Chickpea, Lentil, and Dry Pea Snacks

Expanding Your Business in Great Falls Montana

Brett Doney, President & CEO
BDoney@GFdevelopment.org
1-406-750-2119

Jolene Schalper, VP Business Development
JSchalper@GFdevelopment.org
1-406-750-4481

Great Falls, MT
DEVELOPMENT
AUTHORITY

Table of Contents

The Great Falls Development Authority (GFDA) is a public/private economic development partnership serving the 13 county Golden Triangle region of north-central Montana. Our mission is to grow and diversify the Great Falls regional economy and support the creation of higher wage jobs. We are a private-sector driven, award-winning professional economic development team that prides itself on providing excellent service to support long-term business success. We were the first economic development organization in the Rocky Mountain region to earn accreditation from the International Economic Development Council.

In Addition to World-Renowned Agricultural Production, we offer a range of support for agricultural and food processors, including workforce recruitment and training grants, land and equipment grants, access to low cost capital, low cost utilities, competitive shovel-ready rail-served manufacturing sites, abundance of spring and municipal water, the 6th best tax climate in the nation, and more! We are experts at structuring packages focused on long-term client success.

Purpose of This Business Case is to document the competitive advantages our region offers for niches in agricultural and food processing operations. We have developed business cases for a variety of other agricultural and food processing niches which may be of interest to you.

We look forward to learning about your company and how we may be able to find a great location for your start-up or expansion.

Executive Summary

This document outlines the business opportunity for the start-up or relocation of a chickpea, lentil, and dry pea snack food manufacturing facility into the Great Falls Region. Pulse crops are grown in abundant quantities in Montana as the nation's leading pulse crop growing state for dry peas, lentils, and chickpeas.

CROP SOURCING ADVANTAGE The Region is the site of abundant chickpea, lentil, and dry pea agricultural production giving specialty snack foods producers an economic advantage through the procurement of pulse crops directly from pulse crop producers.

COST OF DOING BUSINESS ADVANTAGE With lower energy and human resources operating costs and operating within substantial pulse crop production acreage, a chickpea, lentil, and dry pea snack foods manufacturing operation in the Great Falls Region would have significant economic advantages to competition.

WORKFORCE TRAINING ADVANTAGE The Region has plentiful labor resources that can be made more economically effective with Montana-sponsored workforce training financial incentives.

LOCATION ADVANTAGE The Region has two impressive, shovel-ready industrial parks with essential infrastructure to support chickpea, lentil, and dry pea snack foods manufacturing facilities.

TRANSPORTATION ADVANTAGE The Region has the I-15 Interstate Corridor and the nearby I-90/94 Interstate Corridor that interconnect with major highway systems for efficient transport of goods by truck throughout North America. The Region has BNSF rail service for efficient transport of raw materials and finished goods by rail. The Region is serviced by dozens of Montana-based and national trucking firms for efficient and cost effective transport of goods by truck.

INDUSTRY CLUSTER ADVANTAGE The Region has been actively successful in attracting and supporting a wide variety of food and beverage intermediate ingredients and finished goods manufacturing operations.

Specifically, agricultural production output of high quality pulse crops in Montana is rapidly increasing each year. Resources that support value added agricultural manufacturing are abundantly available in the Great Falls Region. Pulse crop manufacturing technologies that are employed by snack food manufacturers involve cleaning, conditioning, milling, processing, and packaging pulse crop commodities and their derivatives into shelf stable snack foods. A wide variety of lentil, chickpea, and dry pea snack food products are marketed and distributed in health and nutrition marketplaces worldwide.

Agriculture is the number one industry for the Treasure State, Montana. According to 2015 Montana Agricultural Statistics, Montana's agriculture industry employed over 9.5 million acres of production agriculture to bring in over $5.7 billion in revenue to the state.[1] Agricultural producers and processors in Montana have demonstrated the ability to efficiently grow and process agricultural commodities for shipment to customers throughout the world. The Great Falls Region is Montana's agricultural

processing hub that stands out in the conversion of Montana-grown commodities into intermediate and finished products for food and feed manufacturers.

Food and feed ingredient manufacturers in the Great Falls Region have been very successful in supplying food and feed supply chains with efficient production and shipment of a wide variety of intermediate and consumer products. Prime examples of bulk, intermediate products produced in the Great Falls Region are conditioned grain, oilseeds, and pulses; milled flours, durum semolina, pasta products, barley malt, vegetable oils, and honey. The Region is also home to a large-scale egg production operation.

Companies that operate agri-processing operations in the Great Falls Region are:

General Mills	Pasta Montana	Malteurop
Cenex Harvest States	Grain Craft	JM Grain
Great Northern Growers	Montana Milling	Montana Specialty Mills
Montana Advanced Biofuels	Montana Eggs LLC	Columbia Grain
Timeless Seeds	Giant Springs Water	Smoot Honey

Table 1: Great Falls Region Agri-processing Companies
Source: Great Falls Development Authority

The state of Montana has become the nation's leading producer of pulse crops. Montana is ranked number one in the production of dry peas and lentils. In 2015, Montana produced over 9.4 million hundredweight of dry peas (48% of U.S. production), over 2.5 million hundredweight of lentils (47% of U.S. production), and over 475,000 hundredweight of chickpeas (17% of U.S. production in 2014).[2] The commodity value of pulse crops harvested in Montana currently exceeds $100 million annually.

Chickpea, lentil, and dry pea snack foods are rapidly gaining in favor with consumers worldwide as preferred food sources that are non-allergenic, non-GMO, high in protein, low-glycemic, and high in fiber content. These preferred vegan food sources are increasingly well known as agriculturally sustainable due to their nitrogen fixing ability and low agronomic input requirements. Through advance food processing technologies, pulse crop-related snack foods are gaining through marketing and distribution into retail and food service markets in the U.S. and Canada.

Chickpea, lentil, and dry pea snack food manufacturing technologies range from high volume technologies featuring automated processing systems to lower volume technologies employing semiautomatic systems. Semiautomatic systems involve the least capital cost requirements and have relatively high operating costs. Fully automated, high volume processing systems have high capital cost requirements but feature lower operating costs. The degree of sophistication in snack foods manufacturing systems is dependent upon the type of snack food produced and output volume requirements of a chickpea, lentil, and dry pea snack food manufacturer. All levels of snack food manufacturing sophistication have a need for economical and reliable processing energy. Electricity and natural gas are important energy resources utilized in the processing of pulse crops into snack foods.

Chickpea, lentil, and dry pea snack foods manufacturing operations can be developed and operated in the Great Falls Region due to favorable, cost effective energy and human capital factors. The Great Falls

Region possesses a qualified labor force that has average hourly wages that are 79% of the national average.[3] In fact, the Great Falls area has lower overall hourly wages than other metropolitan areas of Montana.[4] The combination of favorable energy and labor costs along with increasing demand for pulse-related snack foods in retail grocery and food service industries throughout the U.S. and Canada make the Great Falls Region a superior candidate for pulse crop products manufacturing.

The Great Falls Region has some of the nation's lowest industrial electrical costs.[5] The City of Great Falls has the lowest industrial natural gas cost in Montana and that cost is lower than almost all industrial sites in the nation. With lower energy and human resources operating costs and operating within substantial pulse crop production acreage, a chickpea, lentil, and dry pea snack foods manufacturing operation in the Great Falls Region would have significant economic advantages to competition. A chickpea, lentil, and dry pea snack foods manufacturing facility in the Great Falls Region would have the opportunity to become one of the lowest cost producers of pulse crop-derived snack foods in North America.

Pulse Crop Production Resources in the Great Falls Region

In 1998, fewer than 66,000 acres in Montana were planted with pulse crops. In 2015, more than 880,000 acres in Montana were planted with chickpeas, lentils, and dry peas.[6] Montana is now the nation's number one producer of lentils and dry peas and ranks third among chickpea producing states. Pulse crop production has been replacing fallow land in Montana at an increasing pace over the last fifteen years. Chickpeas, lentils, and dry peas grow well in Montana's cool and semi-arid climate. The Montana Department of Agriculture has predicted that Montana's pulse crop acreage could increase to more than 1.2 million acres by 2025.[7]

In 2015, the Great Falls 13 County Region produced 67% of Montana's chickpea production on 37,225 acres and yielded 55,837,500 pounds of chickpeas. The Great Falls Region produced 16% of Montana's lentil production on 35,603 acres and yielded 40,943,500 pounds of lentils. The Region produced 33% of Montana's dry pea production on 196,711 acres and yielded 324,573,200 pounds of dry peas. (Figure 1 and Table 2). Overall, the Great Falls 13 County Region produced over 31% of Montana's total pulse crop production in 2015. Pulse crop acreage in Montana increased from 701,780 acres in 2014 to 879,347 acres in 2015, which amounted to a 25% jump over 2014 acreage.

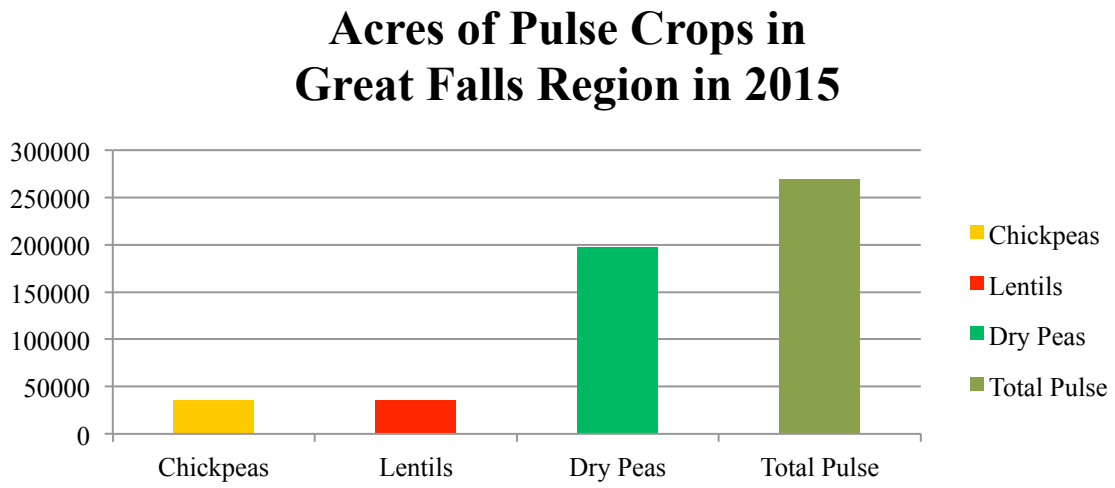


Figure 1: 2015 Pulse Crop Acreage in the 13 County Great Falls Region
Source: Montana FSA USDA

Great Falls Region 2015 Pulse Crop Production by Acreage				
13 County Region	**Chickpea Acreage**	**Lentil Acreage**	**Dry Pea Acreage**	**County Acreage**
Blaine	625	1,978	16,178	18,781
Cascade	107	530	7,379	8,016
Chouteau	8,860	1,159	19,216	29,235
Fergus	1,576	2,054	3,244	6,874
Glacier	2,548	7,932	29,450	39,930
Hill	7,981	5,240	33,878	47,099
Judith Basin	-	228	3,517	3,745
Lewis and Clark	-	-	500	500
Liberty	1,495	9,417	27,353	38,265
Meager	-	-	2,153	2,153
Pondera	1,120	2,196	7,723	11,039
Teton	10,668	1,165	9,260	21,093
Toole	2,245	3,704	36,860	42,809
13 County Acreage	**37,225**	**35,603**	**196,711**	**269,539**
Montana State Acreage	55,294	221,938	602,115	879,347
13 County/MT Acre %	67%	16%	33%	31%
Great Falls Region 2015 Pulse Crop Production by CWT				
13 County CWT	**558,375**	**409,435**	**3,245,732**	**4,213,541**
Montana State CWT	829,410	2,552,287	9,934,898	13,316,595
13 County/MT CWT %	67%	16%	33%	32%

Table 2: Great Falls Region Pulse Crop Acreage and Production for 2015
Source: Montana FSA USDA

Chickpea Production in the Great Falls Region

Pulse crop-derived snack foods are frequently produced from chickpeas. As a primary ingredient in snack foods, chickpeas are relatively bland in flavor and light in color. These characteristics allow the incorporation of a wide range of complimentary ingredients to improve flavor and appearance. Chickpeas are used in food formulations to increase protein and fiber and, as a bonus; chickpeas are also classified as gluten free and non-allergenic.

The Great Falls 13 County Region has dramatically increased chickpea production over the last three years. The Great Falls 13 County Region has increased chickpea production from 4,898 acres in 2013 to 37,225 acres in 2015, a 660% increase over production in 2013. Figure 2 shows the significant rise in chickpea acreage in the Region and Figure 3 shows the Region's corresponding increase in the overall percentage of chickpea production in Montana from 2013 through 2015. Chickpea production in the Great Falls Region exceeded 55 million pounds in 2015.

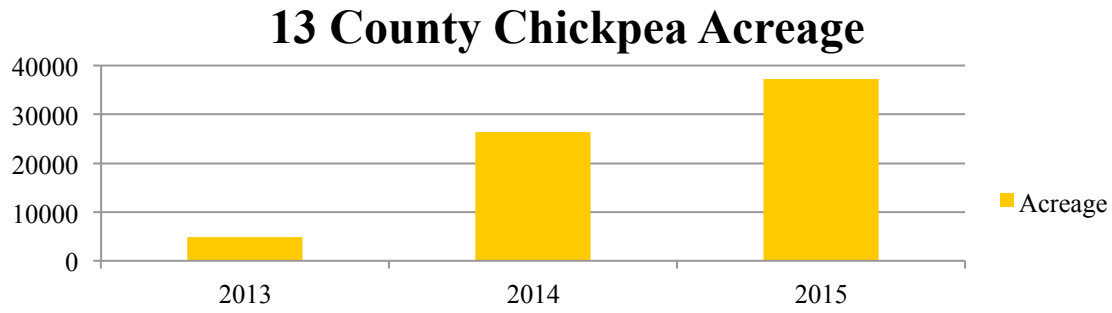


Figure 2: Great Falls 13 County Chickpea Acreage Increase – 2013 through 2015
Source: Montana FSA USDA

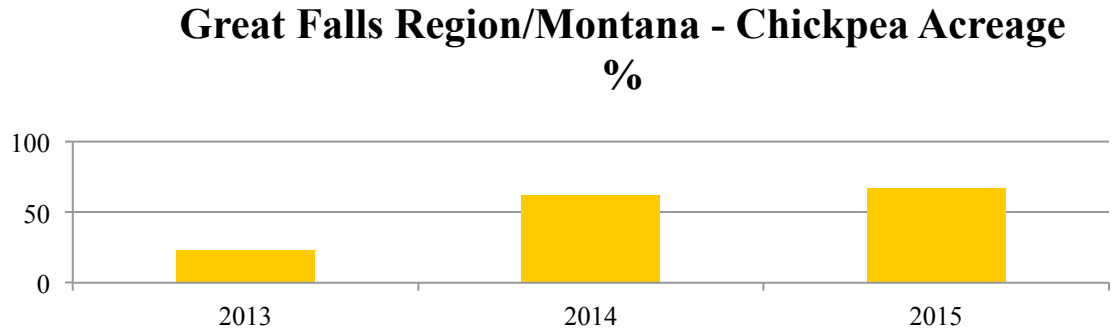


Figure 3: Great Falls Region Compared to Montana Chickpea Acreage % - 2013 through 2015
Source: Montana FSA USDA

In 2015, 67% of all chickpea acres harvested in Montana were in the Great Falls Region as shown in Figure 4. The widespread distribution of chickpea acres in the Great Falls Region is shown in Figure 5.

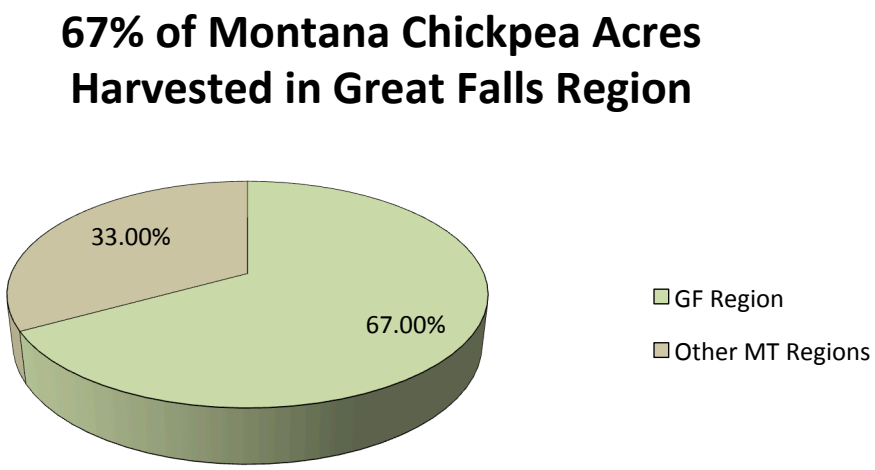


Figure 4: 67% of Montana Chickpea Acres Harvested in Great Falls Region Trade Area
Source: Montana FSA USDA

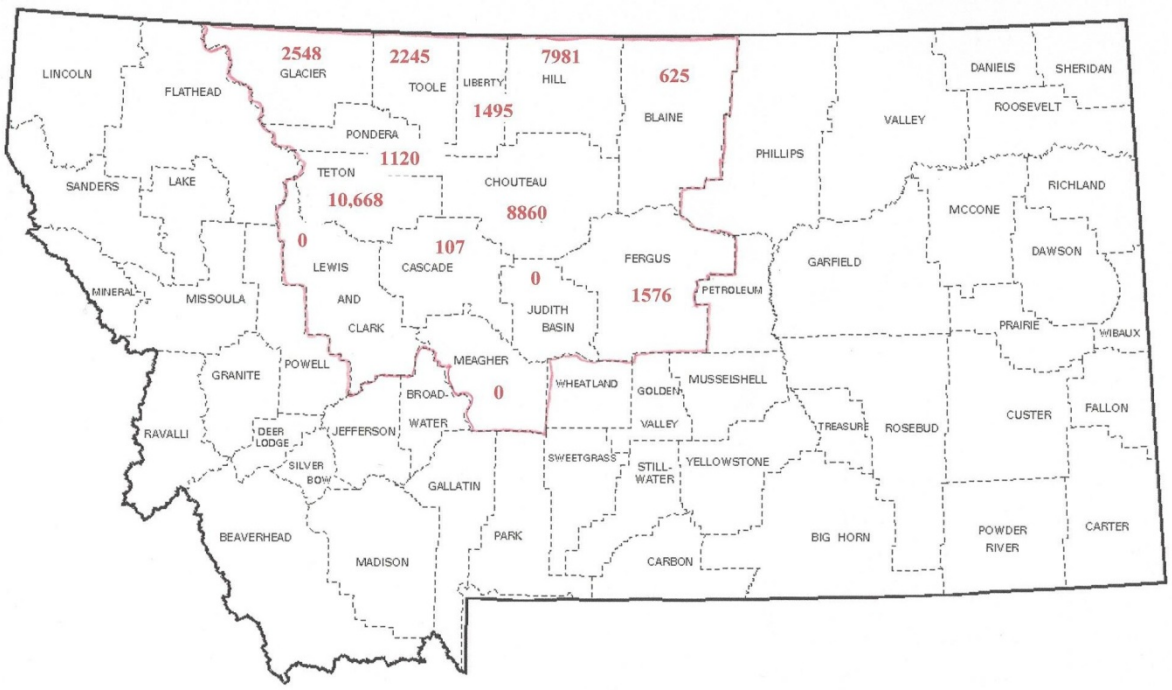


Figure 5: Great Falls Region 2015 Chickpea Acreage by County – 37,225 Acres
Source: Montana FSA USDA

Lentil Production in the Great Falls Region

Pulse crop-derived snack foods are increasingly being manufactured using lentils due to lentils' reputation for providing a high nutrient value. Lentils are used in food formulations to provide protein and fiber nutritional benefits in addition to lentils being gluten free and non-allergenic The Great Falls

13 County Region has increased lentil production from 21,062 acres in 2013 to 35,603 acres in 2015, a 69% production increase over that time period. Figure 6 shows the increase in lentil acreage in the Region and Figure 7 shows the Region's corresponding increase in the overall percentage of lentil production in Montana from 2013 through 2015. Lentil production in the Great Falls Region exceeded 40 million pounds in 2015.

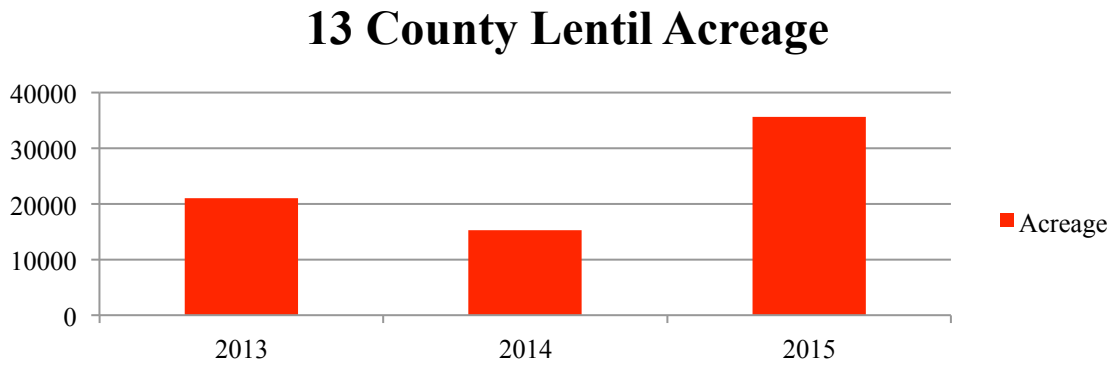


Figure 6: Great Falls 13 County Lentil Acreage Increase – 2013 through 2015
Source: Montana FSA USDA

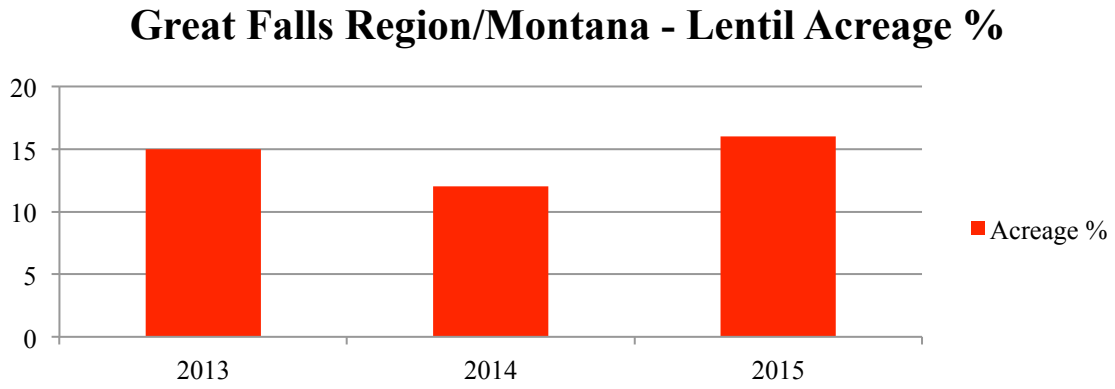


Figure 7: Great Falls Region/Montana Lentil Acreage % - 2013 through 2015
Source: Montana FSA USDA

In 2015, 16% of all lentil acres harvested in Montana were in the Great Falls 13 County Region as shown in Figure 8. The widespread distribution of lentil acres in the Great Falls Region is shown in Figure 9.

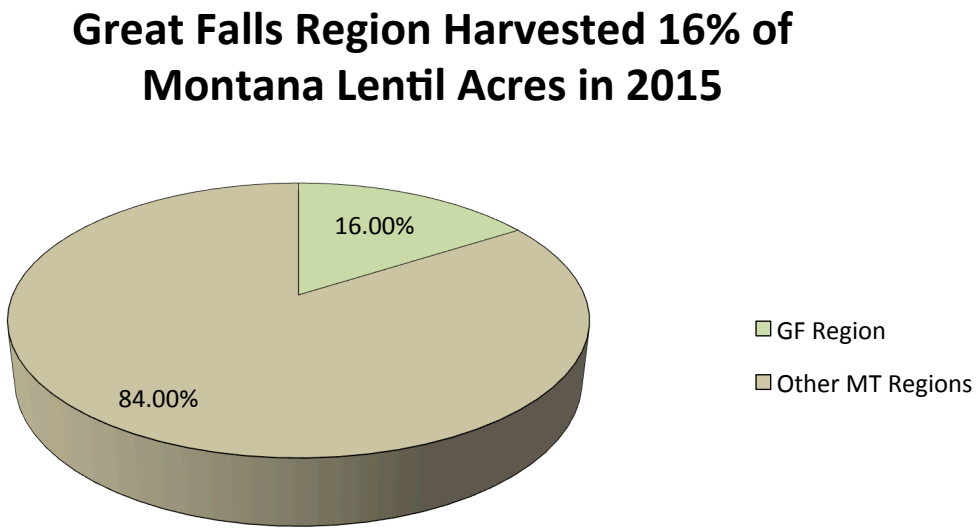


Figure 8: 16% of Montana Lentil Acres Harvested in Great Falls Region Trade Area
Source: Montana FSA USDA

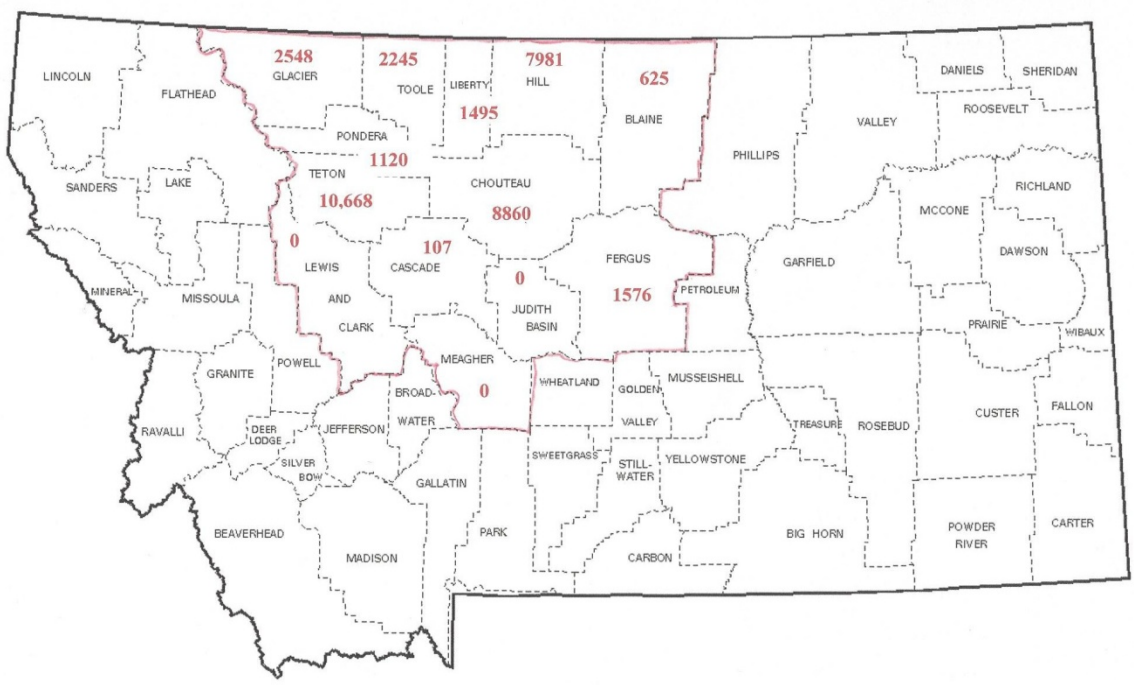


Figure 9: Great Falls Region 2015 Lentil Acreage by County – 35,603 Acres
Source: Montana FSA USDA

Dry Pea Production in the Great Falls Region

Pulse crop-derived snack foods are being formulating using dry peas due to high protein, fiber, and resistant starch content. Dry peas are favored for use in food formulations to provide plentiful nutrition and also dry peas are gluten free and non-allergenic The Great Falls 13 County Region has increased

dry pea production from 169,638 in 2013 to 196,711 acres in 2015, a 16% increase over production in 2013. Figure 10 shows the increase in dry pea acreage in the Region and Figure 11 shows the Region's corresponding increase in the overall percentage of lentil production in Montana from 2013 through 2015. Dry pea production in the Great Falls Region exceeded 324 million pounds in 2015.

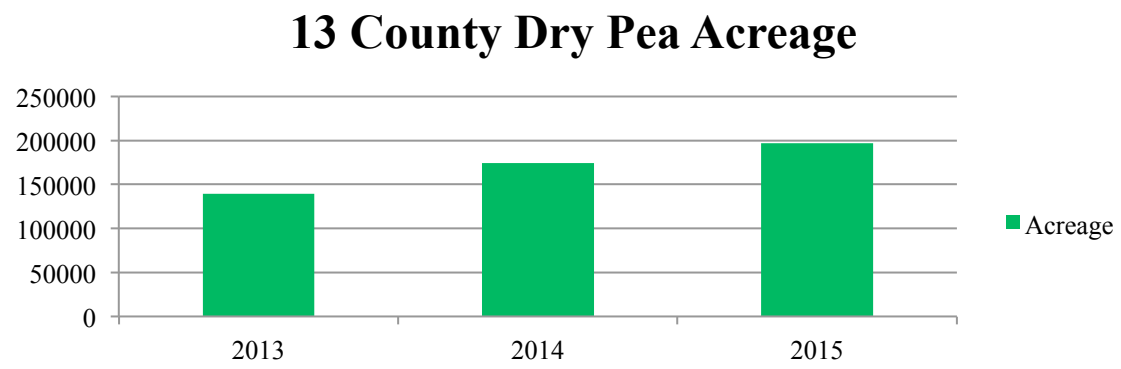


Figure 10: Great Falls 13 County Dry Pea Acreage Increase – 2013 through 2015
Source: Montana FSA USDA

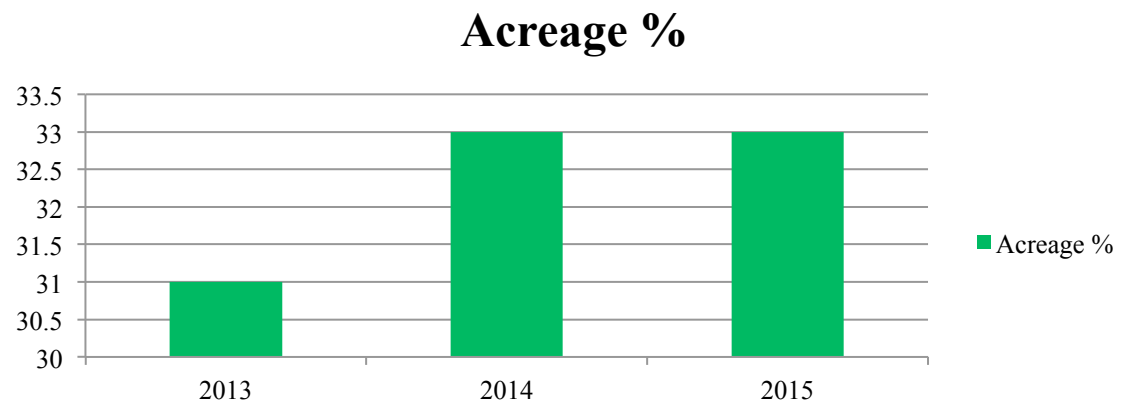


Figure 11: Great Falls Region/Montana Lentil Acreage % - 2013 through 2015
Source: Montana FSA USDA

In 2015, 33% of all dry pea acres harvested in Montana were in the Great Falls Region as shown in Figure 12. The widespread distribution of dry pea acres in the Great Falls Region is shown in Figure 13.

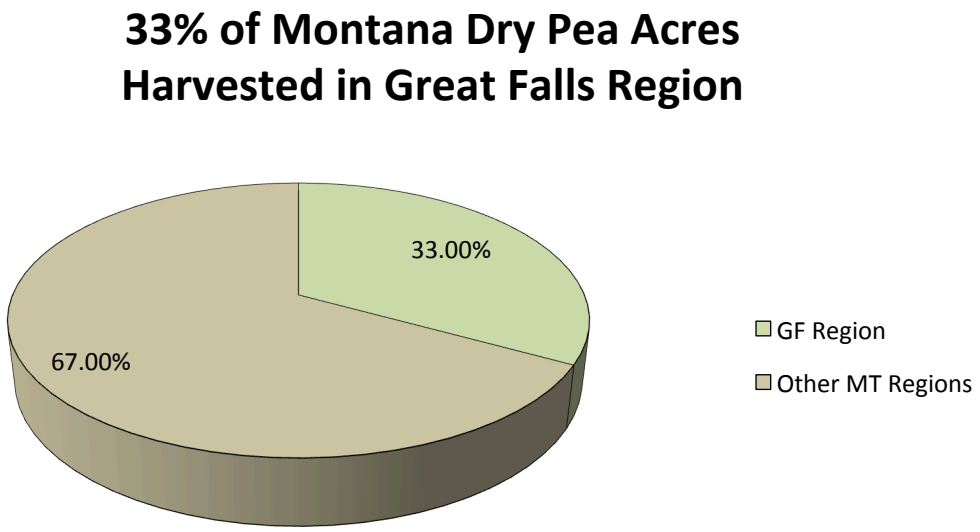


Figure 12: 33% of Montana Dry Pea Acres Harvested in Great Falls Region Trade Area
Source: Montana FSA USDA

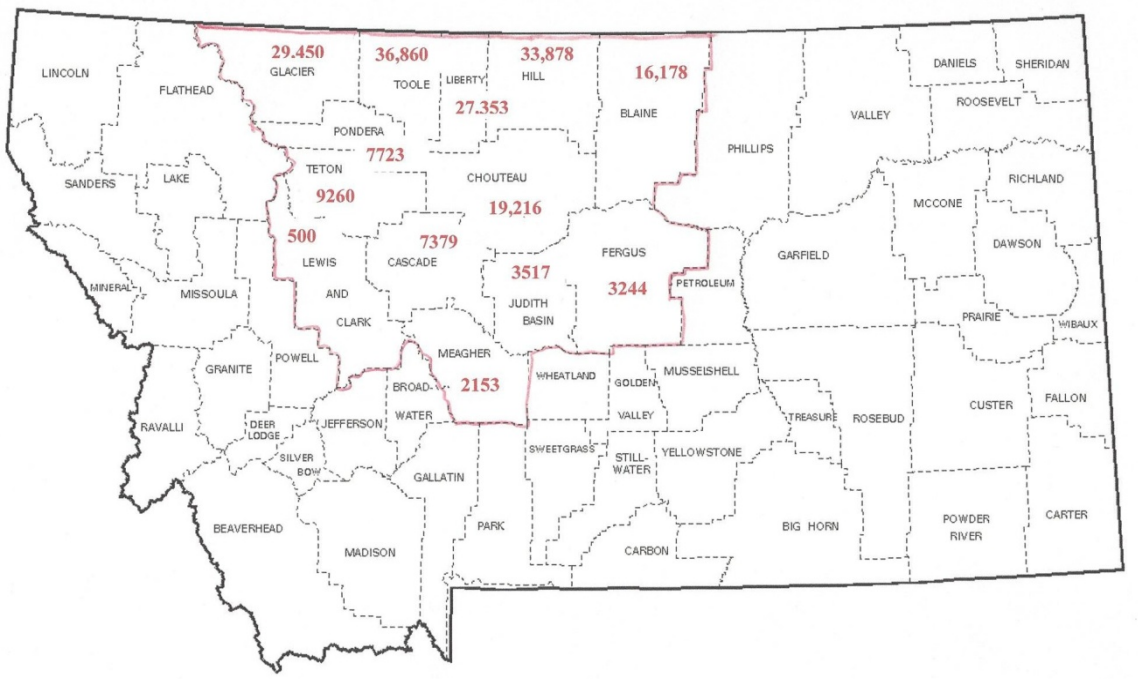


Figure 13: Great Falls Region 2015 Dry Pea Acreage by County – 196,711 Acres
Source: Montana FSA USDA

The Great Falls Region is projected to increase the annual production of pulse crops as reported by the Montana Department of Agriculture. Montana farmers are embracing the economic opportunity to include pulse crops into their wheat crop rotation. Montana State University recently studied the economic impact produced by the introduction of dry pea production crop rotation into traditional wheat production in Montana. Net farm returns were calculated for four rotation scenarios. Dry pea–wheat rotation consistently had the greatest net returns among six historical cropping systems studied. The study concluded that dry pea–wheat crop rotation systems can reduce net return uncertainties for Montana wheat farmers.[8]

The thirteen county Great Falls Region had harvested 2.54 million acres of multiple classes of wheat in 2015, which accounted for 48% of all wheat acres harvested in Montana. The Great Falls Region harvested 269,538 acres of pulse crops, which, comparably, was only 10.6% of the Region's wheat acreage. (Figure 14) Farmers in the thirteen county Region are forecasted to become more aware and more receptive of the potential for higher on-farm net returns from pulse crop production. Regional farmers are projected to increasingly adopt the practice of including pulse crops in their wheat rotation. Pulse production in the Great Falls Region is projected to continue to increase as part of the economically and environmentally superior practice of rotating pulse crop production with wheat production.

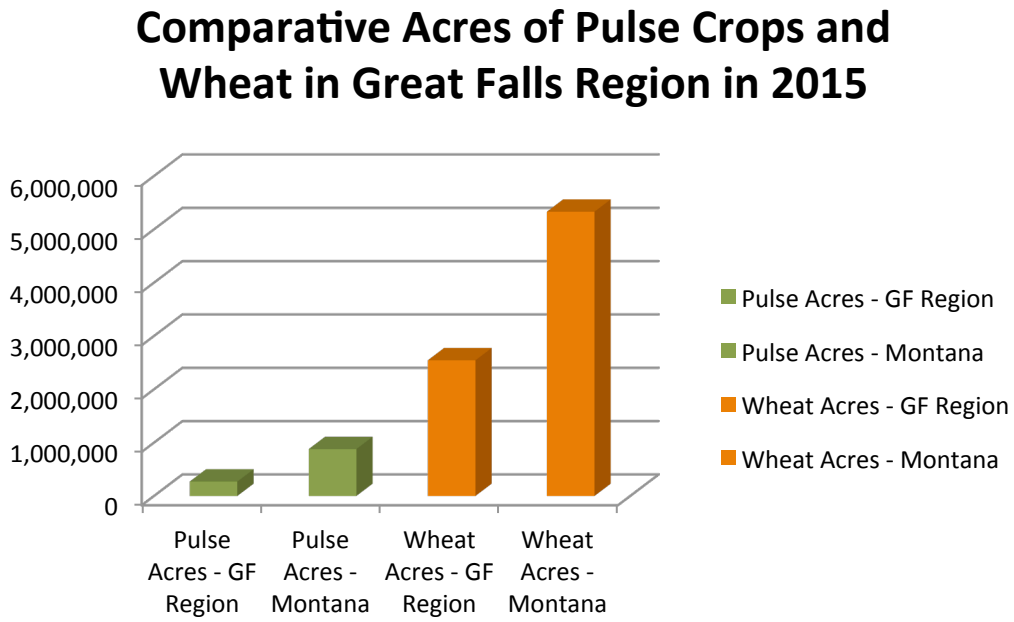


Figure 14: Dry pea and Wheat Acres Harvested in the GF Region and Other MT Regions
Source: Montana FSA USDA

The Great Falls Region contributes toward Montana being the leading state in the production of dry pulse crops, a statistic earned by the production of over 558,375 hundredweight of chickpeas, 409,435 hundredweights of lentils, and 3,245,732 hundredweight of dry peas in 2015. Montana has been producing 48% of the nation's pulse crop production. As an example, the state not only leads in

production, but has shown consistent growth in dry pea production over the past six years compared to total U.S. dry pea production as shown in Figure 15.

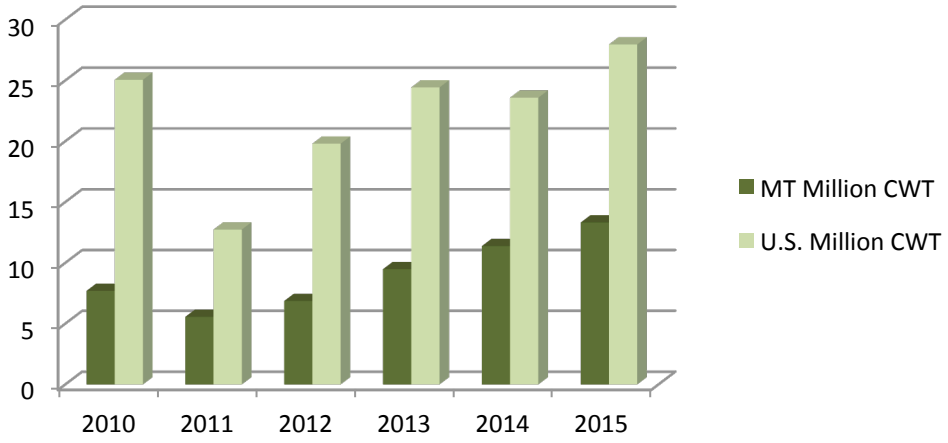


Figure 15: Montana and U.S. Dry pea Production: 2010 – 2015
Source: USDA, NASS, 2010-2015 Data

The availability of pulse crops is not in question in the Great Falls Region due to widespread pulse crop growing region within Montana and the prairie provinces of Canada. In addition to abundant and increasing pulse crop production in the Great Falls Region, pulse crop production in Canada has also been increasing over the last decade. Pulse production in Canada in 2015 exceeded 119 million hundredweight.[9] Dry pea production in Canada adjacent to Montana is concentrated primarily in the provinces of Saskatchewan, and Alberta with Saskatchewan with pulse crop production contributing over 60% of Canada's output.[10]

Montana is a major producer of edible dry beans and farmers in the state are forecasted to plant 80,000 acres in 2016 for a potential 1.28 million hundredweight crop yield. Dry edible beans, such as pinto, navy, and black beans, are grown primarily in eastern Montana. A snack food manufacturer would have ready access to edible dry beans year around in addition to chickpeas, lentils, and dry peas.

Proximity to Raw Materials

One considerable benefit derived from operating a chickpea, lentil, and dry pea snack foods manufacturing facility within pulse crop agricultural production areas is that snack food manufacturing companies have the option to contract and purchase their pulse crop commodities directly from regional farmers. By purchasing pulse crops directly from regional farmers, the company has the potential to capture receiving, cleaning, and conditioning margins that can amount to greater than 10% of annual raw material costs.

Currently, chickpea, lentil, and dry pea snack foods manufacturing companies are primarily located outside pulse growing regions. An analysis of major competitors that market pulse crop-derived snack foods shows concentrations of operations in New York, New Jersey, Connecticut, Texas, Oregon, Illinois,

California and Massachusetts. In general, U.S. chickpea, lentil, and dry pea snack foods manufacturers are located in higher population states.

Smaller, regional pulse crop-derived snack food manufacturers can be found in the prairie provinces of Canada and a few U.S. plains states. By establishing chickpea, lentil, and dry pea snack foods manufacturing operations in the Great Falls Region, chickpea, lentil, and dry pea snack foods manufacturing companies would be operating within proximity to raw materials, using cost effective energy and labor, and would thereby benefit from lower direct costs to become a low cost producer to larger populations of consumers along the Atlantic and Pacific coasts.

Pulse Crop Value Chain in the Great Falls Region

The pulse crop production and processing value chain consists of five business categories that interact to supply a range of pulse crop-based product ingredients and finished products to food, feed and pet food manufacturers. Figure 16 shows a diagram of dry pulse crop industry participants involved in delivering pulse crop-based consumable products to consumers and feeders of livestock, poultry, and pets.

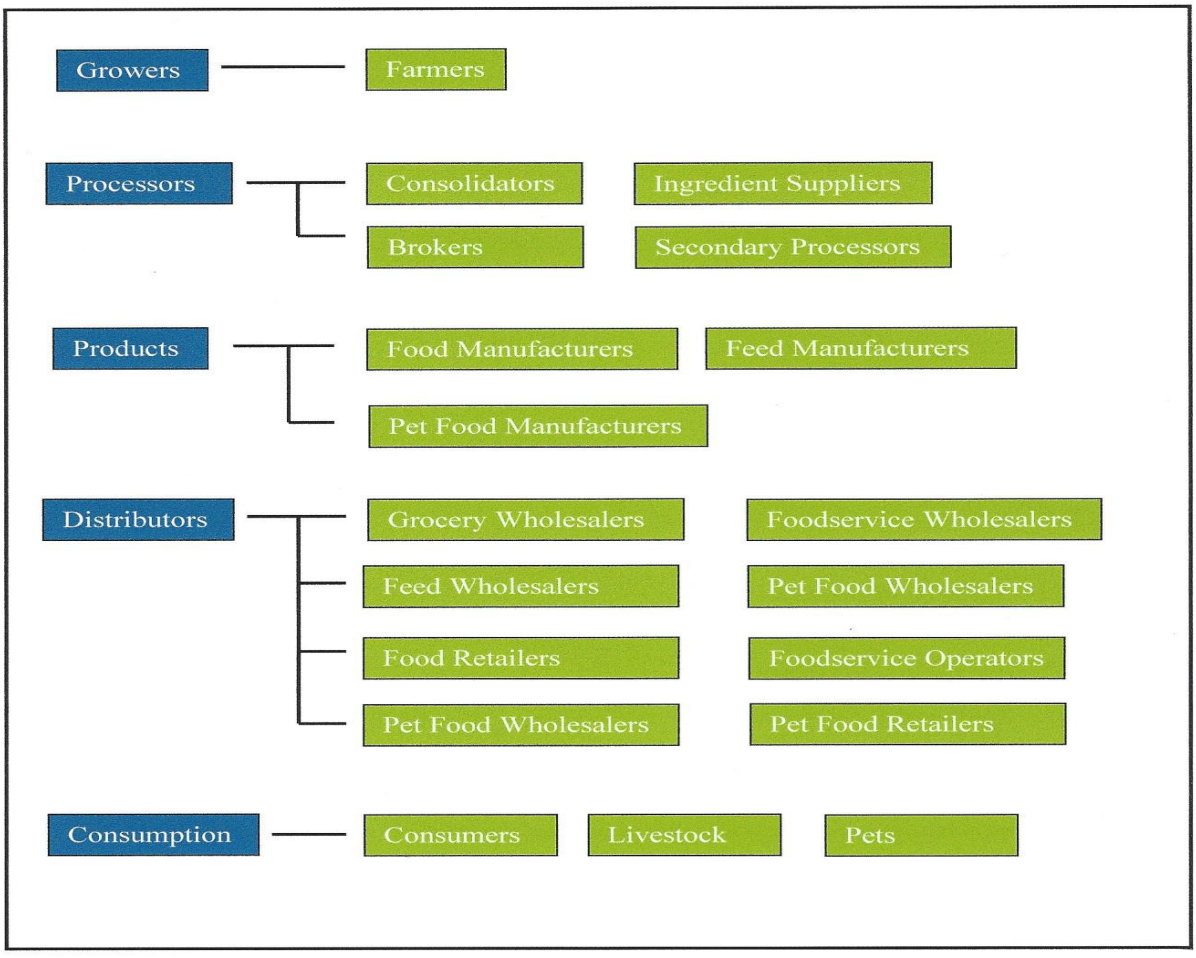


Figure 16: Pulse Crop Processing Value Chain Participants in the Great Falls Region

The Great Falls Region has a significant number of pulse crop producers that are increasing in number and acreage every year. Family farmers and Hutterite colony farm organizations in the Region grew over 269 million pounds of pulse crops in 2015. The vast majority of pulse crops grown in the Great Falls Region are purchased by a diverse collection of pulse crop consolidators.

Consolidators purchase pulse crops for themselves or for clients and have the option to grade, clean, and condition pulse crops in preparation for export or domestic use. Some consolidators are engaged in further value added processing of pulse crops including de-hulling/splitting, color sorting, and custom packaging. Consolidators in the Great Falls Region represent the vast majority of companies that participate in the processing segment of the pulse crop value chain in the Great Falls Region.

Consolidators mapped in Figure 17 have facilities in the Great Falls Region and are actively engaged in primarily receiving, cleaning, and conditioning bulk pulse crop commodities. The consolidators with physical assets in the Region include Columbia Grain, Chinook and Ledger, MT, which is a large grain procurement company headquartered in Portland, OR. Belle Pulses USA, Hingham, MT, is a subsidiary of Belle Pulses, Ltd., St. Isidore de Bellevue, SK, Canada. Regional consolidators include Stricts, Inc., Chester, MT, Northern Seed LLC, Shelby, MT, Sunburst Grain Inc., Sunburst, MT, Pardue Grain Inc., Cut Bank, MT, Hodgskiss Seed, Choteau, MT. Global Agro Commodities, Chester, MT is a subsidiary of Bespoke Group, LLC, Irving, TX, which is an exporter of pulse crops primarily to India.

Exporters/Brokers are several companies that consolidate pulse crop commodities and, for the most part, have facilities in the Region. Companies engaged in foreign commerce in the Great Falls Region are classified as Exporters. Exporters have the option of purchasing and taking title of commodities or acting as an agent for purchasers for a brokerage fee. Exporters are charged with ensuring procurement and delivery of commodities to purchasers in foreign markets. Exporters who have facilities in the Great Falls Region include Columbia Grain, Chinook and Ledger, MT, Belle Pulses USA, Hingham, MT and Global Agro Commodities, Chester, MT. Other major exporters operating in the Great Falls Region include JM Grain, Great Falls, MT with headquarters in Garrison, ND, and Commercial Lynks, Inc., Cut Bank, MT with headquarters in Alexandria, VA.

Consolidators, exporters, and brokers purchase and re-sell pulse crop commodities primarily to intermediate product processors and finished product processors. Processors that purchase pulse crops are primarily located in foreign markets; however, food, feed, and pet food manufacturers in the U.S. are increasingly using dry peas, chickpeas, and lentils as manufacturing ingredients in current and new formulations of snack foods.

Pulse crop procurement companies that operate as consolidators, exporters, or brokers in the Great Falls Region rely upon a dependable network of pulse crop producers to ensure adequate quantities of pulse commodities are consistently grown each crop year. Pulse crop procurement companies are in the business of connecting pulse crop producers with commodity buyers to ensure pulse crop commodities are efficiently delivered to expanding markets.

Figure 17: Pulse Crop Consolidation Locations in the Great Falls Region

Business Opportunity

By employing the combination of the Great Falls Regional resources, a start-up or relocated chickpea, lentil, and dry pea snack food manufacturing facility can become one of the lowest cost North American producers of pulse-based snack foods. The Great Falls Region has some of the nation's lowest industrial electrical costs.[11] The City of Great Falls has the lowest industrial natural gas cost in Montana and that cost is lower than almost all industrial sites in the nation. With lower energy and human resources operating costs and operating within substantial pulse crop production acreage, a chickpea, lentil, and dry pea snack foods manufacturing operation in the Great Falls Region would have significant economic advantages to competition.

The snack food value chain has a number of distribution options for a snack food processing facility in the Great Falls Region. A snack food processing facility could produce products for food ingredient use, food service operations, and for retail markets. Smaller scale snack food manufacturers have the option of obtaining cash flow for their businesses by marketing and selling their products directly to consumers via the Internet and smaller venues such as farmers' markets. The expanding demand for health snack foods offers snack food manufacturers significant opportunities to market and sell their products to a wide variety of food manufacturers, food service distributors, and retail distributors.

Figure 18 shows the product distribution chain options available for snack food manufacturers. Snack food manufacturers can sell directly to a number of customers, namely, other food manufacturers, food service distributors, retail distributors, food service operators, retailers, and consumers. All of the intermediate customers in the value chain, except for consumers, have the option of selling snack products to their customers downstream in the value chain. With projected rapid growth of pulse-

derived snack food products, a snack food manufacturer can plan to provide snack products as their market expands.

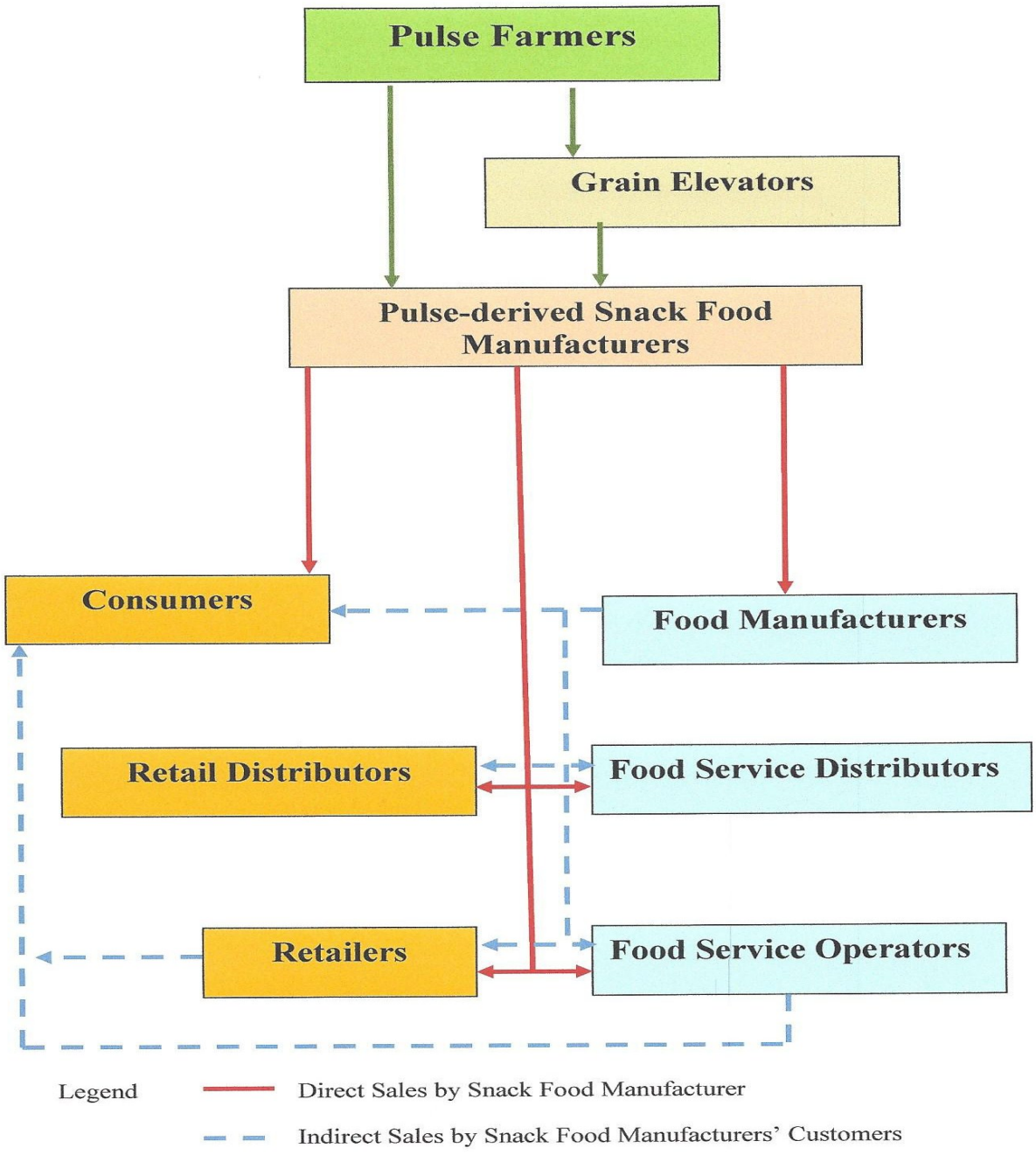


Figure 18: Pulse Snack Food Manufacturers Distribution Chain

Pulse Snack Foods Products Trends

There is an emerging and rapidly growing interest in healthier eating by the American public. Global sales of healthy foods are expected to exceed $1 trillion by 2017. The 2015 Nielsen Global Health and Wellness Survey found that 88% of 30,000 individuals polled stated that they would pay more for healthier foods. Healthier foods are defined as those that are GMO free, natural with no artificial ingredients, high in fiber, high in protein, contain whole grains, contain vitamins and minerals, and those that can reduce disease and promote good health.[12] Pulse crop-derived snack foods have the nutritional factors that promote healthy eating.

Pulses are members of the legume family. The term "pulse" refers strictly to dried seeds from legumes. Dry peas, edible beans, lentils and chickpeas are the most common types of pulse crops grown in the Great Falls Region. Compared to grains, pulses are higher in protein and fiber, lower in fat and have the bonus of being nitrogen-fixing crops that improve the environmental sustainability of annual farming systems. Pulses also have high levels of minerals such as iron, zinc, and phosphorous as well as essential vitamins such as folate and other B-vitamins.[13]

Pulses contain attributes that apply directly to the eight major trends that are occurring within the food and nutrition marketplace. The list includes foods and feeds that have increased demand and consumption that are:

Vegetarian	Gluten Free	Non-GMO
High Protein	Non-allergenic	Low Glycemic
High Fiber	Low Glycemic	Sustainability

Mintel, Chicago, IL, continuously studies a wide variety of product markets. Table 3 shows the number of new snack food product claims in the first half of 2016. Most of the new snack food product claims can be claimed by pulse-derived snack foods as shown in Figure 19.

New Snack Food Product Claim	Number of Product Launches
Low/No/Reduced Allergen	19
No Additives/Preservatives	19
Gluten Free	18
Vegetarian	16
Social Media	15
Kosher	13
GMO-Free	9
Ease of Use	8
Organic	8
Ethical Environmentally Friendly Package	8
Other Claims	8

Table 3: 2016 Snacks Claims – Latest Product Launch Activity Last 6 Months
Source: Mintel 2016

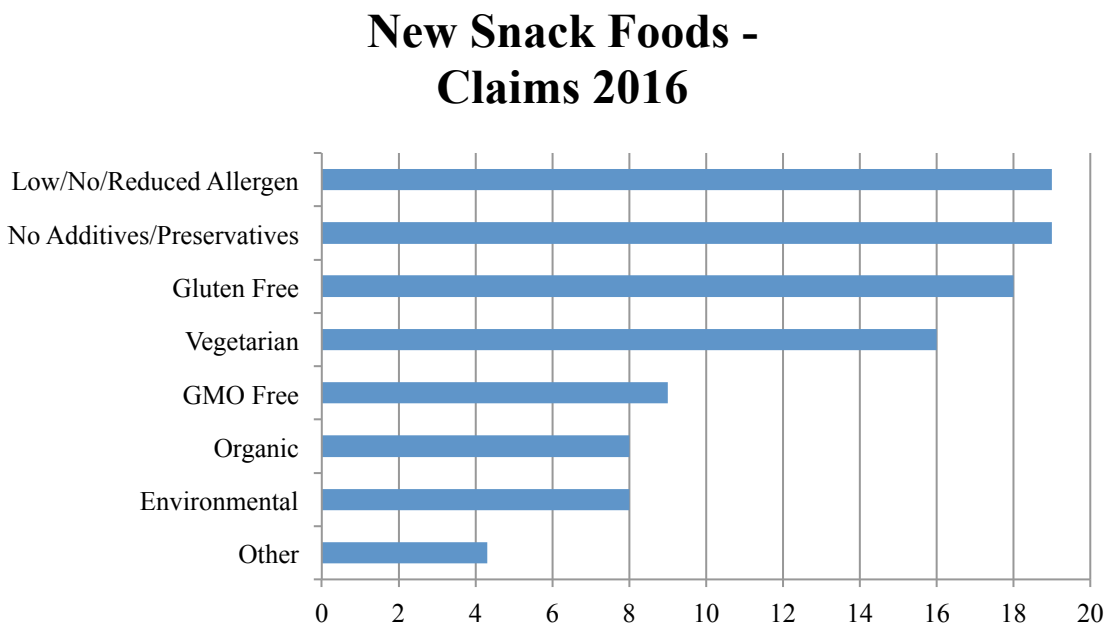


Figure 19: 2016 Snacks Claims – New Product Snack Food Claims Last 6 Months
Source: Mintel 2016

Mintel stated in their April 2015 report "Snacking Motivations and Attitudes – U.S.," that about one third of consumers are serving healthier snacks to their children. Mintel's current Global New Products Database noted that the non-GMO claim had grown more than all other product claims for foods and had risen by more than 800% from 2009 to 2014. Low/no/reduced allergen and gluten free food claims grew by 214% and 240% respectively over the same time period.[14]

Snack foods can be produced in a wide range of shapes and forms. Those include whole pulses, crackers, chips, puffs, sticks, tubes, and cones. Snack foods produced with pulse crop ingredients are predominantly produced using roasting, extrusion, and/or sheeting processing technologies. Modern twin-screw extrusion equipment combined with sheeting equipment can produce a wide variety of snack food shapes, sizes, flavors, and textures.

The largest producer of snack foods in the U.S. is PepsiCo's subsidiary Frito Lay generated $13.6 billion in annual sales as of May 2016. Snack food sales in the U.S. are expected to reach $22.9 billion in 2016 that is a 24% increase since 2012.[15] A list of pulse-derived snack food companies and their primary products is shown in Table 4. These companies feature pulse-derived snack foods with attributes shown in Figure 19

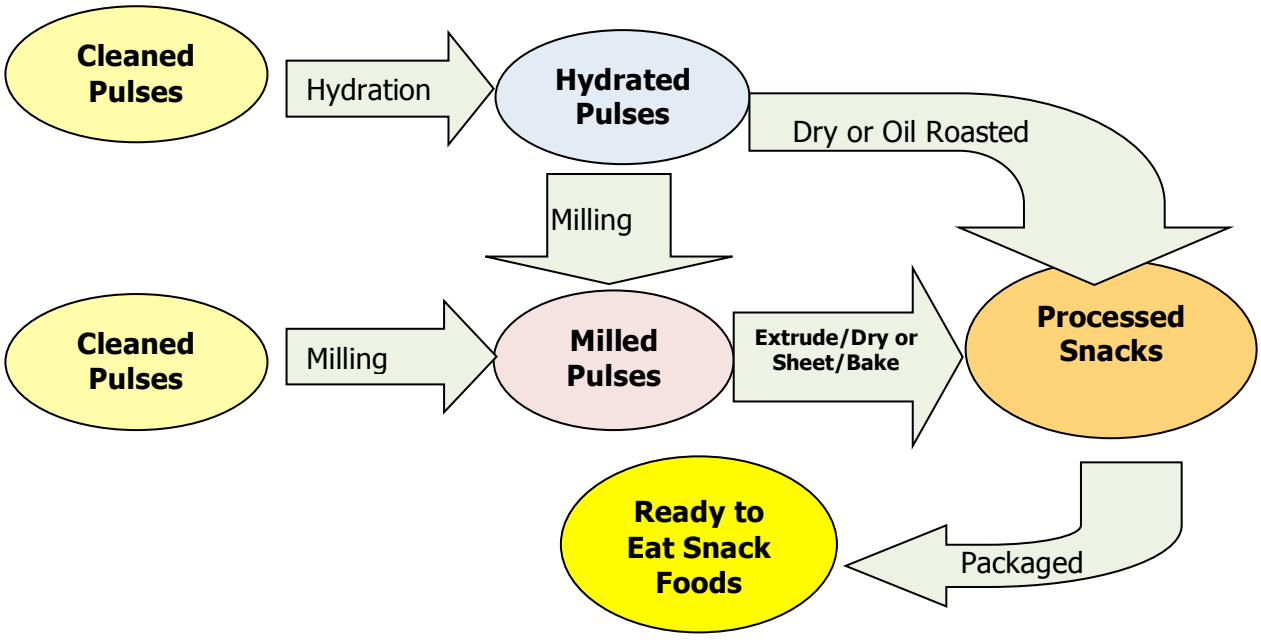
Snack Food Company	Snack Food Type
Biena Food, NY	Roasted Whole Chickpeas
Mondelez International, NJ	Chickpea Crackers
The Good Bean, Berkeley, CA	Roasted Whole Chickpeas
Saffron Road, Stamford, CT	Roasted Whole Chickpeas
Mediterranean Snacks, Stamford, CT	Lentil Chips, Chickpea Crackers
Simply 7, Houston, TX	Lentil Chips, Chickpea Chips
Enjoy Life Foods, Chicago, IL	Lentil Chips
Harvest Snaps, Fairfield, CA	Lentil Chips, Pea Chips
Bhuja Snacks, Kennesaw, GA	Roasted Whole Dry Peas
World Peas, Austin, TX	Roasted Whole Dry Peas

Table 4: List of Pulse-derived Snack Food Companies

Snack Foods Manufacturing

Shown in Figure 20 is a snack food manufacturing process diagram. This simplified diagram includes the basic production steps for the manufacturing of snack foods. Since there are a wide range of methodologies involved in the steps of manufacturing snack foods, processing diagrams can be expanded far beyond the basic diagram shown in Figure 20. One of the least complex processes involves the hydration of whole or split pulses and the roasting of hydrated pulses using hot air or hot oil. More complex technologies employ extruders/dryers, dough sheeters/dryers or a combination of extruders/sheeters/dryers. The latest computerized food processing technologies involve full automation of each manufacturing step involved in the production of pulse-derived snack foods.

Figure 20: Dry Chickpea, lentil, and dry pea snack food manufacturing process



The appeal of developing a pulse crop-based snack food production facility lies in the fact that production facility sizes can range from the small scale utilization of rented commercial kitchen space to large scale automated processing facilities occupying sizeable buildings. The choice of facility size and complexity depends upon a number of factors including available capital, market accessibility, manufacturing expertise, and enterprise objectives. With this in mind, small volume snack foods production facilities could be launched with a minimal amount of equipment costing less than $250,000.

A factor of 4.55 can be applied to equipment costs to arrive at a total plant cost.[16] In addition to equipment costs, total plant costs include equipment installation, instrumentation, piping, electrical supplies, buildings, land, yard structure, rail improvements, engineering, supervision, construction, contractor's fees, contingency fee, certifications, taxes, and working capital. If a small scale facility had equipment costs of $250,000, total facility and equipment costs would be more than $1.1 million. Any proposed snack food facility must be designed as an FDA human food facility with full compliance with the 2011 FDA Food Modernization Safety Act in order to address pet food, animal feed and human food markets.

Financial Illustration

Shown below is a summary compilation of the financial performance of snack food production facilities from 2010 through the second quarter of 2015. The data was compiled by Bizminer.com from a combination of U.S. government and private organization information sources. The average annual sales revenue for the representative snack food companies averaged about $17 million. The annual sales volume of the representative companies ranged from $500,000 to more than $25 million.

Table 5 shows Income and Expenses in dollars for the representative snack food manufacturing companies from 2010 through the second quarter of 2015. Table 6 shows Income and Expenses as percentages of revenue. Analysis of Table 6 shows annual after tax net profits percentage of revenue range from 3.8% to 4.9%. Discretionary annual owner earnings percentages of revenue range from 7.4% to 8.9%.

Table 7 shows the dollar based compilation balance sheet of the representative companies for years 2010 to 2015. Table 8 shows the percentage based compilation balance sheet of the representative companies for years 2010 to 2015. The balance sheet show very favorable current ratios of total current assets divided by total current liabilities. The total liabilities to total assets ratio is very favorable for the representative companies. Net worth to total liabilities ratio is favorable averaging 42% to 48%.

Table 9 and Figure 21 show favorable percentage returns on EBITA (earnings before interest, taxes, and amortization), assets, net worth, and sales. Review of the financial data of representative snack food manufacturers shows that the business of snack food manufacturing can be profitable and can provide favorable returns on equity. Additional financial data for representative snack food manufacturing companies can be obtained from Bizminer.com.[17]

Income and Expense- Profit and Loss $						
Number of Manufacturers	**119**	**122**	**123**	**142**	**163**	**170**
	2010	**2011**	**2012**	**2013**	**2014**	**2015q2**
Business Revenue	17,375,511	17,611,021	17,161,003	17,354,318	17,285,850	17,597,373
Cost of Sales	12,053,034	12,433,033	12,271,766	12,447,673	12,407,507	12,607,813
Cost of Sales - Labor	584,366	806,524	696,034	571,576	648,191	658,655
Gross Margin	5,322,477	5,177,988	4,889,237	4,906,645	4,878,343	4,989,560
Officers Comp.	268,704	283,132	271,314	261,553	279,072	292,968
Salary-Wages	1,039,056	1,050,961	1,036,229	1,070,154	987,054	1,043,802
Rent	219,138	182,093	193,160	220,764	188,339	195,055
Taxes Paid	188,731	215,394	226,077	241,147	237,775	251,414
Advertising	318,102	150,576	199,204	246,828	217,375	238,171
Benefits-Pensions	258,796	304,906	218,333	278,494	247,141	266,913
Repairs	87,003	75,153	79,186	112,932	75,123	80,834
Bad Debt	13,291	9,902	17,652	12,755	10,759	11,641
Sales, General, Admin & Misc.	1,292,173	1,174,705	1,084,374	1,147,240	1,186,357	1,221,491
EBITDA	1,637,483	1,731,166	1,563,708	1,314,778	1,449,348	1,387,271
Amortization Depreciation Depletion	397,808	420,935	346,731	409,297	376,475	404,065
Operating Expenses	4,082,802	3,867,757	3,672,260	4,001,164	3,805,470	4,006,354
Operating Income	1,239,675	1,310,231	1,216,977	905,481	1,072,873	983,206
Interest Income	7,716	3,345	8,351	6,214	5,483	5,761
Interest Expense	276,322	100,322	105,578	133,546	119,384	123,764
Other Income	193,593	117,626	177,910	149,544	156,834	169,172
Pre-Tax Net Profit	1,164,662	1,330,880	1,297,660	927,693	1,115,806	1,034,375
Income Tax	395,985	452,499	441,204	315,416	386,484	351,688
After Tax Net Profit	768,677	878,381	856,456	612,277	729,322	682,687
Discretionary Owner Earnings	1,435,189	1,582,448	1,474,501	1,283,127	1,384,869	1,379,720

Table 5: Compiled Income Statement in $ for Snack Food Manufacturers from 2010 to 2015 (2nd Q) Source: Bizminer.com

Income and Expense- Profit and Loss %						
Number of Manufacturers	**119**	**122**	**123**	**142**	**163**	**170**
	2010	**2011**	**2012**	**2013**	**2014**	**2015q2**
Business Revenue	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Cost of Sales	69.37%	70.60%	71.51%	71.73%	71.78%	71.65%
Cost of Sales - Labor Portion	3.36%	4.58%	4.06%	3.29%	3.75%	3.74%
Gross Margin	30.63%	29.40%	28.49%	28.27%	28.34%	28.35%
Officers Comp.	1.55%	1.61%	1.58%	1.51%	1.61%	1.66%
Salary-Wages	5.98%	5.97%	6.04%	6.17%	5.71%	5.93%
Rent	1.26%	1.03%	1.13%	1.27%	1.09%	1.11%
Taxes Paid	1.09%	1.22%	1.32%	1.39%	1.38%	1.43%
Advertising	1.83%	0.86%	1.16%	1.42%	1.26%	1.35%
Benefits-Pensions	1.49%	1.73%	1.27%	1.60%	1.43%	1.52%
Repairs	0.50%	0.43%	0.46%	0.65%	0.43%	0.46%
Bad Debt	0.08%	0.06%	0.10%	0.07%	0.06%	0.07%
Sales, General, Admin & Misc.	7.44%	6.67%	6.32%	6.61%	6.86%	6.94%
EBITDA	9.41%	9.82%	9.11%	7.58%	8.51%	7.88%
Amortization Depreciation Depletion	2.29%	2.39%	2.02%	2.36%	2.18%	2.30%
Operating Expenses	23.51%	21.97%	21.40%	23.05%	22.01%	22.77%
Operating Income	7.12%	7.43%	7.09%	5.22%	6.33%	5.58%
Interest Income	0.04%	0.02%	0.05%	0.04%	0.03%	0.03%
Interest Expense	1.59%	0.57%	0.62%	0.77%	0.69%	0.70%
Other Income	1.11%	0.67%	1.04%	0.86%	0.91%	0.96%
Pre-Tax Net Profit	6.68%	7.55%	7.56%	5.35%	6.58%	5.87%
Income Tax	2.28%	2.57%	2.57%	1.82%	2.24%	2.00%
After Tax Net Profit	4.40%	4.98%	4.99%	3.53%	4.34%	3.87%
Discretionary Owner Earnings	8.24%	8.98%	8.59%	7.40%	8.13%	7.83%

Table 6: Compiled Income Statement by % for Snack Food Manufacturers from 2010 to 2015 (2nd Q) Source: Bizminer.com

Balance Sheet - dollar-based						
Number of Manufacturers	**119**	**122**	**123**	**142**	**163**	**170**
Assets	**2010**	**2011**	**2012**	**2013**	**2014**	**2015q2**
Cash	905,697	828,630	632,912	652,254	644,056	634,795
Receivables	1,903,930	1,714,721	1,301,900	1,305,755	1,278,153	1,253,685
Inventory	2,319,936	2,227,954	1,642,416	1,666,490	1,656,407	1,605,990
Other Current Assets	411,237	421,606	304,792	316,465	307,708	300,882
Total Current Assets	5,540,800	5,192,911	3,882,020	3,940,964	3,886,324	3,795,352
Gross Fixed Assets	5,516,604	5,007,990	3,702,461	3,776,716	3,758,058	3,785,973
Accum. Depreciation-Amortization-Depltn.	1,561,823	1,417,828	1,048,215	1,069,238	1,063,956	1,071,859
Net Fixed Assets	3,954,780	3,590,162	2,654,245	2,707,478	2,694,102	2,714,114
Other Non-Current Assets	2,150,563	2,448,356	1,484,938	1,577,221	1,426,456	1,428,323
Total Assets	11,646,143	11,231,429	8,021,203	8,225,663	8,006,882	7,937,789
Liabilities						
Accounts Payable	1,766,651	1,686,122	1,068,940	1,141,382	1,102,128	1,059,614
Loans/Notes Payable	682,280	714,157	446,199	474,945	444,586	418,842
Other Current Liabilities	916,640	1,177,436	677,521	766,124	793,528	748,086
Total Current Liabilities	3,365,572	3,577,715	2,192,660	2,382,451	2,340,241	2,226,542
Total Long Term Liabilities	2,899,920	2,898,894	1,961,826	1,919,499	1,947,271	1,960,149
Total Liabilities	6,265,491	6,476,609	4,154,486	4,301,950	4,287,513	4,186,691
Net Worth	5,380,652	4,754,820	3,866,717	3,923,713	3,719,369	3,751,098
Total Liabilities & Net Worth	11,646,143	11,231,429	8,021,203	8,225,663	8,006,882	7,937,789

Table 7: Compiled Balance Sheet in $ for Snack Food Manufacturers from 2010 to 2015 (2nd Q)
Source: Bizminer.com

Balance Sheet - percentage-based						
Number of Manufacturers	**119**	**122**	**123**	**142**	**163**	**170**
Assets	**2010**	**2011**	**2012**	**2013**	**2014**	**2015q2**
Cash	7.78%	7.38%	7.89%	7.93%	8.04%	8.00%
Receivables	16.35%	15.27%	16.23%	15.87%	15.96%	15.79%
Inventory	19.92%	19.84%	20.48%	20.26%	20.69%	20.23%
Other Current Assets	3.53%	3.75%	3.80%	3.85%	3.84%	3.79%
Total Current Assets	47.58%	46.24%	48.40%	47.91%	48.54%	47.81%
Gross Fixed Assets	47.37%	44.59%	46.16%	45.91%	46.94%	47.70%
Accum. Depreciation-Amortization-Depltn.	13.41%	12.62%	13.07%	13.00%	13.29%	13.50%
Net Fixed Assets	33.96%	31.97%	33.09%	32.92%	33.65%	34.19%
Other Non-Current Assets	18.47%	21.80%	18.51%	19.17%	17.82%	17.99%
Total Assets	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Liabilities						
Accounts Payable	15.17%	15.01%	13.33%	13.88%	13.76%	13.35%
Loans/Notes Payable	5.86%	6.36%	5.56%	5.77%	5.55%	5.28%
Other Current Liabilities	7.87%	10.48%	8.45%	9.31%	9.91%	9.42%
Total Current Liabilities	28.90%	31.85%	27.34%	28.96%	29.23%	28.05%
Total Long Term Liabilities	24.90%	25.81%	24.46%	23.34%	24.32%	24.69%
Total Liabilities	53.80%	57.67%	51.79%	52.30%	53.55%	52.74%
Net Worth	46.20%	42.33%	48.21%	47.70%	46.45%	47.26%
Total Liabilities & Net Worth	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Table 8: Compiled Balance Sheet by % for Snack Food Manufacturers from 2010 to 2015 (2nd Q)
Source: Bizminer.com

Financial Ratios: Profitability						
	2010	**2011**	**2012**	**2013**	**2014**	**2015q2**
EBITDA: Business Revenue (%)	9.42	9.83	9.11	7.58	8.38	7.88
Pre-Tax Return On Assets (%)	10.00	11.85	16.18	11.28	13.94	13.03
Pre-Tax Return on Net Worth (%)	21.65	27.99	33.56	23.64	30.00	27.58
Pre-Tax Return on Business Revenue (%)	6.68	7.55	7.56	5.35	6.58	5.87
After Tax Return on Assets (%)	6.60	7.82	10.68	7.44	9.37	8.60
After Tax Return on Net Worth (%)	14.29	18.47	22.15	15.60	20.17	18.20
After Tax Return on Business Revenue (%)	4.40	4.98	4.99	3.53	4.34	3.87
Discretionary Owner Earnings (%)	8.24	8.98	8.59	7.40	8.13	7.83

Table 9: Financial Returns for Snack Food Manufacturers from 2010 to 2015 (2nd Q)
Source: Bizminer.com

Profitability Ratios:

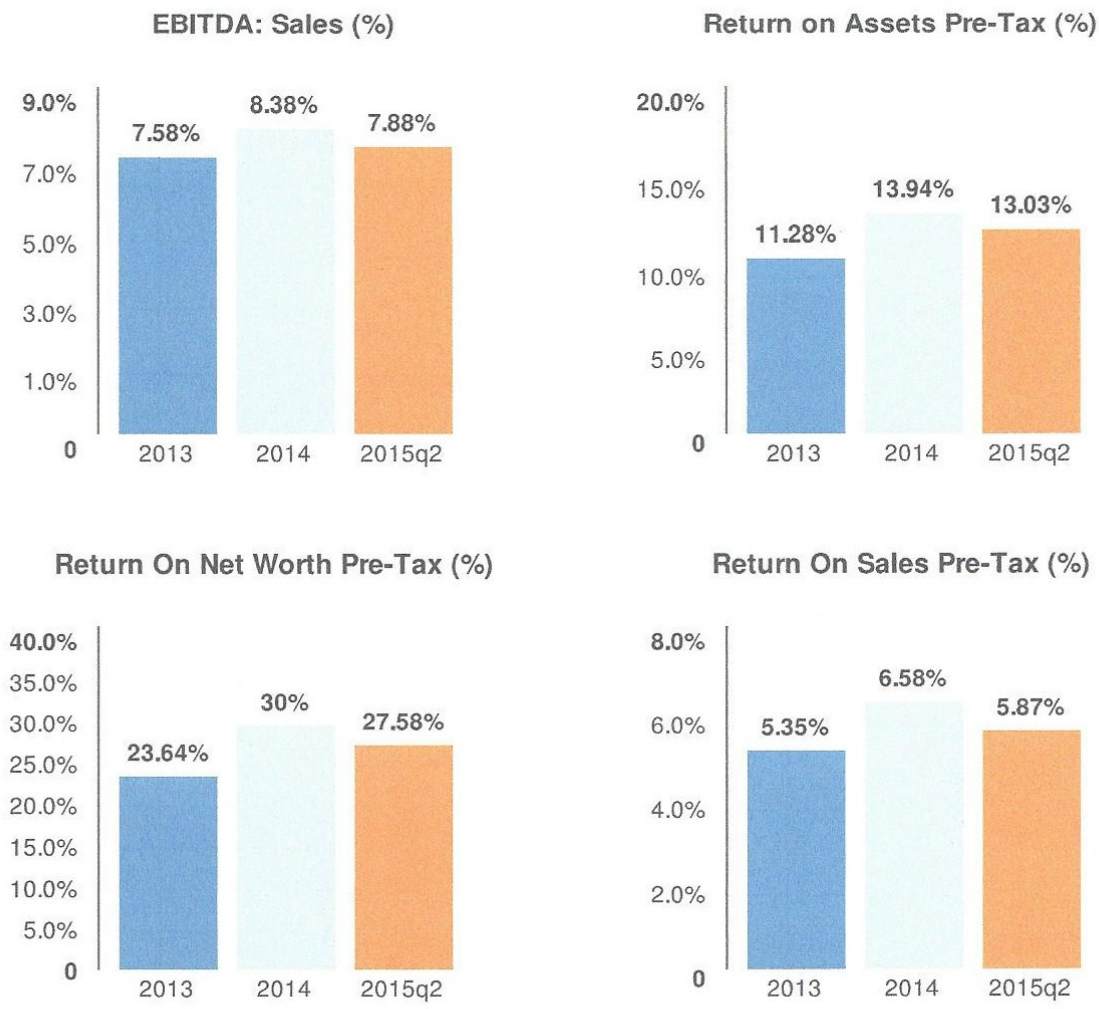


Figure 21: Compiled Profitability Ratios by % for Snack Food Manufacturers from 2010 to 2015 (2nd Q)
Source: Bizminer.com

Summary

The Great Falls Region is well suited for the development and operation of chickpea, lentil, and dry pea snack foods manufacturing facilities. The Region has the advantages of an abundant supply of high quality pulse crop commodities; low cost electrical and natural gas energy inputs; shovel-ready, fully equipped industrial parks; a robust transportation system; plentiful labor resources; and a pro-business attitude.

Chickpea, lentil, and dry pea snack foods manufacturing operations in the Great Falls Region will have the opportunity to obtain high quality pulse crop commodities directly from agricultural producers. Pulse crop inbound transportation costs in the Great Falls Region would be low relative to competitors located outside of pulse crop-growing areas. On-farm storage of commodities throughout the Great Falls Region would provide year around access to pulse crop commodity deliveries to chickpea, lentil, and dry pea snack foods manufacturing facilities.

The combination of cost effective energy, water, property, pulse commodities, and human resources all work together to provide a superior business environment for the establishment of profitable chickpea, lentil, and dry pea snack foods manufacturing operations in the Great Falls Region. The Region can provide an optimum environment for dry and wet chickpea, lentil, and dry pea snack foods manufacturing operations.

References

[1] Montana 2015 Agricultural Statistics, http://www.nass.usda.gov/Statistics_by_State/Montana/Publications/Annual_Statistical_Bulletin/2015/Montana_Annual_Bulletin_2015.pdf

[2] USDA, National Agricultural Statistics Services, Quick Stats, http://www.nass.usda.gov/Statistics_by_State/Montana/

[3] U.S. Bureau of Labor Statistics, Occupational Employment Statistics, May 2014. www.bls.gov/regions/mountain-plains

[4] Montana Department of Labor and Industry, Montana Labor Market Information, http://lmi.mt.gov/

[5] U.S. Energy Information Agency, April 27, 2015, http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_6_a

[6] Montana FSA USA, Montana Reported Crops Excel Spreadsheet.

[7]How Pulse Crops Are Saving Montana Grain Farmers, Great Falls Tribune, David Murrey, August 27, 2015, http://www.greatfallstribune.com/story/money/2015/08/27/pulse-crops-saving-montana-grain-farmers/32456249/?from=global&sessionKey=&autologin=

[8] Pea in Rotation with Wheat Reduced Uncertainty of Economic Returns in Southwest Montana, Perry R. Miller, et. al., Crop Economics, Production & Management, Agronomy Journal, V. 107, Issue 2, February 25, 2015, https://www.google.com/webhp?sourceid=chrome-instant&rlz=1C1AVSX_enUS413US416&ion=1&espv=2&ie=UTF-8#q=Pea+in+Rotation+with+Wheat+Reduced+Uncertainty+of+Economic+Returns+in+Southwest+Montana

[9] Commodity News Service Canada, November 24, 2015, http://futures.tradingcharts.com/news/futures/Ag_Canada_Adjusts_Pulse_Special_Crops_Supply_Demand_Tables_242227780.html

[10] Saskatchewan Pulse Growers, http://saskpulse.com/about/the-industry/

[11] U.S. Energy Information Agency, April 27, 2015, http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_6_a

[12] Consumers Want Healthy Foods – And Will Pay More for Them, Forbes Business, Nancy Gagliardi, February 18, 2015, http://www.forbes.com/sites/nancygagliardi/2015/02/18/consumers-want-healthy-foods-and-will-pay-more-for-them/

[13] Pulse Canada, What is a Pulse, http://www.pulsecanada.com/food-health/what-is-a-pulse.

[14] Snack Market Overview, State of the Industry 2015, Snack Food & Wholesale Bakery Magazine, Douglas J. Peckenpaugh, July 14, 2015, http://www.snackandbakery.com/articles/88122-snack-market-overview-state-of-the-industry-2015

[15] The Business of Healthy Snacks, The Kitchn, Amanda Erickson, http://www.thekitchn.com/the-business-of-healthy-snacks-228213

[16] Peters, M., K. Timmerhaus, and R. West. 2003. Plant Design and Economics for Chemical Engineers, 5th ed. New York: McGraw Hill.

[17] Industry Financial Ratios and Industry Market Statistics, www.bizminer.com