

A Business Case for Chickpea, Lentil, and Dry Pea Spreads, Dips and Butters Production In the Great Falls Montana Region

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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

The Great Falls Region is the premier location for the development of chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing facilities for the following reasons:

The Region is the site of abundant dry chickpea, lentil, and dry pea agricultural production giving specialty spreads, dips, and/or butters producers an economic advantage by procuring pulse crops directly from pulse producers.

The Region has one of the lowest combined costs of industrial energy in the nation including one of the lowest electrical rates for industrial use in pulse crop growing areas in North America, which significantly reduces production energy costs. The Region also boasts low natural gas rates for industrial use, which is necessary for industrial heating purposes.

The Region has plentiful labor resources that can be coupled with Montana-sponsored workforce training financial incentives.

The Region has two impressive, shovel-ready industrial parks with required infrastructure to support chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing facilities.

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 goods by rail.

The Region is serviced by dozens of Montana-based and out-of-state trucking firms for efficient and cost effective transport of goods by truck.

The Region has been active in attracting and supporting a wide variety of specialty food and beverage manufacturing operations.

This document outlines the justification for the start-up or relocation of a chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing facility into the Great Falls Region. Pulse crops are grown in large quantities in Montana and include dry peas, lentils, and chickpeas. The opportunity that exists for processing pulse crops in Montana is uncommonly advantageous due to the rapidly increasing demand for food products derived from pulse crops and pulse crop-derived ingredients.

Importantly, agricultural production of high quality pulse crops in Montana is rapidly increasing. Resources that enhance value added agricultural manufacturing are abundantly available in the Great Falls Region. Pulse crop manufacturing technology that is featured in this business case involves cleaning, hydration, cooking, milling and packaging pulse ingredients into refrigerated and/or shelf stable spreads, dips, and/or butters. Chickpea ingredients comprise the majority of pulse crop-related spreads, dips, and/or butters with lentils and dry peas rapidly gaining acceptance in retail food markets.

Agriculture is the number one industry for the Treasure State, Montana. According to the 2015 Montana Agricultural Statistics, Montana’s agriculture industry employed over 9.5 million acres to bring in over \$5.7 billion in revenue to the state.ⁱ 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 an agricultural processing hub that excels in the conversion of Montana-grown commodities into intermediate and finished products for food and feed industries.

The collection of food and feed component manufacturers in the Great Falls Region has 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 grains, 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	Cereal Food Processors	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).ⁱⁱ In the U.S., dry pea prices have averaged \$10.50/cwt (\$6.30/bushel) over the last ten years.ⁱⁱⁱ The commodity value of pulse crops harvested in Montana currently exceeds \$100 million in sales.

Chickpea, lentil, and dry pea spreads, dips, and/or butters 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 well

known to be agriculturally sustainable due to their nitrogen fixing ability and low agronomic requirements. Through food processing technologies, pulse crop-related spreads, dips, and/or butters are increasingly manufactured and gaining in distribution in retail and food service markets in the U.S. and Canada.

Chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing technologies range from high technology, fully automated processing systems to low technology, highly manual systems. Manual systems involve the least capital cost requirements and have relatively high operating costs. Fully automated processing systems have high capital cost requirements but feature lower operating costs. The degree of sophistication in spreads, dips, and/or butters manufacturing systems is dependent upon output volume requirements of a chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturer. All levels of spreads, dips, and/or butters manufacturing sophistication have requirements for processing energy. Electricity and natural gas are important energy resources required in the processing of pulse crops into spreads, dips, and/or butters.

Chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing operations can be established in the Great Falls Region due to favorable energy and human capital economic factors. The Great Falls Region boasts of a qualified labor force that has average hourly wages that are 79% of the national average.^{iv} In fact, the Great Falls area has lower overall hourly wages than other metropolitan areas of Montana.^v The combination of favorable energy and labor costs along with increasing demand for pulse-related spreads, dips, and/or butters 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.^{vi} 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 spreads, dips, and/or butters manufacturing operation in the Great Falls Region would have significant economic advantages to competition. A chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing facility in the Great Falls Region would have the opportunity to become one of the lowest cost producers of pulse crop-derived spreads, dips, and/or butters 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.^{vii} 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.^{viii}

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.

Acres of Pulse Crops in Great Falls Region in 2015

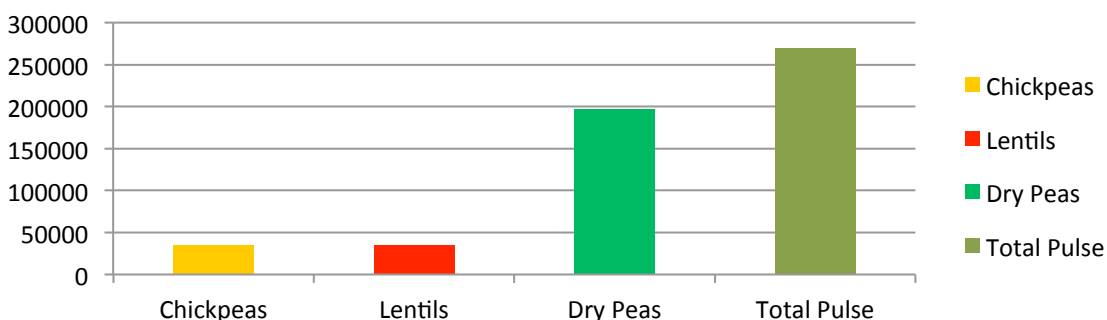


Figure 1: 2015 Pulse Crop Acreage in the 13 County Great Falls Region

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 spreads and dips are primarily produced from chickpeas. As a primary ingredient, chickpeas are used in food formulations to provide nutrition in addition to being 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 1 shows the significant rise in chickpea acreage in the Region and Figure 2 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.

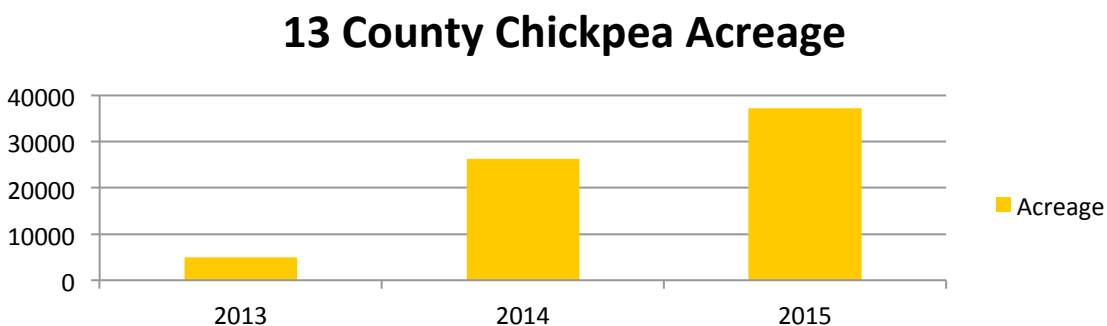


Figure 2: Great Falls 13 County Chickpea Acreage Increase – 2013 through 2015

Source: Montana FSA USDA

Great Falls Region/Montana - Chickpea Acreage %

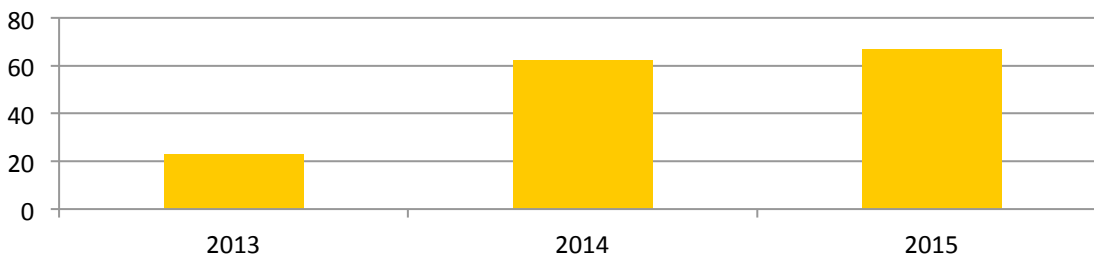


Figure 3: Great Falls Region Compared to Montana Chickpea Acreage % - 2013 through 2015

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.

67% of Montana Chickpea Acres Harvested in Great Falls Region

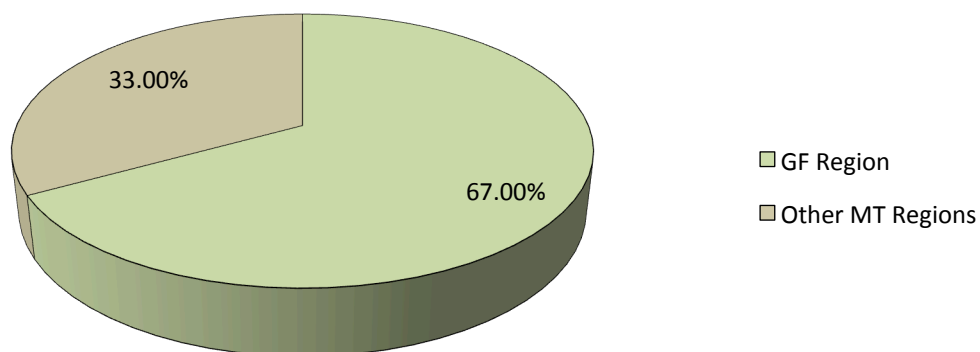


Figure 4: 67% of Montana Chickpea Acres Harvested in Great Falls Region Trade Area

Source: Montana FSA USDA

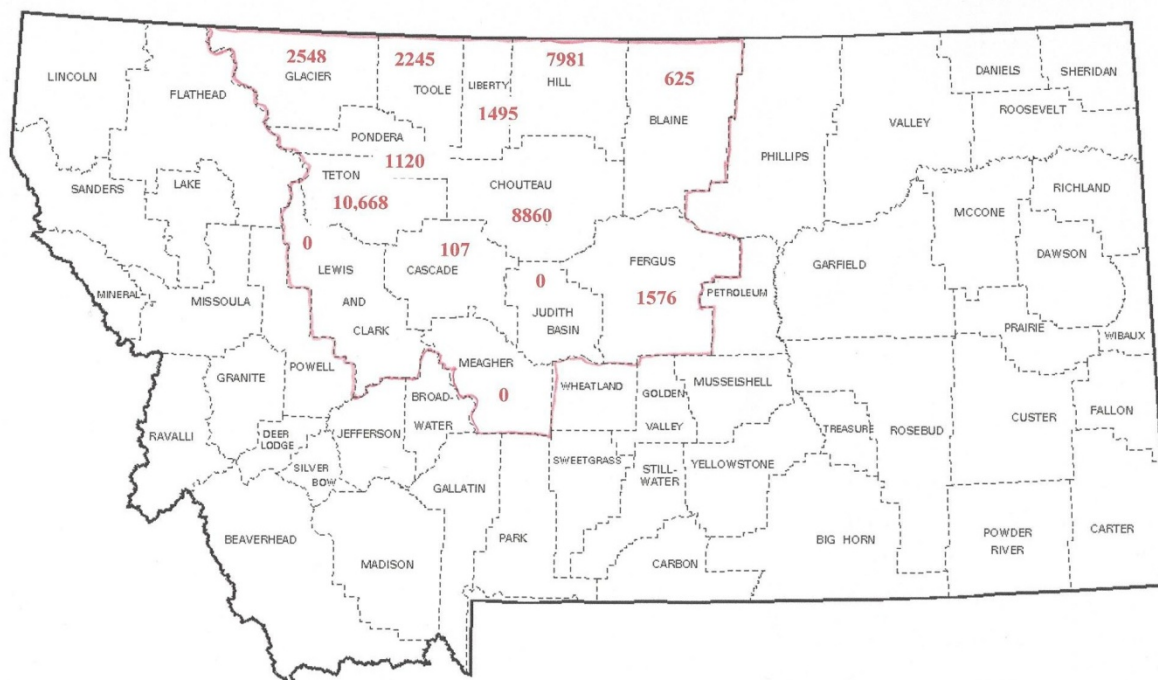


Figure 5: Great Falls Region 2015 Chickpea Acreage by County – 37,225 Acres
Source: Montana FSA USDA

Lentil Production in the Great Falls Region

Pulse crop spreads and dips are increasingly being manufactured using lentils due to lentil's reputation for high nutrient value. Lentils are used in food formulations to provide protein and fiber nutritional benefits in addition to being gluten free and non-allergenic. The Great Falls 13 County Region has increased lentil production from 21,062 in 2013 to 35,603 acres in 2015, a 69% increase over production in 2013. 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.

13 County Lentil Acreage

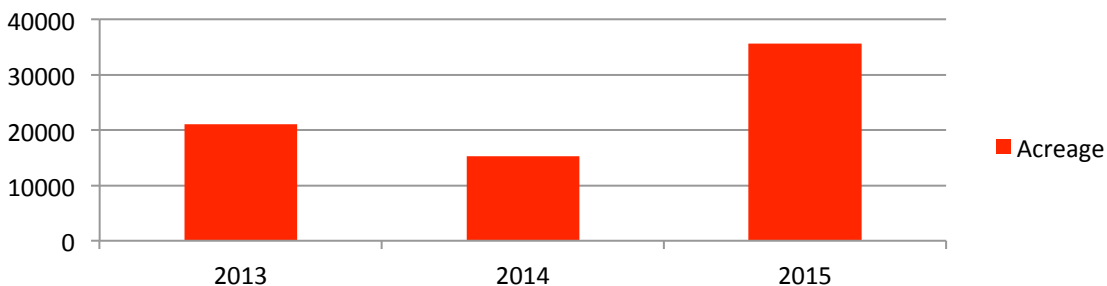


Figure 6: Great Falls 13 County Lentil Acreage Increase – 2013 through 2015
Source: Montana FSA USDA

Great Falls Region/Montana - Lentil Acreage %

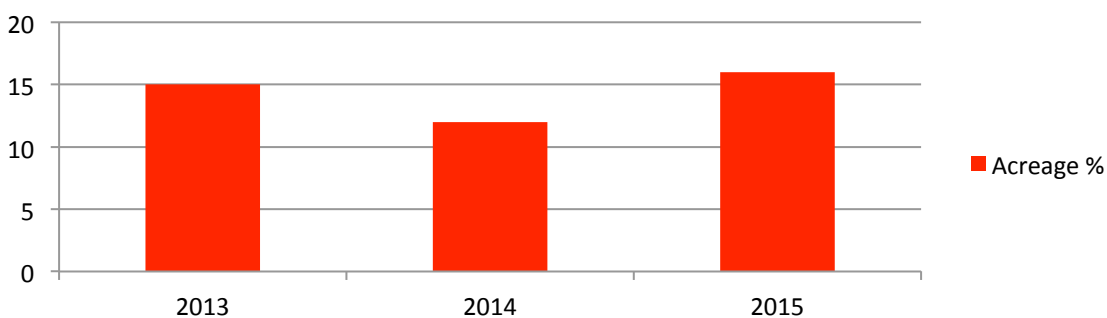


Figure 7: Great Falls Region/Montana Lentil Acreage % - 2013 through 2015
Source: Montana FSA USDA

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.

Great Falls Region Harvested 16% of Montana Lentil Acres in 2015

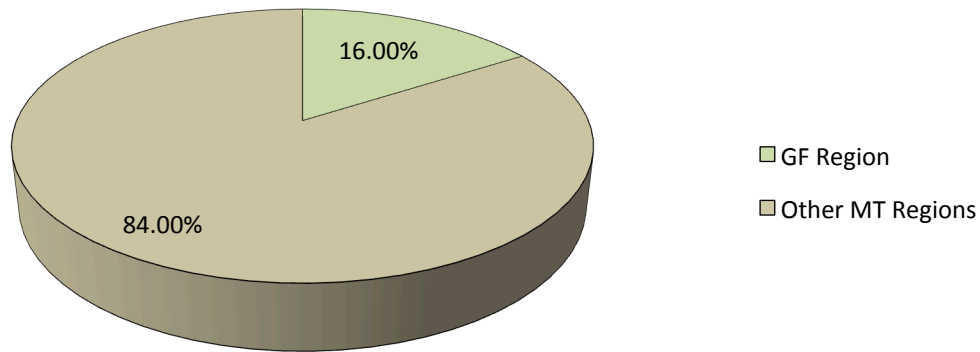


Figure 8: 16% of Montana Lentil Acres Harvested in Great Falls Region Trade Area

Source: Montana FSA USDA

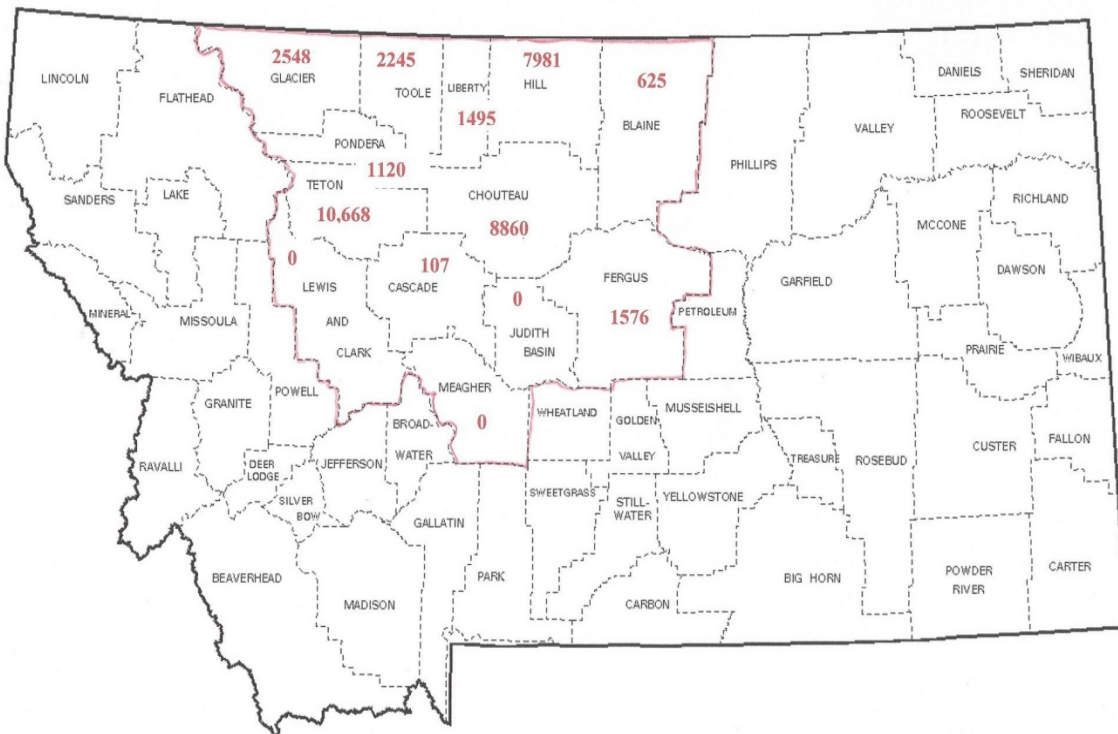


Figure 9: Great Falls Region 2015 Lentil Acreage by County – 35,603 Acres

Source: Montana FSA USDA

Dry Pea Production in the Great Falls Region

Pulse crop spreads, dips, and/or butters are being formulated using dry peas due to considerable protein, fiber, and resistant starch content. Dry peas are favored for use in food formulations to provide abundant nutrition and also being 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.

13 County Dry Pea Acreage

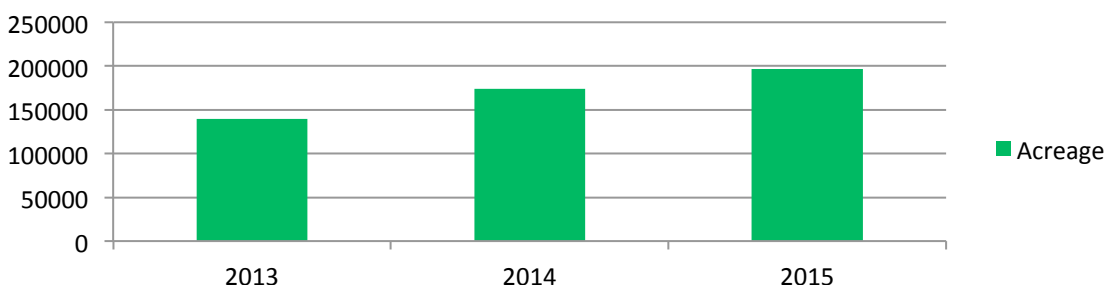


Figure 10: Great Falls 13 County Dry Pea Acreage Increase – 2013 through 2015

Source: Montana FSA USDA

Acreage %

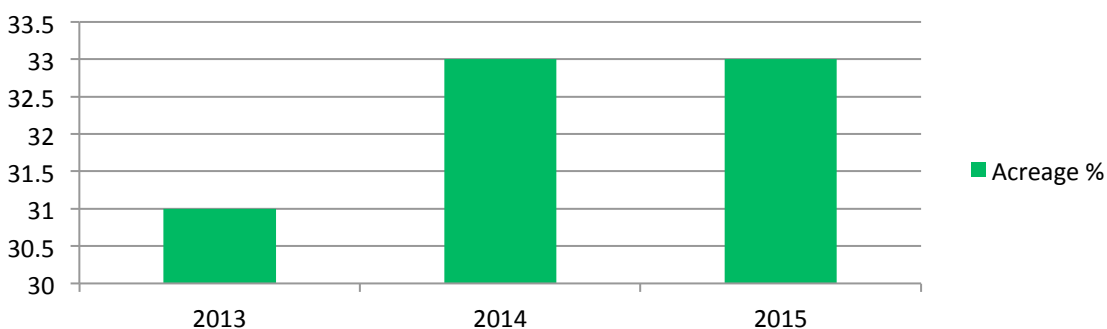


Figure 11: Great Falls Region/Montana Lentil Acreage % - 2013 through 2015

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.

33% of Montana Dry Pea Acres Harvested in Great Falls Region

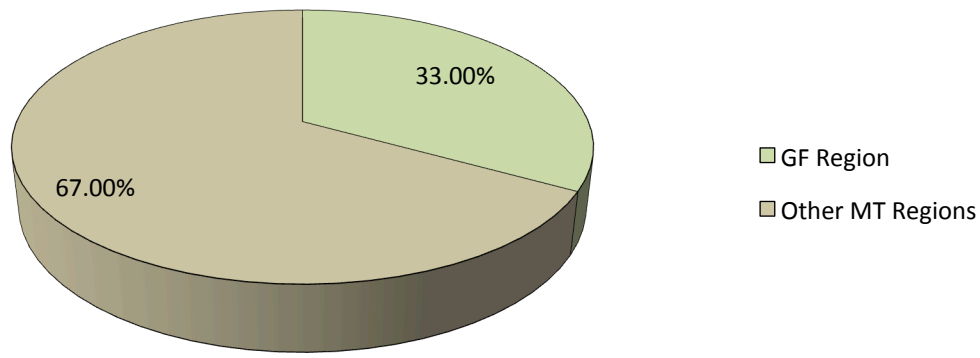


Figure 12: 33% of Montana Dry Pea Acres Harvested in Great Falls Region Trade Area
Source: Montana FSA USDA

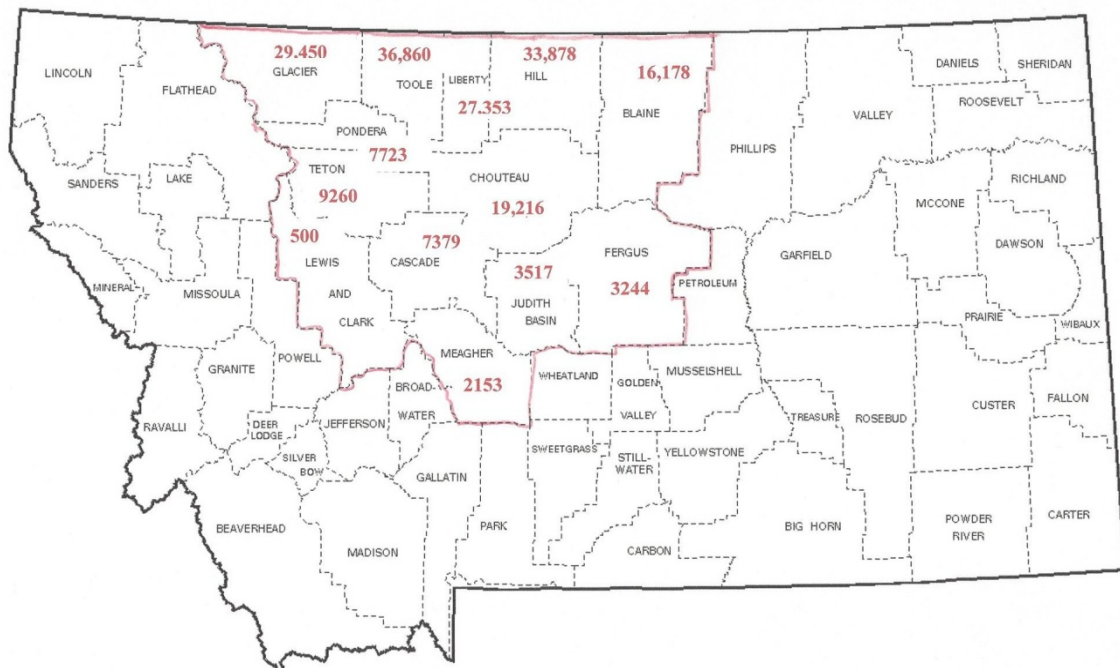


Figure 13: Great Falls Region 2015 Dry Pea Acreage by County – 196,711 Acres
Source: Montana FSA USDA

The percentage of pulse crop acres harvested in the Great Falls Region is projected by the Montana Department of Agriculture to increase as Montana farmers embrace the economic opportunity that includes placing 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 systems studied. The study concluded that dry pea–wheat systems can reduce net return uncertainties for Montana wheat farmers.^{ix}

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 and farmers are projected to increasingly adopt the practice of raising 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.

Comparative Acres of Pulse Crops and Wheat in Great Falls Region in 2015

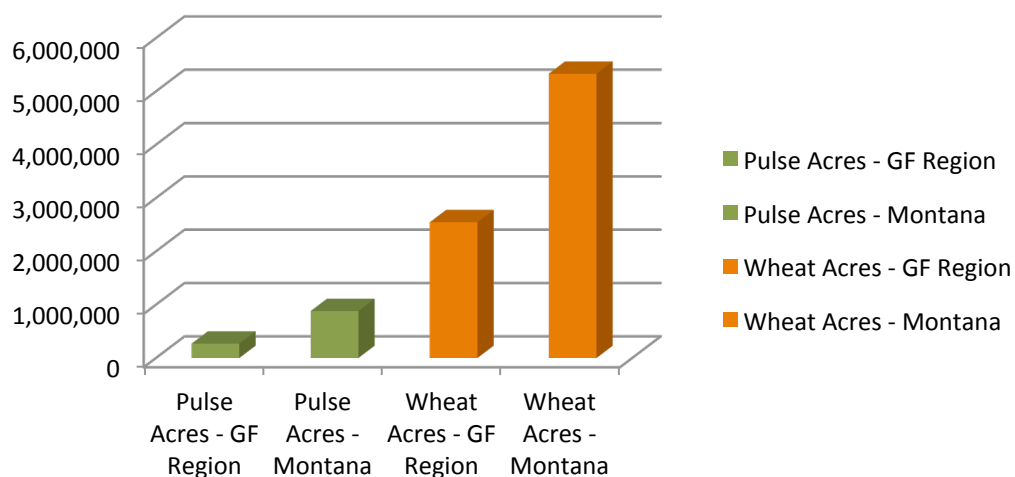


Figure 14: Dry pea and Wheat Acres Harvested in the GF Region and Other MT Regions
Source: Montana FSA USDA

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.

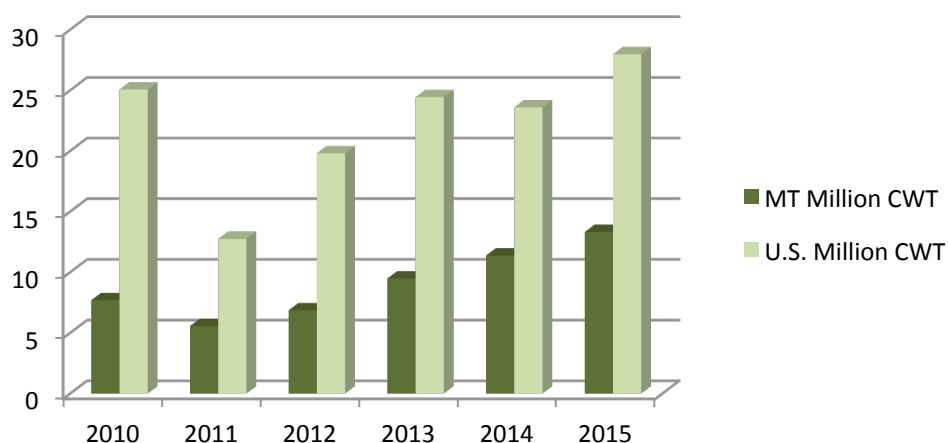


Figure 15: Montana and U.S. Dry pea Production: 2010 – 2015

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.^x 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.^{xi}

Proximity to Raw Materials

One considerable benefit derived from operating a chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing facility within pulse crop agricultural production areas is that the manufacturing company can contract and purchase its pulse commodities directly from regional farmers. By receiving pulse crops directly from regional farmers, the company can capture receiving, cleaning, and conditioning margins that can amount to greater than 10% of annual raw material costs.

Currently, chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing companies are generally located outside pulse growing regions. An analysis of major competitors that

market pulse-related spreads, dips, and butters shows concentrations of operations in Virginia, New York, Massachusetts, Ohio, New Hampshire, Vermont, Illinois, Colorado, Washington, California and North Carolina. In general, U.S. chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturers are located in higher population states. Smaller, regional humus manufacturers can be found in the prairie provinces of Canada and a few U.S. plains states. By establishing chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing operations in the Great Falls Region, chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing companies would be operating in close proximity to raw materials, using cost effective energy and labor, and would thereby drive down direct costs to become a low cost producer.

Pulse Processing 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.

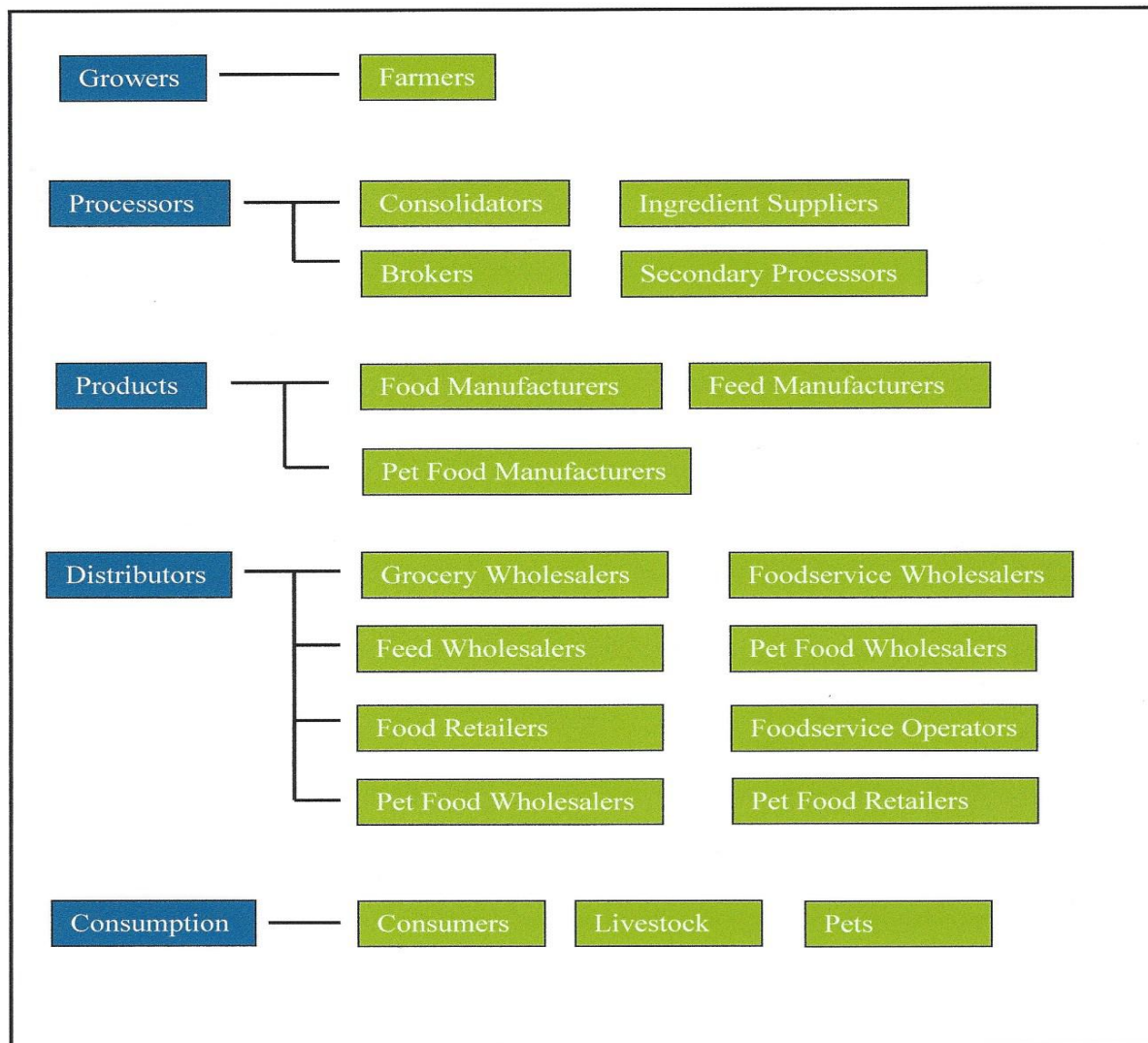


Figure 16: Pulse Crop Processing Value Chain Participants in the Great Falls Region

Participants in the pulse crop processing value chain in the Great Falls Region are shown in Figure 17. 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 listed in Figure 17 and mapped in Figure 18 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.

Listed in Figure 17, as Exporters/Brokers, are several companies that consolidate pulse crop commodities but may or may not 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 spreads, dips, and/or butters.

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.

Groups	Participants	Roles	Sells to
Farmers	Family Farmers Hutterite Colonies	Growers of Pulse Crops: Peas, Lentils, and Chickpeas	Consolidators
Consolidators	Columbia Grain Chinoook, Tiber Belle Pulses USA Hingham Stricts Inc. Chester Northern Seed LLC Shelby Sunburst Grain Sunburst Pardue Grain Inc. Cut Bank Hodgskiss Seed Choteau Global Agro Chester	One or more of the following services: Cleaning, grading, conditioning, splitting, polishing, packaging, and other preparation of peas.	Food, Feed and Pet Food manufacturers, Ingredient suppliers, Exporters, Brokers
Ingredient Suppliers	Opportunity for Great Falls Region	Purchase farm produced commodities and perform value-added processing to produce pea fibre, pulse flours, pulse fractions, or other food ingredients.	Food manufacturers, Feed manufacturers, Pet food manufacturers, Exporters, Brokers
Exporters/ Brokers	Columbia Grain Great Falls Belle Pulses USA Hingham JM Grain Great Falls Commercial Lynks Inc. Cut Bank Global Agro Chester	Provide sales services, distribution and warehousing assistance on worldwide selling to ingredient manufacturers and secondary processors.	Ingredient, Food, Feed and Pet Food manufacturers, Ingredient suppliers, Export Customers
Secondary Processors	Opportunity for Great Falls Region	Create custom-made food and feed intermediate products for preparation of livestock, poultry, pets, and human products.	Food, Feed, and Pet Food Manufacturers Opportunity for Great Falls Region

Figure 17: Pulse crop Processing Value Chain Participants in the Great Falls Region



Figure 18: 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 spreads, dips, and/or butters manufacturing facility can become one of the lowest cost North American producers of pulse-based spreads, dips, and/or butters. The Great Falls Region has some of the nation's lowest industrial electrical costs.^{xii} 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 dry pea production acreage, a chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing operation in the Great Falls Region would have significant economic advantages to competition.

Pulse Spreads, Dips, and/or Butters Products Trends

There exists emerging 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.^{xiii} Pulse commodity spreads, dips, and/or butters 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. 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.^{xiv}

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
- High Protein
- High Fiber
- Gluten Free (Grain Free)
- Non-allergen
- Non-GMO
- Low Glycemic
- Demonstrates Ecological Sustainability

The primary pulse-based spread, dip, and butter food category is dominated by hummus products. Hummus is a spread of Middle Eastern origin that traditionally was made with chickpeas, sesame seeds, olive oil, lemon juice, garlic, and salt. U.S. hummus retail sales were reported to have increased from \$549.4 million in 2013 to \$695.5 million in 2014, a 26.5% increase over 2015 retail sales.^{xv} The largest producer of hummus to the U.S. retail marketplace is Sabra® brand hummus, manufactured and distributed by Sabra Dipping Company, a joint venture between PepsiCo and Israeli-based Strauss Group Ltd. The Sabra® brand of hummus commands a 60% market share of the U.S. hummus marketplace.^{xvi}

Within the fresh dip category consisting of hummus, salsa, guacamole, and yogurt-based dips, hummus leads in sales in the category. The annual growth rate of hummus from 2009 through 2013 was 18.5% with Sabra® brand hummus growth of 29.1% in that same time period.^{xvii} Sabra Dipping Co. operates a 250,000 square foot manufacturing facility in Chesterfield, VA. The Sabra Dipping Co. is working with the University of Virginia to grow chickpeas in Virginia to provide a local source of raw materials.^{xviii} This observation confirms the strategic thinking of chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing facilities’ placement near pulse crop sources of supply in the Great Falls Region.

Spreads, Dips, and/or Butters Manufacturing

Shown in Figure 19 is a spreads, dips, and/or butters manufacturing process diagram. The simplified diagram includes the basic processing steps for the production of spreads, dips,

and/or butters. Since there exists a wide range of methodologies involved in the steps of soaking, cooking, mashing, ingredient addition, sterilization, and packaging, processing diagrams can be expanded far beyond the basic diagram shown in Figure 19. The latest computerized food processing technologies involve full automation of each manufacturing step involved in the production of pulse-derived spreads, dips, and/or butters.

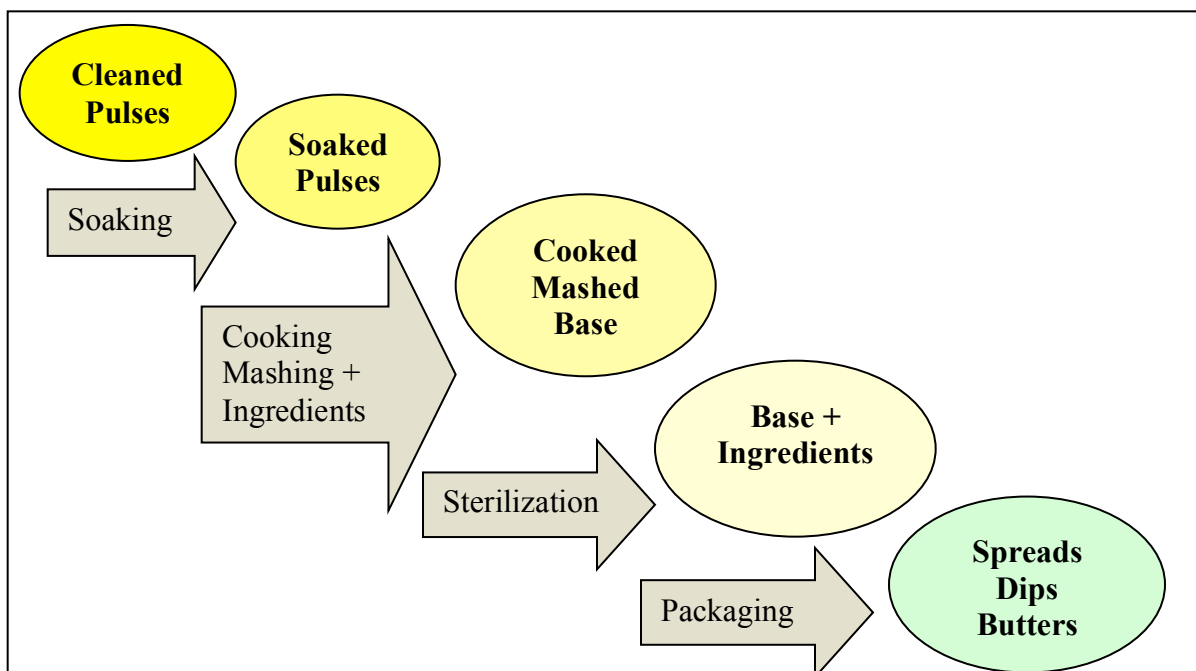


Figure 19: Dry Chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing Process

Chickpeas are traditionally the primary ingredient in hummus. Figure 20 show the nutrient value of a traditional hummus.

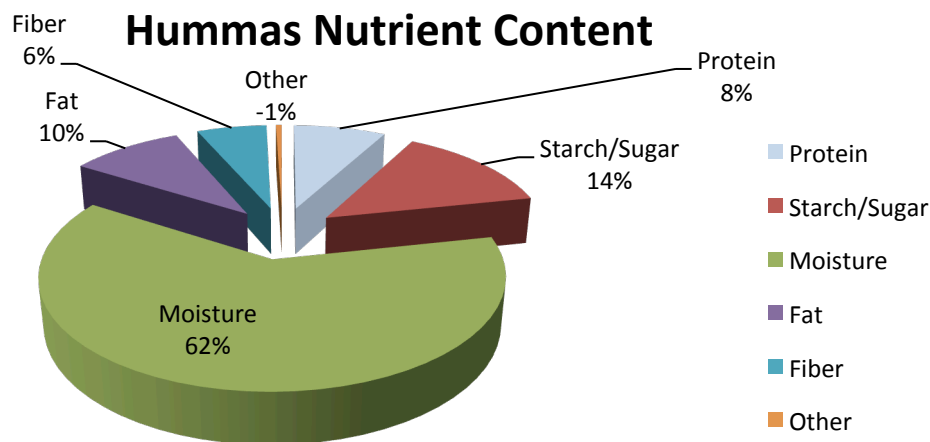


Figure 20: Hummus Nutrient Content
Source: USDA Nutrient Database

The appeal of developing a pulse crop-based spreads, dips, and/or butters 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 spreads, dips, and/or butters production facilities could be launched with a minimal amount of equipment costing less than \$250,000.

A factor of 4.55 is applied to equipment costs to arrive at a total plant cost.^{xix} 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 facility must be designed as an FDA human food facility with full compliance with the 2015 FDA Food Modernization Safety Act in order to address pet food, animal feed and human food markets.

Financial Illustration

The summary financial Table 6 shows a potential cash flow forecast for a 1,000 bushel per day pulse-oriented spreads, dips and butters manufacturing facility. Assumptions include debt paid back over 7 years at a 5% interest rate, plant operation on a single shift basis. All chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing products are forecasted to be sold F.O.B. factory on average at \$1.50 per pound in retail packaging.

The example shown below features the production of hummus from chickpeas. The USDA Agricultural Marketing Service posted grower prices for chickpeas on December 1, 2015 at \$30.00/cwt and posted dealer prices for chickpeas at \$42.00/cwt. Organically grown chickpeas brought \$97.00/cwt for organic growers on December 1, 2015. Purchasing chickpeas from dealers provides the majority of hummus formula costs of \$0.457/lb on a dry basis. The addition of water (62.2% of formula) and to a hummus formula reduces the cost of hummus to an estimate of less than \$0.17/lb for the chickpea components.

The addition of sesame seeds, olive oil, garlic, and salt can add an additional \$0.20/lb of the finished, hydrated product. Raw material costs of basic hummus formulas are estimated to be 25% of the F.O.B. plant selling price of \$1.50/lb for retail hummus products. Labor, packaging, and other direct costs can be another 35% of the selling price. Addition of administration, marketing and other indirect costs can be 30% of the selling price to leave net margin earnings before interest, taxes, depreciation, and amortization of 10% for a hummus production operation.

Equity Investment	\$750,000		
Debt	<u>\$75,000</u>		
Total Investment	\$1,500,000		
	Year 1	Year 2	Year 3
Sales	\$1,000,000	\$1,200,000	\$1,500,000
Cost of Sales	\$600,000	\$720,000	\$900,000
Gross Margin	\$400,000	\$480,000	\$600,000
Indirect Expenses	\$300,000	\$360,000	\$450,000
EBITDA	\$100,000	\$120,000	\$150,000

Table 6: Example of Hummus Spreads Manufacturing Financial Illustration Summary

Summary

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

Chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing operations in the Great Falls Region would have the opportunity to obtain high quality pulse crop commodities directly from agricultural producers. Pulse crop procurement 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 provide year around access to pulse crop commodity deliveries to chickpea, lentil, and dry pea spreads, dips, and/or butters 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 spreads, dips, and/or butters manufacturing operations in the Great Falls Region. The Region can provide an optimum environment for dry and wet chickpea, lentil, and dry pea spreads, dips, and/or butters manufacturing operations.

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