Farmers' Perceptions and Reactions to Changes in Grain Elevator Size and Location in Central Montana

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FARMERS’ PERCEPTIONS AND REACTIONS TO CHANGES IN GRAIN ELEVATOR SIZE AND LOCATION IN CENTRAL MONTANA

By

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In Central Montana, grain elevators serve as the primary market for wheat. What began in the 1910’s as numerous small grain elevators scattered at short intervals along the railroad has now been condensed to a few very large grain elevators at central points in the region, increasing their efficiency and reducing their costs as they can load larger trains in less time with fewer employees. For farmers, this often means reduced competition among elevators that buy grain and an increase in the distance they must transport their grain. Existing literature addressing agricultural markets and transportation costs typically employs a quantitative perspective, such as von Thünen’s land use theory or the supply area concept. This study uses a qualitative approach based on interviews and content analysis to add the perspective of local farmers. Thirty-five interviews were conducted with farmers and grain elevator operators patronizing the United Harvest elevator in Moccasin, Montana or the Peavey elevator in Moore, Montana. Analysis of these interviews explores how farmers evaluate the expansion of Moore’s smaller grain elevator to a larger 110-shuttle facility and how this change in marketing infrastructure is expected to affect farm operations in the region. Three themes emerged from farmers’ evaluations of changing market infrastructure: competition, risk, and market access.

Competition, including its benefits to farmers, management and service, and strategies for small operators, refers to how farmers perceive elevator competition and its effect on the price the farmer receives. Risk includes trucking hazards, crop rotation and alternative crops, and local environmental conditions. Market access includes distance, time, site accessibility, and market availability. These themes inform the farmers’ calculation of costs. The balance of these costs with the market price drives marketing and crop decisions. Findings from this study support the use of the supply area concept when evaluating grain elevator placement and confirm its value when applied to-grain marketing systems at the regional level. Beyond this, it revealed considerations that are important at the local and individual level. Understanding farmers’ decisions can help grain elevators take action to improve their own competitiveness as well as the farmers’ marketing options.
I would like to thank my thesis committee chair, Dr. Christiane von Reichert, for going out of her way to provide me assistance in the weeks leading up to my thesis defense and for all her encouragement along the way. I have learned much from her and am grateful for her guidance. I would also like to thank Dr. Sarah J. Halvorson and Dr. Rebecca T. Richards for serving on my thesis committee and for their assistance in finishing my thesis; my supervisor at NorthWestern Energy, Stephen Yonce, for his support and flexibility at work; the farmers and grain elevator managers who donated their time for interviews for sharing their knowledge and insight; and finally, my aunt Noel Hauser for suggesting this topic for research.
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Announcement prompted the Montana Departments of Transportation, Agriculture, and Commerce, in connection the Montana Branch Line Study (2004), a report concerning the potential effects of the abandonment. The proposed abandonment is reflective of a trend towards the use of fewer, larger, and more efficient facilities to load grain into train cars. Railroad and grain elevator companies have moved from loading single cars at small grain elevators to loading 26, 52, and now 110 cars at a time at a single elevator. A larger facility requires a larger supply area to fill more cars, affecting the supply areas of smaller elevators. If the supply area of a large facility encompasses that of one or more smaller elevators, the smaller elevators and the railroad that serves them are likely to be shut down and abandoned. This reduces the number of locations at which farmers can sell their grain and increases the distance many must transport it.

BNSF and large grain companies which own many of the grain elevators along the railroad claim that the benefits arising from the trend toward fewer and larger facilities are passed on to farmers through higher rates per bushel for their grain. Many farmers and grain elevator operators interviewed for the aforementioned study disagreed. They asserted that the need to truck the grain over greater distances to a large elevator offsets any increase received in the price per bushel for grain for many farmers. In addition, the farmers felt that job losses due to the closure of smaller elevators and the subsequent impacts on rural communities were more important than grain prices (Montana Branch Line Study 2004, 15-19).
CHAPTER ONE - INTRODUCTION

In late 2003, the Burlington Northern Santa Fe Railroad Company (BNSF) announced its intentions to abandon two sections of track in eastern Montana. This announcement prompted the Montana Departments of Transportation, Agriculture, and Commerce, to commission the Montana Branch Line Study (2004), a report concerning the potential effects of the abandonment. The proposed abandonment is reflective of a trend towards the use of fewer, larger, and more efficient facilities to load grain into train cars. Railroad and grain elevator companies have moved from loading single cars at small grain elevators to loading 26, 52, and now 110 cars at a time at a single elevator. A larger facility requires a larger supply area to fill more cars, affecting the supply areas of smaller elevators. If the supply area of a large facility encompasses that of one or more smaller elevators, the smaller elevators and the railroad that serves them are likely to be shut down and abandoned. This reduces the number of locations at which farmers can sell their grain and increases the distance many must transport it.

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Increases in elevator size and the accompanying shifts in transportation and market options have also been occurring in Central Montana. In 2001, a new elevator was built at Moccasin to fill 110-car shuttle trains, and in early 2009, the Peavey elevator in Moore completed an upgrade to a similar size facility. The new elevator began receiving grain in January of 2009, making Central Montana a prime location for research concerning these changes.

Changes in transportation and market options are not new to the agricultural community, nor are theories about the interactions between farmers and markets. One prominent theory concerning location and agricultural activity was developed in the 1820’s by Johann Heinrich von Thünen, a well-educated German estate owner (Hall 1966). Von Thünen used detailed records and observations from the farms on his estate to form a model relating market distance to agricultural production and land values. His model assumes that rational choices are made by farmers based on the distance they need to travel to market, with all other agricultural variables being equal (Hall 1966).

Agricultural location theory drawn from von Thünen’s model suggests that potential for profit drives farmers’ decisions (Berry et al. 1993, 253).

Other sources suggest that profit is not the primary factor in a farmer’s business decisions. For example, an article from the Oregon State University Extension Service (Bubl and Stephenson 2001) advises new farmers to consider their families’ talents and interests when choosing a crop or product. Another example comes from the farmers interviewed for the Montana Branch Line Study (2004, 15-19). Many in this study

---

1 The terms shuttle train and unit train refer to trains which consist of many identical cars intended to carry large amounts of a single commodity from a single origin point to a single destination point. In the case of grain elevators, a facility which loads unit trains is often referred to as a 52-car facility, and a facility which loads shuttle trains is referred to as a 110-car facility.
disapproved of the railroad’s business practices regarding incentives given to those who sold their grain at a larger elevator while bypassing smaller, but closer elevators. In this case, the farmers’ decisions were driven by the value the farmers placed on their community rather than personal profit.

Today’s farmers and ranchers face different transportation and market challenges than those of von Thünen’s time, but they are still affected by the geography of their farms, including issues such as access to market, availability of labor, cost of transportation, quality of soil, temperature, rainfall, or any number of regionally variable factors. Because of the recent elevator construction, the farmers of Central Montana can provide valuable information through their knowledge of grain marketing and their own operations about how these changes affect them.

The purpose of this study is to explore the role of location and the market from the farmer’s perspective. How do farmers evaluate grain marketing infrastructure? Do changes in transportation and market options affect elevator choice? Do marketing options affect their cropping decisions? To answer these questions, this study explores how farmers respond to the presence of a newly-constructed shuttle-train elevator in Central Montana and to what extent this affects their crop and marketing practices.
CHAPTER TWO - BACKGROUND

Location theory in agriculture helps describe and predict patterns in agriculture based on market distances, production and transportation costs, and land types. This chapter describes agricultural location theory as written by von Thünen and briefly comments on the current literature. The rules of supply area are then introduced, and these arguments are linked to the grain market landscape in Central Montana. The chapter continues with the context for understanding grain marketing in the study area, including a short history of grain elevators and farming in the study area and a discussion of the grain marketing process.

Models for Agricultural Land Use

In 1826, Johann Heinrich von Thünen published his Isolated State with Respect to Agriculture and National Economy. His classic work described the effects of distance to market on land rents and agricultural land use. Much of the current and past research on agricultural location theory draws on von Thünen’s work (Duram and Archer 2003; Lucas and Chhajed 2004). Von Thünen’s research and subsequent theoretical developments reach the conclusion that there exists an optimum use for land (i.e. type of crop grown or animal raised) which is dependent on land value and distance from market (Lucas and Chhajed 2004; Singh 2002). Von Thünen’s simplest model assumes uniform conditions throughout the market region including cost and type of transportation. The concentric rings in the top portion of Figure 1 illustrate the pattern that developed based on these factors. High-value, perishable crops were grown nearest to the central city or market where land value is high, whereas lower value crops and livestock were grown on the fringes of the market area where land value is low. With that, von Thünen points out
that proximity and distance to markets simultaneously affect land values and land use intensity: land near a central market has higher land values and is used more intensively, while land distant from such a market has lower land values and is used less intensively (or extensively). The bottom portion gives an example of what occurs when the region is not uniform. In this case, a river has been included in the region, which reduces transportation costs for those nearest the river. The reduction in transportation costs brought on by water transport alters the crop growing zones.

In the 1950's and 1960's, new, more complicated models emerged as researchers attempted to address the limitations of von Thünen's original model (Lucas and Chhajed 2004). Their work considered variables assumed to be uniform in the von Thünen model, such as land quality, transportation networks, and market demands. Singh (2002) identifies transport costs and wage rates with respect to market distance as important

**Figure 1. The von Thünen Model. Adapted from Hall (1966).**

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variables to consider when modeling optimal zones of production. Archer and Lonsdale (1997) show that metropolitan centers and areas with aesthetically desirable landscapes tend to increase nearby farm land values, and therefore proximity to these areas weighs heavily in land use choices. Both articles assert that distance to market and location relative to population centers are important in land use decisions. It follows that farmers should maximize their profit by making decisions based on how much they will pay in labor and transportation costs compared to the price offered for their crops.

In contrast to economic models, the organic and sustainable farming movements, as described by Michael Pollan in *The Omnivore’s Dilemma* (2006) and Richard Manning in *Against the Grain* (2004), suggest moral issues, quality of life motives, and sustainable land use practices are increasingly influencing farmers’ land use and crop choices. Both authors highlight cases where farmers make decisions based on long term benefits to their communities and land, not on maximizing personal profit. The Montana Branch Line Study (2004) echoes these motives with example of concerns for community impacts related to the closure of local grain elevators voiced by farmers and grain elevator operators in eastern Montana. Farmers who place more value on community, quality of life, and sustainable land use should then make decisions based on benefits to their community and land.

In spite of the importance of motives that differ from profit maximizing, work in agricultural location theory concentrates on profit maximizing economic motives and treats agriculture as a special case of location theory in industry. Indeed, from the late 1950’s through the present a major focus has been the location of collection, processing, and distribution facilities, including grain elevators, with the goal to reduce costs to the
processor and consumer and increase profits. Lucas and Chhajed (2004) provide an overview of these works. Since farmers must consider the location of collection and processing facilities when choosing what to grow and where to sell it, it is useful to consider the relationship between markets and supply areas from the industrial point of view.

**Supply Areas**

Berry, Conkling, and Ray (1993, 182-186) offer a simple explanation of the economic rules of supply areas (Figure 2). A market’s supply area is determined by the difference between the price at the market and the cost of transportation to the market. This is referred to as the producer price floor. The cost of transportation increases with distance to the market, so the price floor declines as the distance to the market increases.

![Figure 2. Supply Areas of Central Markets. Adapted from Berry, Conkling, and Ray (1993, 185)](image)

Suppliers will sell at the market where they receive the highest producer price, or net price. If the price offered at competing markets is equal, suppliers maximize their net price, by selling at the market closest to them. The supply area boundary between competing markets occurs where the price floors are equal. The supply area boundary between two markets offering equal prices is therefore equidistant between the two markets. If a difference in price exists between competing markets such as B and C in
Figure 2, the supply area boundary falls farther from the higher paying market. This results in a larger supply area for the market at B than for the market at C. Suppliers transport their goods a longer distance if the producer price floor is higher and the potential for profit exceeds that of a closer market.

Figure 3 illustrates the impact of a large price increase at one market on the supply areas of smaller markets. The higher market price at B means that the producer price floor is always greater for goods transported to B than those taken to A or C. A supplier who makes his decision based on profit would then invariably choose to sell at B rather than at A or C. Effectively, a large enough price increase at B would mean that no goods are sold at A or C. Markets at A and C would then need to increase their prices to regain lost supply area. In the worst case scenario, they would be unable to do so and disappear entirely.

Applications in Grain Production

For the grain industry at large, the market is considered to be the companies or countries who consume the grain. For individual farmers, however, the grain elevator
acts as the market, and decisions are based at least partially on the transportation cost or
distance to the market as described by von Thünen. The closure of an existing elevator or
the construction of a new elevator may correspond to both a change in market
opportunities and a change in transportation for farmers.

Both changes play a role in von Thünen’s land use theory and in the supply area
concept. While von Thünen’s model offers some insight when looking for patterns in
crops grown in relation to a market, this theory seems more applicable at the regional
level than at the local level. From a regional perspective, Central Montana could be
described as consisting entirely of moderate to low intensity land use zones similar to the
two outer regions in von Thünen’s model, three-way systems, and extensive animal
production. These zones are comparable in intensity of use to grain production and cattle
operations in Montana. Central Montana is a relatively homogenous wheat-producing
area, meaning that, aside from livestock and forage, the area surrounding grain elevators
produces primarily wheat and few other crops. Thus there is not a large difference in
what the farmers closest to their local market, or grain elevator, grow when compared to
what those on the fringes grow.

Grain elevators are essentially collection points for larger markets outside of the
local area. For understanding grain markets at the local scale, the supply area rules
described above are useful in evaluating the effect of price changes, elevator expansions,
and elevator closures, all of which amount to major shifts in the farmers’ grain market.
For instance, the construction of large capacity grain elevators in a region affects the
price offered for grain. One reason the price changes is because these facilities can load
larger trains quickly and efficiently, and therefore are rewarded with reduced freight
rates. This allows the elevator to pass the savings on to the farmers in the form of higher prices per bushel. A second reason prices are raised is to increase the amount of grain delivered to the elevator. When grain elevators increase their capacity to store grain and load it onto train cars, they require more input. In order to reach their quota, they require more grain and consequently a larger supply area.

Consider, for example, that A, B, C, and D in Figure 4 represent four 26-car capacity grain elevators along the railroad. When capacities are equal, each grain elevator requires the same amount of supply area to fill the elevator, and prices are competitive. If a 110-car grain elevator were constructed at B, it would require much more land area to fill the elevator to capacity. Therefore, it must attract grain farmers from the supply areas originally belonging to neighboring grain elevators. According to the supply area rules above, the solution to this problem is to increase the price offered for grain to entice farmers to transport their grain the extra distance.

![Figure 4. Effect of Introducing a Larger Grain Elevator near Smaller Existing Elevators.](image)

As the Montana Branch Line Study (2004) illustrates however, where farmers will receive the highest price is not their only concern. If the larger grain elevator is successful in gaining its needed supply, the smaller capacity elevators cannot remain
open. The farmers interviewed for the 2004 study are aware that the closure of smaller
grain elevators has direct and indirect economic and social impacts on their communities.
In this case, the farmers then must base their decisions of where to sell their grain on the
potential impact on their communities. If they sell at the larger elevator instead of a
closer but smaller elevator, they receive a higher price for themselves, but they also
deprive the smaller elevator of their patronage and increase its risk of closure. They must
decide whether the negative effects of closure of the smaller elevator outweigh personal
profit. In addition, farmers must tailor their crops and land use to best suit transportation
and marketing options tied to the continued operation or closure of local grain elevators.

Understanding Grain Marketing in Montana

Transportation technology has long had an effect on the placement of grain
facilities and the marketing of grain, and therefore affects the farmer as well. This
section outlines the history of grain elevators in the state and the study area, the
transportation of grain from the farm to the elevator, and the process of selling grain.

Grain Elevators and the Railroad

Grain elevators debuted in Montana with the arrival of the railroads. By 1913
there were as many as 600 grain elevators in the state (Malta Enterprise 1913). In Central
Montana, elevators were constructed along the railroad at intervals sometimes less than
ten miles and often three elevator companies operated in the same town. However, since
the initial wave of elevator construction, the number of elevators in the state has
continually declined. Many factors contributed to this decline, including expansions in
elevator size which increased competition among elevators and improvements in
transportation of grain from the farm to the elevator which gave farmers greater ability to take advantage of that competition.

Prior to 1970, six major railroads served the State of Montana. A map of the Montana rail system in 1945 is included in Appendix A. Of these major railroads, two served Central Montana: the Great Northern Railway and the Milwaukee Road². Beginning in 1970, railroads in Montana began to merge or fall into bankruptcy. By 1985, mergers and bankruptcies had resulted in one company, Burlington Northern Railway (BN), now called the Burlington Northern Santa Fe Railway (BNSF), owning more than 90% of Montana rails (Montana Department of Transportation 2005). In Central Montana, the former Milwaukee Road tracks were abandoned leaving only those owned by BN and a short-line track owned by the State of Montana³. A map of the current Montana rail system is included in Appendix A.

In the 1970's, analyses of transportation and marketing systems in Montana from Montana State University and the Montana Department of Highways⁴ favored the consolidation of marketing facilities into fewer, larger, and more efficient operations. A study by Cramer and Copeland (1972) of the Montana wheat marketing system concluded that “the lowest cost solution involved only 27 elevators.” In 1979, the Montana Rail Plan was completed in response to changes occurring among the railroad companies. This plan also encouraged the trend towards fewer and larger grain elevators, declaring “the chief virtue of the grain subterminal concept is that it introduces major economies of scale” (Montana Department of Highways 1979, 66). Following this

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² Milwaukee Road is commonly used to refer to the Chicago, Milwaukee, St. Paul, and Pacific Railroad.
³ This short line track is maintained and used by Central Montana Rail, Inc., a nonprofit organization based in Denton, MT.
⁴ The Montana Department of Highways is now the Montana Department of Transportation.
research, Burlington Northern Railway introduced lower rates for unit trains in 1980 (Gilles 1991). For the grain industry, this would mean a movement towards even fewer and larger grain elevators.

Gilles (1987) calls the “introduction of reduced per-bushel freight rates for 52-car trains” a “major force in changing the architecture and ecology of Montana elevators.” Indeed, through the 1980’s and 1990’s, construction of large 52-car and 110-car facilities began in earnest. During this time, the number of elevators continued to drop dramatically, from 332 in 1970 (Cramer and Copeland 1972) to 189 in 1984 (Montana Wheat and Barley Committee 2007, 8). As of May 2009, there are just 122 elevators operating with one additional 110-car facility under construction in Westby (Montana Wheat and Barley Committee 2008, 13). The maps in Appendix A show the locations of these elevators in 1984 and 2006 as well as the locations of 110-car facilities existing prior to the construction at Moore.

Rail Access within the Study Area

Railroad proponents assert that rail freight is a cheap, efficient method of transportation for hauling large amounts of a single commodity. This was especially true when railroads were first built in Montana, before the present road system existed. Because this initial advantage of the railroad in shipping large quantities and its continued competitiveness with truck freight, grain elevators continue to be heavily reliant on rail access.

Differences in rail access throughout the study area affect the location of grain elevators and therefore farmers’ access to them. Farmers in most counties in the study area had access to numerous grain elevators before major consolidations and
abandonments of rail lines. Elevator numbers had been declining since the initial boom in the 1910s, and after rail service was lost, many more elevators closed.

In 1983, BNSF proposed abandonment of its branch line running north from Moccasin to Geraldine. The Central Montana Co-op operates two 52-car facilities on this line, one at Geraldine, and another at Denton. Without rail service, these facilities would likely have been closed or at least been unable to buy wheat at competitive prices. To prevent the loss of rail service to these two facilities, Central Montana Rail, Inc. was formed and took over operation and maintenance of the tracks in 1985.

A few facilities, however, continued to operate even without rail, such as the General Mills facility in Harlowton which bought grain trucked in by farmers, then trucked that grain to its other facilities which still had rail service. When General Mills sold or leased most of its Montana facilities in 2002, the facility in Harlowton passed to Olson Grain & Fertilizer, which still buys and sells grain in limited quantities and utilizes truck freight rather than rail freight. Olson Grain & Fertilizer is one of very few grain elevators which handle wheat without the benefit of the railroad.

In contrast to the relatively good rail access in the western part of the study area, Garfield County in the eastern part has always lacked rail service (Alwin 1981, 491-493). Thus, it has always had poor access to grain elevators as well. Before motorized vehicles, most of the grain was hauled by wagon to grain elevators south and east of the county. This trip could take as much as a week to complete. While farmers in this county are still farther than any others in the study area from grain elevators, the advent of semi-trucks allows them to haul at least one 1200 bushel load a day, and most now
haul west rather than east or south to take advantage of higher prices at the elevators due to differences in rail freight rates.

For the farmers in Garfield County, these differences in prices are due as much to an elevator’s location as they are to its size and loading speed. Facilities shipping wheat for export to Portland pay less to the railroad for freight the further west they are located because they are closer to their product’s destination, allowing them to pay more to the farmer (farmer interview, January 2009). This means that many farmers in the county travel west as much as twice the distance as they would travel east or south to take advantage of elevators who can offer a higher price due to reduced freight rates.

Transportation from the Farm to the Elevator

The farmer’s ability to transport grain also has an effect on the placement of grain facilities. In the early 1900’s, grain was transported to the elevator using horse-drawn wagons. Because the wagons could not cover many miles in a day, grain elevators were built close together (Gilles 1987). For example, if a wagon could cover seven miles to the elevator and back again in one day, elevators were built fourteen miles apart so that most farmers could deliver at least one load a day.

By the 1930’s many farmers had acquired small trucks with which to haul their grain. This had several effects on farmers and elevators. First, farmers could haul more grain per load in a truck. Wagons held around 100 bushels per load whereas a small farm truck could hold 300 bushels per load (Gilles 1987). Second, trucks could travel faster than wagons, meaning a farmer could make more trips to the elevator. With larger loads arriving more frequently, an elevator tended to fill up faster, requiring more labor and more train cars to keep pace with supply. Farmers also benefited from reduced labor
costs as less time was being spent in transit to the elevator. Third, since farmers could travel faster, they could also travel farther. This meant an increase in their options when marketing grain and an increase in competition among elevators.

With improvements in motorized transport, farmers have been acquiring larger trucks with which to haul their products to market. Today, most farmers in Montana own large farm trucks or semi tractor-trailers ranging from 600 to 1200 bushels capacity. Also, due to the decline in the number of grain elevators, most farmers in Montana are two to three times farther from an elevator than they were twenty years ago (Montana Wheat and Barley Committee 2008, 4). This makes large trucks a necessity especially for farmers in areas such as Garfield County, who are all more than 90 miles from a grain elevator.

Gilles states in his 1987 newspaper article that “as the horse and wagon days gave way to the small truck and later the big ones and semi tractor-trailers, it became unnecessary to have so many small elevators.” This implies that increases in transportation efficiency for the farmer contributed to the demise of some elevators, but it may also be said that the decrease in the number of elevators required many farmers to invest in larger trucks. Although the direction of this relationship between transportation technology and grain elevator location in ambiguous, it is clear that location of markets and means of transportation are connected.

**Selling Grain**

Grain prices fluctuate daily, so the timing of delivery can be important depending on how farmers market their grain. Farmers have two options concerning when and where their grain is sold. The first option is to sell using marketing contracts which can
be complex and are only briefly described here. Grain can be sold prior to delivery in processes referred to as forward contracting or hedging. These processes allow farmers to mitigate the risk of market price changes by selling portions of their anticipated yields at what they believe to be a favorable price. Depending on the risk the farmer is willing to sustain, some contracts allow the final price to fluctuate with market conditions. Grain sold on contracts has a specified date for delivery, usually flexible within a 30-day window. (Jerry Simpson, April 17, 2009, phone conversation with author). The other option is to sell at delivery. Grain sold at delivery receives the current market price. Accordingly, grain sold at delivery and under certain types of contracts is subject to market conditions at the time of delivery.

Timing of grain delivery is important to farmers for financial reasons including changes in market price and farmers’ cash flow. The time at which debt is incurred or income is received significantly affects farmers’ cash flow. If a farmer sells a large amount of grain in one year, it inflates his or her income and raises his or her taxes. Also, many farmers have loan or lease payments due in the first part of the year. Thus, many farmers use forward contracting and delayed payment options as strategies to meet their financial needs. Many farmers contract grain to be delivered in December or January so that money is available to pay bills due at that time and any income corresponds to expenses for the tax year. Others deliver grain but defer payment for it until a later date. This is a good option for farmers who lack storage but do not want to be paid for their grain at harvest time.

Conditions at the elevator can influence the delivery of grain and therefore the final price that the farmer receives. The elevator gives premiums and discounts on grain
delivered dependent on the quality of the grain and market demand for specific characteristics of the grain, such as the protein level. These premiums and discounts change rapidly with market conditions, so farmers often have a limited window in which to sell grain at a specific price. If conditions at the elevator mean delivery is slow or the elevator cannot accept additional grain, some farmers may miss out on a good price. For example, consider a farmer who has 50,000 bushels of grain he or she would like to sell, but can’t deliver it to the elevator because it is full. If the market changes so that he or she loses only one dollar per bushel to deliver it at another time, it amounts to a $50,000 difference in the price he or she receives.

Summary

Quantitative studies illustrate that a variety of factors impact the supply area of grain elevators. Factors such as crop prices, land value, local environmental conditions, wage rates, transportation costs, and proximity to urban areas affect what may be grown in a grain elevator’s potential supply area. While many of these factors are out of the control of grain companies, there are some means by which they can influence the supply area of their elevators. Notably, the price offered at the elevator affects the potential size of the supply area as well as the supply area of competing elevators. While supply area rules and existing research focus on factors at the regional level, the themes uncovered in the following chapters add other important considerations at the local level.
CHAPTER THREE - METHODOLOGY

The methods used in this study explore the role of location in the farmer’s grain production and marketing decisions, focusing on the farmer’s relationship with grain elevators in Central Montana. Studies of market location and agriculture have traditionally used quantitative economic models. This study uses qualitative methodology to add to the current model of farmer-market interactions. This chapter describes the role of the researcher, the study population, the sampling methods, the interview process, and the analytical procedures used in the study.

Role of the Researcher

“Who we are shapes the kinds of theories we create and the kinds of explanations we offer” (Esterberg 2002, 12). Who we are also shapes the questions we ask and our pursuit of the answers. My choice of topic and study area developed from a vested interest in the communities in my study area. I am a native of the area and come from an agricultural background. My status as a social insider in these communities and my background knowledge in the area’s agriculture served as assets while gathering data and undoubtedly influenced my analysis.

My relationship to my study area and study population aided data gathering and analysis in two ways. First, because of my social insider status, I had prior rapport with many of my potential interviewees. Furthermore, my background helped me quickly establish rapport with those farmers whom I did not know. This positive rapport gave me easier access to interviewees and those interviewees became more eager to share their knowledge and opinions to help a local student. Second, my familiarity with many of the agricultural terms and practices used in the study area as well as the geography of the
study area allowed me to use interview time more effectively. I spent less time on technical explanations of farming processes than would a researcher unfamiliar with this area’s agriculture and was therefore able to spend more time discussing motives and opinions related to farmers’ decisions. In addition, I was able to better form useful probe questions. During interviews as well as analysis, this knowledge was helpful in recognizing important ideas making connections among interviews.

Similarly, my close relationship to my study area and study population means that my analysis is unavoidably biased by my own experiences and perceptions as an insider. While this bias is not necessarily detrimental to my research, one should note the impact it may have on my conclusions. For instance, some interesting concepts of interest to a social outsider could be overlooked because I, as a social insider, may see them as normal. Similarly, my understanding of key concepts is affected by my experiences growing up in this community. In contrast, my social insider status is tempered by a six year absence from the community while I attended college, with only infrequent, short visits. This buffer of time effectively reduces some of the biases I would have as a true social insider. Thus, my relationship to the study area and study population necessarily influences my interpretation of the data, but these influences can be helpful during the research process and are moderated by my other experiences.

**Study Population and Sampling**

The population of interest of this study includes those farmers who grow grain within the potential supply area of the grain elevators at Moore and Moccasin, Montana and use at least one of these elevators. Farmers may be either male or female. Though gender issues are outside the scope of this study, it is important to note that many more men than
women were included in this study. The 2007 Census of Agriculture shows that about 10% of the principle farm operators in this area are women, and many more are actively involved in farming decisions. Despite men and women often having equal responsibility for farming decisions, local convention labels men as the decision-makers. Following this convention, all of the interviews included men, with few women actively participating.

To identify and select participants, I started with a series of land ownership maps produced by the Montana Department of Fish, Wildlife and Parks (FWP) and the Montana Natural Resource Information System (NRIS). I drew a random sample from the land owners on these maps within approximately 30 to 40 miles of Moore and Moccasin to select potential participants to ensure a geographic cross section of
participants. This proved problematic for several reasons. First, the area initially sampled was significantly smaller than the actual service area of the elevators. Second, individual farmers of these properties were difficult to contact because a number of the land owners appeared as corporation or business names, not individuals, and many in the random sample were not farmers, but landlords. Finally, several in the random sample didn’t grow grain at all. This meant that the sampling procedure needed to be reevaluated.

I then conducted a set of initial interviews as a departure point for snowball sampling. The seven initial interviews were conducted with the managers of the elevators at Moore and Moccasin, a Farm Service Agency employee, and four farmers with whom I am personally acquainted. Obtaining a sample characteristic of the study population using snowball sampling requires a variety of initial contacts (Esterberg 2002, 94). The four farmers represented different age groups, acres farmed, and distances from the elevator. The initial diversity of farmers as well as the knowledge of the grain elevator managers and Farm Service Agency employee helped achieve an appropriately diverse sample of the area’s grain farmers.

The primary goal when obtaining the sample was to identify and interview farmers at a variety of distances from the elevator, and I was successful in reaching this goal. My secondary goal was to interview grain farmers from a variety of age groups and farm sizes. When asking for referrals for additional interviews, farmers seemed to recommend only farmers with larger holdings or those whom they knew who patronized both elevators. To correct for this, I emphasized that farms of all sizes were of interest, not just large farms, and that farmers who patronized more than one elevator or only one elevator
were equally important. After clarifying my interests to the participants, the number and variety of recommendations increased.

Recommendations from my initial contacts yielded many more potential participants than could feasibly be interviewed. Therefore, I chose interviews from among the referrals primarily to maximize the variation in distance and direction from the grain elevators, the age of farmers, and the size of farming operation.

**Interviews**

Interviews were conducted over a 17-day period in January, 2009. I sent a letter of introduction (see Appendix B) to four newspapers with local circulation about a week in advance of beginning interviews, but only one printed it before I began my interviews. The others printed the letter three or four days later. This did not create difficulties as I was able to begin in an area where I knew almost all of the farmers I talked to. The letter did prove helpful when contacting those farmers whom I didn’t know but who remembered reading my letter. Farmers were generally eager to aid a graduate student, but became even more interested in helping when they discovered I was from the area, or that they knew me, my parents, or my grandparents.
Map 2. Interview Locations

I attempted to contact more than 45 farmers, resulting in 31 interviews. Most initial requests for interviews were made by phone. Several requests were made at a local basketball game, and one was made at a chance meeting at a local store. No farmers actually denied my request for an interview. Some were not interviewed because they did not return phone calls after I left a message, could not meet in my research time frame, or were absent. Those who were known to be absent were visiting family or had business obligations unrelated to their farms.

An effort was made to reach saturation, or conducting interviews until no additional insights emerge (Flick 2002, 65). However saturation was not achieved because of time constraints. Geographically, saturation was achieved in the area south and east of the grain elevators, but not in the north and west. Saturation was more difficult to achieve north and west of the Moccasin and Moore grain elevators (110-car facilities) because of
the presence of the Central Montana Co-op elevator (a 52 car facility) in Denton, which competes with the two larger elevators. This seemed to impact farmers in this area differently than farmers south and east of the larger elevators where there are no 52-car facilities in competition with the larger elevators at Moccasin and Moore. Therefore, a broader range of responses emerged from the farmers in the Denton area.

Some potential participants were not interviewed because a sufficient number had been interviewed in the area in which they farmed. If potential participants farmed in an area where saturation had nearly been reached, I chose interviews based on underrepresented age groups or farm sizes. For example, most of the farmers I interviewed are older than 50 years. Therefore, hoping to obtain new information, I chose to interview a younger farmer rather than an older farmer since my sample already included many older farmers. Others were not interviewed because of time constraints, even if they farmed in an area in which I had not conducted many interviews.

During the same time period, I conducted interviews with four grain elevator or seed and feed business managers and/or owners. Two of these operated the largest elevators in the area at Moccasin and Moore, one operated a Central Montana Co-op elevator, and one owned and operated a small elevator several miles south of Moore.

A Farm Service Agency (FSA) employee who works with farmers from this area was also interviewed. Though the FSA has no direct information on the relationship between farmers and grain elevators, the agency works closely with farmers regarding financing, conservation programs, and other assistance programs. Consequently, the FSA employee was able to provide valuable information on the general operation of farms in the area and recommend several farmers for interviews.
Conducting the Interviews

Interviews were semi-structured, following the interview guides in Appendix B. Questions for farmers began as generalizations about how each farmer makes his crop and market decisions and moved towards questions specifically concerning the local grain elevators. Questions for elevator owners or managers began with questions concerning the operation and history of the grain elevator and moved towards the elevator’s relationship with the farmers. Those farmers who also operated an elevator or seed and feed business were first asked questions pertaining to elevator owners or managers and then asked questions pertaining to their farms. Minor modifications were made to the interview guide as the interview process suggested probe questions or better phrasing.

All participants who owned or managed an elevator or seed and feed business were interviewed at their place of business. These interviews were generally free of background noise, but tended to be interrupted by business phone calls. Of the farmers who were not associated with an elevator or seed and feed business, 17 were interviewed in their homes, 8 were interviewed in local cafés or other public places, and two were interviewed at an elevator or seed and feed business. Interviews in the farmers’ homes yielded the longest interviews with the richest content, and were the easiest to transcribe due to the lack of background noise. Interviews in local cafés tended to be short and to the point. They were also difficult to transcribe because of background noise.

Analytical Procedure

I started transcription of the interviews as soon as possible after the interviews had taken place, but this took several weeks to complete because of school and work.
Interviews were transcribed verbatim. Each interview participant was assigned a pseudonym and identifying information was obscured. After transcription, I coded the interviews using NVivo8, a qualitative data management program. Coding and analysis took approximately a week of intensive work.

Esterberg (2002, 158) states that when open coding, "you work intensively with your data, line by line, identifying themes and categories that seem of interest." She also notes that "you should remain open to whatever you see in the data," and "you shouldn’t hesitate to note categories or themes that may not seem relevant to your original research problem." Beginning with open coding in this manner, I created nearly 600 codes or categories.

Many of these initial categories referred to the same or similar concepts. Using NVivo8, I was able to easily sort categories and form hierarchies where similar categories were grouped under one concept. Bailey (2007, 129) refers to this process of "reduc[ing] the data into larger categories that subsume multiple codes" as focused coding, also known as axial coding. For example, the categories ‘competition is good for everybody’, ‘keeping competition’, ‘level playing field’, and several others were all grouped under the larger concept of Competition. Grouping categories in this way and applying further meaning to them was the first step leading to the construction of overarching themes in the data.

Esterberg’s (2002) and Bailey’s (2007) advice allowed me to code my data in a way that eventually revealed three key themes and the connections among them. For example, my original research problem did not address influences on farmers not related to changes in grain elevators. Focusing only on categories directly related to grain
elevators would have caused me to exclude important information about how the area’s environmental conditions such as soil type and precipitation influence farmers and how they practice crop rotation. These categories are important components of the theme risk discussed in the following chapter and help connect it to another theme, market access. Arriving at the key themes and their connections involved multiple possibilities for arranging the data during the process of coding and analysis.

Both Esterberg (2002) and Bailey (2007) indicate that coding is a subjective process which can lead to different interpretations of the same data. None of these interpretations is necessarily wrong, but multiple iterations of focused coding helped to identify the most important and most clear themes in the data. My first attempt at focused coding generated numerous themes, many of which appear as subthemes in the following chapter. These themes covered a broad range of topics and were difficult to connect individually. At this point, I needed a new way to look at the data and found that sketching a concept map was helpful. I drew and redrew connections among the themes which suggested merging some themes and grouping others into larger categories. After several attempts, three key themes emerged: competition, risk, and market access.
CHAPTER FOUR - RESULTS

This chapter will first describe the farmers and their operations, including age, farm size, crops grown, distance to market, and location of markets. I will then present the themes that emerged from the interviews using quotes from the farmers themselves to illustrate these themes. Three broad but interrelated themes developed from the interviews: competition, risk, and market access. Competition among elevators was the most prominent theme. Competition concerns the price the farmer receives for his product, the quality of service he receives, and strategies for smaller elevators or seed and feed business. Competition is tied to the second theme, risk, in that farmers consider increased competition a factor which reduces their risk by increasing prices and ensuring a market exists. Other major elements of risk include the location of elevators in terms of distance and road conditions, crop rotation, and local environmental conditions. The third theme, market access, is also closely tied to the location of elevators in terms of the distance to them, their site accessibility, and the availability of specific markets. Time is one of the most significant issues within this theme.

Interviewee Demographics

I spoke with 31 male farmers. Some of their wives also actively participated in the interview. The average age of these farmers was 51.6 years. This contrasts with an average age of 57.7 years in the study area counties listed by the 2007 Census of Agriculture. The difference may be due to two exceptionally young participants, aged 28 and 30 sought out deliberately to get the perspective of the younger farmers. Also the Census of Agriculture reports the average age of the principal operators of all farm types
whereas my sample only includes farmers who produce wheat and is not restricted to the principal operator.

Farmers in the sample cropped approximately 4,800 acres on average, or a median of 3,200 acres. Since this number does not include additional acres for livestock or hay ground, acres cropped is different from average farm size as reported by the Census of Agriculture, but it does fall within the same range as the average farm sizes of 2,700 to 8,300 acres in the study counties. The farms belonging to interviewees range in size from 1,500 to 15,000 acres of cropped land with one farmer cropping only 400 acres. Almost all farmers leased at least some of their cropland, averaging nearly 40% leased. Four farmers owned or were partners in small grain elevators or seed and feed operations in addition to their farming operations.

Farmers grew primarily wheat as a cash crop, or that crop which is expected to net a profit. Other crops were grown mostly for rotational benefits such as pest and disease control, but with the hope that the crop would also net a profit. All participants grew winter wheat in the last year, with all but two also growing spring wheat in the recent past. Most also grew barley, or had grown it in the recent past. Barley may be considered a cash crop, but is more valued for rotational benefits. Nearly all grew a crop other than barley for rotation as well, with the most popular being peas, lentils, and canola.

The distance farmers transported their grain to their preferred elevator ranged from less than one mile to 145 miles, averaging approximately 35 miles. To transport their grain to the elevator, most farmers own large semi trucks. The capacity of the most
common truck was 1200 bushels. All farmers farther than 30 miles from their preferred elevator owned trucks with at least 900 bushels capacity.

Farmers in the study deliver primarily to the Peavey elevator in Moore and the United Harvest elevator in Moccasin, but most deliver to elevators in at least one other place. Twenty-five farmers sell wheat at Moccasin, 21 sell wheat or barley at Moore, ten sell wheat or barley at Great Falls, five sell wheat at Billings, four sell wheat or an alternative crop at Denton, and three sell wheat at Harlowton. Several sell crops other than wheat to area seed and feed businesses or feedlots as well as to more distant markets in Montana as well as out of state. The themes which emerged from interviews with these farmers reveal complex reasons for this variety of market choices.

**Competition**

The primary theme which emerged was that of competition. The farmer considers two facets of competition among elevators: price and management. Farmers felt that the upgrade of the Peavey elevator in Moore represented greater competition for their grain and therefore a higher price offered for it. While most farmers felt this would have positive effects on the price received, a few were concerned about the effect it would have on the remaining small elevators in the area. The farmer’s relationship with an elevator’s manager and crew is a deciding factor when choosing which elevator to patronize. While farmers claim that price is the primary factor in choosing which elevator to patronize, they also assert that an extremely positive or negative experience at an elevator will affect that choice. In order to stay in business, smaller elevators and feed and seed businesses diversify their operations to limit or remove their competition with larger elevators and rely on loyal customers who see value in supporting local businesses.
Benefits of Competition

Farmers referred to the construction of the shuttle loading elevator at Moore as good for competition. For example, Mr. Weaver said:

I think everybody was very glad to see that elevator over there because they know competition’s healthy. I think everybody over here certainly wanted it. It gives us another opportunity.

Mr. Holland expressed a similar opinion: “I’m all for competition. Any time you can get more businesses in a local area competing for your business, you’re going to benefit. Yeah, I’m glad they’re doing it.” Both farmers’ comments could refer to an increase in the quality of service and management. Other farmers refer directly to the effect of competition on the price they receive.

Several expressed the need for two shuttle elevators in the region to “keep the elevators honest,” or ensure that the elevators offer a fair price. Mr. York argues that “if there’s only one elevator here, they’re going to put that in their pocket. They know it’s going to cost us that much more to take it out of the country [to transport it to the next closest elevator].” For example, if the next closest elevator offers a price of $6.50 per bushel, but it costs the farmer $0.40 more per bushel to transport his grain to that elevator, a local elevator without competition could offer $6.10 per bushel and be sure that the farmer would sell there at the lower price. Competition in closer proximity to the local elevator tends to drive the price per bushel higher as two or more elevators compete for the same grain supply.

Realizing this, many farmers anticipate that competition between the two shuttle-train facilities will increase the overall price offered to farmers as they compete for the region’s grain. Mr. Scott, who sells almost exclusively at United Harvest, noted:
The biggest advantage is that we’ve got competition here now, guaranteed competition, so we’re going to get a better price here at Moccasin than we would have if they had not come in, and vice versa over there.

Similarly, he added:

If Peavey would have fallen by the wayside there’s not a doubt in my mind that United Harvest would probably—could very well be 10 cents a bushel behind what they should be.

Mr. Finneran expressed a corresponding opinion:

In order to buy enough wheat, they’ll be more aggressive and bump the price a little bit. I’m sure it won’t hurt to have another elevator bidding on the grain in the area. I can’t see any negative things about it.

For the reasons outlined above, farmers feel a need for the competition provided by the two elevators and that they would suffer if one closed. Mr. Harper expressed his relief at the Peavey elevator’s upgrade while implying that the alternative to upgrade was closure of the elevator and loss of competition:

Those guys putting in those unit train outfits, I’m sure, has made them at least competitive with each other. We’re sure glad that Peavey did that at Moore, because we were afraid we were going to lose them. Then we’re stuck.

Mr. York also commented on the consequences of closure rather than upgrade:

I hope that we can keep them both. I don’t want one or the other to fold because we need this competition. . . . I’m not sure in terms of wheat or spring wheat, winter wheat where our next market would be. I hope I never have to find that out. That’s why having these two elevators here are very important. We can’t just have one because everybody will be looking at that other—where is that next best place for competition? And I can guarantee you it’s just going to be another 40 cents [per bushel] out of our pockets if one of those doesn’t survive.

Mr. York captures the overall sentiment among his fellow farmers concerning elevator competition: “Like I said several times, we need them both. I can’t stress it enough, we need the competition here.”
Management and Service

While farmers assert that price is the most important factor when choosing where to sell their grain, management of the elevators is still an important part of competition among elevators. It is not the parent company of the elevator that makes the difference in most cases, but the competence and demeanor of local managers and employees of the elevator.

When asked about changes in management or ownership of an elevator, Mr. Robinson explained, “It’s the guy that’s managing it is why people go there. It isn’t the Gavilon or whatever it is now, or United Harvest [companies that own the elevators].”

Mr. Robinson’s point of view is repeated throughout the interviews. For example, even though he occasionally hauls his wheat to one of the larger elevators because of the price difference, Mr. Clausen says, “Personally, if I can, I’ll just haul to [my local elevator] because of- well, because of the people that work there,” and Mr. Landers said:

I rely heavily on relationships with the people that I do business with, and how accommodating they are and willing to work with me. . . . The advantage of selling at [here] is the way that [the manager] and his crew treat me. It’s probably the biggest, the relationship we have with the management and the crew who work there.

A poor relationship with farmers can cost a grain elevator its patrons. While only one farmer said that he had not patronized an elevator because of poor treatment, many cited their positive relationship with an elevator’s manager or crew as a reason to patronize an elevator and even mentioned that they might avoid an elevator if they were treated poorly. For instance, Mr. Finneran notes:

I had a neighbor who had an even bigger concern, I think it was over protein. I don’t remember the details now, but I know he ended up selling wheat the next year to a different direction. Sometimes managers certainly can have an effect on your decision to market with a particular business.
Furthermore, rapport and trust with the manager and crew is very important. Mr. Glenn says of one of the shuttle-train elevators:

The advantage is the management. Very well managed, good guy. If he gives you his word, he will keep going. I think he takes buying his grain personally. He makes it appear that he is doing the best job that he can for us, and I think that he does that with every customer.

Along with a positive relationship with the manager and crew at the elevator, farmers value the service they receive, such as unloading their trucks at the elevator or even help obtaining good prices for their grain. Mr. Weber explains:

A lot of times managers can help you out with your samples. You know, averaging out different proteins and different dockages and things like that. Try to get you the best price that they can give you.

To put Mr. Weber’s statement in context, consider the following simplified example. If grain with greater than 11% protein content can be sold for $0.50 per bushel more than grain with less than 11% protein content, Mr. Weber would want to bring in several truckloads of grain with greater than 11% protein content each. Since his grain varies in protein content from field to field, if he simply loads grain from the field or his storage bins, Mr. Weber might end up with three loads at 12% protein, and one at 10% protein. If the elevator considers each truckload individually, Mr. Weber loses $0.50 per bushel on one load. To obtain the premium on all his grain, Mr. Weber could guess at his grain’s protein content and attempt to fill his trucks so that each contains the appropriate mixture to average above 11% protein, but this method is time consuming and unreliable.

Mr. Weber then relies on the elevator manager to mix his grain together and average the protein samples from each load on paper. For these four loads of approximately equal size, the average is 11.5% protein, above the threshold required for the $0.50 premium.

If Mr. Weber hauls approximately 1000 bushels per trip, the elevator manager’s help
allows him to get the $0.50 premium on all four loads, a difference of $500. In the process of selling one season’s harvest, the elevator manager’s help could total thousands or even tens of thousands of dollars.

Mr. Robinson also asserts that customer service is a major factor in keeping smaller elevators competitive. He attributed the survival of the 52-car facility in Moore to the quality of their customer service.

While management and customer service are of great importance, these qualities are associated with managers or employees with whom the farmer has direct contact and generally not with the companies who own the elevators. Mr. Hendrix notes of the larger elevators:

I’ve got along pretty well with them. We’ve had General Mills and Peavey. Now it’s United Harvest. And at one time it was Harvest States and I didn’t see any difference.

However, Mr. Holland and one other farmer said they were skeptical of ownership change because they were unsure of the financial stability of the new company. He explains:

[If] the [elevator] changed hands, I would probably put some of my contracts in [the other elevator] just in the event that one of the two goes under. You know, I don’t think it’s going to happen, but it could. I don’t want it to. You know, there’s a lot of money hanging out there when you contract half your crop or something. . . . We’ll deliver wheat in October and November and defer payment until January 1st, so if that company technically went under in that time you’d be out [the money you deferred]. So, you no longer have the commodity and no payment for it. So that’s why I would be hesitant. I know the current ownership, you know. I know they’re on pretty fair financial footing.

Two farmers also mentioned that they would be less likely to patronize one elevator because it is partially foreign owned.
Strategies for Staying in Business

Smaller elevators and feed and seed businesses still serve an important role even though farmers in this area have mostly transitioned to using the large shuttle facilities. For the most part, these smaller businesses operate in niche markets, separate from the wheat market dominated by the shuttle facilities. However, some facilities still buy wheat in addition to operating in niche markets. To survive in the wheat market against the larger facilities, these facilities must offer excellent customer service as outlined above and rely on a loyal customer base.

While some farmers value the local elevator because it is close and convenient, others value it because of its economic significance in their community or other services it offers. Mr. Kingly first claims that price dictates where he sells his grain, but then describes his reasons for patronizing the local elevator over the shuttle facilities:

So, yeah, I try to do business with them if I can. It’s not always economics there, I guess. I back up on that. You try to support local people the best you can. I mean, you can’t run yourself into bankruptcy doing it, yet you still need the local businesses. If you can keep them going, well, it helps you out in the long run. . . . I hate to see elevators get bigger and less of them. I mean, that’s just the sign of the times, sign of business, but I would just really like to see local ones stay open. . . . I don’t sell hardly any grain here anymore on account of prices, but I still do other business there. I know I could get better deals- I’m sure I could get better deals- I don’t know that, but I’m pretty sure I could get better deals if I went other places for fertilizers or feed, but it’s still important for our operation to have a local elevator in business. So, you do what you think you can afford to do to keep it that way.

Mr. Rider patronizes his local elevator for similar reasons:

It probably would be to our advantage to try to keep our town intact as long as possible. You take that business out of town, and there are several jobs tied to that business. And it affects your school and it affects your tax base. So, we do consider that.

While smaller elevators and feed and seed operations do offer some competition regarding price and service, this alone may not be enough for them to remain in business.
However, as Mr. Kingly and Mr. Rider demonstrate above, farmers value access to smaller local markets which extends beyond good prices and good management.

**Risk**

Interviews with farmers frequently touched on issues related to risk, making risk the second most important theme that emerged. Farmers encounter different types of risks when choosing how and where to sell their grain. Risk when delivering crops can limit the farmer’s choice of markets. The risk of crop failure because of pests, disease, local growing conditions, or severe weather events may cause a farmer to choose to grow one crop rather than another or prevent him from growing a new crop. As mentioned above, changing elevator ownership may cause a farmer to be more cautious when selling his crop. Changing market conditions compound this uncertainty and are a risk to farmers, but these changes will be discussed in more detail under the theme of market availability.

This section addresses the risks that farmers encounter when trucking grain to the elevator, when choosing what, if any, rotation crops to grow, when trying to predict weather patterns. Overall, farmers’ options become limited as they make decisions which minimize risk.

**Trucking**

Transporting grain to the elevator represents significant risk, especially as farmers must travel further to deliver their grain.

Mr. Finneran outlines the hazards of driving large trucks:

You put yourself a little more at risk being on the road a longer distance and driving in more traffic. I’ve had a close call with people pulling out in front of me, and well, the first time you have a big wreck with a truck and smash somebody up and they sue you, what difference you’re making in the price there [at a more...
distant elevator] would not pay for a big lawsuit. So, you have to try to take those things into consideration too, when you start driving farther. . . . Anytime you get on this highway, the traffic’s a lot busier, and that is a concern. That was a concern for us. We had been used to hauling to this elevator here, and there’s so little traffic compared to the main highway. When we had to start going to Moccasin at harvest time, it’s a disadvantage, I would say, having to get on that busy highway, especially at harvest. Maybe you have a little more inexperienced drivers. That’s always my biggest worry is having somebody get in a wreck at harvest when you’re busy. I had it happen one time when I was hauling to Great Falls. A car just pulled out from an approach in front of me. I was going down the other side, and you can’t stop a 100,000 pound truck very easily. . . . [The] big disadvantage there, the elevator in Fort Benton where they take the barley, is on kind of a hillside and a rough railroad crossing. I’ve pulled in more than once where it makes me appreciate these elevators down here that are on the flat because if you goof up shifting gears there, as you’re going to that one, you can come to a stop and have to take off with your truck with a load on. Guys have twisted their drive shafts and burned up clutches.

Mr. Glenn adds concern over winter driving conditions to Mr. Finneran’s concerns:

We have to sell at a time of year when these hills are capable- we’re capable of making it up without having an accident. Like recently, snow and ice, we just cannot move grain.

In addition to risks from other drivers and road conditions, Mr. Kingly talks about the challenges of hauling as many bushels as possible per trip without loading his semi truck heavier than what the legal limit allows:

Got to be careful. It’s a risk because you don’t always guess the right amount anyways. So if you try to load for the maximum, usually you end up getting more. If you get stopped, then it gets expensive. Most people, they don’t get stopped very often, so they get by with it, but I’d rather not.

Rotation and Alternative Crops

Rotation and alternative crops are important tools for farmers. Growing the same crop in the same field for several consecutive years depletes nutrients in the soil and increases the incidence of weeds, insects, and disease. These problems can be managed by using chemicals, letting land sit idle, or fallow, or rotating a different crop into the field. Chemicals such as fertilizer and pesticides are becoming increasingly costly and
fallow ground gives no possibility of profiting from a crop since no crop is grown during such a year. Therefore many farmers use alternative or rotation crops which help control pests and disease, increase the fertility of the soil, and may net a profit when sold. The quantity and manner in which these crops are used may effect the amount of wheat available to larger elevators. Similarly, large elevators may influence rotation practices.

Rotation and alternative crops are grown primarily as a tool to control the risk of disease and pests. Mr. Bell expresses skepticism that some farmers can farm without rotation:

I’m a firm believer [in rotation]. Some people get away with- I don’t know how they do it- but, [they] can grow wheat on wheat on wheat for- back to back- year after year. I think they’re heading for a wreck.

Farmers generally select these crops based on past success or the success of friends and neighbors. Several mentioned that once a crop was “proven,” they would feel more comfortable growing it. Many farmers claim that they would be willing to try a new crop, but most feel the risks are greater than the benefits. Mr. Clancy summarizes these views:

I don’t necessarily want to be the last guy in the world to try something, but I don’t necessarily have to be the first either. I want to make sure it’s proven so I don’t have to get that valuable experience called education at the price of tuition that maybe I don’t like.

Mr. York parallels this, noting “It’s really hard for me to change what we know has been working for several years.”

**Local Environmental Conditions**

The success of crops is largely dependent on local environmental conditions including soil conditions, precipitation, temperature, and severe weather events. These conditions vary widely throughout the study area. For example, much of the croppable
land in Garfield and Petroleum Counties in the west has very thick topsoil, but the area has little precipitation and hot summers. The area nearest to Moore and Moccasin has a somewhat thinner layer of topsoil, but receives more precipitation, may be irrigated, and tends to be cooler in the summer than areas to the west. Land south of the Belt Mountains in Wheatland County has very thin topsoil and low precipitation. The entire study area is subject to severe weather events such as hail, high winds, and the occasional tornado that can destroy a crop. The maps in Appendix A provide information about temperature, precipitation, and crop growth potential.

Farmers repeatedly described the study area as “winter wheat country.” Historically, winter wheat is the most reliable crop for this and therefore less risk is incurred by growing primarily winter wheat. Farmers are hesitant to try new crops or crops which they are unfamiliar with or which require particular weather conditions to grow. Fourteen of 31 farmers said they were limited in their options by the local environmental conditions or weather patterns.

When asked about choosing what crops to grow, Mr. Darcy explained:

We are limited here, of course, by our elevation and rainfall that we can only grow certain crops, so [we choose our crops] within what we can grow and have a reasonable possibility of success.

Mr. Harper says that recent weather patterns have an effect on crop decisions:

On this side of the [Snowy Mountains], there’s been a lot of ground seeded down to grass and hay in the last ten years because of the drought, and so now, some of them are long on hay acres and they’re selling hay and they’re doing way better. A couple of my neighbors said they’re doing way better on the hay per acre than they ever did with spring wheat, so I think we’ll start to see some of that.

Mr. Finley notes, “It’s got to produce, or we don’t have anything to sell, no matter what the price.” Following this logic, most farmers in this area rely on winter wheat, which is
considered the most reliable crop because it doesn’t require a large amount of moisture throughout the summer, survives heat well, and doesn’t require a long growing season.

**Market Access**

Market access refers to the availability of markets for grain crops and rotation crops and the ease with which farmers can deliver to those markets in both time and space. Distance is a major factor because of costs associated with transportation. The physical layout and location of the market or elevator site also affects delivery of products. Time in transit and at the elevator is a common factor linking these two concepts, and the timing of delivery can further influence market access.

**Distance**

Farmers refer to the distance they must transport their grain as a cost with three components: the time it takes to get to the elevator, the actual costs associated with trucking, and the risk involved in driving a semi truck on the highway or in town.

Because of these costs, an increase in distance is generally perceived as a barrier to elevator access.

Those near the elevator frequently remarked how fortunate they were to be near two large elevators because of low freight costs when trucking grain to the elevator.

Similarly, those who live further out compare the difference in cost of freight to those living near the large elevators. For example, Mr. Robinson, who lives more than 120 miles from Moore, remarks:

We’re at quite a disadvantage compared to people that farm up around Moore and Moccasin. It costs us 65 cents during harvest to hire a truck to haul a bushel from here to there. Well, that’s 65 cents [per bushel] those guys didn’t have to spend. It’s just the cost of doing business here I guess.
In spite of this, the distance between Moore and Moccasin was viewed as a comparatively smaller barrier for those who had to drive farther than those living near the elevator, allowing those farther from the elevator more opportunity to take advantage of price differences between the two. For example, Mr. Baker, who lives near Moore, says:

Well, for me, when my furthest haul is five miles [to Moore] and then you have to tack on another eleven to that [to drive to Moccasin], that’s doubling and almost tripling my mileage. Now the guys coming from Hysham, Circle, Jordan, when they’re already driving four hours another fifteen minutes is nothing to them. It pays them.

Mr. Rider, who lives more than sixty miles from Moore and Moccasin, explains that much of the cost involved in trucking is incurred during loading and unloading, and miles traveled is a small proportion of trucking expense:

Once you’ve got the grain loaded on the truck- you’ve got to load the truck no matter where you haul it- you can run a few extra miles down the highway to capture a few extra cents and sometimes it pays.

One farmer takes this view even further and sees distance as an advantage rather than a barrier. Mr. Potts said:

One thing I’ve learned is, because we’re a long ways from the market, and because we’re a long ways from the supplies, we have to have to have big trucks to bring it in and to take it out. So what that does is gives us a way bigger marketing area than somebody who lives right next to the elevator. For instance, somebody that lives right next to the elevator at Moore is probably going to market at Moore, or Moccasin. . . . We can reach out a lot further for our input and for our market- selling our stuff. So, while we have that much more cost to get it there, we’ll save money on the price of fertilizer because we have more places we can buy it. We’ll get a better deal. When we sell our wheat, we’ll get a better deal for our wheat for the same reason. We have a lot more places that we can go with it.

**Site Accessibility**

Major differences in accessibility exist between old and new elevators. This topic appeared frequently when farmers compared the United Harvest and Peavey facilities prior to Peavey’s update and the old and new Peavey facilities, but was also mentioned in
reference to domestic milling markets in Billings and Great Falls, which are located in town and lack the space to upgrade to faster facilities. As with distance, farmers often refer to time and risk when talking about an elevator’s accessibility.

Older elevators are viewed as outdated, cumbersome, and slow. For example, Mr. Harper says of the old Peavey facility, “The old one was just a mess to get in and out of. It was slow and painful.” Mr. Bell compares the old Peavey facility to what he expects from the upgraded facility:

That elevator was dilapidated. It was in need of repair. The infrastructure wasn’t there to keep things moving and you’re constantly waiting in line, but I think the new facility will alleviate that problem.

Mrs. Finley, who farms with her husband in Garfield County, says of a flour mill:

Right now we’re hauling to [a mill], and that’s a miserable place to unload. . . . You can only deliver from, I guess, seven in the morning until- you have to be there by one o’clock, or you can’t make two trips in a day, and it’s slow to unload. It takes about 35 to 45 minutes to unload, and at Moccasin and Moore with those unit trains, you can unload in about, less than ten minutes.

New elevators are viewed as convenient, quick, and efficient. Mr. York describes the Moccasin shuttle-train facility:

I really feel like they were getting the bulk of the wheat from that direction simply because their facility was state of the art. Fast, efficient, clean. It was nice to haul in there.

Another component of accessibility is physical location. Elevators located in town were perceived as less accessible than those outside of town because the large trucks now used by most farmers are difficult to operate in limited space.

As mentioned above, farmers also prefer to avoid difficult or hazardous highway conditions such as driving up a steep hill in icy winter conditions, and blind or busy highway intersections.
**Time**

Farmers refer to both distance and accessibility in terms of the time it takes them to deliver a load of grain to the elevator. According to Mr. Clancy, farmers are “all limited by time, energy, and money. So if we can get that product there, get it unloaded swiftly, get back, get some more, then we’re alright.” When delivering grain, time is of the essence for three reasons: harvest operation, market fluctuations, and time needed for other chores.

First, at harvest farmers need to keep their operation running smoothly, meaning that combines must operate continuously as much as possible in a narrow harvest time window. If on-farm storage is limited, farmers must truck this grain from the combine to the elevator during harvest. It is therefore essential to minimize the time spent hauling to and from the elevator so that trucks are available to empty combines and allow them to return to harvesting. For instance, Mr. Clancy said:

> I can’t afford to have a combine sitting because we need to harvest when the weather is- allows us to do that. That’s why we’re just tickled to death to have that elevator at Moore and Moccasin.

Second, because of the rapid nature with which the market prices change, farmers need to haul large amounts of grain from storage to the elevator in short periods of time to take advantage of such prices or the associated protein and/or quality premiums. Mr. Holland explains why delivery timing is essential:

> Let’s say, I contracted wheat 6 months ago, [and] I’m delivering today. There’s protein premiums and discounts that come into effect. So, if the quality of my wheat is higher than I contracted, they pay me more money. If it’s lower, they pay me less. Now, those premiums or discounts change on a daily basis. The problem with Moccasin is they’ll sometimes fill up in three or four days. You know, they load a train up and they’ll call people to start hauling. They fill up in three to four days. So if you can’t move all of your product in those three to four days, you can’t hit the premiums for that time period. Last year, there was a situation where somebody I know couldn’t get 40,000 bushels delivered in when he wanted to
because they had filled up, and he ended up losing over a dollar in premiums a bushel. So it was a $50,000 swing just simply due to the fact that they can’t hold as much as they contract. They can’t move the product out as fast as they would like to. We’ve run into problems with that before. You’ve got a timeframe to haul, and usually it’s 30 days and you can market within that 30 days even though your commodity’s already sold. If you can’t get it in when you want to, it can cost you money.

Third, time spent hauling grain is time spent away from other chores. Mr. Glenn explains why he delivers grain from part of his operation to his local elevator rather than to one of the shuttle-train facilities:

We can haul three to four times the amount of grain in a day there versus [the amount] we can at the other farms, which means we’re in the truck less...

You’ve got more time to do other things on the farm.

Mr. York explains that sometimes it is necessary to deliver at a more distant elevator because, in spite of the extra distance, it takes less time to complete a trip due to faster facilities or a shorter line:

It was getting to the point where it cost us more to try to sit in line down here and only get one or two loads a day. I could take it all the way to [the other elevator] and get four times the amount of grain hauled in the same day, even though it’s farther away.

Similarly, Mr. Corbin comments that if wait times at the elevator are equal, “the only disadvantage for me is just the extra time it takes to haul over there.”

Market Availability

When asked how much the elevator influenced what they grew, 20 of the 31 farmers said that the elevator did not affect them at all. But after reflection, many of those reconsidered and said that if the elevators did not exist or did not buy wheat, they would be much less likely to grow wheat. The same answer appeared when farmers talked about which alternative or rotation crops they grew. Seventeen of the 31 farmers
mentioned that a local opportunity to market alternative crops would induce them to grow more of those crops.

Camelina, an oilseed crop with potential for both food and biofuel uses, was a popular example when farmers spoke of the possibility of markets for alternative crops.

Mr. Holland explains the problem of markets for alternative crops like camelina and peas:

They talk about camelina as being a viable crop, and I’d love to grow it, but we have no place to deliver it here. You know, there’s a lot of oilseed crops- peas- I would like to get into peas, but our market for peas is Stevenson livestock, and, you know, if they decide to stop taking them, then where do you go with them? Put them in a shed and buy some cattle to feed them out. Personally for me, the market’s got to be there. I have to know the market’s stable. And I have to- if I am contracting, I have to know that the person’s good for it. But yeah, I’ll grow anything, it’s just more a matter of where I’m going to sell it . . . They would have to bring in a facility that would handle an alternative crop before I would go for that over what I’m raising.

Mr. Scott offers a similar explanation, noting that the nearest current facility for camelina is inaccessible because it is a three hour haul from his farm:

We would grow- people have got to realize, the industry doesn’t realize, which kind of upsets me- we will grow any- well, these farms here would switch completely from wheat to something else if it was profitable. If it was profitable and easy to haul like it is wheat to this facility, we’d be raising it. The infrastructure we have in place is for wheat and barley, predominantly wheat. Plus, that’s historically what we’ve raised here because we raise it good. This is a very good wheat and barley grain growing area. So part of the reason they raised wheat is because it grows well here, but also because the infrastructure is in place for it. If the infrastructure were to take place- like for camelina for example- if we had a crushing mill here and they were paying it and it was profitable to raise camelina, I guarantee we’d be raising camelina. But not when you have to haul it for three hours to get to the nearest mill. It just isn’t feasible. So it’s infrastructure and profitability. We raise wheat because it’s profitable in this business.

Mr. Potts observes that “the fact that we have the huge train loading facilities for wheat, and we don’t have any facilities for other stuff within a very good range has definitely made us more monoculture wheat.”
Mr. Gregory notes that alternative crops are difficult to sell unless they are forward contracted:

One of the problems with some of those crops is they’re what they call thin crop as far as being marketed. Unless you have a contract or something like that, you have a tough time marketing them or delivering them.

Summary

All farmers cited price as the main reason they patronize a particular elevator or would go to a different elevator. However, to deliver at a more distant elevator, the difference in price must be great enough to pay their costs. Farmers consider many factors when assessing these costs including time, risk, convenience, customer service, and the importance of maintaining local businesses. It also must be feasible to deliver at a time when market conditions would allow them to take advantage of price differences.

The farmers in this study consider the construction of the new shuttle-train facility in Moore to be a benefit to competition among elevators in the area and therefore to the price they receive for wheat.
CHAPTER FIVE - SUMMARY AND CONCLUSIONS

The three themes which emerged in this study- competition, risk, and market availability- address how farmers evaluate changes in the location and size of grain elevators, which represent critical changes in the marketing infrastructure. The theme competition refers to how farmers perceive grain elevator competition and how the outcome of this interaction affects the price the farmer receives. The themes risk and market availability inform the farmers’ calculation of costs. The balance of these costs with the market price drives their marketing and crop decisions.

Farmers assert that price is their primary motive for choosing an elevator at which to sell grain and that the costs associated with transportation to the elevator affect the final price they receive. Findings from this study support the use of the supply area concept when evaluating grain elevator placement and confirm the value of this concept when applied to grain marketing systems at the aggregate or regional level. Beyond emphasizing regional patterns described by supply area rules, this investigation revealed considerations that are important at the local and individual level. Overall, farmers are remarkably proficient in navigating the complex grain marketing system. In addition, they are very aware of unique local factors that affect the success of their operation.

This chapter summarizes the study’s findings and draws conclusions about farmers and grain markets in Central Montana by demonstrating how the three emergent themes shape farmers perceptions and decisions. It begins with a discussion of the evaluation of costs and values and continues by presenting the relevance of findings from this study to grain elevators and how this study might help individual elevators to strengthen their position assisting farmers, agriculture in general, and Central Montana as
an agricultural region on the longer term. The chapter concludes with suggestions for further research derived from this study.

**Evaluating Costs and Values**

At the local level, farmers evaluate costs and values in terms of competition, risk, and market availability using their knowledge of the grain marketing system, their local elevators, and their own operations. The comparison of costs and value of growing, marketing, and transporting to price at the elevator affects their assessment of the elevator and steers their decisions. The costs and values here are key factors mentioned in the interviews, but this discussion by no means provides an exhaustive list of factors farmers consider.

Farmers value wheat because it is easy to sell, easy to grow, and receives a high price. Stated in terms of the themes competition, risk, and market availability, wheat is a favorite crop in this area because there is high competition among buyers for the product, it has a relatively low risk of failing in Central Montana’s climate, and markets are easily available. Other crops are valued particularly because they can be used to reduce the costs of growing wheat. Growing a different crop removes the food source for pests such as the wheat stem sawfly and allows farmers to apply different types of pesticides to the field to control weeds and other insects. However this value is often outweighed by the costs associated with these crops and the values of wheat itself. These costs include the lack of markets for these crops, especially locally, and the temperature and moisture needs of such crops. For example, growing peas allows a farmer to apply herbicide that will kill cheatgrass as well as wheat, but will not kill the peas. Growing peas allows the farmer to reduce the amount of cheatgrass infesting the field the next time he plants.
wheat there. In spite of this benefit, the farmer could decide not to grow peas because he may need to ship them more than 100 miles to a market, or he may anticipate a poor harvest because of a lack of rain or an excess of heat. There is inadequate competition for alternative or rotation crops among markets which are difficult to ship to, and although their growth reduces risks presented by continuously growing wheat, there are additional climatic risks associated with growing these crops.

Marketing and transporting add even more variables to the equation. Good management and service at the elevator adds value both in terms of convenience and price. The costs of accessing markets are higher or lower for different elevators depending on the amount of time spent traveling to the market and unloading at the elevator. Trucking risks add varying costs depending on road hazards existing between the farm and the elevator.

Relevance to Grain Elevators

Grain elevators are the link between farmers and larger markets. As such, they are responsible for delivering enough quality products to these larger markets while also catering to the needs of their suppliers, the farmers. The findings in this study are relevant to grain elevator owners and managers as well as the owners of feed and seed operations because they help explain the motives behind farmers' decisions. Understanding farmers' decisions can help these businesses take action to improve both their own competitiveness and the farmers' marketing options.

Farmer Perception of Increased Competition

Almost all farmers in this study viewed the upgrade of the elevator in Moore as a positive change which is "good for competition." For many farmers in this area, the
elevators at Moore and Moccasin have long been their local elevators with little competition from other facilities. Most farmers seem to have moved past regretting the decline in number of small elevators and adjusted to the presence of a few large elevators, even seeing their large capacities and high speed, high tech facilities as essential. Any upgrade in an older facility is seen as an increase in competition and a benefit to farmers. Farmers extol the change at the Moore facility with reference to improvements in unloading time and convenience and the ability to offer better prices. The older facility was viewed as dilapidated and slow, whereas the new facility is deemed fast and efficient. The gain in speed and efficiency when delivering grain is valuable to farmers who want to “get in, get out, and get going” with truckloads of grain. This concept applies as much to farmers who deliver at Moccasin as it does to those who deliver at Moore.

Farmers who usually deliver at the Moccasin elevator were as excited as farmers who usually deliver at the Moore elevator about its improvements. This is not necessarily because farmers who deliver at Moccasin anticipate delivering at Moore instead. Rather, it is because they expect the Moore facility to acquire from other farmers some of the grain usually delivered to Moccasin. These farmers expect competition between the two elevators to increase the prices offered to farmers and a reduction in traffic at the Moccasin elevator, reducing time waiting in line and occasions where the elevator is full.

Increasing Competitiveness

In an area such as Central Montana where competition among elevators is close, micro or local level considerations by farmers can make as much difference as price
when choosing one elevator over another. In instances of close competition, grain companies should consider these local factors as much as they consider the macro or regional level factors. By understanding the criteria by which farmers evaluate grain elevators and the costs associated with delivering to them, grain elevators can attract farmers with improved access to elevator sites, promote their value as a local business, and improve the marketability for crops other than wheat.

**Site Accessibility.** Site accessibility is important. However, many elevators can do little to improve the ease of access to their sites. They cannot, of course, remove large hills from the path of the farmer, control the weather to prevent ice on the road, or ensure that other drivers are safe and courteous. Repeatedly, farmers indicate that the drivers of smaller vehicles are unaware of the difficulty of driving a larger truck and frequently pull out in front of large trucks at intersections or do not give the truck adequate time or space to safely make a turn. While beyond the control of elevator operators, they could, however, collaborate with state-wide or regional agricultural organizations and the Montana Department of Transportation to coordinate a campaign to inform other drivers as to how their behavior puts grain truck as well as livestock truck drivers at risk and explore the possibility of improving or constructing turning lanes at problem intersections.

Other factors are more in the control of the elevator. Newly constructed elevators have the option to locate on easily accessible and level sites outside of difficult to navigate towns. The United Harvest elevator at Moccasin is a good example of this. It is located a mile from both the townsite of Moccasin and the highway, giving ample room for trucks to maneuver away from other traffic. Others, such as the Peavey elevator in
Moore have historically been situated in town. These elevators face the extra challenge of giving farm trucks easy access in a more confined space. This has been increasingly difficult as the size of these trucks has increased.

**Promoting Local Value.** Smaller companies may want to consider promoting their value as a local business to area farmers, appealing to their sense of community and the long term effects of the closure of such an elevator. In fact, some farmers already evaluate smaller elevators in terms of the costs they would incur if that elevator were to close. They would be subject to increased risks in trucking, increased time reaching the market, and their access to other goods and services at or near the elevator would be reduced.

Management and service is also perceived as a local value, regardless of the size of elevator. Interviews showed that farmers are fully aware and very sensitive to how the quality of service and management practices affect their livelihood. Elevators can perhaps do more to enhance their service. Especially smaller elevator operators, often with less competitive pricing strategies, should promote how they serve as niche markets.

**Markets for Alternative Crops.** The farmers in this study consider alternative crops important for use in rotations. Farmers value these rotations to control weeds, insects, and disease and to increase the fertility of the soil. Several even commented that these crops increased the yield of wheat grown the following season. However, these crops present marketing dilemmas which currently outweigh their rotational value. Farmers see inadequate demand for these products. The numerous seed and feed businesses and local feedlots cannot buy more than what is already grown or cannot offer
adequate prices. Thus, the increase in wheat yield due to crop rotation does not outweigh the loss in profit due to lack of marketing options for alternatives.

Small elevators and seed and feed businesses have focused on niche markets which remove them from direct competition with the large elevators. However, farmers still perceive access to markets for alternative crops to be limited. Smaller elevators should explore to what extent they can play a greater role in facilitating the marketing of alternative crops.

If the use of these crops in rotation increases the yield of wheat as farmers claim, it would be of benefit to the larger elevators' to support markets for these crops. Some farmers let land sit idle, or fallow, rather than grow a rotation crop. This yields some of the same pest and disease control benefits as rotation. Others do not rotate as much as they would like simply because "it doesn't pencil." The change in wheat yield is not enough to make up for a poor price for the rotation crop. The wheat yield drops for every year it is continuously cropped because of depleted nutrients, pests, and disease, but the farmer still makes more money than he would growing and selling a different crop as a rotation and gaining in wheat yield the following season. If elevators could provide attractive markets for rotation crops, farmers may grow both more alternative crops and more wheat as ground is removed from fallow and rotation boosts wheat yields.

The example presented in the previous chapter illustrates what farmers see as the major roadblock to a market for alternatives. Farmers claim they would grow camelina if a local market for it existed. Current markets are too far away to justify the extra time and freight costs to deliver the product. However, no company wants to place a market in an area where they cannot be sure a supply exists. So, farmers will not grow camelina.
until they have a reliable market and camelina buyers will not invest in a collection or processing facility in an area where camelina is not yet produced in sufficient quantities. Collaborative efforts among agricultural organizations, farmers, and elevators should be made to improve access to newer markets.

Both smaller and larger elevators can play a bigger role in providing markets to foster crop rotation and alternative crops. In addition to improving the short-term ‘bottom line’, it fosters the long-term viability and sustainability of farm operations. Thereby it not only adds to the success of individual farms, but also strengthens the agricultural sector in the region. And with that it adds to the vitality of rural communities of Central Montana.

**Future Research Directions**

Farmers who participated in my study discussed a remarkable variety of complicated issues related to their grain marketing. To get a complete picture of grain marketing, much time and energy would need to be devoted to researching and explaining the finer points of grain marketing, government farm programs, research availability, the role of large agribusiness companies, and many other contributing factors.

This study suggests several directions for future research into farming operations and their relationship to markets. First, an additional study focusing on farmers near the Central Montana Co-op elevators in Denton and Geraldine would be of great interest, because the greater complexity of marketing options in this area and the role of farmer-owned elevators could not be fully explored within time constraints of this study.

Second, because this study uses qualitative methods to add perspective to existing
quantitative research, it raises several questions which call for further quantitative research. For example, when describing the interviewee demographics in the previous chapter, I call attention to the differences in truck size in relation to distance from the elevator. In the background chapter, I also relate means of transportation of grain to the elevator to the location of elevators, noting that the direction of this relationship is unclear. It would be useful to design a quantitative study, for instance by using a survey, to clarify this relationship. Another study could be designed to address the ability of the region to sustain a market for a crop such as camelina.

These research possibilities can be explored with reference to the themes of competition, risk, and market availability uncovered in this study. These themes add to our understanding of farmers’ decisions regarding what crops not to grow, what crops to grow, and where to sell their crops. These insights point toward new possibilities for improving and expanding market options and crop choices to boost farming in central Montana.
WORKS CITED


Montana Rail System
Average Daily Maximum Temperature
1971-2000

Montana

This temperature map was created by PRISM software, based on data from the National Climate Data Center, National Oceanic and Atmospheric Administration, and the United States Department of Agriculture.

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Natural Resource Information System

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Montana Minimum Temperature
1971-2000

Average Daily Minimum Temperature

Average Daily Minimum Temperature Degrees Fahrenheit

Scale of Miles: 0 30 60 90 120 150

This temperature map was created by PRISM software, based on data from the National Climate Data Center, NCDC-SHISD stations, and USGS Digital Elevation Models.

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The above map combines soil, geology, climate, topography, and vegetation data to describe the grain yield potential in Montana (U.S. Department of Agriculture Natural Resources Conservation Service 2006). While yield is expressed in bushels per acre of barley, the data can be extrapolated to describe the relative potential for yields of other grains as well. Lower yields are likely in areas colored tan, and higher yields are likely in dark green areas.
Letter to Newspapers

To the Farmers and Ranchers of Fergus and Judith Basin Counties,

I am a graduate of Moore High School and currently pursuing my master’s degree in geography at the University of Montana-Missoula. For my thesis topic, I have chosen to focus on the geography of agriculture. In the next few weeks, I will be attempting to contact several people in the farming community to request interviews for use in my research. These interviews will be used to help describe farmers’ perceptions and reactions to changes in the location and size of grain elevators in Central Montana.

This topic is of particular interest to me because I grew up in Central Montana. My research will be made available to the public in the hopes that policy-makers will use it to better understand the perspective of our farmers on issues which affect the ability to grow and sell agricultural products. My research is also intended to benefit the individual farmer by making the knowledge, opinions, and ideas of other farmers available for discussion.

If you receive a phone call from me, please consider allowing me some of your time. Your experience and insights are valuable to me, your community members, and policy makers.

Thank You,

Jessie Reynolds
Graduate Student, Department of Geography
University of Montana
SUBJECT INFORMATION AND CONSENT FORM

Title: Farmers' perceptions and reactions to changes in grain elevator size and locations

Project Directors:
Jessie Reynolds, Graduate Student
Christiane von Reichert, Faculty Supervisor
Department of Geography
Old Journalism Bldg 204
The University of Montana
Missoula, MT 59812
jessie.reynolds@umontana.edu
Professor of Geography
406-243-4784

Special instructions:
If any part of this consent form is unclear to you, please ask the person who gave you this form for an explanation.

Purpose:
You are being asked to take part in a research study examining the effects of farmers’ perceptions and reactions to changes in the location and size of grain elevators in central Montana.

Procedures:
The interview will take place at a time and place of your convenience and will last for approximately 20-40 minutes.

Risks/Discomforts:
There is no anticipated discomfort for those contributing to this study, so risk to participants is minimal.

Benefits:
Your help with this study will contribute to the understanding of how changes in grain elevator size and location affect farmers in your community.

Confidentiality:
Your identity will be kept confidential. Only the researcher and her faculty supervisor will have access to the files. If the results of this study are written in a scientific journal or presented at a scientific meeting, your name will not be used. The audiotape will be transcribed without any information that could identify you. The tape will then be erased.

Compensation for Injury:
Although we do not foresee any risk in taking part in this study, the following liability statement is required in all University of Montana consent forms.
In the event that you are injured as a result of this research you should individually seek appropriate medical treatment. If the injury is caused by the negligence of the University or any of its employees, you may be entitled to reimbursement or compensation pursuant to the Comprehensive State Insurance Plan established by the Department of Administration under the authority of M.C.A., Title 2, Chapter 9. In the event of a claim for such injury, further information may be obtained from the University's Claims representative or University Legal Counsel. (Reviewed by University Legal Counsel, July 6, 1993)

**Voluntary Participation/Withdrawal:**
Your decision to take part in this research study is entirely voluntary. You may withdraw from the study at any time for any reason.

**Questions:**
If you have any questions about the research now or during the study contact: Jessie Reynolds at the address or phone number listed above.

**Statement of Consent:**
I have read the above description of this research study. I have been informed of the risks and benefits involved, and all my questions have been answered to my satisfaction. Furthermore, I have been assured that any future questions I may have will also be answered by the researcher. I voluntarily agree to take part in this study. I understand I will receive a copy of this consent form.

________________________
Printed (Typed) Name of Subject

________________________  ________________
Subject's Signature Date

**Statement of Consent to be Audio Recorded:** (Please initial)

____ I will allow audio recording during the interview. I understand that audio recordings will be destroyed following transcription, and that no identifying information will be included in the transcription.

or

____ I prefer not to be audio recorded.
Interviewee/Informant Rights

From Dunn and McGuirk in Dunn (2005)

Please keep this copy for your records. Feel free to contact me via phone or email with any questions, concerns, or additional information you feel is relevant to my research.

- Permission to use a voice-recorder during the interview must be given in advance.
- All transcribed material will be anonymous.
- Audio recordings and transcripts will be made available to those participants who request them.
- Participants have the right to change an answer.
- Participants can contact me at any time in the future to alter or delete any statements made.
- Participants can discontinue the interview at any stage.
- Participants can request that the voice-recorder be paused at any stage during the interview.
- Participant may obtain a copy of the final thesis at the Moore Public Library.

Contact information:

Jessie Reynolds
Department of Geography
University of Montana
Missoula, MT 59812

Phone: 406-240-8294
Email: jessie.reynolds@umontana.edu

Thank you for your time and input! I intend to make a copy of my completed thesis available at the Moore Public Library.
Interview Guide for Farmers

What crops do you grow?
What crops have you grown in the past?

How do you decide what crops to grow?
Where do you sell your crops?
   How far is it?
   How do you get your grain there?
      Truck or semi transport?
   Personal storage?
   Who owns the elevator/market?

If the distance you must drive your grain changes, would you grow something different?
Would you sell at a different place?
What if fuel prices change?
What if the grain elevator changes its offering price?
What if the elevator changes ownership?
Are there any factors that I haven’t mentioned that might cause you to grow something different or sell your crop at a different place?

What are the advantages and disadvantages of selling at ______? 
Where else could you sell it? 
   Why do you choose ______ instead?

How do you think the new elevator in Moore changes farming practices?
Did the construction of the elevator at Mocasin have similar effects?

How much does the grain elevator influence what you grow?
   Be prepared to follow up.

Is there anything else you would like to mention?

Demographic Data
   Farm Size
   Farmer Age
   # of Working Family Members
   Crops Grown
   Distance to Market
   Ownership
**Interview Guide for Elevator Operators**

<table>
<thead>
<tr>
<th>New, large elevators</th>
<th>Older, smaller elevators and feed and seed stores</th>
</tr>
</thead>
<tbody>
<tr>
<td>What do you know about the history of the grain elevator(s) in this area?</td>
<td></td>
</tr>
<tr>
<td>Tell me about this elevator. Who owns it? Do they own others in the area? How do you set grain prices? Describe your company's relationship with the railroad.</td>
<td></td>
</tr>
<tr>
<td>Who has sold here in the past? Who sells here now?</td>
<td></td>
</tr>
<tr>
<td>How do you think your elevator will affect or does affect other nearby elevators? How does your elevator affect the farmers? How does your elevator affect the community?</td>
<td>How does the construction of larger elevators affect you? How does it affect the farmers? How does it affect the community?</td>
</tr>
<tr>
<td>Do you anticipate any new customers? How far might farmers be willing to drive to sell here?</td>
<td>Do you anticipate losing any business to the new elevator in Moore? and/or Did you lose any business when the elevator in Moccasin was built?</td>
</tr>
<tr>
<td>Have you noticed a change in the variety or quantity of grain being sold?</td>
<td></td>
</tr>
<tr>
<td>If yes: What, in your opinion, are factors that contribute to it?</td>
<td></td>
</tr>
<tr>
<td>Is there anything else you would like to mention?</td>
<td></td>
</tr>
<tr>
<td>Is there anyone else I should talk to?</td>
<td></td>
</tr>
</tbody>
</table>