to already existing production systems and the refusal of government regulators to enforce the identification of GM crops through labelling. For these reasons, they argued, the market was not offering the freedom of choice that its proponents celebrated.

In the last section of this chapter I have discussed the political subjectivities associated with the concept of individual consumer choice and contrasted these with notions of collective action and common good drawn from farmers’ historical and contemporary experiences. I have argued that farmers’ common positionality as producers of food is erased through the market mechanism, which posits them as individual consumers and ‘centres of circulation’. As the imperative of market choice expands to more and more aspects of social and political life under
neoliberal governance it will be important to keep collective political subjectivities alive through ongoing struggle.

Producers have a wide range of examples of collectivity to help them think beyond neoliberal subjectivity. They have both historical and contemporary examples ranging from quite radical to quite mainstream, including the type of coordinated industry action that forced the deregistration of GM flax. Looking back at the history of consumer activism (Lang and Gabriel, 2005 providing one example), it is clear that non-market forms of agency do exist for consumers as well. The notion of ‘voting with your dollar’ in the marketplace similarly strips consumers of a notion of commonality or collectivity. Even if they face a more difficult task in the articulation of a common good, since the category of consumer is as internally differentiated as the spectrum of diversity across humanity, consumers can and have worked collectively through actions such as boycotts and protests, through consumer cooperatives, and as allies of producers. Remembering that collective forms of action have and do exist might enable more creative ways of thinking beyond neoliberal subjectivity for both producers and consumers.
Conclusions

Anti-GM movements usually conjure up images of radical activists slashing and uprooting GM crops in unsuspecting farmers’ fields wearing biohazard suits or dressed as the grim reaper. Indeed, a Google image search of “GM crop protest” and “anti-GM movement” produces a large number Greenpeace signs, young white activists in European cities, and corn cobs wearing frightening faces. Scattered photos of large peasant protests in India are the only regular interruptions of the seemingly European, consumer-centred anti GM-movement. Thus, when in 2001 a coalition, with a majority of rural and farm groups, announced its opposition to Monsanto’s roundup ready wheat in Canada I became excited about the possibilities it brought for shedding new light on issues of genetic modification. So far, there has been very little written about “first world” farmers as subjects and leaders of movements against genetic modification.

As I set out to investigate the coalition against RR wheat and their claims about genetic modification, I soon realised that the movement could not be properly characterised as anti-GM. In fact, many of the mainstream farm movements that were part of the coalition had embraced the arrival of Monsanto’s RR canola just five years earlier, and many of their members continued to plant RR canola while they spoke out against RR wheat. That many of the coalition’s members were not opposed to genetic modification did not, however, limit the group from taking advantage of wider scepticism amongst the public over genetic modification, or from mounting their own claims against RR wheat alongside and through consumer anti-GM discourses (the subject of chapter three). If coalition organizations had not organized against RR canola, what
made them so actively oppose RR wheat? This was a simple empirical question which led me to interesting answers that challenge the possibility of a widespread anti-GM movement.

In this dissertation I have engaged the longstanding agrarian question that explores the development of capitalism in agriculture in order to frame my analysis of the anti-RR wheat movement. My research has shed light on the need for an updating of the traditional agrarian question in order to adequately capture the extent to which capitalist relations and the practice of labouring produce more than just economic values; they simultaneously fabricate cultural signification and nature/space/place. For both those that produce it and those that consume it, food is the product of deeply moral and cultural economies. Ironically, the updating of the agrarian question to include cultural and moral processes can be accomplished, in part, through some fairly ‘old’ literature including Marx’s insistence on the understanding of commodities as relations between differently positioned buyers and sellers and between simultaneous but distinct modes of existence as exchange, use and surplus values.

In order to maintain a dual focus on both the material and semiotic existence of wheat as a product of labour and as a commodity to be sold on the market, I have brought Neil Smith’s production of nature thesis to bear on the agrarian question. An understanding of nature and space as produced through agricultural labour and as disciplined by a wider political economy invites a particular reading of differentiation across commodities and place. For example, the production of nature perspective explains both the tendency for capitalist relations to permeate agriculture more evenly and at the same time for barriers to be produced from within the realm of social relations that make for a differentiated agricultural landscape. In this perspective the materiality of nature is constantly reproduced in changing forms, something that can be demonstrated by the changing biology and relations of wheat and canola.
In chapter two I juxtaposed the political, institutional, agronomic and cultural histories and characters of wheat and canola in order to gain insight into the differences in the politics of their genetic modification. I showed how wheat is associated with a history of political activism amongst prairie farmers; how it is characterised by large investments of public breeding money and by the prominence of the Canadian Wheat Board, which monopolizes the marketing of wheat in the interests of farmers; how it is agronomically familiar and relatively easy to grow; and that it is culturally significant for eaters and prairie folk. Canola, on the other hand, is characterised by rapid movement to private investment in breeding and research, a commodity organization that represents industry and farmers, agronomic difficulty in the fields, a culture of innovation and competition, and low cultural significance to eaters. The material-semiotics of the two different plants set the scene for producer and consumer reactions to new varieties and modifications.

Producer rejections of RR wheat not only centred on the plant, but also had to do with the perceived value of the RR trait. In chapter four I argued that commodities can be best understood as sites of intertwined values (both what might be considered economic and cultural). Producers understood the RR trait as threatening to their moral economies of wheat since they perceived little use value in a second RR crop in their rotations, since wary consumer markets in the EU and Japan endangered the capacity of farmers to successfully exchange the RR crop for payment, and since the new variety would lead to a change in the moral and cultural relationship of farmers to wheat. Interestingly, only a minority of farm organizations presented the new trait as a means of extracting surplus value from the farm even though such an understanding was reasonable and prairie farmers had a history of making similar claims with regard to credit
suppliers, grain merchants and elevators, etc. Instead, the use of public scientists and scientific resources was presented as an amoral transfer of value from the public sphere to private hands.

In chapter three I have argued that prairie producers articulated their concerns through discourses that are often considered consumer-driven. In fact, the three most prominent discourses of opposition to RR wheat included the loss of consumer markets in Europe and Japan, the possibility of environmental contamination, and the lack of democratic and transparent process in Canadian biotech policy and regulation. Producers strategically communicated their interests through these consumer discourses, presenting themselves as precariously positioned vis-à-vis other actors in food systems, advancing a notion of the environment as working landscape, and presenting the Canadian state as supporting corporate rather than public (including producer) interests. Producers navigated a thin line, expounding their own concerns through consumer discourses while at the same time rejecting the attempts made by proponents of RR wheat to relegate them to consuming subjects, who would best register their dissent by voting with their dollars on the market. In chapter five I showed how producers countered such claims that the market mechanism was that the most just and fair way of deciding the fate of RR wheat. I argued that the individualistic discourse of consumer choice stripped farmers of their political subjectivities as producers and foreclosed the possibility of collective action.

All of the above factors, which encouraged producers to take positions of opposition to RR wheat, point to the ways in which the agrarian question was played out in specific and uneven ways on the Canadian prairies. If the family farm is going to persist, many organizations argued that wheat will need to continue to be produced at high standards of quality for human consumption, in viable rotations with other crops, and with some level of producer control over agronomic practice, including the capacity to save and reproduce seed. Wheat, therefore,
occupies a prominent position in the prairie agrarian question such that the corporate takeover of wheat would threaten the capacity of family farms to continue subsisting in ways that have not been evident with the corporate control of other crops. One of the reasons that small farmers have been able to persist as long as they have is that they have built collective marketing and producer organizations that work in their interests. Such institutions were built around mass production and international marketing; any challenge to international markets and mass production also threaten to undermine producer organizations. The struggle over RR wheat, thus, draws out competing visions for the future of farming on the prairies and highlights the capacity of producers to act as collective and individual subjects that shape their history.

Given their acceptance of RR canola and their failure to capitalise on the argument that Monsanto’s RR wheat was a method of extracting value from their farms, prairie farmers seem to be uneasy allies for broader movements against genetic modification. Their anti-RR wheat story points to the need to understand narratives in agriculture and food and in the politics of opposition as mediated by biophysical nature and local histories and cultures. As I have shown in chapter 4, farmers do not produce only for production’s sake; their concrete practices of labour make for complicated and moral economies based on material and cultural relationships with plants and institutions. In this way, the penetration of capitalism in agriculture is shaped not only by nature’s obstacles, but also by moral economies. Similarly, opposition movements are also mediated by biophysical, economic and cultural practices of livelihood making. Broader movements against genetic modification will need to recognize these moral economies and biophysical specificities if they plan to ally more regularly with producers.

Most importantly, this research suggests that anti-GM movements will need to include more nuance in their arguments by considering the implications of specific crops and particular
traits of modification. Such attention to specificity will challenge the coherence of a global (the double entendre here is purposeful) anti-GM politics. Furthermore, in the absence of significant food safety concerns and with the introduction of a new wave of ‘consumer friendly’ traits and/or the development of traits that facilitate low input agriculture (like drought resistance) opposition to genetic modification may wane. Under such circumstances, the argument that has the greatest capacity to articulate necessarily local and specific struggles is the corporate control of biotechnology and food systems more broadly. The corporate control of biotechnology is a discourse behind which both producers and consumers can unite, and it names a problem that requires a conception of collectivity in order for it to be challenged. Such an analysis of the problem with biotechnology also allows for the possibility of coalition work with other struggles over agriculture and food across the globe.
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