Innovation in the Basin-Boundary Beef Supply Chain

RESEARCH BRIEF

INTRODUCTION

In 2014, the RDI began a research project focused on ***Identifying Opportunities to Increase Food Production and Improve Food Security in the Columbia Basin-Boundary region***. Elements of this line of research have included: common themes in the region's agricultural plans, availability and costs of farmlands, soils and climate information, and innovative practices within the food system. This report aims to explore the nature and extent of innovation within the beef production and distribution supply chain.

The nature of innovation has been studied extensively in many different contexts[1,2,3]. Innovation has been identified as the chief source of productivity improvements and hence higher profitability and competitiveness[4-7] . Researchers have codified elements of innovation and created a framework for studying, quantifying and analyzing innovation[8].

This report is the product of a series of interviews with farmers, processors, and distributors of beef raised in the region. These stakeholders were asked questions about their innovations and the impacts on their businesses. This information has been analyzed to inform other stakeholders in the sector about best practices and the advantages of innovating.

RESEARCH METHODS

This paper is largely the result of interviews[9] that were held with three types of stakeholders in the beef supply chain: cattle ranchers, abattoir managers/proponents, and retail distribution business-people. Members of the Kootenay Livestock Association, the Windermere District Farmer's Institute, the Creston Valley Beef Grower's Association, the Grand Forks Stock Breeders, and the Kettle River Stockmen's Association were approached for recruitment recommendations in their respective regions.

With the assistance of two locally based researchers (locals to Grand Forks and Invermere), a selection of eight stakeholders was reached. These stakeholders represented each of the three target respondent groups, and major farming centres in both the East Kootenays and the Kootenay Boundary.

Interviews were held at a location of the stakeholders' choosing. Information was recorded both by audio recording and the transcription of detailed notes. Questions probed the nature of innovation in the respondent's operation, and their relationships within their local food network and the larger regional/national landscape.

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Innovations described within the interviews have been categorized according to a structure established by the Organisation for Economic Cooperation and Development (OECD). This involves categorization by:

Type of innovation:
- Product
- Process
- Marketing
- Organizational

Degree of novelty:
- Firm level
- Sector level
- World level

Degree of impact:
- Small
- Medium
- Large

Innovations were then categorized by the desired outcome: expanding markets, increasing productivity, improving customer service, lowering transaction costs, internalizing value-added, increasing employment.

Finally, stakeholder responses regarding challenges were analyzed to find commonalities and generalized learnings.

RESULTS

BEEF SECTOR INNOVATIONS

A summary of innovations in the Columbia Basin-Boundary beef sector follows in figures 1 through 4:

Figure 1: Columbia Basin-Boundary Product Innovations

Description of Product Innovation	Type – Primary (Secondary)	Impact
Inspected Abattoir Services	Prod (Mkt, Org)	Low-Medium
Local stakeholders working together, in a collaboration, to open inspected abattoir services reduces the need for expensive and stressful travel to Alberta finishing and processing facilities. This can facilitate local/regional distribution and market development, but may not reach the economies of scale possible in the Alberta market.		
Mobile Abattoir Services	Prod (Mkt, Org)	Low-Medium
Same as above. Suffers from greater NIMBY (Not In My Back Yard) attitudes regarding waste disposal (due to increased number of people exposed). Also, harder still to achieve economies of scale.		
Non-Beef Products from Abattoir	Prod	Low
Processing other products, such as duck, pork, lamb, can diversify the activities of the abattoir. This comes at the costs of diffusing the focus of the operation and increasing changeover costs.		
Ecological Services	Prod (Proc)	Low – Medium
Farms have an impact on the local ecology; both positive and negative. Farms in this region have pioneered relationships with neighbouring conservation tax authorities to direct funds to pay for ecological service improvements. This region's pilot programs have been replicated at the national level.		
Bone Broth and Other Processed Products	Prod (Mkt)	Low - Medium
Working with local food processors, there is an opportunity to keep some of the value-added food-system activities located within the region's economy. This is a response to the demand conditions in the market, but also requires educating customers to grow that segment.		

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Figure 2: Columbia Basin-Boundary Process Innovations

Description of Product Innovation	Type – Primary (Secondary)	Impact
Improved Irrigation	Proc	Low-Medium
Farmers have adopted irrigation improvements, such as pivot irrigation systems, to improve feed crop productivity and increase watering access for cattle.		
Hay Tepping	Proc	Low-Medium
Hay tepping is a process innovation that speeds drying time, decreases rot, improves longevity and improves nutrient content.		
Weather Shelters: Feed, Calving, Equipment	Proc	Medium
Farmers have adopted weather sheltering techniques for feed, calving and for equipment. Feed that is sheltered has better nutrient content for cows and lowers rates of illness. Equipment that is sheltered lasts longer and requires less maintenance. Calving shelters protect birthing cows, lowers monitoring costs and reduces mortality.		
Digital Rosters	Proc	Low-Medium
Digital rosters are an efficient way of keeping track of herds, immunization, and other important herd related data.		
Locally Optimized Feed Crops	Proc	Low-Medium
Some farmers have experimented with alternate feed crops, such as radishes, that grow well in the local climate. Lower cost or higher nutrient feed crops improve general productivity.		
In-House Transportation Contracting	Proc (Org)	Medium
Taking control of the transportation process allows farmers to reduce the stress on their animals by moving fewer cows per truck and laying more hay per truck. This lowers illness and protects the reputation of the farm. This requires good relationships with local trucking contractors.		
In-House Artificial Insemination	Proc	Medium
Some farmers develop the expertise for artificial insemination, in-house. This facilitates the development of a house-brand, internalizes value-added, and allows for rapid improvement of genetic stock.		
Continual Flow Fresh Inventory (Proposed)	Proc	Medium - High
Currently, local meats are only available frozen. This does not directly compete with the fresh meats that are produced out of large scale processors in AB, where they have enough volume to stage processing throughout the year. With beef-dedicated (local abattoirs are often busy with wild-game in the fall) abattoirs and a commitment by local retail grocery outlets to purchase large volumes, there may be sufficient scale of operations to stage product through the year. This would increase handling / transaction costs.		

Figure 3: Columbia Basin-Boundary Marketing Innovations

Description of Product Innovation	Type – Primary (Secondary)	Impact
Local Market Supply	Mkt (Org)	Low-Medium
Farmers have started allocating a proportion of their herd to the local market. This requires a deviation from the traditional farm -> feedlot -> industrial abattoir process. Low volumes of trade and higher transaction costs stand in the way of increasing this market development.		
Grass-Fed Hormone Free	Mkt (Prod)	Low - Medium
Providing grass-fed, hormone free product to the local market is a response to the demand side of the market. Currently, this represents a small proportion of total production (less than 15%). This offers a point of differentiation in the retail market.		

Pre-Sales / On-Line Sales Direct pre-sales and on-line sales, even if facilitated by a 'retail operator' can allow for direct sales from farmer to final customer. If the retailer never actually owns the beef, the regulations on processing and handling can be met by smaller scale abattoirs.	Mkt	Low-Medium
Branding Development of local market presence and improved relationships with local retailers allows for brand recognition.	Mkt	Low-Medium
Agri-Tourism Inviting visitors to see operations, or hosting events at the farm opens an additional, diversified portfolio of commercial activities. This has created employment within the farm, sometimes keeping family members actively employed on the farm. These activities also provide a motivation and payment stream to keep operations at the highest level of cleanliness and professionalism.	Mkt	Medium

Figure 4: Columbia Basin-Boundary Marketing Innovations

Description of Product Innovation	Type – Primary (Secondary)	Impact
Direct Supply Relationships: Farm – Retail Farmers have developed direct supply relationships with retail stores. This cuts out the administrative side of the distribution chain. This lowers transaction costs and, with lower volumes, minimizes the restrictions of the existing framework.	Org (Mkt)	Low - Medium
Direct Supply Relationships: Farm – Feedlot Farmers have developed direct supply relationships with feedlots. When directing beef to the local market, this can eliminate costly and stressful transportation and offer greater control over the treatment of the animals.	Org (Proc)	Low - Medium
Agri-Park An agri-park is a space for agriculturally focused fairs/festivals, exhibits, or agriculture focused facilities. These types of spaces can offer local producers an important venue for local sales, promotion and place to meet potential collaborators.	Org (Mkt)	Low-Medium
Local Market Agent One local farmer described the development of a relationship with a local market agent. This is an individual who acts as sales agent for the producer at regional farmers markets, where the time demands of the farmer are too high to permit them to do it on their own. In this specific case, the market agent also processed locally grown/raised product and sold their own product.	Org (Mkt)	Medium
Mentor Family Most farmers face challenges ensuring that their farms carry on; both with future operators and future access to agricultural lands. Some farmers have specifically and consciously begun mentoring their family members, grooming them to take over the farm in the future.	Org	Medium
Network Facilitations Trade organizations (such as Cattleman's Associations) open communications within the network of member stakeholders. This facilitates diffusion of innovative ideas and lowers research and development costs for members.	Org	Low-Medium

Figure 5: Innovation Matrix: Basin-Boundary Beef Sector

PRODUCT	PROCESS
• Inspected Abattoir Services (Mkt, Org) • Mobile Abattoir Services (Mkt, Proc) • Non-Beef Products from Abattoir • Ecological Services (Proc, Mkt) • Bone Broth & Processed Product (Mkt)	• Irrigation • Hay Tepping • Weather Shelters: Feed, Calving & Equipment • Digital Roosters • Locally Optimized Feed Crops • In-House Transport • In-House Artificial Insemination & Calving (Mkt, Prod) • Continual Flow Fresh Inventory (Mkt, Prod)
MARKETING	**ORGANIZATIONAL**
• Local Market Supply (Org) • Grass-fed Hormone Free (Prod, Proc) • Pre-Sales / Online Sales • Branding • Agri-Tourism (Prod)	• Direct Supply Relationships: Farm-Retail (Mkt) & Farm-Feedlot • Agri-Park (Mkt) • Local Market Agent (Mkt) • Mentor Family • Network Facilitation

Using the OECD innovation classifications, Figure 5 illustrates the type of innovations that have occurred at respondent businesses over the last decade. Innovations have been classified by their primary classification. Secondary innovation types are listed in brackets. Proposed innovations are in italics. For example: *Continual Flow Fresh Inventory (Mkt, Prod)* indicates that the innovation of providing a continual flow of fresh inventory would constitute a process innovation, but that this also would constitute a marketing and a product type innovation. *Italic text* indicates that this is an innovation that is not being implemented, it is simply proposed.

Product Innovations

Product innovations principally centered around the processing sub-sector. Basin-Boundary communities have spent considerable energy on establishing abattoirs that are inspected and certified. The absence of this service poses the greatest challenge to establishing a local supply of beef. These product innovations are closely linked with Marketing innovations for this sector.

Process Innovations

Process innovations in this sector have come exclusively from the cattle-ranching sub-sector. While the processing and distribution sub-sectors are preoccupied with market access issues, the cattle-ranchers look for ways to increase their productivity and internalize value-added aspects of their operations.

Marketing Innovations

Marketing innovations in the beef sector have been aimed at establishing the local market. Cattle-ranchers have made portions of their herd available to the local market. The processing and distribution sub-sectors have focused their efforts on sales innovations that avoid regulation triggers. On-line and pre-sales systems have effectively created a farmer to consumer, direct-sales relationship.

Organizational Innovations

Organizational innovations have been wider ranging in their goals. Many have been tied to the need to address the restrictive regulatory environment by bringing together diverse interests to pool resources (such as cooperative processing and distribution efforts). Others have aimed to capitalize on overlapping interests by forming partnerships that leverage resources (such as engaging a local market agent) or to lower transaction costs (such as establishing direct relationships with feedlots or range-land owners).

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NOVELTY AND IMPACT

Most of these innovations are firm-level innovations. For the most part, the product innovations have been adopted from other jurisdictions through open sources. Through observation of other ranchers, internet research, industry publications, and network connections, Basin-Boundary cattle-ranchers have adopted techniques and production systems that are appropriate to their context. The innovations have low to medium impact. Trial and error often guide their implementation.

Likewise, the product innovations are firm-level adaptations of products and services that are well established in other jurisdictions but new to the area. The development of local, inspected abattoirs are firm level innovations if viewed from the perspective of the processing industry. However, they do have the potential to have an impact on the regional sector, viewed from the beef supply perspective. These adaptations range from low to medium level impacts, while the local inspected abattoirs have the potential for a larger impact once fully integrated.

The marketing innovations demonstrate some of the more novel innovations, providing sectoral level innovations to deal with sales regulations. Cows must be slaughtered, cut and wrapped at an inspected abattoir in order to be eligible for retail sale in BC . There are somewhat less stringent regulations for sales direct to consumers. The creation of on-line and pre-sale local beef transaction systems facilitates the direct purchase of beef by consumers from farmers. With sufficient uptake, this could prove to be a medium to large impact innovation for the region.

Limits to available land, low population density, high transportation costs, and low volume businesses are common pressures experienced throughout the Basin-Boundary region. Combined with the regulatory pressures in the beef industry, these have collectively induced some interesting organizational innovations among the region's stakeholders. Characterized by a highly cooperative attitude, there has been impressive collaboration within the region's stakeholders. The direct supply relationships between ranchers and processors, or range land owners, have a medium impact on the firms involved. And, the collaboration between rancher and sales agent could prove an important avenue for sales if they proceed smoothly.

INNOVATION PROCESS AND DISPERSION

It is a relatively small population involved with the beef sector. The network is effective and collaborative. There are a number of notable exceptions, but for the most part people work together and support one another openly.

To inspire and guide the innovation process, most respondents report using open sources such as: the internet, industry publications, trade journals, and network newsletters. Where there are coordinated network gatherings, visiting experts have been employed to good effect. A couple of stakeholders have employed business consultants to assist with planning, evaluation and implementation.

The most contentious component in the supply chain seems to be the processing sub-sector. Ranging from minor competitive friction, to conflicts that have stopped business altogether, the processing of beef has proven the most difficult to coordinate. The abattoir business is a commercial operation; as such, it is difficult to raise public sector grants to support it. There are existing small-scale local abattoirs processing game and limited numbers of farm animals; these existing private businesses may be threatened by any potential Class A or B abattoir developments. The low volumes of locally produced beef form an unfavourable business case for profit motivated investors; therefore, any abattoir enterprise requires considerable volunteer time and resource support by local stakeholders. Finally, the stakeholders involved have so much invested (financially and emotionally) in their operations that disagreements have sometimes hampered cooperation and led to counterproductive actions.

It should be noted that these difficult organizational innovations, involving multiple stakeholders, are the changes that have the potential to positively transform the sector for the greatest number of individuals. We have heard about some great innovations at the firm level, with small to medium sized impacts. We have seen some novel collaborations between partners on new market developments that could disperse through the coordinated networks and have regional sector level impacts. But the regionally transformative innovations revolve around the abattoir issue and establishing a system that can open producer – retailer lines.

SUMMARY OF FINDINGS

> *"Traditional commercial markets...you just pick up the phone and sell your cows, bring them to the feedlots in these liners, in two days they're gone, you hardly get a thank you. That's it, you never hear a thing back. Whereas the other way, you sell to someone here in town, and you hear repeatedly 'how good that steak was'... It just feels better."*

This quote from one of our region's beef producers neatly sums the sentiments expressed by every person interviewed. There is a great deal of passion-driven work being done in the Basin-Boundary beef sector. Profit and financial return were 'also mentioned' on every respondent's list of motivations for innovating, but overwhelmingly, our producers are driven by a desire to bring high quality products and services to our communities, to share their love of the land, and to continue acting as stewards for that land.

There have been modest levels of innovation in the Basin-Boundary beef industry. For a sector characterized by low prices and high costs, these innovation efforts are impressive. This, again, is a direct result of the passion held by these stakeholders. The over-riding desire to see a thriving local farming industry, and to preserve its health for future generations, can be seen in both these efforts and the willingness of stakeholders to work together for joint benefit. There is a certain irony that this same passion is the cause of potentially beneficial collaborations falling apart.

Every stakeholder honed in automatically to the issues surrounding the regulatory environment for inspected abattoirs and their ability to access local markets. This is the central issue facing our beef producers. There is a willingness and desire to work collaboratively to address this problem, and it cannot be effectively addressed by any single individual. However, passionate individuals have had difficulty in harmonizing their objectives on this issue. Given how close their objectives truly are, transformative opportunities are possible with effective communication and compromise.

Raising cows in the region, sending them for processing in Alberta, then re-importing them for sale in our supermarkets necessitates transportation costs in both directions, and sends value-added activity to Alberta (finishing, slaughtering, packing).

Avoiding the cost of transportation requires use of low-volume local facilities, which involves higher slaughter and packing costs. Given that stakeholders talk about 'more expensive' local meats, the local slaughter and packing costs must be higher by a margin greater than the transportation costs.

FUTURE CONSIDERATION

This regional sector is limited by three significant pressures: low market volume, low levels of coordination through the supply chain, and a stifling regulatory environment. In terms of next steps, chain grocery stores, who bear the incoming transportation costs, could explore the collective benefits of directing volume purchases to support local processing. This is not likely to occur if left to the market, private interests and existing supply systems.

While the discussed innovations have moved in the right direction (collaboration and coordination of the supply side), there is still an opportunity for coordination of the market as a whole. We hear, consistently, that local product is more expensive than the large-scale commercial alternatives. Yet, the large commercial retailers are selling the same beef back after transportation in both directions. This is likely the result of economies of scale for Alberta processors, with which local abattoirs cannot compete with current volumes.

Consider what this market would look like if:

- there were a retail buyers' cooperative, and
- all the region's retailers (both large and small) prioritized local product purchase ahead of their proprietary, or usual supply lines, and
- the region's cattle ranchers directed all of their herds to regional abattoirs, and
- the existing abattoirs upgraded their processes to meet retailer requirements, and
- existing abattoirs created a continual flow management system.

Further study might include an examination of the magnitude of transportation costs versus local processing costs and threshold volumes required for different processing price schedules. It seems unlikely that the processing costs cannot be offset by lower transportation costs with sufficient market coordination.

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