

**Feasibility Study**

**For a**

**Regional Oilseed Production and Processing  
Facility**

**For**

**Johnston County**

**Prepared by:**

**Matson Consulting, LLC**

PO Box 661

Aiken SC 29802

Phone: 803-233-7134

Fax: 803-233-7938

[www.matsonconsult.com](http://www.matsonconsult.com)



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## EXECUTIVE SUMMARY

This feasibility study reviews the economic and technical possibilities of establishing an oilseed processing facility in Johnston County, North Carolina to process canola seeds harvested from the surrounding area.

As the canola industry expands in the United States, more farmers are seeing the potential in adding canola to their fields. The hardy crop can be processed into oil which can be used in a variety of functions including cooking oil and biodiesel production. In addition, the processed seed mash can be used to produce a healthy animal feed.

The cost of raising quality inputs for the project, though equally critical for the success of the venture, is outside of the scope of this study. Its impact and risk is not evaluated or considered, and the processing facility is assumed to be able to source the necessary inputs for production.

This feasibility study has determined that this type of entity CAN BE both technically and economically viable given research and specific assumptions, although the margins are very small and not assured with the venture. Though potentially feasible, the assumptions used to evaluate the project are subject to change in the future. The Johnston County region has sufficient farmland and infrastructure, and can feasibly produce enough canola to sustain the project if farmer cooperation can be obtained. A sufficient canola crop should be established in the region, and markets for oil and meal should be identified before operations begin to ensure an operational flow and success.

This operation will need to surmount a series of risk factors and uncertainties to establish a successful enterprise. These risks include a highly competitive marketplace with existing players, and operating costs that may be higher than competitors'. Several potential risks are included in this study.

A model was created in mind to show what levels the facility would need to reach to break even financially and move towards a level of growth. Estimated sales for the operation to break even would be \$8.2 million in year one (20,000 acres), \$8.7 million in year two (21,000 acres), and \$9.1 million (22,000 acres) in year three, resulting in total sales for the three year period of about \$26.1 million. Net loss levels in year one would be (\$325,000) with the business moving into net gains in years two and three with \$167,000 and \$176,000 in net income, respectively. Total net income for the three year period would be about \$16,000. Financial feasibility will be drastically affected by changes in the market or operational costs.

As part of the feasibility study, a scenario analysis was completed upon the establishment of a baseline financial model. Within these scenarios, the consultants changed a single input factor in the baseline model and observed how these singular changes affect the business. Scenarios include addition of soybean processing, changes in price, changes in production, and revenue to producers.

The analysis in this report is based on current market research and consultant estimates. There will be differences between the projected and actual results, due to unforeseen events and circumstances. Numbers may not always exactly add or compare due to rounding errors, but differences do not affect financial results.

**TABLE OF CONTENTS**

**EXECUTIVE SUMMARY ..... 2**

**TABLE OF CONTENTS ..... 3**

    TASK LIST ..... 6

**INTRODUCTION..... 7**

**GENERAL SETTING AND NEED FOR THE PROJECT ..... 8**

    PROJECT DEFINITION AND OBJECTIVES..... 8

    EVALUATION CRITERIA ..... 8

    PROJECT RATIONALE ..... 8

    CONSUMER MARKETPLACE ..... 9

*Figure 1: Johnston County Highway Accessibility..... 9*

**INDUSTRY BACKGROUND ..... 12**

*Figure 2: Acres of Farmland in North Carolina, 2007 ..... 12*

    CANOLA..... 13

*Figure 3: US Canola Oil Production and Demand..... 13*

*Figure 4: Uses of Canola..... 14*

*Figure 5: Comparison of Dietary Fats ..... 15*

*Figure 6: Cross-price Effect on Domestic Demand for Vegetable Oils ..... 16*

    NORTH CAROLINA CANOLA INDUSTRY ..... 16

*Table 1: 2012 Canola Production for Surrounding States..... 17*

*Table 2: Southeastern Canola Crop Yields ..... 18*

*Figure 7: Seed Yield by Canola Variety ..... 18*

*Figure 8: Johnston Soil Types ..... 19*

**SELECTED REGIONAL OILSEED OPERATIONS ..... 20**

**MANAGEMENT AND OPERATIONAL STRUCTURE ..... 24**

    PROCESSING PLANT WORKFORCE..... 29

*Figure 9: General Processing Plant Roles..... 29*

**OPERATING PROCEDURES..... 32**

    LOCATION AND SITE SPECIFICATIONS ..... 32

    FACILITY CHARACTERISTICS ..... 32

*Figure 10: Typical Plant Layout..... 33*

    EQUIPMENT NEEDS ..... 34

*Table 3: Examples of Oilseed Processing Equipment ..... 35*

    CANOLA PROCESSING METHODS ..... 35

*Figure 11: Expeller (Screw) Press Diagram..... 36*

*Figure 12: Bleached vs. Unbleached Canola Oils ..... 37*

*Table 4: Differentiating Brand Identifiers..... 37*

    ADDITIONAL CANOLA USES..... 37

*Figure 13: NC Feed Manufacturers/Distributors by District..... 39*

*Table 5: Average Nutrient Composition of Grains..... 40*

*Figure 14: Comparison of Soybean and Canola Meals ..... 40*

*Figure 15: Process Flow Schematic for Biodiesel Production ..... 41*

<i>Table 6: Farm to Fuel Scenarios Based on Rotation Type</i> .....	42
PRODUCTION CONSIDERATIONS.....	42
<b>IMPLEMENTATION PLAN .....</b>	<b>43</b>
SUPPLY ARRANGEMENTS.....	43
<i>Table 7: Estimated Vegetable Oil and Meal Production Based on Average Crop Yields by Rotation</i> .....	43
SITE .....	43
<i>Figure 16: Johnston County Land Use Map</i> .....	44
<i>Figure 17: Eastern North Carolina Highway Access</i> .....	45
<i>Figure 18: Railway Access</i> .....	45
<i>Figure 19: Available Properties</i> .....	46
<i>Figure 20: Selma Crossings</i> .....	47
OPERATIONS .....	47
<i>Figure 21: Basic Expeller Process</i> .....	48
MULTI-CROP SETUP.....	48
<i>Table 8: Average Canola and Soybean Yield Comparison</i> .....	49
<i>Figure 22: Comparison of Soybean and Canola Seed Prices</i> .....	50
<i>Figure 23: Comparison of Soy and Canola Meal Prices</i> .....	50
<i>Figure 24: Comparison of Soy and Canola Oil Prices</i> .....	51
EQUIPMENT SPECIFICATIONS .....	51
<i>Table 9: Equipment Needed</i> .....	51
QUALITY CONTROL AND REGULATORY FRAMEWORK .....	52
<b>FUNDING SOURCES .....</b>	<b>53</b>
NATIONAL FUNDING AND AID .....	53
NORTH CAROLINA ASSISTANCE.....	55
<b>RISKS, REGISTRATION, REGULATIONS, AND POTENTIAL ISSUES.....</b>	<b>56</b>
GENERAL BUSINESS REGISTRATION .....	57
BUSINESS REGULATION .....	60
POTENTIAL ISSUES .....	66
<i>Table 10: Standard Requirements for Site Development</i> .....	67
<b>PRELIMINARY BREAK EVEN MODEL FINANCIAL PROJECTIONS, ASSUMPTIONS, AND METHODS.....</b>	<b>69</b>
GENERAL INFORMATION .....	69
PROJECT TIMING .....	69
REVENUE .....	70
EXPENSES .....	70
<i>Table 11: Equipment and Building Financing</i> .....	74
INCOME.....	74
<i>Table 12: Canola Oil and Meal Sales Prices</i> .....	74
<i>Figure 25: Sales Distribution</i> .....	75
<i>Figure 26: Annual Sales</i> .....	75
<i>Figure 27: Canola Oil and Meal Production and Sales Breakdown</i> .....	76
EXPENSES .....	77
<i>Figure 28: Total Variable Costs</i> .....	77
<i>Figure 29: Total Fixed Costs</i> .....	78

CASH FLOW .....	79
<i>Figure 30: Cash on Hand</i> .....	79
PRO FORMA OPERATING STATEMENTS .....	80
<i>Table 13: Pro Forma Operating Statement</i> .....	80
<i>Figure 31: Yearly Net Income</i> .....	81
BALANCE SHEET .....	82
<i>Table 14: Balance Sheet</i> .....	82
<b>SCENARIO ANALYSIS .....</b>	<b>83</b>
SCENARIO: ADDITION OF SOYBEAN TO THE CANOLA FACILITY .....	84
<i>Figure 32: Soybean and Canola Acreage</i> .....	84
<i>Table 15: Canola Pro Forma</i> .....	85
<i>Table 16: Soybean and Canola Pro Forma</i> .....	86
<i>Figure 33: Soybean and Oilseed Scenario Cash on Hand Years 1-3</i> .....	87
SCENARIO: VARIATION IN OILSEED SALES PRICES .....	87
<i>Table 17: Canola Oil and Meal Pricing Chart</i> .....	88
<i>Table 18: Variation in Oil and Meal prices</i> .....	88
<i>Figure 34: Canola Oil and Meal Prices Scenario Cash on Hand Years 1-3</i> .....	89
<i>Figure 35: Canola Prices Scenario Cash on Hand End of Year Three</i> .....	90
SCENARIO: VARIATION IN OILSEED PRODUCTION QUANTITIES.....	91
<i>Table 19: Variation in Production Quantities Net Income</i> .....	91
<i>Table 20: Variation in Production Quantities in Tons</i> .....	91
<i>Figure 36: Production Quantities Scenario Cash on Hand Years 1-3</i> .....	92
SCENARIO: REVENUE TO PRODUCERS .....	93
<i>Table 21: Oilseed Pro Forma</i> .....	93
<i>Table 22: Revenue to Producers Pro Forma</i> .....	94
<i>Table 23: Variation in Revenue to Producers in Tons</i> .....	95
<b>OBSERVATIONS.....</b>	<b>96</b>
<b>RECOMMENDATIONS.....</b>	<b>99</b>
<b>APPENDICES .....</b>	<b>102</b>
APPENDIX A: SELECTED RESOURCES .....	102
APPENDIX B: SAMPLE STAFF DESCRIPTIONS .....	106
APPENDIX C: LABORATORY CANOLA ANALYSIS .....	110
APPENDIX D: TENNESSEE 2016 CANOLA BUDGET .....	111
APPENDIX E: INSTAPRO EQUIPMENT LISTING.....	112
APPENDIX F: LABOR .....	115
APPENDIX G: REVENUE AND EXPENSES .....	117
APPENDIX H: CASH FLOWS .....	124
APPENDIX I: PRO FORMA OPERATING STATEMENT .....	126
APPENDIX J: BALANCE SHEET .....	127
APPENDIX K: DESCRIPTION OF CONSULTANTS.....	128



## Task List

To complete this feasibility study, the following tasks were undertaken:

- A literature and data base search was completed, the results reviewed, and conclusions drawn. The results of this literature search are provided throughout the document.
- Prices, costs, and operations for similar activities in other facilities were researched.
- Based on the information gathered from all sources, assumptions of throughput and pricing were made and financial models were prepared. Details of assumptions and the financial models are attached.



Canola Council of Canada

## **INTRODUCTION**

Matson Consulting was hired by Johnston County to conduct a feasibility study that provides an in-depth analysis of the possibility of establishing an oilseed processing facility. To make the feasibility study as realistic as possible, Matson Consulting worked with Johnston County to:

- a) Determine critical factors for success
- b) Assess management and operation options
- c) Estimate operating costs for a processing operation
- d) Develop financial model for sensitivity studies
- e) Create a feasibility study report

### **Financial Model**

A financial model for the business venture was developed within this project, which will allow sensitivity scenario assessments to be used in the decision process for the expansion. The model reports monthly data for the first year of operation and then quarterly thereafter. It contains a detailed sales breakdown, labor expenses, profit and loss statement, depreciation schedule, cash flows, and a balance sheet. The analysis in this report is based on current market research and consultant estimates. There will be differences between the projected and actual results, due to unforeseen events and circumstances. Numbers may not always exactly add or compare due to rounding errors, but differences do not affect financial results.

### **Scenario Analysis**

As events and circumstances frequently do not occur as expected, a scenario analysis involving the changing of different variables is conducted upon completion of the baseline financial model. One input is changed at a time to see the effect on operating incomes throughout all five years of the study. This permits one to view how stable the initial assumptions of the baseline model are to changes. The goal of this scenario analysis is to provide a range of operating incomes to show what might occur in a given situation such as the ability to drastically increase production or the effects of reducing labor costs.

### **Research and Data Collection**

To determine the feasibility of the venture from a market and operations standpoint, research was conducted on both the current market and industry standards for oilseed production operations. As part of this information, the consultants used credible information and high quality resources to serve as a starting point for this study. Data was gathered to support diverse claims, including market structures, government statistics, current and future supply estimates, and the knowledge of the consultants. Photos used throughout the document were sourced from readily available stock photos, pictures available at USA.gov, and other sites.

### **Observations and Recommendations**

Throughout the process of completing the feasibility study, observation and informal information has provided insight into the overall business idea proposed by the owner. This information has been collected and provided in an observation and recommendation format for the consideration of the owner.

## GENERAL SETTING AND NEED FOR THE PROJECT

The US oilseed production and processing industry has an overall favorable outlook, as producers continue diversifying their crops and consumers look for healthier food options and alternative fuel sources. US canola production has experienced significant growth in recent years as a result of the increase in production of oilseed products used for biofuels, animal feed, and cooking oil for human consumption.

In their mission to continue investigating ways to serve their regional farmers, Johnston County, along with the North Carolina Agricultural Development and Farmland Preservation Trust Grant, will use this feasibility study to assess the viability of establishing an oilseed crushing and processing plant in the county. Should the venture be deemed viable, it would provide numerous financial opportunities for local farmers, create jobs in the area, and generate alternative crop choices to continue the agricultural success of North Carolina.

### Project Definition and Objectives

The goal of this project is to assess the feasibility of establishing a canola processing facility in Johnston County to provide services for surrounding counties and townships. This feasibility study will explore and present Johnston County's initiation of canola seed processing through a dedicated processing facility in the county.

The facility may produce a range of products, from biofuels, to animal feed, to oil for cooking purposes. It will initially operate with minimal staff and specialized equipment, although increases in staff levels and additional equipment will become necessary as the business expands. This study will identify the staff levels and equipment costs that will be essential to maintain an efficient operation into the future.

This study also includes the venture's potential to support a marketing budget at a level permitting it to serve its intended market and beyond. To some extent, marketing will be tied to processing services to the facility's surrounding area, as well as sales of the end products to end customers. However, some additional questions also need to be answered:

- At what level does the canola processing facility need to operate to be profitable?
- What additional equipment will be needed as the business' needs increase?
- What is the minimum number of producers necessary for this facility to be a viable business?

**This study will evaluate the conditions under which the business will become commercially profitable and viable.**

### Evaluation Criteria

The success of this project will be judged on two criteria: *achieving market share for the products produced by the facility* and *becoming economically self-sufficient and providing an economic return*.

### Project Rationale

The oilseed processing industry is well established and has become a vital component to the nation's economy. According to the National Oilseed Processors Association, canola "quickly

became a valuable crop for farmers, processors, and consumers” after its creation in the 1960s, and it “is now extensively used as a source of protein for animal feed, while canola oil is used for consumer products, notably cooking and salad oil.”<sup>1</sup> Due to its extremely versatile processing and marketing options, a variety of markets would be accessible to a canola processing facility in North Carolina.

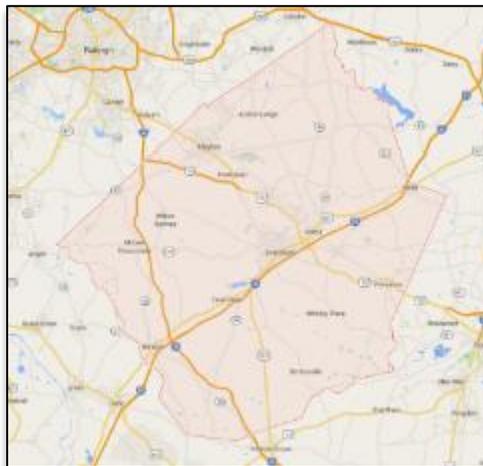
The 2012 Census of Agriculture reports that Johnston County had approximately 1,175 farms, a six percent decrease from the previous census in 2007. However, the land dedicated to farms remained about the same, with the average farm size increasing by six percent from 156 acres to 166 acres and market value of crop sales increasing by 31 percent to over \$265 million for the period. The grains, oilseeds, dry beans, and dry peas segment brought in well over \$41 million in sales for the year, ranking 13<sup>th</sup> among North Carolina’s 100 counties.<sup>2</sup>

Similarly, the US reported a decrease in farms of about four percent from 2007 to 2012, falling to 2.1 million farms from 2.2 in the previous census, and a minimal decrease of just under one percent in land dedicated to farms, from 922 million acres in 2007 to 914 million in 2012. The vast majority of farms were less than 50 acres, comprising about 32.4 percent of the total acreage in the nation.<sup>3</sup> Agricultural crop sales showed a dramatic increase of 47.8 percent from 2007 to 2012, with North Carolina reporting a 12.6 increase in sales of both crops and livestock.<sup>4</sup>

## Consumer Marketplace

A canola processing facility located in Johnston County would be well situated to serve the central region of North Carolina. The state overall is experiencing strong population growth, as well as the counties surrounding Johnston County. As shown in the following figure, Johnston County is highly accessible on both a more local scale within the state, as well as on a regional and national scale due to its proximity within two major highways:

**Figure 1: Johnston County Highway Accessibility**



<sup>1</sup> “Oilseed Processing.” National Oilseed Processors Association. [www.nopa.org/oilseed-processing/](http://www.nopa.org/oilseed-processing/)

<sup>2</sup> (2012). “2012 Census of Agriculture: County Profile.” *USDA NASS*. [www.agcensus.usda.gov/Publications/2012/Online\\_Resources/County\\_Profiles/North\\_Carolina/cp37101.pdf](http://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/North_Carolina/cp37101.pdf)

<sup>3</sup> (2012). “2012 Census of Agriculture-United States Data.” *USDA NASS*. [www.agcensus.usda.gov/Publications/2012/Full\\_Report/Volume\\_1,\\_Chapter\\_1\\_US/st99\\_1\\_008\\_008.pdf](http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_1_US/st99_1_008_008.pdf)

<sup>4</sup> (2012). “2012 Census Highlights.” *USDA NASS*. [www.agcensus.usda.gov/Publications/2012/Online\\_Resources/Highlights/Farm\\_Economics/](http://www.agcensus.usda.gov/Publications/2012/Online_Resources/Highlights/Farm_Economics/)



**Johnston County:** According to the United States Census Bureau State & County Quick Facts resource, Johnston County had an estimated population of over 185,600 people in 2015, an increase of 9.9 percent from 2010. The county reported well over 61,000 households with a median household income of almost \$49,800

from 2010 to 2014. Johnston had a poverty rate of 15.3 percent, which is slightly higher at .5 percent, than the national average.<sup>5</sup>

The 2012 Census of Agriculture shows that Johnston County had approximately 1,175 farms occupying almost 195,000 acres in that year and almost 118,000 harvested crop acres, showing the ample opportunity for producer movement into canola production.<sup>6</sup>

Johnston is situated centrally within the state, and is easily accessible to several major highways, such as Interstate 95, which runs along the East Coast, and Interstate 40, which runs across the country from the East Coast to California. These roadways will provide ideal transport for products as they are shipped from a production facility in Johnston County.



**Wayne County:** Wayne County is located to the east of Johnston County, with a population of over 124,000 people in 2015, an increase of 1.2 percent from 2010. The county had over 47,000 households in 2014, with an annual household income of over \$41,000 and a poverty rate of

23.3 percent, almost nine percent over the national average.<sup>7</sup> The 2012 Census of Agriculture reported that Wayne County had 593 farms for that year, comprising over 191,000 acres of land, with over 142,500 as harvested cropland.



**Wilson County:** This county is located to the northeast of Johnston County. In 2015, Wilson County reported a population of almost 82,000 people, a 0.6 percent increase from 2010. The county consisted of almost 36,000 households, with an annual income of over \$39,000 and a poverty rate of 23.9 percent, over nine

percent higher than the national average.<sup>8</sup> The 2012 Census of Agriculture showed that Wilson County had 297 farms, occupying well over 111,000 acres of land, with over 83,500 acres of that as harvested cropland.

<sup>5</sup> (2015). "QuickFacts: Johnston County, North Carolina." *United States Census Bureau*. [www.census.gov/quickfacts/table/PST045215/37101,00](http://www.census.gov/quickfacts/table/PST045215/37101,00)

<sup>6</sup> (2012). "County Summary Highlights: 2012." *USDA NASS*. [www.agcensus.usda.gov/Publications/2012/Full\\_Report/Volume\\_1,\\_Chapter\\_2\\_County\\_Level/North\\_Carolina/st37\\_2\\_001\\_001.pdf](http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/North_Carolina/st37_2_001_001.pdf)

<sup>7</sup> (2015). "QuickFacts: Wayne County, North Carolina." *United States Census Bureau*. [www.census.gov/quickfacts/table/PST045215/37191,00](http://www.census.gov/quickfacts/table/PST045215/37191,00)

<sup>8</sup> (2015). "QuickFacts: Wilson County, North Carolina." *United States Census Bureau*. [www.census.gov/quickfacts/table/PST045215/37195,00](http://www.census.gov/quickfacts/table/PST045215/37195,00)



14.2 percent over the national average.<sup>9</sup> The 2012 Census of Agriculture also showed the county having 1,067 farms occupying 291,635 acres of land in 2012, with 167,549 of that dedicated to harvested cropland.

**Sampson County:** Located directly to the south of Johnston County, The US Census Bureau reported a 2015 population of almost 64,000 people in the county, an increase of 0.5 percent from 2010. There were just under 23,500 households with an average annual income of just over \$35,700, and a poverty rate of 29 percent,



national average.<sup>10</sup> The 2012 Census of Agriculture showed the county as having 797 farms total for the year, consisting of 119,775 acres of land and 71,179 acres of harvested cropland.

**Harnett County:** Lying to the west of Johnston, Harnett County had a 2015 population of over 128,000 people, an 11.7 percent increase from 2010. The county had over 46,500 households in 2014, with a median annual income of well over \$41,000, and a poverty rate of 20.5 percent, 5.7 percent over the

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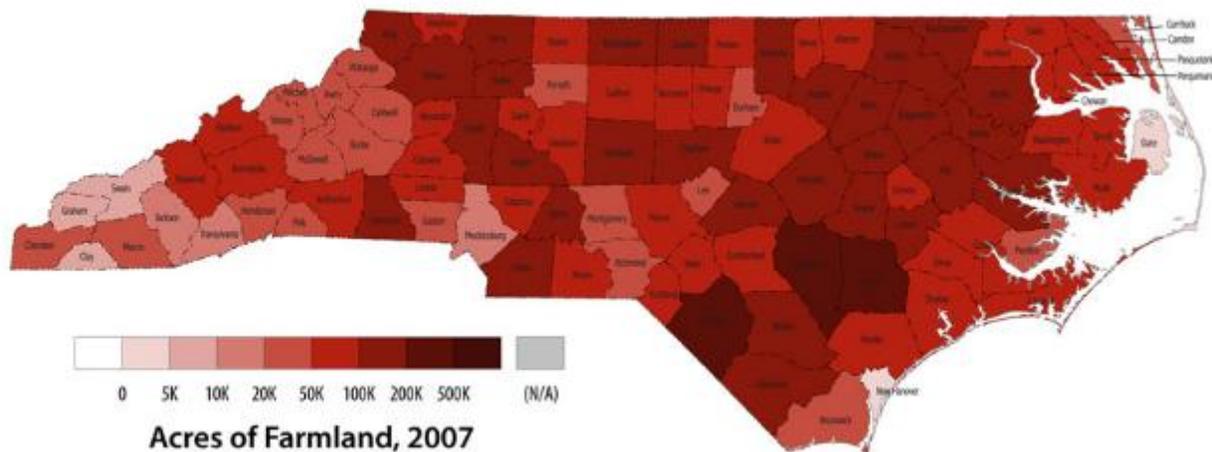
<sup>9</sup> (2015). "QuickFacts: Sampson County, North Carolina." *United States Census Bureau*. [www.census.gov/quickfacts/table/PST045215/37163,00](http://www.census.gov/quickfacts/table/PST045215/37163,00)

<sup>10</sup> (2015). "QuickFacts: Harnett County, North Carolina." *United States Census Bureau*. <http://www.census.gov/quickfacts/table/PST045215/37085,00>

## INDUSTRY BACKGROUND

North Carolina operates over 50,000 farm operations across 8.4 million acres of farmland. Agriculture generates \$84 billion, 17 percent of the state’s income.<sup>11</sup> The state has a diverse agricultural community producing a variety of significant commodity groups including grains, livestock, fruits and nuts, vegetables, and other field crops. Historically, tobacco is the single most valuable crop in the state, accounting for over 700 million dollars in sales. Poultry is the leading agricultural industry in the state for value of sales, with an estimated value of over \$48 billion dollars. North Carolina ranks number one in the nation for both tobacco and poultry production.<sup>12</sup> As seen below, agricultural land is spread out throughout the state, but is predominantly centered in the eastern and south eastern portions of the state, including Johnston and surrounding counties.

**Figure 2: Acres of Farmland in North Carolina, 2007**<sup>13</sup>



Agriculture is an important part of Johnston County’s economy and plans for future development. Agricultural lands accounts for almost 40 percent of the county’s land with about 195,000 acres and 1,175 farms according to the 2012 Census of Agriculture. It ranks 6<sup>th</sup> in the state for amount of land in farms. Total sales of agricultural products have experienced a 30 percent increase between 2007 and 2012, growing from over \$202 million to \$265 million. Johnston County’s crop sector has historically been the largest agricultural area, with tobacco and nursery-greenhouse production being predominant. Since 2004, the livestock industry has grown in importance, with hog and pigs accounting for about 23 percent of the state’s agricultural sales.<sup>14</sup>

<sup>11</sup> (2016) “North Carolina Agriculture Overview” *NC Department of Agriculture and Consumer Services*. [www.ncagr.gov/stats/general/overview.htm](http://www.ncagr.gov/stats/general/overview.htm)

<sup>12</sup> “2015 State Agriculture Overview – North Carolina” *USDA NASS*. [www.nass.usda.gov/Quick\\_Stats/Ag\\_Overview/stateOverview.php?state=NORTH%20CAROLINA](http://www.nass.usda.gov/Quick_Stats/Ag_Overview/stateOverview.php?state=NORTH%20CAROLINA)

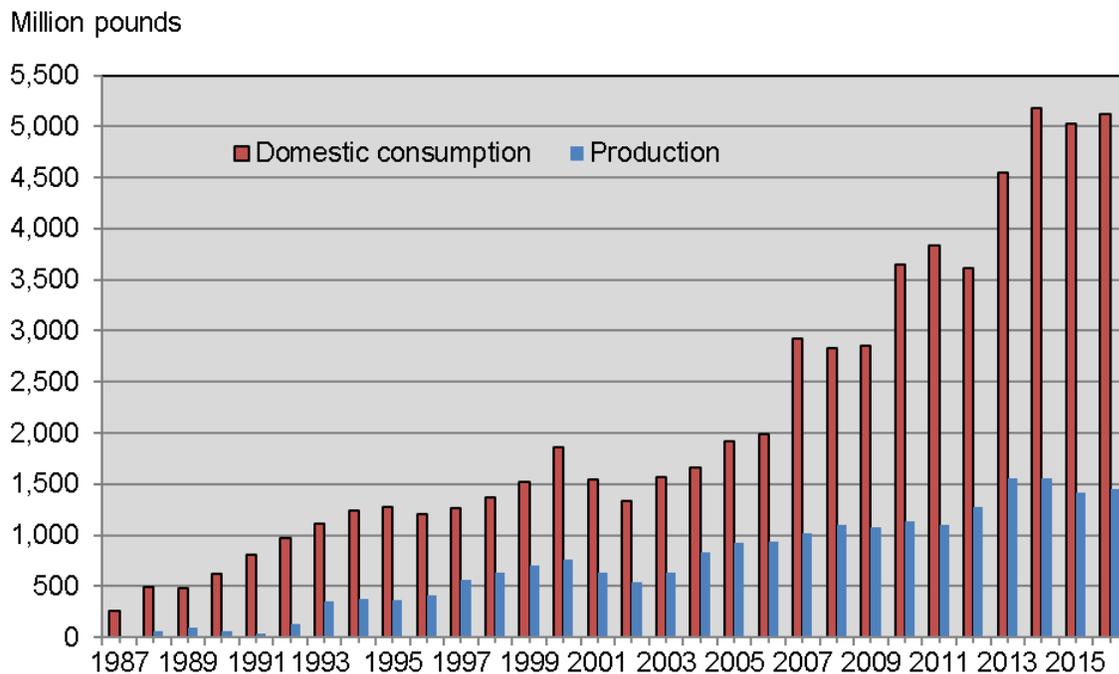
<sup>13</sup> “Acres of Farmland in North Carolina, 2007” *Learn NC*. [www.learnnc.org/lp/multimedia/12714](http://www.learnnc.org/lp/multimedia/12714)

<sup>14</sup> Agricultural data derived from the 2012 US Census of Agriculture. [www.agcensus.usda.gov/Publications/2012/Full\\_Report/Volume\\_1,\\_Chapter\\_2\\_County\\_Level/North\\_Carolina/](http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_County_Level/North_Carolina/)

## Canola

Canola is an oilseed crop bred from the rapeseed plant and related to such staples as mustard, broccoli, and cauliflower. Standing between three and five feet tall, canola plants produce vibrant yellow flowers and pods containing small dark brown seeds. The majority of canola is grown in Canada, with sizable amounts coming from the US and Australia as well. The U.S. Canola Association reports that the ratio of supply vs. demand is approximately 1:3, representing a massive opportunity for US producers, especially those in North Carolina, to enter the market. However, because of NAFTA, canola imports from Canada are not subject to tariffs and are therefore of comparable price to domestic canola. According to an interview with Mark Ash of the USDA, only the shipping and marketing costs of Canadian canola create a price difference between large-scale canola production and the smaller-scale available in North Carolina. Because of this, prices for oil and meal are generally determined by the price which Canadian canola is at currently.<sup>15</sup> Of the almost 2 million acres of canola being grown in the country, the vast majority is grown in North Dakota, although a number of other states are taking advantage of the tremendous demand and developing their own canola programs.<sup>16</sup>

**Figure 3: US Canola Oil Production and Demand<sup>17</sup>**



Source, USDA, Economic Research Service, *Oil Crops Yearbook*.

The USDA’s Soybeans & Oil Crops summary details the rapidly growing market for canola, noting that production has risen from the sixth largest oil crop to the second largest over the last 40 years, comprising between 10-15 percent of the world’s oil crop production in 2009. Canola oil alone was the world’s third most produced vegetable for the same year, as well as capturing 13-16 percent of global vegetable oil production. Finally, canola meal, used for animal feed, was

<sup>15</sup> From phone conversation with Mark Ash. *USDA-ERS*. January 2017.

<sup>16</sup> “What is Canola?” *U.S. Canola Association*. [www.uscanola.com/what-is-canola/](http://www.uscanola.com/what-is-canola/)

<sup>17</sup> “Oil Crops Yearbook.” (2016). *USDA*. [www.ers.usda.gov/webdocs/charts/canolaoil\\_1\\_\\_2png/canolaoil\\_1\\_\\_png](http://www.ers.usda.gov/webdocs/charts/canolaoil_1__2png/canolaoil_1__png)

the second most used feed meal.<sup>18</sup> Due to its many uses—for animal feed, for human use, and for biofuel—canola represents a flexible crop option that can be sold in a variety of markets.<sup>19</sup> The table below details some of the numerous uses for the canola seed.

**Figure 4: Uses of Canola<sup>20</sup>**

Canola seed				
Crushing process				
Oil extraction		Meal processing		
<i>Edible uses</i>	<i>Inedible uses</i>	Pellets	<i>Meal</i>	Mash
<ul style="list-style-type: none"> <li>• Shortening</li> </ul>	<ul style="list-style-type: none"> <li>• Cosmetics</li> </ul>	→		←
<ul style="list-style-type: none"> <li>• Liquid shortening</li> </ul>	<ul style="list-style-type: none"> <li>• Dust suppressants</li> </ul>		<ul style="list-style-type: none"> <li>• Dairy and beef cattle</li> </ul>	
<ul style="list-style-type: none"> <li>• Margarine</li> </ul>	<ul style="list-style-type: none"> <li>• Industrial lubricants</li> </ul>		<ul style="list-style-type: none"> <li>• Swine</li> </ul>	
<ul style="list-style-type: none"> <li>• Deep frying</li> </ul>	<ul style="list-style-type: none"> <li>• Fungicide</li> </ul>		<ul style="list-style-type: none"> <li>• Poultry</li> </ul>	
<ul style="list-style-type: none"> <li>• Baking</li> </ul>	<ul style="list-style-type: none"> <li>• Herbicide</li> </ul>		<ul style="list-style-type: none"> <li>• Mink</li> </ul>	
<ul style="list-style-type: none"> <li>• Salad oils</li> </ul>	<ul style="list-style-type: none"> <li>• Pesticide</li> </ul>		<ul style="list-style-type: none"> <li>• Specialty Aquaculture</li> </ul>	
<ul style="list-style-type: none"> <li>• Mayonnaise</li> </ul>	<ul style="list-style-type: none"> <li>• Oiled fabrics</li> </ul>		<ul style="list-style-type: none"> <li>• Horse</li> </ul>	
<ul style="list-style-type: none"> <li>• Sandwich spreads</li> </ul>	<ul style="list-style-type: none"> <li>• Printing inks</li> </ul>		<ul style="list-style-type: none"> <li>• Sheep</li> </ul>	
<ul style="list-style-type: none"> <li>• Creamers</li> </ul>	<ul style="list-style-type: none"> <li>• Plasticizers</li> </ul>		<ul style="list-style-type: none"> <li>• Rabbits</li> </ul>	
<ul style="list-style-type: none"> <li>• Pharmaceuticals</li> </ul>	<ul style="list-style-type: none"> <li>• Suntan oil</li> </ul>		<ul style="list-style-type: none"> <li>• Ostriches</li> </ul>	
<ul style="list-style-type: none"> <li>• Nutraceuticals</li> </ul>	<ul style="list-style-type: none"> <li>• Anti-static for paper and plastic wrap</li> </ul>			
	<ul style="list-style-type: none"> <li>• Biodiesel</li> </ul>			

The National Agriculture Statistics Service recently reported that in 2016 the US had about 1.7 million acres of canola harvested, yielding almost 3 billion pounds for production. While the overall acres planted and harvested were slightly lower than 2015, both the yield per acre and total production pounds increased. Overall production saw a four percent increase, rising from over 2.8 million pounds in 2015 to about 3 million pounds in 2016.<sup>21</sup> Similarly, the USDA Oil Crops Yearbook showed an increase in value of seed production from the 2014/2015 fiscal year to the 2015/2016 year, growing over three percent to an estimated \$437 million in 2016. While the total canola yield is at an all-time high, the overall crop value has fell since it reached its high of over \$630 million in 2013.<sup>22</sup> This steady increase in production corresponds with the rise in demand and indicates a strong market and future for canola seeds; however, the crop’s volatility can be seen in the price fluctuations and the overall decrease in the price received by farmers, which did not increase in line with the overall value of canola between 2015 and 2016. Average

<sup>18</sup> “Soybeans & Oil Crops.” (2016). *USDA ERS*. [www.ers.usda.gov/topics/crops/soybeans-oil-crops/canola.aspx](http://www.ers.usda.gov/topics/crops/soybeans-oil-crops/canola.aspx)

<sup>19</sup> Roberson, Roy. (2011). “North Carolina Canola Field Day is June 2.” *Southeast Farm Press*. [southeastfarmpress.com/grains/north-carolina-canola-field-day-june-2?page=1](http://southeastfarmpress.com/grains/north-carolina-canola-field-day-june-2?page=1)

<sup>20</sup> Canola Council of Canada, 2006

<sup>21</sup> (2016) “Crop Production.” *USDA*. <https://www.usda.gov/nass/PUBS/TODAYRPT/crop1116.pdf>

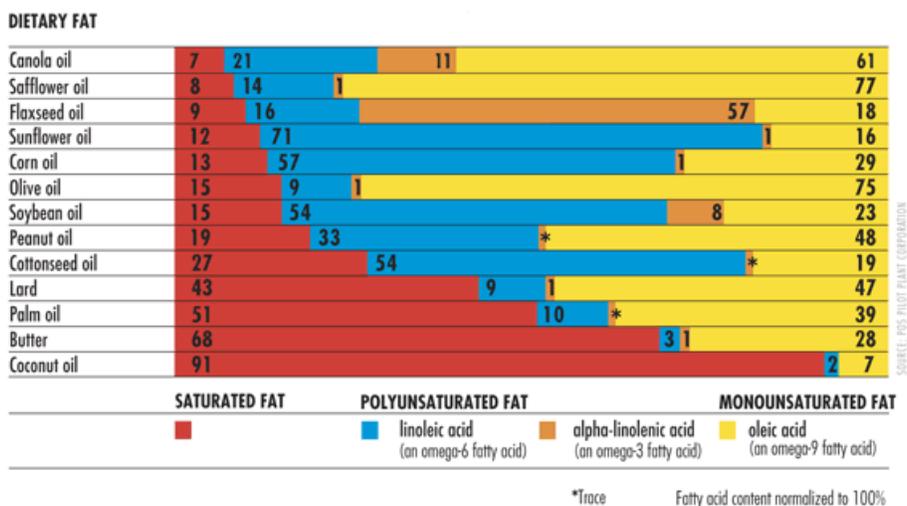
<sup>22</sup> (2016). “Table 24: Canola Seed.” *USDA ERS*. <https://www.ers.usda.gov/data-products/oil-crops-yearbook/>

price received dropped from \$16.90 per cwt. to \$15.60 per cwt. respectively.<sup>23</sup> Despite the drop in price paid to farmers over the past few years, the trend of steadily rising production and consumption values indicates a strong incentive for, and interest in, growing canola.

The main byproduct of the canola seeds, canola oil, has seen increases in domestic production, consumption, and price over the past ten years. Between 2005 and 2015, US canola oil production jumped from 928 million pounds to over 1.5 billion pounds, while domestic consumption increased from 1.9 billion pounds to nearly 5.2 billion.<sup>24</sup> Imports of foreign canola oil, especially from Canada, exceed US domestic production and fill the demand for oil which the domestic canola industry is unable to fill. Because of the discrepancy between domestic consumption and domestic production, there is room for growth in the US canola processing industry which a new facility can capitalize on. While oil production and consumption have been consistently increasing, oil prices have fluctuated more widely. National average prices in fiscal year 2006/2007 were recorded at over \$0.40 per pound, and are estimated to end the 2016/2017 fiscal year between \$0.39 and \$0.42 per pound. During this time period, oil prices reached a high of \$0.65 per pound during 2007/2008 and a low of \$0.35 in 2015/2016.<sup>25</sup> This market movement is consistent with the price variations of other vegetable oils and fats during the same period. Canola oil’s price per pound has also been consistently higher than soybean oil, the current dominant oilseed crop in North Carolina.

Canola oil’s growth in popularity is due in part by its health benefits compared to other cooking oils. Canola has a high oil content, and low saturated fat content. The figure below shows a breakdown of fat content among many oils commonly used in cooking.

**Figure 5: Comparison of Dietary Fats<sup>26</sup>**



<sup>23</sup> (2017). “Table 8: Oilseed Prices Received by U.S. Farmers.” *USDA Oil Crops Outlook: January 2017*. [www.ers.usda.gov/publications/pub-details/?pubid=82031](http://www.ers.usda.gov/publications/pub-details/?pubid=82031)

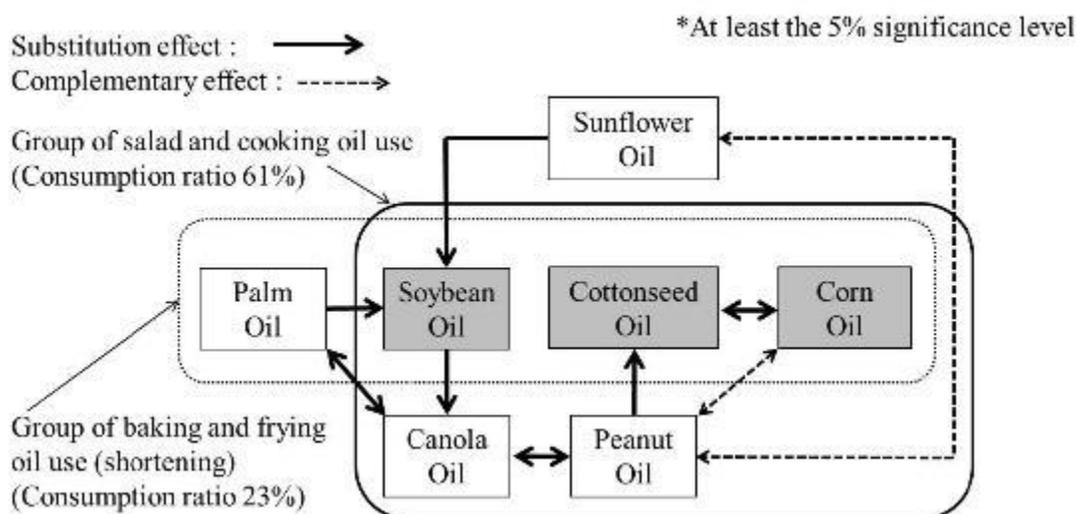
<sup>24</sup> (2016) “Table 25: Canola Oil Supply.” *USDA ERS Oilseed Yearbook*. [www.ers.usda.gov/data-products/oil-crops-yearbook.aspx](http://www.ers.usda.gov/data-products/oil-crops-yearbook.aspx)

<sup>25</sup> (2017) “Table 9: U.S. Vegetable Oil and Fats Prices.” *USDA ERS Oil Crops Outlook: January 2017*. [www.ers.usda.gov/publications/pub-details/?pubid=82031](http://www.ers.usda.gov/publications/pub-details/?pubid=82031)

<sup>26</sup> Comparison of Dietary Fats. [canolainfo.org](http://canolainfo.org)

Research by the University of Missouri has also shown canola oil to be a marketable substitute for peanut, palm, and soybean oils. The figure below shows the cross-price effect on U.S. demand for vegetable oils, displaying both substitutions and complements among vegetable oil varieties.

**Figure 6: Cross-price Effect on Domestic Demand for Vegetable Oils<sup>27</sup>**



### North Carolina Canola Industry

North Carolina stands in a good position to enter the canola market, as farmers look to either transition away from other crops or engage in double cropping and bring in another variety of crop to condition soil. Wheat, the primary winter crop, has seen its prices declining in recent years, leaving farmers more open to discussions on substitute crops such as canola.

A study in 2010 found that the state’s yield of winter canola was well within the national average, showing that the state’s terroir was ideal for this type of crop. According to the study, “the best performing varieties...are broadly adapted and suitable for production across the entire state.”<sup>28</sup> While canola is generally a hardy crop, it is still vulnerable to a couple of pathogens that can negatively affect yield and plant health: *Sclerotinia sclerotiorum* (white mold) and blackleg. These fungal pathogens typically form in environmental conditions with higher levels of ground moisture and temperatures of around 70°F, consistent with North Carolina’s spring growing season. Fortunately, these risks can be easily handled by prudent administration of fungicides if growing in the spring, or simply adding canola to fall/winter crop rotation schedules instead.<sup>29</sup>

The NASS 2012 Census of Agriculture reported that there were 17 farms growing canola on 2,942 acres throughout North Carolina, which yielded over 4.2 million pounds of canola for the year. This is a massive increase from 2007, in which the state only reported one farm total, with

<sup>27</sup> (2014) Kojima, Yasutomo, et al. “A Demand Model of the Wholesale Vegetable Oils Market in the U.S.A.” *UMO Department of Agricultural & Applied Economics*.

<sup>28</sup> George, Nicholas, et al. “An Evaluation of Winter Canola in North Carolina.” *NCSU College of Agriculture and Life Sciences*. [www.ncovt.com/files/Canola2010\\_CanolaNCSUVarietyTrial.pdf](http://www.ncovt.com/files/Canola2010_CanolaNCSUVarietyTrial.pdf)

<sup>29</sup> Shumaker, Link and Ferrell, Jeremy. (2013). “Oilseed Farming and Biodiesel Plant Integration Considerations.” [sustec.appstate.edu/sites/sustec.appstate.edu/files/OilseedFarmingandBiodieselPlantIntegrationConsiderations.pdf](http://sustec.appstate.edu/sites/sustec.appstate.edu/files/OilseedFarmingandBiodieselPlantIntegrationConsiderations.pdf)

minimal yield.<sup>30</sup> Of the 10 counties listed as canola producers, Iredell contains the largest concentration of canola industry with seven farms producing almost 2 million pounds. Wayne County is the only county noted in the census that is located surrounding Johnston County. The census reports a single canola farm in the county, however it does not report production numbers to avoid listing an individual business’s information.<sup>31</sup> The table below compares North Carolina’s canola production with surrounding states. Virginia is not included, as only one farm was listed in the census.

**Table 1: 2012 Canola Production for Surrounding States<sup>32</sup>**

	States			
	North Carolina	South Carolina	Tennessee	Georgia
Pounds Harvested	4,215,031	1,117,256	772,514	4,211,080

However, while North Carolina’s number of farms has drastically increased, there are only three processing locations within the state: Whole Harvest, Perdue Grain and Oilseed, and Cargill, representing perhaps the most significant roadblock in transitioning into canola production—the expense of transporting product into other states for processing. Due to its central location within the state, Johnston County is an ideal place in which to establish a canola processing facility, as it will be accessible to most, if not all, of the canola producers in North Carolina.

According to a 2011 study on canola production in North Carolina, soil terroir is critical to the crop’s viability. For optimum yields and growth, “medium textured, well-drained soil” is best, as well as well-organized planting systems. The study elaborates, “If a seedbed is too fine and overworked, it will lose soil moisture and create a crust easily after a heavy rain. If a seedbed is too coarse, improper seed placement may lead to poor stands. Seed and soil moisture contact is critical for rapid emergence, so seeding canola into dry soil is not recommended.”<sup>33</sup>

The study also examines canola types optimal for the Southeastern US’ typical environmental conditions, as a result of a 2004 National Canola Winter Variety Trial. The following figure shows yield averages in four locations throughout the region for four varieties of canola (Banjo, Ceres, Jetton, and Wichita):

<sup>30</sup> (2014) “North Carolina State and County Data.” *USDA*. [agcensus.usda.gov/Publications/2012/Full\\_Report/Volume\\_1,\\_Chapter\\_1\\_State\\_Level/North\\_Carolina/ncv1.pdf](http://agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_1_State_Level/North_Carolina/ncv1.pdf)

<sup>31</sup> *Ibid.*, “Table 25: Field Crops.”

<sup>32</sup> State Level. “Field Crops: 2012 and 2007.” [www.agcensus.usda.gov/Publications/2012/Full\\_Report/Volume\\_1,\\_Chapter\\_2\\_US\\_State\\_Level/st99\\_2\\_025\\_025.pdf](http://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_US_State_Level/st99_2_025_025.pdf)

<sup>33</sup> Atkinson, A.D., et al. (2011). “North Carolina Canola Production.” *North Carolina Solar Center with College of Agriculture and Life Sciences*. <https://nccleantech.ncsu.edu/wp-content/uploads/2011/09/Canol-Guide-Final.pdf>

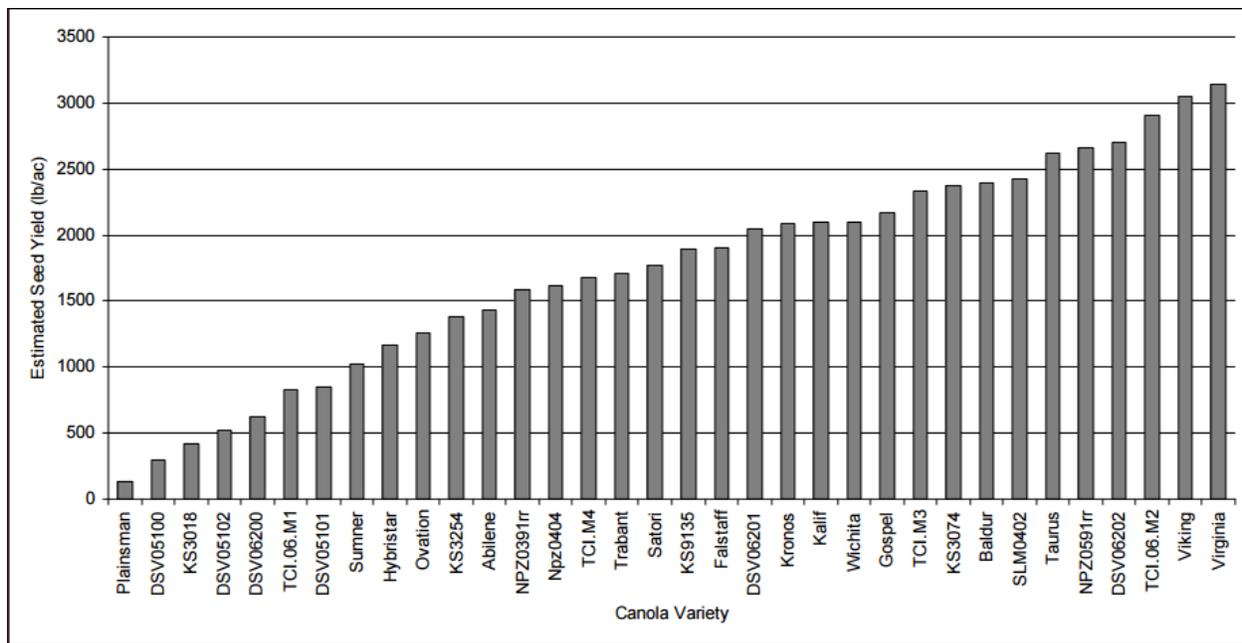
**Table 2: Southeastern Canola Crop Yields<sup>34</sup>**

Table 1. The 2002 to 2004 yield averages for four canola varieties grown in the Southeastern U.S.				
Variety	Locations			
	Suffolk, Va	Petersburg, Va	Orange, Va	Griffin, Ga
yield (lbs/ ac.)*				
Banjo	2295	2795	3553	1722
Ceres	1451	1907	2301	1189
Jetton	2099	3119	2995	1391
Wichita	2099	3448	2083	1488

\* yield averages were calculated using data from 2002, 2003, and 2004 (National Canola Winter Variety Trial, 2004).

The following chart, from a NC State University slideshow on canola in the state, shows a more detailed listing of plant varieties and their associated seed yield estimates:

**Figure 7: Seed Yield by Canola Variety<sup>35</sup>**



Soil nutrient content also plays a key role in the crop’s success, as canola typically requires about 25 percent more nitrogen than other types of winter wheat crops, as well as slightly higher levels of sulfur and normal levels of phosphorous and potassium. The ideal soil pH level is anywhere from 5.8 to 6.2.<sup>36</sup> Since soil can vary throughout a county and region, it is recommended to perform soil samples periodically to monitor the elements present in a given area. Johnston,

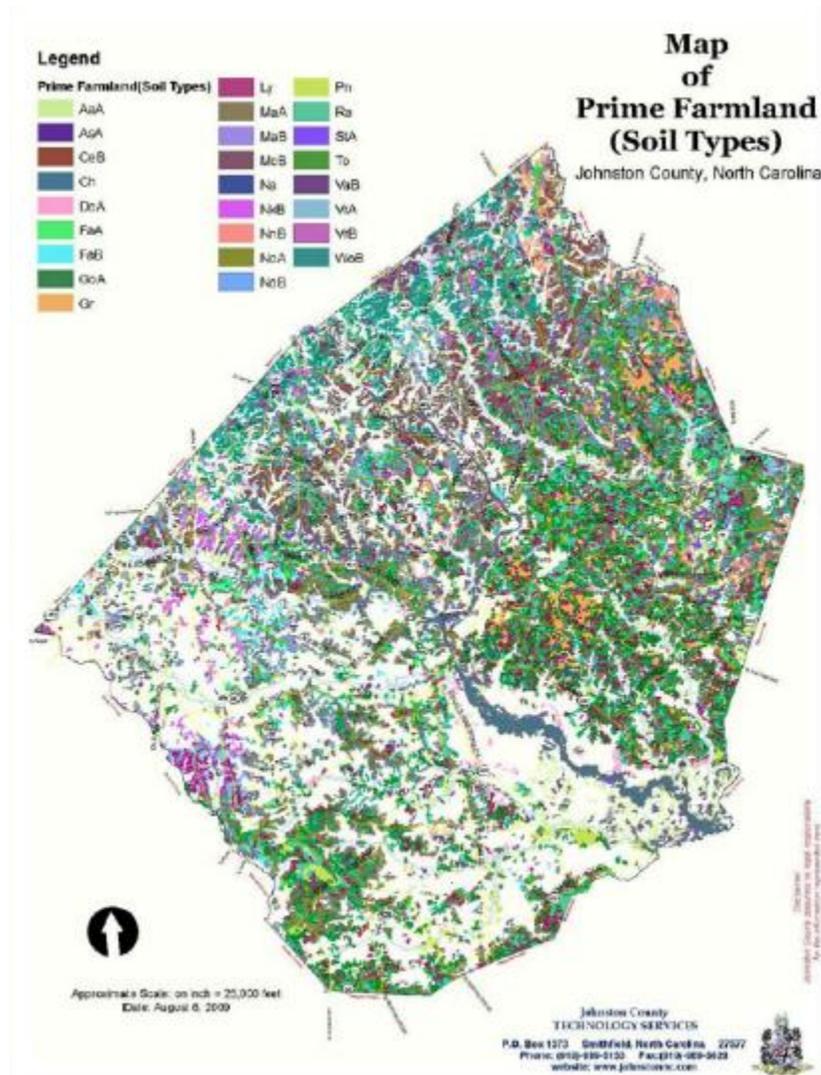
<sup>34</sup> Ibid.

<sup>35</sup> Dr. Nicholas George & Dr. Kim Tungate. “Oilseed Production for Biodiesel in North Carolina.” *NC State University*. <https://cefs.ncsu.edu/wp-content/uploads/nicholasgeorge.pdf?x47549>

<sup>36</sup> Atkinson, A.D., et al. (2011). “North Carolina Canola Production.”

North Carolina, for example, has several specific soil divisions, as demonstrated in the following figure (intended to show the variety of types, not specific information):

**Figure 8: Johnston Soil Types<sup>37</sup>**



As demonstrated above, Johnston County contains numerous soil types, many of which can be suitable for canola growth. Despite this seemingly drastic variance, canola has the potential to be a viable addition to farmers' crop rotations, given adequate research and planning.

<sup>37</sup> (2010) "Agricultural Development Plan for Johnston County."

## SELECTED REGIONAL OILSEED OPERATIONS

North Carolina and the surrounding region feature a number of facilities and companies that work in the oilseed industry either offering crushing services, biofuel production, or both. Soybeans are the primary oil crop in the region, but canola, cottonseed, and other crops have also made inroads into the area in recent years. Most crushing facilities in the region focus on soybeans, leaving an opening in the market for canola focused facilities.

As the canola industry initially developed in North Carolina and crop prices were high, multiple small scale crushing facilities formed through partnerships between growers, biodiesel producers, and soy crushers. The drop in canola prices since around 2009 has seen many of these smaller facilities cease operations or be purchased by larger-scale competitors in the oilseed crushing industry. The industry is experiencing a period of integration as larger multinational companies such as Cargill, Bunge, and Perdue have been purchasing local small and medium crushing operations and biofuel producers. Fewer canola crushing facilities have been opening with this shift in industry environment; however there are multiple small-scale research operations attempted as winter wheat prices have fallen to see if canola can once again become feasible for growers at a small or medium scale.

### Large-Scale Crushing

Multiple large-scale crushing facilities either operate plants or contract with farmers in North Carolina and the surrounding region. While these facilities are all within North Carolina and surrounding states, they may not be the ideal choice for smaller operations that produce lesser quantities of canola, or for those without the means to independently transport their product to and from the processing locations. The following is a brief description of each company.

- **Cargill, Inc. (Fayetteville, NC):** Cargill Inc. is a multinational distributor and processor for a number of agricultural products including field crops, animal products, feed, starches, and more that has been in business since 1865 and involved in canola since 1994. They reported over \$107 billion in sales during fiscal year 2016. Cargill Grain & Oilseed Supply Chain acts as



their processing division for various oilseed products, from soybeans to canola, connecting producers with end-users. According to their website, Cargill's various locations charter more than 185 million metric tons of dry bulk tonnage, through an established and efficient supply chain. They operate using an international business model in 46 countries that links producers of a wide variety of grains and oilseeds to their processing plants. Even while dealing with bulk product from around the world, Cargill specializes in "handling identity-preserved and differentiated products." This allows certain regional brands and products sources to remain unique and distinctive in marketplaces across the world.<sup>38</sup>

- **Bunge North America/Whole Harvest (Warsaw, NC):** Bunge North America is a subsidiary of Bunge Limited, a global integrated agribusiness that deals in production, processing, and distribution of a wide range of agricultural products. In 2015, Bunge North America purchased Whole Harvest Foods, LLC and its facility in Warsaw, NC. Bunge markets



<sup>38</sup> 2016. "Cargill Grain & Oilseed Supply Chain." [www.cargill.com/company/businesses/cargill-grain-oilseed-supply-chain/index.jsp](http://www.cargill.com/company/businesses/cargill-grain-oilseed-supply-chain/index.jsp)

their expeller pressed oils under the Whole Harvest brand.

Whole Harvest uses a patented refining process to produce a variety of products, including non-GMO canola oil, canola oil, soy oil, cottonseed oil, canola & soy oil, and others, all intended for human consumption. They pride themselves on being an all-natural brand and being the first line of no trans-fat cooking oil made without chemicals.



The company was formed as “Whole Harvest Foods, LLC” in 2003, having previously operated as “Carolina Soy Products, LLC” and “Carolina Soy Acquisition, LLC” as they transitioned from soy meal processing to making high quality cooking products. Their products can now be found in many commercial restaurants and institutions throughout the country, as well as to individual customers.<sup>39</sup>

With the 2015 purchase by Bunge North America, Whole Harvest Foods is now a part of a much larger chain, with access to a larger customer base. Between its two locations, manufacturing in Warsaw and packaging in Las Vegas, Whole Harvest operates with a total staff of 35 employees, part of Bunge Limited’s overall staff of over 35,000 people.<sup>40</sup>

- **Perdue Grain & Oilseed/East Carolina Soy Processors (Cofield, NC and Pantego, NC):**



Perdue Grain & Oilseed is a subsidiary of Perdue AgriBusiness, a US based company that has specialized in grain and oilseed processing, marketing, and distribution since 1985. They operate three solvent extraction soybean crush plants in the eastern United States: Salisbury, Maryland; Cofield, North Carolina; and Chesapeake, Virginia. Perdue also operates an animal nutrition division which uses the meal and husks from their processing plants for animal feed. The closest operation to Johnston County is a poultry feed plant in Wadesboro, North Carolina.<sup>41</sup>

In 2011, Perdue announced a partnership with East Carolina Soy Processors who operate a plant in Pantego, North Carolina. Unlike the other Perdue extraction facilities, the Pantego operation produces value-added products through the mechanical extruder method. This plant originally operated at a crushing capacity of 100 tons per day, and has expanded to 250 tons per day through Perdue’s expansions.<sup>42</sup>

Perdue is also involved in the production of high erucic acid rapeseed (HEAR) in North Carolina through their purchase of Technology Crops International in 2015. Through this arrangement, growers work under contract for Perdue to produce rapeseed which is then crushed for oil to use in a variety of applications including personal care products, plastics, pharmaceuticals, and more. They currently operate North Carolina contract farms in Belhaven, Wilson, Greenville, and Elizabeth City.<sup>43</sup> This should be taken into consideration

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<sup>39</sup> [www.linkedin.com/company/whole-harvest-products](http://www.linkedin.com/company/whole-harvest-products)

<sup>40</sup> [www.prnewswire.com/news-releases/bunge-purchases-whole-harvest-foods-llc-300153906.html](http://www.prnewswire.com/news-releases/bunge-purchases-whole-harvest-foods-llc-300153906.html)

<sup>41</sup> (2016). “Oilseed Crush.” *Perdue AgriBusiness*. <https://www.perdueagribusiness.com/oilseed-crush>

<sup>42</sup> (2011) “Perdue Agribusiness Partners with ECSP LLC to Expand Soybean Processing Operations.” *Grainnet*. [www.grainnet.com/articles/Perdue\\_Agribusiness\\_Partners\\_With\\_ECSP\\_LLC\\_to\\_Expand\\_Soybean\\_Processing\\_Operations-109916.html](http://www.grainnet.com/articles/Perdue_Agribusiness_Partners_With_ECSP_LLC_to_Expand_Soybean_Processing_Operations-109916.html)

<sup>43</sup> “Specialty Products.” *Perdue AgriBusiness*. [www.perdueagribusiness.com/Grain-Specialty-Products](http://www.perdueagribusiness.com/Grain-Specialty-Products)

by any potential canola projects as risks of cross-pollination can occur which compromises the canola, as well as rapeseed competing for canola in securing growing contracts.

- **AgStrong, LLC (Bowersville, GA):** AgStrong is an oilseed crushing and refining operation that has been working with local farmers to contract land for oilseed production since 2006. They operate expeller press facilities in Bowersville, Georgia and Trenton, Kentucky where they mechanically crush canola and sunflower into oil and meal. They operate an integrated farm-to-market operation in which they work to assist farmers with crop transition, advise on the planting and harvest process, crush and refine the seeds, and develop finished products they can ship to markets. AgStrong differentiates their product by crushing non-GMO canola seeds using a mechanical expeller press instead of the solvent method.<sup>44</sup>



AgStrong has expressed interest in working with farmers in eastern North Carolina including Johnston County, and in recent years has begun working with farmers in the PeeDee region of South Carolina to establish crop cycles including canola. By establishing sales and shipment points in these areas, they have been able to expand their reach and grow operations.<sup>45</sup> With a larger canola presence, AgStrong may see more push to establish a crushing facility in the region. This could offer competition to a proposed Johnston plant, or it could be a source of cooperation and support.

The plant in Bowersville suffered from a fire in November 2016 which burned on and off again for approximately six weeks in the grain bin.<sup>46</sup> The impact of this on the plant's 2017 year has yet to be determined. The risks associated from storing large quantities of dry material should be considered by any startup.

## Biofuel

Biofuel production has been an important impetus in the growth of canola production. Smaller scale biodiesel plants are able to purchase oil from a variety of sources including large crushing facilities, small local operations, and food establishments. With the growth in interest in alternative energies and cheaper fuel sources, biodiesel has also grown in popularity. Farmers are able to lower their fuel costs by using the canola they grow, and many have set up small on-farm biodiesel converters for personal use lowering transportation costs.

- **Piedmont Biofuels (Pittsboro, NC):** Piedmont Biofuels, located in Pittsboro, North Carolina operate a small biodiesel production facility that primarily collects and uses cooking oil and waste oils. The group is dedicated to research, education, and creating sustainable farm systems. In addition to cooking oil, the group also operates a medium-scale industrial cold press and offers educational opportunities for farmers to learn about



<sup>44</sup> About AgStrong. [www.agstrong.com/about-us](http://www.agstrong.com/about-us)

<sup>45</sup> (June 12, 2013) Roberson, Roy. "Canola Finding a Home in South Carolina Farming Operation." *Southeast Farm Press*. [www.southeastfarmpress.com/grains/canola-finding-home-south-carolina-farming-operation](http://www.southeastfarmpress.com/grains/canola-finding-home-south-carolina-farming-operation)

<sup>46</sup> (Dec 9, 2016) Shaw, Amanda. "Firefighters Battling Blaze at Georgia Canola Plant." *WTOC*.

[www.wtoc.com/story/33692114/firefighters-battling-blaze-at-georgia-canola-plant](http://www.wtoc.com/story/33692114/firefighters-battling-blaze-at-georgia-canola-plant)

oilseed pressing and purchases presses for them to use themselves on the farm.<sup>47</sup> They demonstrate and sell the Komet line of seed presses to producers. These small scale presses are well suited for individual on-farm operations, ranging in capacity from 6-11 pounds of seed input per hour, to 110-220 pounds of input per hour depending on the type of oilseed used.<sup>48</sup>

- **Blue Ridge Biofuels (Asheville, NC):** Blue Ridge Biofuels, formed in 2005, is a small scale biodiesel producer operating in western North Carolina. They work to supply pumps, produce biofuel, and operate oil collection and recycling programs throughout North Carolina, South Carolina, Tennessee, and Virginia. Blue Ridge Biofuels mainly sources used cooking oil to produce their fuels.<sup>49</sup>

Blue Ridge Biofuels has also been involved in a Field to Fryer to Fuel program in which they hope to create a new opportunity for area farmers by growing canola that will then be pressed by Blue Ridge and sold to local restaurants through Leading Green Distributing. These restaurants will then return the used cooking oil to Blue Ridge for it to be converted into biodiesel. They received a grant from AdvantageWest to establish a small crushing facility. The first batch of canola oil was pressed in the fall of 2013.<sup>50</sup> In 2015, the group opened a new factory in Catawba County, North Carolina to increase their production and reach. They currently produce over 350,000 gallons of biodiesel per year.<sup>51</sup>

### Small-Scale Projects

Although most of the previous medium-scale crushing operations have been purchased by larger corporations, small-scale research projects have continued to test the viability of community based canola and soy crushing in North Carolina.

- **Paul Dunn of Mule City Feeds (Benson, NC):** Mule City Specialty Feeds is a Benson, NC based operation owned by Paul Dunn. Mule City offers custom livestock feeds to area farmers. Mr. Dunn has also added a single line, Insta-Pro extruder-expeller to his operation in order to press soybeans. The extruder produces 2,500 pounds per hour, or 50,000 bushels of soybeans per year which he uses for feed for sow herds. His startup costs included \$80,000 for a machine and \$80,000 startup costs. A similar scale canola operation could be established in the manner of this operation.

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<sup>47</sup> (2016) "About." *Piedmont Biofuels*. [www.biofuels.coop/about](http://www.biofuels.coop/about)

<sup>48</sup> "Monforts Komet Seed Presses." *Piedmont Biofuels*. [www.biofuels.coop/technologies/monforts](http://www.biofuels.coop/technologies/monforts)

<sup>49</sup> Blue Ridge Biofuels. [www.blueridgebiofuels.com/](http://www.blueridgebiofuels.com/)

<sup>50</sup> "Local Cooking Oil – Farm to Fryer to Fuel." [www.blueridgebiofuels.com/cookingoil/](http://www.blueridgebiofuels.com/cookingoil/)

<sup>51</sup> Blue Ridge Biofuels

## MANAGEMENT AND OPERATIONAL STRUCTURE

When analyzing any potential business, it is necessary to examine and understand possible ownership and legal business structures in order to choose one that best fits the venture. There are numerous possibilities for the actual legal structure of the entity. The type of organization structure selected for the business may influence the amount of paperwork and other requirements for obtaining federal and state licenses. Below, we discuss two types of ownership classification and six business organizational structures:

### Ownership

- Privately Owned
- Publically Owned

### Business Organization

- C-Corporation
- S-Corporation
- Cooperative
- Sole Proprietorship
- Partnership
- Limited Liability Company

## Ownership Classifications

The businesses ownership classifications determine how ownership of the venture will be structured and how shares of the company can be sold. Privately owned businesses have their shares held by an individual or small number of owners and are not traded publically. Publically owned companies are listed on a stock exchange and have a percentage of their ownership shares offered for trade to the general public.

### Privately-Owned

A privately owned company is one whose shares are not publically traded, but are rather held privately by a small number of individuals. Most smaller businesses are privately owned and are subject to fewer oversight regulations than their public counterparts, such as publishing annual reports and registering with the Securities and Exchange Commission. Because there are only a small number of shareholders, this type of business organization allows for a much greater degree of control and flexibility among the owners in regards to business decisions. Privately owned businesses can come in a number of organizational structures including sole proprietorship, partnerships, LLCs, and corporations.

#### *Advantages of a Privately-Owned Business*

- Not required to file annual financial reports to federal agencies
- More focus can be placed on long term growth as opposed to short term gains
- Business decisions do not require shareholder or board of directors' approval
- Lower costs to establish and incorporate a privately held business

#### *Disadvantages of a Privately-Owned Business*

- Unable to quickly raise capital through stock sales to the general public
- Stock sales are limited by individual state regulations
- Liability for the business's finances and legal action taken against it is placed on the owner for many non-corporate privately-owned businesses<sup>52</sup>

<sup>52</sup> Karen Rogers, "Advantages & Disadvantages of Being Privately Owned." [smallbusiness.chron.com/advantages-disadvantages-being-privately-owned-76877.html](http://smallbusiness.chron.com/advantages-disadvantages-being-privately-owned-76877.html)

## Publically-Owned

Publically-owned businesses are organized as corporations. Their ownership shares are traded publically through a stock exchange instead of held by an individual or small group. These corporations are led by a Board of Directors and responsible for providing positive quarterly returns to their shareholders.

### *Advantages of a Publically-Owned Business*

- Able to access capital quickly through sales of stock
- Important business decisions need to go through a process of checks and oversight
- The business life can extend beyond that of a single owner due to corporate status and the large number of shares
- Personal liability is limited, with financial and legal problems being attributed to the corporate entity and diffused through share prices

### *Disadvantages of a Publically-Owned Business*

- Costs related to going public and complying with reporting regulations can be high
- Business performance is often judged more on stock prices than long term planning
- Decision making is no longer concentrated in the hands of an individual or partnership, potentially slowing down business decisions<sup>53</sup>

## Legal Structure Comparisons

The venture must choose a legal structure through which to organize and register their company. This business structure is important for legal and taxation purposes, as each has different liability and tax requirements. Below we discuss six types; C-corporation, S-corporation, Cooperatives, Sole Proprietorships, Partnerships, and Limited Liability Companies.



### **C-Corporation**

C-Corporations are the most common structure for large businesses in the United States. The structure offers the investor (stockholder) limited liability protection – any liability is limited to the value of the stock held in the corporation. Businesses formed under this structure require oversight by state regulatory boards at a minimum and in some cases by the Federal Security and

Exchange Commission. A C-Corporation has a perpetual existence. Owners can routinely sell or reassign stock (or ownership) without disrupting ongoing operations.

### *Advantages and Disadvantages of C-Corporations*

- The corporation is the most complex of business structures because it acts as a legal entity that exists separately from its owners
- Control depends on stock ownership
- Stockholders are at risk only for money they have invested in the stock of the corporation
- When applying for federal licenses, the only members required to provide personal information are officer, directors, and shareholders with more than 10 percent ownership
- Allows capital to be raised more easily through the sale of stocks or bonds

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<sup>53</sup> “Public vs. Private: Advantages and Disadvantages of Raising Capital in the Public Markets.” *LRRC*. [www.lrrc.com/Public-Vs-Private--Advantages-and-Disadvantages-of-Raising-Capital-in-the-Public-Markets-10-30-2012](http://www.lrrc.com/Public-Vs-Private--Advantages-and-Disadvantages-of-Raising-Capital-in-the-Public-Markets-10-30-2012)

- Can continue to function even without key individuals
- Double taxation occurs because the business exists as a separate entity



### **S-Corporation**

The S-Corporation is a special tax designation applied for and granted by the IRS to corporations that have already been formed. To become an S-Corporation, the business first must form a general or professional corporation, and the company must complete Form 2553, Election by a Small Business Corporation, and file it with the IRS.

Many entrepreneurs and small business owners take advantage of the S-Corporation structure because it combines many of the advantages of the sole proprietorship, partnership, and corporate forms of business.

#### *Advantages and Disadvantages of S-Corporations*

- Avoids the double taxation of C-Corporations
- Restrictions on the number and type of ownership
- S-Corporations have the same basic advantages of the general corporation



### **Cooperatives**

A cooperative is a business owned and democratically controlled by the people who use its services and whose benefits are derived and distributed to the users.<sup>54</sup> Cooperatives have a unique form of organization with distinct characteristics, strengths, and difficulties. A cooperative is organized and incorporated under applicable state laws. To qualify as a cooperative, attributes include:

1. Management controlled by a board of directors elected by the members. One unique feature of a cooperative is that all, or most, of the directors must be members of the cooperative. Thus, the leaders are regular users of the business' products or services.
2. Equity mainly comes from the members, rather than outside investors, although cooperatives are allowed to raise equity from outside sources. Equity is obtained by direct contributions through membership fees or sale of stock, by agreement with members to withhold a portion of net income based on patronage, or through retention of a portion of sales proceeds for each unit of product marketed. If a cooperative fails, the liability of each member is limited to the amount he/she has invested.

### **Process for Incorporation**

The following process is adapted from the NC Department of the Secretary of State:

- Register a unique entity name and file Articles of Incorporation
- Appoint a registered agent to accept legal papers for the company
- Establish administrative structure, draft bylaws, and appoint a board of directors
- Board of Directors will formally adopt bylaws and establish guidelines regarding operations, stock, and finances.
- Issue stock to shareholders in accordance to NC Securities Division.

Details for "Incorporating Your Business in North Carolina" can be found at: [www.sosnc.gov/corporations/pdf/business\\_corporation.pdf](http://www.sosnc.gov/corporations/pdf/business_corporation.pdf)

<sup>54</sup> USDA Rural Development. "Cooperatives." [www.rurdev.usda.gov/lp\\_coopprograms.html](http://www.rurdev.usda.gov/lp_coopprograms.html)

3. Earnings/losses on business conducted on a cooperative basis, often called net margins, are allocated to the members on the basis of the use they made of the cooperative during the year, not on the basis of equity held. The allocations may be distributed in cash or retained in members' accounts in the cooperative, to be distributed at a later time. Members usually receive a combination of cash and an allocation of equity.

Statistics from the United States Department of Agriculture (USDA) Cooperative Statistics for 2012 reports that there are about 2,238 farmer, rancher, and fishery cooperatives in the United States. These cooperatives had a combined membership of 2.1 million people and total gross business volume of \$235 billion. Collectively, cooperatives employed 129,000 full-time employees and 56,000 part-time and seasonal employees.<sup>55</sup>

#### *Advantages and Disadvantages of Cooperatives*

- Maintain or increase market access.
- Allow producers to have access to additional pricing and marketing opportunities.
- Reduce risk
- Generate more profits.
- Reduce costs.
- Can be complex to organize.



#### **Sole proprietorship**

Sole proprietorship is the simplest and least regulated business structure. When establishing a sole proprietorship, there are likely to be fees to obtain business name registration, a fictitious name certificate, and other necessary licenses.

Any potential attorneys' fees for starting the business, however, will be less than the other business forms because less preparation of documents is required.

To finance the sole proprietorship, the sole owner must contribute or borrow all of the capital needed to start the business. Any outside funding sources must be in the form of loans.

#### *Advantages and Disadvantages of Sole Proprietorships*

- As a sole proprietorship, the business itself does not pay income tax
- The profit or loss of the business is taxed as personal income and is included on the owner's individual tax return
- The sole proprietor has total control of the business and receives all profits
- An individual who is responsible for all aspects of the business, including any debts, even in excess of the amount invested, owns it
- In addition to potential personal liability for the owner, there is the possibility of dissolution of the business upon the owner's death

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<sup>55</sup> Ali, S. & Eversull, E. (2013). "Cooperative Statistics 2012." USDA Rural Business-Cooperative Programs Service Report 74.



### **Partnership**

A general partnership (sometimes simply referred to as “a partnership”) is an association of two or more persons to carry on as co-owners of a business for profit. Each partner contributes money, property, and/or services, and agrees to share in the profits or losses of the business. Ordinarily, each partner is liable for all obligations of the partnership.

To form a partnership, two or more persons sign and file partnership agreements (Statement of Partnership Authority –with the appropriate state office; this agreement states the exact contributions and returns of the members). The two most common types of this business structure are general partnerships and limited partnerships.

#### *Advantages and Disadvantages of Partnerships*

- A partnership allows for additional financial resources
- A partnership allows members to escape double taxation
- The requirements and procedures for formation are fairly simple
- All partners are personally liable for business debts and liabilities



### **Limited Liability Company**

An LLC's purpose is to combine the limited liability for its members usually found in the corporate structure (and to limited partners in limited partnerships) with the pass-through tax advantages of the general partnership. (Any profits/losses pass through to the individual investor and appear on the individual's tax return). Therefore, an LLC has some, but not all, of the characteristics of each entity. Just one person may form an LLC, but it commonly requires two or more persons.

LLC formation and liability characteristics are similar to that of a corporation. To form a corporation or LLC, the necessary documents are filed with the designated state agency. Unlike a general partnership, shareholders are not personally liable. Other characteristics may be similar to or different from corporate characteristics, depending upon how the LLC members wish to structure the entity and comply with IRS regulations to receive favorable tax treatment.

#### *Advantages and Disadvantages of LLCs*

- Provides its members limited liability
- Allows members to escape double taxation
- Any "person," either natural (an individual) or legal (another legal entity, such as a partnership), can be a member
- Members may actively manage the LLC without incurring personal liability
- More regulations on transferring ownership
- Uncertain tax status
- Drafting the agreement can be fairly complex
- When applying for federal licenses, all members must provide personal information, such as band reference, personal references, credit rating, residence for past 10 years, and sources of invested funds

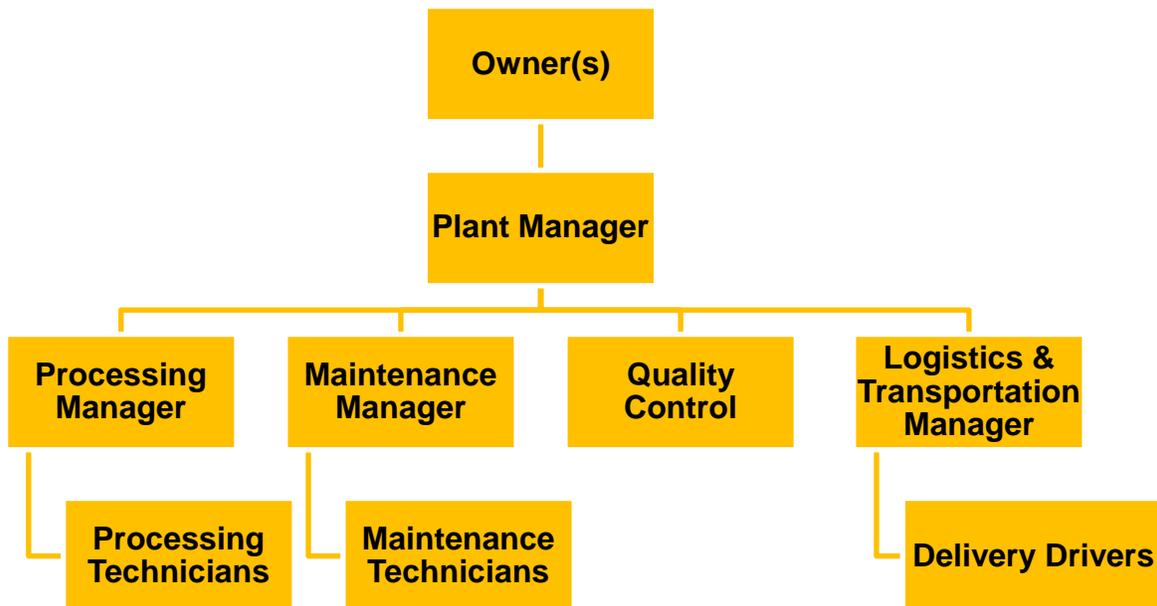
The county will need to take several factors into account when deciding how to best organize their operation such as the level of farmer and government involvement expected, business size, and project goals. If the goal is to help establish a small independent company that will help the

area's oilseed industry grow, creating a privately-owned proprietorship, partnership, or LLC may be desirable due to organizational simplicity and independence. However, creating a larger enterprise with multi-county level of involvement from area producers and distributors may be best achieved through a cooperative or a publically-owned corporation. These structures would allow for a broader and more diverse level of producer involvement, and keep the operation focused on larger scale benefits to the county's oilseed industry. There is no "one size fits all" approach to determining a specific legal and ownership structure to a business. This determination will come through analyzing the operation's needs and future goals.

### **Processing Plant Workforce**

As with most businesses, the efficient operation of this venture will require the fulfillment of numerous roles in order to operate successfully. For maximum efficiency, it is necessary for a business to clearly define necessary roles, positions, and responsibilities, and to hire qualified individuals to perform the necessary labor functions of the business. The number of employees will depend on the scale at which Johnston County plans to operate and the desired oil production. Employees will be needed to manage a number of areas including processing machinery, maintenance, refining, management, meal production, and more.

**Figure 9: General Processing Plant Roles**



- **Owner(s)**

The owner oversees all business operations at the plant including administrative and processing tasks. While the owner can wear many hats, he or she typically relies on the skills of the general manager, processing manager, maintenance manager, and others to manage the day to day details of the oilseed processing and plant operations. The owner is also still very involved in the end resulting product, brand details and sales on both wholesale and retail levels. The owner can work with the plant manager in developing strategies and policies and managing the daily operations of the business.

- **Plant Manager**

The plant manager is a full-time position and reports to the owners. This position will require a broad knowledge of the processing operations from seed pressing to oil and meal refining, as well as associated administrative tasks. The plant manager organizes, oversees, and directs all processing operations. This position is also responsible for developing policies and managing the daily operations of the business. The plant manager is the liaison between the owners and the staff, synchronizing staff needs with owner goals in order to keep the facility operating as best as possible.

- **Maintenance Manager**

The maintenance manager ensures that various pieces of machinery necessary in canola processing are functioning properly. This position requires an in depth understanding of heavy machinery, technical maintenance skills, and mechanical engineering. Depending on the size of the facility, the maintenance manager will be assisted by, and responsible for, a number of maintenance technicians who will work with the manager to keep the plant operational. The maintenance manager reports to the plant manager and ensures that the plant's equipment needs are being met and taken into account during general operational planning.

- **Maintenance Technician**

Maintenance technicians assist the maintenance manager as needed with mechanical issues around the processing plant. These workers will be responsible for responding to machinery issues around the site, including presses, solvent extractors, storage equipment, pipes for moving oil, on site transportation equipment, and more.

- **Processing Manager**

The processing manager oversees and directs the oil extraction and refining processes at the plant. This position reports to the plant manager with whom they work to establish production standards and quotas to ensure oilseed processing meets both grower supply and buyer demand. The processing manager is responsible for overseeing the equipment at all stages of the oil extraction process, as well as leading other processing employees.

- **Processing Technician**

Processing technicians work under the processing manager and operate the various presses and other equipment used throughout the oil extraction process. Depending on whether the plant uses mechanical, chemical, or both, the assistants will be working with screw presses, hammer presses, heat exchangers, solvent extractors, and other related equipment. These employees will be responsible for creating quality oil that matches the standards and goals of the processing facility owner and general manager.

- **Quality Control**

The quality control or laboratory manager will assist the processing team in ensuring the input and output products are of high quality and meet industry standards. The quality control lead will keep up with environmental regulations that impact the facility, and make sure that the facility staff is aware of any changes in operating procedure. QC is also in charge of leading any tests on the oil, meal, and seed products to provide research information per any consumer or industry requests.

- **Logistics and Transportation Manager**

The logistics and transportation manager is responsible for overseeing all tasks related to shipping and delivery of both seeds to the facility and oil to customers. This position can be full time or part time depending on if the business uses in house transportation or a third party distributor. This manager plans, organizes, and manages the delivery drivers to ensure efficient and coordinated deliveries. He or she is also responsible for dispatching, routing, and tracking transportation vehicles.

## **OPERATING PROCEDURES**

While the following section presents details about the basic procedures envisioned for the processing facility, the county will need to examine and respond to its own unique agricultural and commercial. All numbers presented here are meant for preliminary analysis only and should be considered no more than estimates. Actual environments for the processing facility are likely to be different once in operation. In order to remain a successful enterprise, the county should continuously revise procedures as they discover new opportunities or obstacles.

### **Location and Site Specifications**

Johnston County has embraced its agricultural traditions and made agricultural preservation an important aspect of their county planning process through both their 2030 Comprehensive Plan and their Agricultural Development Plan.

The facility should also include space or appropriate structures for storage of production inputs and equipment. Canola seeds will need to be stored in a controlled environment to reduce the risk of rot, pests, or other contaminations before processing. Production equipment such as presses, dryers, and storage tanks require adequate space to be used safely and efficiently.

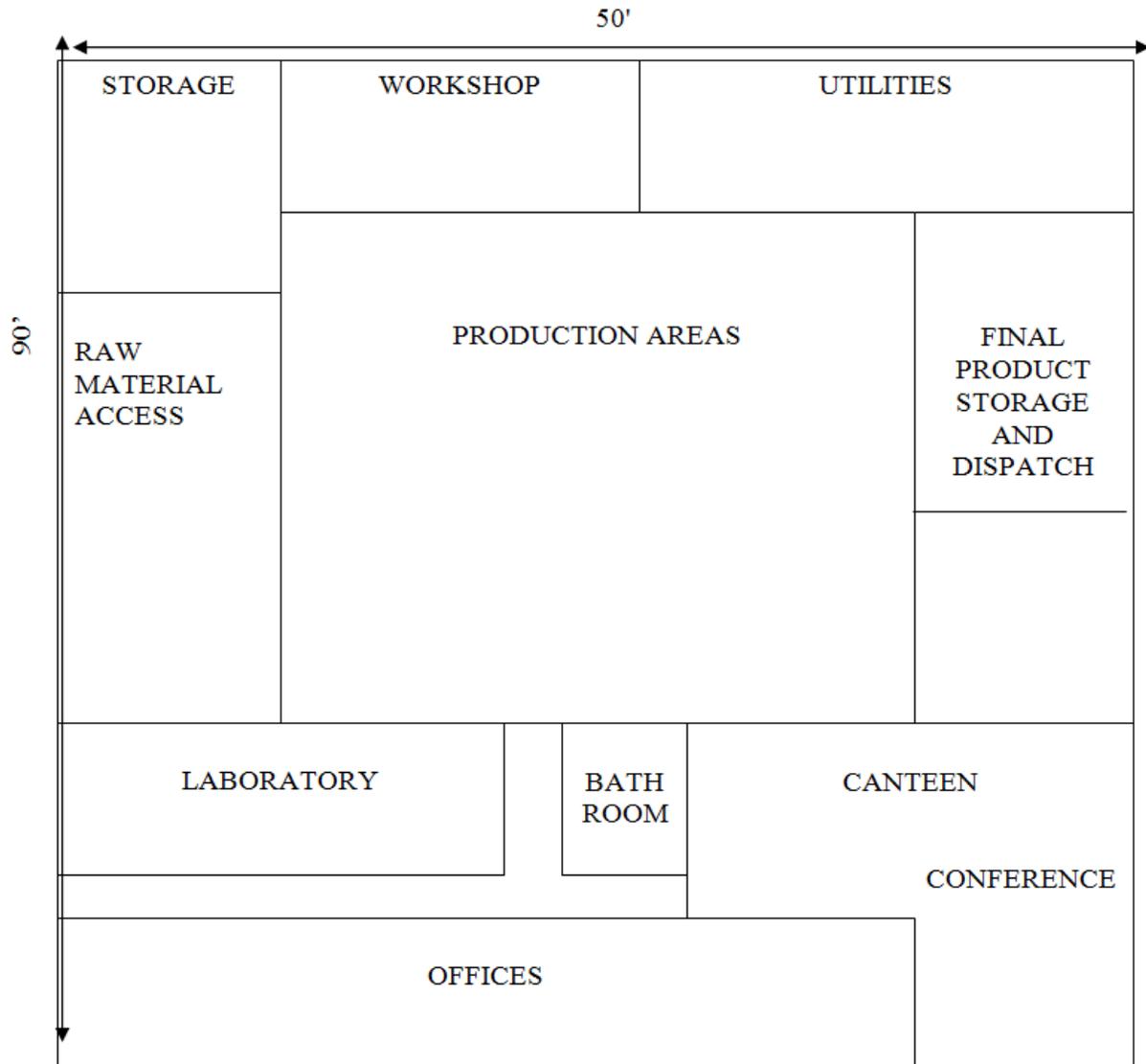
A good location is essential to establishing a successful processing facility that is both financially stable and meets the needs of the grower community. Ideally, the facilities will be accessible from a major roadway to allow for proper traffic flow of raw canola in and processed oil out of the site. A location near current or potential canola growers will allow for fast and easy transportation of canola seeds from farm to facility. Enough room and proper entrance/exit routes will be needed to provide vehicles transporting materials to and from the site the proper convenience and clearance they need. The site should have space to handle the initial operations and room for growth, should demand make this necessary. It should also have adequate parking for employees and visitors, including cars and commercial vehicles.

A facility would have to receive zoning and use approval from the county. To obtain this approval, a plan must be submitted to the county. This plan is presented to the county planning commission. The commission reviews the plan. They forward the proposal for the site and the activity to the County Board of Supervisors for approval. Most counties have an opportunity for public comments to the proposal built into the planning commission approval process. Typically this county process takes around three months.

### **Facility Characteristics**

Once a site has been selected, planning will need to begin on the facility of around 8,000 square feet. The site will need to include storage, production, personnel, maintenance, and testing areas in order to cover all aspects of the process from the time the seed arrives until the meal and oil leave the facility. A properly designed facility will be efficient, safe, and free of risks of contamination. The quality of the products will be focused from not only from personal hygiene and safety but also in the organization of the factory, procedures and methods of control. The image below is an example of a production facility layout (not to scale):

**Figure 10: Typical Plant Layout**



**Production areas:** The production areas will house the oilseed presses and be the main hub of operation for the facility. Seeds will pass from one end of the facility to the other on their way through the process to avoid contamination and increase efficiency.

**Laboratory:** The laboratory will monitor the quality of the inputs and outputs. Given that oils are going to be produced, chemical analysis procedures will be tabulated for oils for cooking products (cooking oils) and biodiesel. Research and monitoring of the regions seed and oil supply will occur to assist with future canola growth in North Carolina. There will be sufficient access to the laboratory while keeping all processes performed here separate from the production plant.

**Workshop:** The workshop will house all engineering, maintenance, and mechanical items to keep foreign bodies out of the processing area.

**Offices:** Offices will house administrative staff and act as the main operational hub of the Matson Consulting

facility. The office and office materials will be away from the products to avoid any foreign material in the products.

**Canteen and Conference:** The canteen and conference rooms will offer employees an area separate from the production facility to hold meetings, eat, rest, and perform other activities as necessary. This area is slightly removed from the production plant to reduce noise and eliminate contamination.

**Utilities:** A utilities room will house the sources of water, steam, electricity, etc. that are needed in the production process.

**Raw material Access:** A clear entrance for the canola inputs is important to keep order in the processes. This entrance will connect to the external storage where growers will deposit their raw canola seeds.

**Final Product Storage and Dispatch:** Finished products such as canola oil and feed meal will exit the facility at the end of the production process on the opposite end as they entered the line. From here, the products can be collected by truck and shipped to their intended destination.



(Pictures from East Carolina Soybean Processors <http://www.ecspllc.com/photogallery.htm> to show a similar type of operation)

## Equipment Needs

A variety of equipment manufacturers should be considered before deciding which will fit best for the processing facility. This selection may involve consulting experts on canola oil production to advise on the various options available.

The facility owners will need to choose machinery that is designed to handle the project's intended production capacity as well as room for future growth. Equipment needs will also vary based on the processing method or methods which will be used to extract the oil.

The following table provides selected examples of equipment that may be necessary for an operational canola seed processing plant.

**Table 3: Examples of Oilseed Processing Equipment**

Processing Equipment
Screw Press
Seed Hopper
Dryers
Roller Mill/Flaker
Oil Storage Tanks
Expander/Extruder
Hammer Mill
Heat Exchanger

### Canola Processing Methods

Canola seeds are around 40 to 45 percent oil and various trials have resulted in yields between 75 and 240 gallons of oil per acre, with around 100 gallons being most common.<sup>56</sup> Variations in oil production come from the quality of the seed and pressing method chosen. Inefficiencies in the pressing leave oil in the seed meal. Once the canola has been harvested, the seeds are first separated from any residual plant matter or other debris from the field by a mesh screen. They are then passed through grain dryers to heat the seeds to an optimum temperature to be more malleable and prevent them from shattering during the flaking process. Flaking involves the seeds passing through roller mills which apply pressure in order to break the cell walls of the seed and release the oil. The rollers press the seeds into flakes of around .3 mm in thickness to ensure high oil extraction.

The seed flakes are then run through a heated drum to raise their temperature. This further breaks oil cells that were not ruptured during the flaking process, warms the oil within the flakes for easier extraction, and inactivates enzymes within the seeds which can affect the oil quality during processing. Following the 15-20 minute heating process, the seed flakes are ready to be passed through a screw press.

This device features a barrel with a rotating screw that presses the flakes towards a press head. The screw press crushes the flakes and removes over 50-60 percent of the oil which drains out of the bottom of the barrel through oil canals. The pressed flakes, now called cake, are expelled out of the front of the press.<sup>57</sup> At this point the oil is either ready for refining, or the cake can be further processed using a solvent.

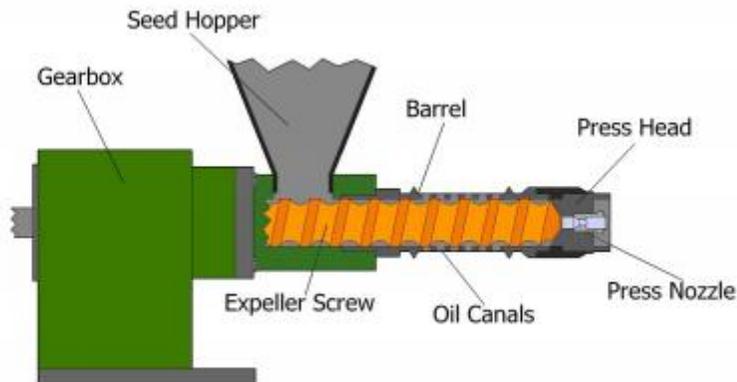
‘Cold pressed’ is a variant of the expeller press method used to create product differentiation. Cold pressed oil involves removing the heat from the process to avoid changes to the color and taste caused by the oil’s reactions to high heat. Instead of the typical method which involves heating seeds at numerous points during the process to better facilitate the oil removal, the seeds are not heated and are pressed more slowly to avoid heat caused by the friction of the expeller press. By avoiding the changes caused by heat to the oil’s character, cold pressing can limit the need for post-expelling refining. While in Europe, cold pressed oils are regulated to production

<sup>56</sup> (2014) “Rapeseed and Canola for Biodiesel Production.” *Extension*. [articles.extension.org/pages/26629/rapeseed-and-canola-for-biodiesel-production](http://articles.extension.org/pages/26629/rapeseed-and-canola-for-biodiesel-production)

<sup>57</sup> (2016) “Steps in Oil and Meal Processing.” *Canola Council of Canada*. [www.canolacouncil.org/oil-and-meal/what-is-canola/how-canola-is-processed/steps-in-oil-and-meal-processing/](http://www.canolacouncil.org/oil-and-meal/what-is-canola/how-canola-is-processed/steps-in-oil-and-meal-processing/)

in below 90 degree heat, US regulation is not as stringent, resulting in oils pressed in any temperature below 400 degrees.<sup>58</sup>

**Figure 11: Expeller (Screw) Press Diagram<sup>59</sup>**



A common method of canola seed processing involves using a solvent to help extract the oil remaining in the cakes. The cake is placed in an extractor and covered in hexane, which is pumped in the opposite direction of the cakes to create a counter-current. The solvent saturates the cakes and pulls the oil from them. The remaining cakes are then processed further into animal meal. The oil and hexane mixture is then subjected to a heating process to remove the solvent. While this purifies the oil, as stated above in the discussion of cold pressing, high heat can alter the oil's flavor.<sup>60</sup>

The oil from the screw press and the solvent extraction is collected and stored. It will next go through a refining process to remove fatty acids, phospholipids, and any remaining meal particles. A process called bleaching, which involves filtering the oil through clay, lightens the color of the oil and further filters larger particles from the final oil. Finally, steam distillation is used to remove any bad odors or tastes. From here, the oil is ready to be marketed as cooking oil or to continue being processed into margarine or other oil based products.<sup>61</sup>

<sup>58</sup> (2008) "What is Expeller Pressed Oil and Why Does it Matter?" *Fooducate*. [www.fooducate.com/app#!page=post&id=57A334F9-5D86-7EE8-4279-8B713393BECF](http://www.fooducate.com/app#!page=post&id=57A334F9-5D86-7EE8-4279-8B713393BECF)

<sup>59</sup> "Oilseed Fact Sheet: Oilseed Presses." *University of Vermont Extension*. [www.uvm.edu/extension/cropsoil/wp-content/uploads/Oilseed-Presses.pdf](http://www.uvm.edu/extension/cropsoil/wp-content/uploads/Oilseed-Presses.pdf)

<sup>60</sup> "What is Expeller Pressed Oil and Why Does it Matter?" *Fooducate*.

<sup>61</sup> "Steps in Oil and Meal Processing." *Canola Council of Canada*

**Figure 12: Bleached vs. Unbleached Canola Oils<sup>62</sup>**



In order to further differentiate from other brands and offer a unique product, some canola processors such as Whole Harvest go beyond processing methods and market their oil as non-genetically modified. Non-GMO canola oil requires sourcing canola seeds that are certified as non-genetically modified and generally involves making use of only the expeller press during processing. As around 90 percent of the North American canola crop is genetically modified in order to increase herbicide resistance, having a steady supply of GMO free seeds for the processing plant could present a problem.<sup>63</sup> This combination of using a GMO free raw commodity and avoiding the chemical processing method promotes a healthy and natural product identity that can differentiate it from competitors. Given the continuously growing awareness and popularity of ‘all natural’ products, this differentiation could increase the potential customer base for the oil produced from this facility.

**Table 4: Differentiating Brand Identifiers**

Oil Extraction			Seed Origins	
Hot Expeller Pressed	Cold Pressed	Solvent Extraction	GMO Free	GM Canola Oil
<ul style="list-style-type: none"> <li>• Chemical free</li> <li>• Traditional method</li> <li>• Extracts less oil than solvents</li> </ul>	<ul style="list-style-type: none"> <li>• Lower yield than hot pressed</li> <li>• Simpler refining</li> <li>• Higher quality oil</li> </ul>	<ul style="list-style-type: none"> <li>• Efficient extraction</li> <li>• Chemical process</li> </ul>	<ul style="list-style-type: none"> <li>• Marketing appeal</li> <li>• Requires source of GMO free canola</li> </ul>	<ul style="list-style-type: none"> <li>• 90% of the canola crop</li> <li>• Easier to source seeds</li> <li>• Lacks healthy marketing appeal</li> </ul>

### Additional Canola Uses

In addition to refined oil used in cooking, the canola seed has other uses such as feed meal for animals, and biodiesel. Once the oil has been removed, the crushed seed mash can be incorporated into animal feed as a secondary profit avenue. In regards to biodiesel, the oil can be

<sup>62</sup> (2013) Douglas Schaufler and Russell Schaufler. “Small-Scale Oilseed Processing Guide.” *Penn State University*

<sup>63</sup> (2010) “Genetically Modified Crop on the Loose and Evolving in the U.S. Midwest.” *Scientific American*.

[www.scientificamerican.com/article/genetically-modified-crop/](http://www.scientificamerican.com/article/genetically-modified-crop/)

turned an environmentally friendly biofuel through a simple process that can be done on a large or small scale.

### **Canola Feed Meal**

Processing canola involves extracting the oil from the seed. The resulting seed meal by-product can be put to use as an animal feed supplement to avoid it becoming a waste product. On average, canola seed is around 60 percent meal in weight. A bushel of canola can produce about 30 pounds of meal. As canola has grown in popularity, it has become a possible alternative to soybeans as a protein meal for cattle and other animals. This results in a more sustainable product, a source of animal feed for local farmers, and an additional source of income for the crushing facility.

Once the canola seeds have gone through the oil extraction process, the remaining seed product is put through a process to remove any solvent used in extraction and to dry the meal. To remove solvent, the meal is heated by steam-heated plates and then toasted by pushing hot steam through the meal itself. This process takes about a half hour and is followed by an air drying step that reduces the moisture content of the meal to around 12 percent. The meal is then ground up in a hammer mill.<sup>64</sup>

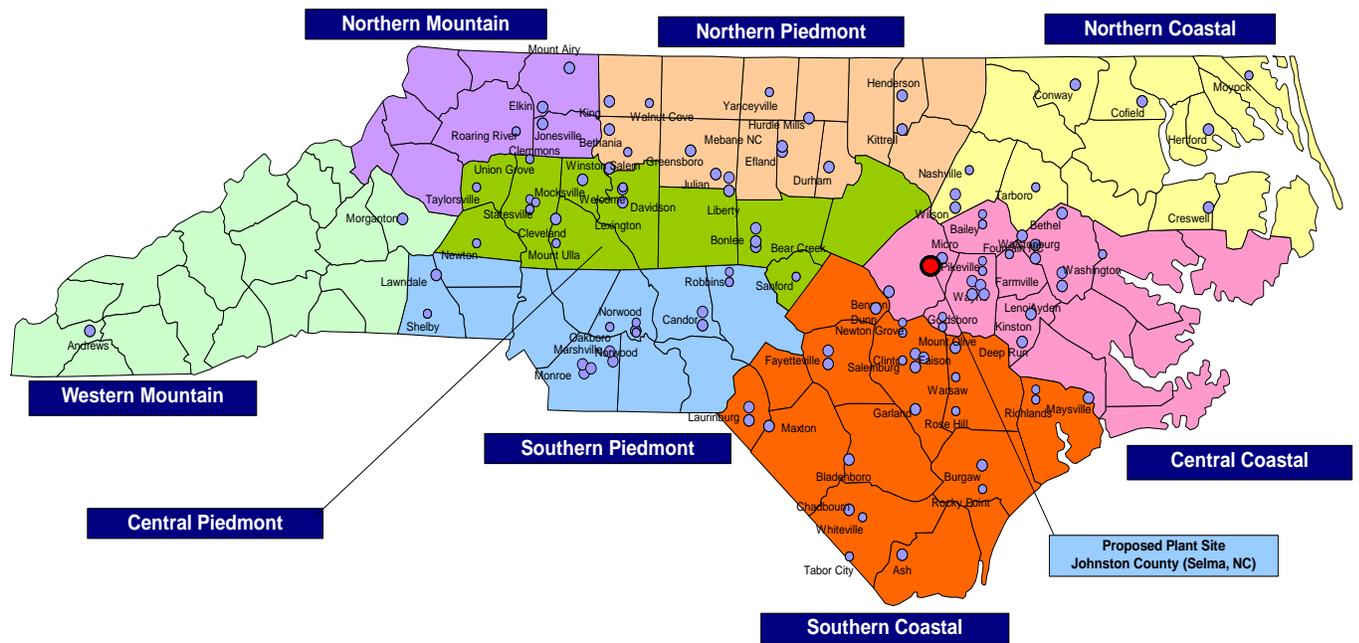
Once this process is completed, the meal is ready to be stored or sold as animal feed to supplement a balanced diet. Based on conversation with Mark Ash, author of the USDA-ERS Canola page, canola meal is better suited for a cattle feed additive than for hogs. As hogs account for the majority of North Carolina's animal production, this could negatively impact canola's viability in the feed market.<sup>65</sup> The figure below by Frazier, Barnes & Associates shows feed manufacturers and distributors across North Carolina. Many of these use soy or canola as ingredients in their feed, and represent potential consumers of the proposed facility's waste meal.

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<sup>64</sup> (2016) "Steps in Oil and Meal Processing." *Canola Council of Canada*. [www.canolacouncil.org/oil-and-meal/what-is-canola/how-canola-is-processed/steps-in-oil-and-meal-processing/](http://www.canolacouncil.org/oil-and-meal/what-is-canola/how-canola-is-processed/steps-in-oil-and-meal-processing/)

<sup>65</sup> From phone conversation with Mark Ash. *USDA-ERS*. January 2017.

**Figure 13: NC Feed Manufacturers/Distributors by District<sup>66</sup>**



As a feed crop, canola would be replacing winter wheat which has seen its value fall in recent years. National average price for canola in December 2016 was \$8.10 per 50 pound bushel according to the USDA’s Oil Crops Outlook.<sup>67</sup> This is compared to a November 2016 winter wheat price of \$3.85 per 60 pound bushel.<sup>68</sup> North Carolina’s wheat price has traditionally been higher than national average, with a recent February 2017 report of \$4.43 paid for wheat at state feed mills.<sup>69</sup> Unlike wheat however, canola has to undergo further processing to be a usable animal feed, leading to additional costs that offset canola’s higher value. Canola also faces issues with storage in humid climates like North Carolina that can lead to spoilage. The nutritional content of canola and wheat also differs, with canola providing much higher levels of crude protein through its oil content, while wheat offers primarily starches. Canola offers between 90 and 93 percent crude protein compared to about 16 percent in wheat. Table 5 shows a comparison of nutrient composition between wheat and other common feed grains.<sup>70</sup>

<sup>66</sup> (2002) Frazier, Barnes & Associates. “Identity-Preserved Soybean Processing Feasibility Study.” *North Carolina Grain Growers Cooperative, Inc.*

<sup>67</sup> Table 8. Oil Crops Outlook Dec. 2016. [www.ers.usda.gov/publications/pub-details/?pubid=81587](http://www.ers.usda.gov/publications/pub-details/?pubid=81587)

<sup>68</sup> Wheat Data-Recent. USDA ERS. [www.ers.usda.gov/data-products/wheat-data/](http://www.ers.usda.gov/data-products/wheat-data/)

<sup>69</sup> NC Dept of Ag Market News. February 6, 2017. [www.ams.usda.gov/mnreports/ra\\_gr110.txt](http://www.ams.usda.gov/mnreports/ra_gr110.txt)

<sup>70</sup> Nutrition and Management: Characteristics of Common Feed Grains. *Alberta Agriculture and Forestry.*

[http://www1.agric.gov.ab.ca/\\$department/deptdocs.nsf/all/beef11489](http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/beef11489)

**Table 5: Average Nutrient Composition of Grains**

Grain	Crude Protein %	Starch %	DE <sup>a</sup> Mcal/kg	ADF <sup>b</sup> %	Ruminal Starch Digestion % Total Starch <sup>c</sup>
Corn	10.3	75.7	4.1	3	65
Barley	12.7	64.3	3.7	7	87
Wheat	15.9	70.3	3.9	8	89
Rye	11.8	65.0	3.7	8	90
Triticale	15.7	67.0	3.7	8	90
Oats	11.6	58.1	3.4	16	92

<sup>a</sup>Digestible Energy<sup>b</sup>Acid Detergent Fibre<sup>c</sup>All grains were steam rolled, except corn which was cracked.

The method by which the oil was extracted has an impact on the nutritional and energy content of the final canola meal. Utilizing solvent extraction removes more of the oil from the seed for processing, while mechanical extraction is less effective but results in a more nutritious meal due to the higher oil content. As seen in Figure 14, meal by-product generated from a mechanical oil expelling process contains three times as much residual oil as that produced by solvent extraction, and ten times as that of comparable soybean meal. Protein content, however, is lower for both processing methods of canola than soybeans.

**Figure 14: Comparison of Soybean and Canola Meals<sup>71</sup>**

	Solvent-extracted Soybean Meal	Solvent-extracted Canola Meal	Expelled, Extruded, Expelled Canola Meal
<b>Dry Matter (%)</b>	90	90	93
<b>Crude Protein (%)</b>	47.5	36	39.2
<b>Residual Oil in Meal (% , ether extract)</b>	1	3.5	10.2
<b>True Metabolizable Energy Broilers (kcal/kg)</b>	2485	2070	3000
<b>Digestible Methionine (%)</b>	0.61	0.69	0.71
<b>Digestible Lysine (%)</b>	2.7	1.6	2

### Canola for Biodiesel

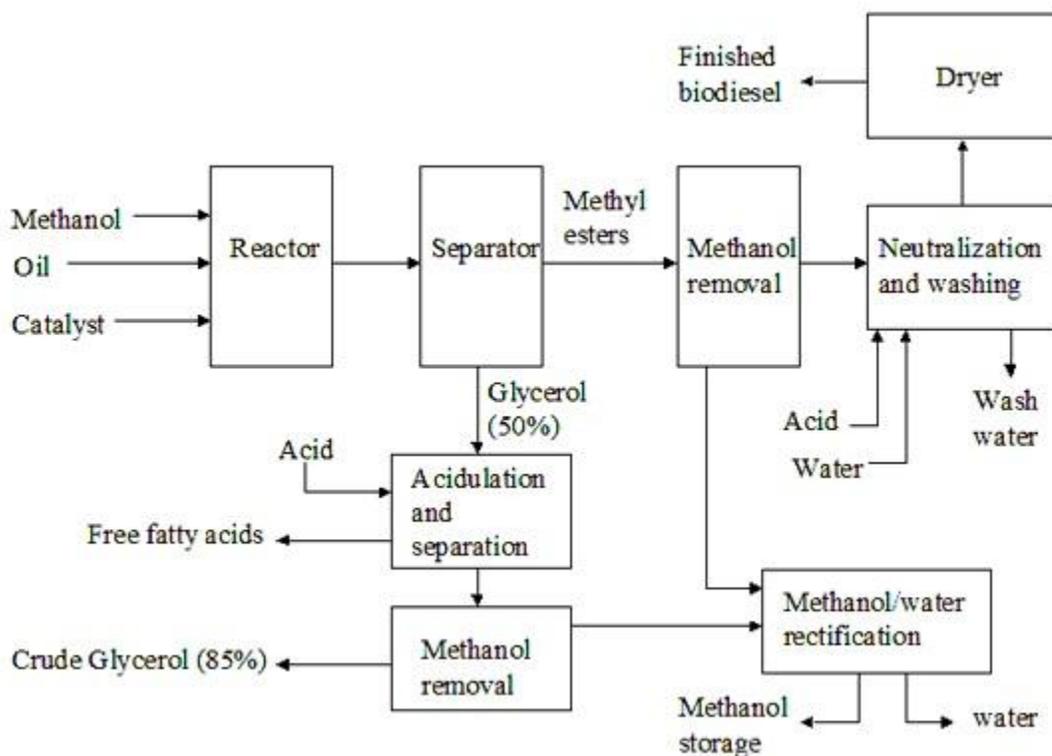
In addition to the traditional use as cooking oil, canola oil can also be further processed into a high quality biodiesel. While in Europe canola oil is already the most common oilseed for biodiesel, it falls behind soybean oil in popularity among United States biodiesel production due to the longstanding soybean industry already present in the country. Canola, however, has several advantages over soybean for biodiesel use. Research from the University of Idaho has shown that canola biodiesel is able to remain a liquid at much lower temperatures than soy or animal fat biodiesels. The cloud point for canola, or the temperature at which vehicle damaging

<sup>71</sup> (2015) "Further Canola Processing Makes Better Meal For Livestock Feed." *WATT AgNet*.

[www.wattagnet.com/articles/23944-further-canola-processing-makes-better-meal-for-livestock-feed](http://www.wattagnet.com/articles/23944-further-canola-processing-makes-better-meal-for-livestock-feed)

crystals begin to form in the fuel, is 1°C, allowing for canola based biodiesel to be used in cold climate regions.<sup>72</sup> To produce this biodiesel, the refined oil is mixed with methoxide, a sodium hydroxide and methanol mixture. This mixture will separate the glycerin from the useable biodiesel. Following this, the glycerin layer from the oil mixture drained out and the biodiesel is washed and filtered to remove excess water and unwanted residue.<sup>73</sup> The following diagram details the steps and byproducts of a commercial-scale biodiesel process.

**Figure 15: Process Flow Schematic for Biodiesel Production<sup>74</sup>**



Biodiesel production can act as a compliment to a canola oil processing facility, offering a market for the finished oil. The oil can be sold to a third-party biodiesel producer, or used by the canola growers themselves in small-scale, on-farm biodiesel production operations. Creating biodiesel initiatives alongside a canola processing operation can help to increase the crushing project’s overall sustainability. Canola farmers are able to reduce their operating costs by creating their own fuel for their farm equipment, thereby lowering transportation costs they would normally incur. The following table from an oilseed and biodiesel study by Link Shumaker and Jeremy Ferrell details various crop rotation scenarios and the corresponding amounts of oil, meal, and biodiesel that can be produced in a year based on the crop types.

<sup>72</sup> (2014) “Rapeseed and Canola for Biodiesel Production.” *Extension*

<sup>73</sup> (2008) “Canola Biodiesel Production.” *Biodiesel Times*. [biodiesel.rain-barrel.net/canola-biodiesel-production/](http://biodiesel.rain-barrel.net/canola-biodiesel-production/)

<sup>74</sup> (2012) “Commercial and Large Scale Biodiesel Production Systems.” *eXtension*.

<http://articles.extension.org/pages/27537/commercial-and-large-scale-biodiesel-production-systems>

**Table 6: Farm to Fuel Scenarios Based on Rotation Type<sup>75</sup>**

<b>500 Acre Farm</b>	<b>Oil-gallons/yr</b>	<b>Meal-tons/yr</b>	<b>Biodiesel-gallons/yr</b>
1) Soybeans-Wheat-Soybeans-Canola	42,250	678	34,645
2) Corn-Canola-Soy-Wheat	32,750	440	26,855
3) Soybeans-Winter Cover Crop-Sunflower-Wheat-Corn-Canola	30,833	372	25,283
<b>2000 Acre Farm</b>	<b>Oil-gallons/yr</b>	<b>Meal-tons/yr</b>	<b>Biodiesel-gallons/yr</b>
1) Soybeans-Wheat-Soybeans-Canola	169,000	2,710	138,580
2) Corn-Canola-Soy-Wheat	131,000	1,760	107,420
3) Soybeans-Winter Cover Crop-Sunflower-Wheat-Corn-Canola	123,333	1,488	101,133

While canola is a strong candidate crop for creating biodiesel, the increasing commoditization of biofuels will lead to difficulties in marketing North Carolina canola as an input source for industrial scale operations. The growing interest in alternative fuel sources such as biodiesel has led to increasingly larger scale production operations to keep up with demand. The commoditization of biodiesel, as with any product, leads producers to seek out input sources that have the lowest production costs and the highest yields in order to maximize profits. While North Carolina soy and canola production can create sufficient amounts of fuel for local consumption, high-yield regions such as the Midwest and Great Plains where biofuel inputs such as soybeans and corn can be produced cheaply are more profitable for large biodiesel production operations.

### **Production Considerations**

Some important considerations should be made when considering the product the facility will produce. If they do not have adequate supply to meet consumer demand and farmer needs, the facility can irrevocably damage their reputation in the area. The following critical factors are some of those that should be taken into account prior to initiating operations:

- **Quality Assurance of Supply**

Inputs are one of the key determinants of the quality of the finished oil. Plant operators must ensure the canola seeds they source are of high quality to guarantee consistent taste and quality. The volume of production necessary will determine if the facility will need to source inputs from additional producers outside of the county. The source of commodity used may have different quality characteristics associated with it. Any suppliers for the facility will need to meet the business' stringent product guidelines, especially if going with a distinguishing brand identifier such as GMO free.

- **Seasonality**

Seasonality is an important issue for every oilseed processing facility. Continuity of supply is vital because customers expect a consistent supply of products and for orders to be filled as they are placed. The inputs used in oil production have a seasonal cycle of growth, yet oil must be available all year long. In order for the business to grow and thrive, the producers must be prepared to supply what its customers demand year round by sourcing enough inputs to fuel production and meet demand.

<sup>75</sup> (2013). Link Shumaker and Jeremy Ferrell. "Oilseed Farming and Biodiesel Plant Integration Considerations." Matson Consulting

## IMPLEMENTATION PLAN

This section details procedures specific to a Johnston County oilseed crushing facility. These include, but are not limited to, raw commodity needs, crushing processes, and daily business operations. As the business develops, procedures may evolve and be adjusted.

### Supply Arrangements

Canola seeds for the proposed facility would be sourced from farms in the local region through mutually beneficial agreements between growers and the facility management. An estimated 22,000 to 25,000 acres of canola would be required to establish a sustainable crushing facility. As there is not an established canola crop in the region, existing growers would need to begin incorporating canola into their crop rotations. The proposed facility would source seeds from an estimated 75-mile radius, including Johnston, Nash, Wilson, Wayne, Wake, and Sampson Counties.<sup>76</sup>



As canola is a winter crop, it would enter the regional crop rotation as a substitute for the winter wheat that is currently produced. To reduce the risk of potential pathogen contamination, it is recommended that canola plantings be broken up every two to three years. Table 7 represents different crop rotations and their associated oil and meal yields according to a study on North Carolina oilseed by Link Shumaker and Jeremy Ferrell.

**Table 7: Estimated Vegetable Oil and Meal Production Based on Average Crop Yields by Rotation<sup>77</sup>**

Rotation	Average Vegetable Oil (gal/acre/year)	Average Oilseed Meal (lbs/acre/year)
1) Soybeans-Wheat-Soybeans-Canola	85	2,710
2) Corn-Canola-Soy-Wheat	66	1,760
3) Soybeans-Winter Cover Crop-Sunflower-Wheat-Corn-Canola	62	1,488

### Site

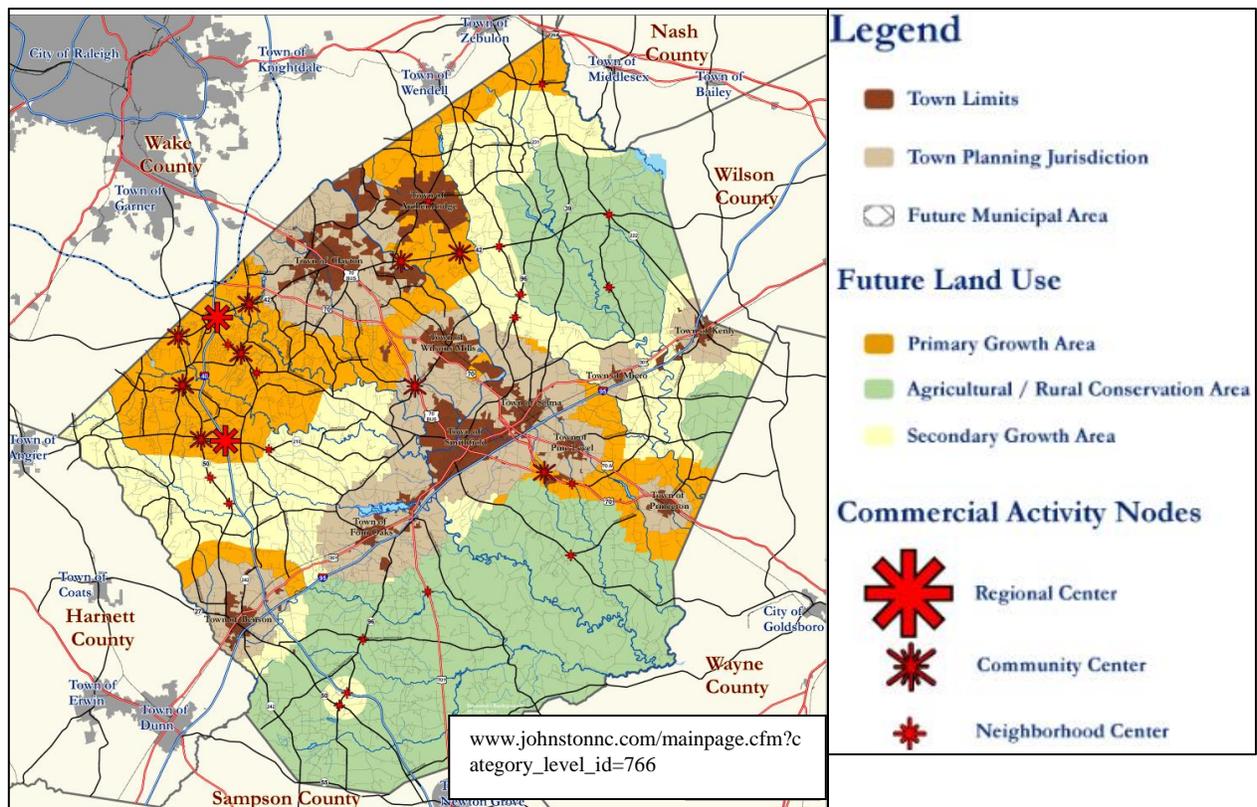
As shown in the land use map displayed in Figure 16, Johnston County agriculture is located in two primary regions separated by the I-95 corridor that divides the county. According to the county's Agricultural Development Plan, the larger southern agricultural region features better soil and is more conducive to larger field crops and livestock operations. The northern area by contrast is made of piedmont soils, smaller farms, and tobacco production. This region also has to balance agriculture and the increasing development radiating from the numerous nearby

<sup>76</sup> Conference call with Tim Britton, NCSU Extension Agent in Johnston Co. Sept 27, 2016.

<sup>77</sup> (2013). Link Shumaker and Jeremy Ferrell. "Oilseed Farming and Biodiesel Plant Integration Considerations."

towns. Most of Johnston County’s primary and secondary growth regions are located north of I-95 and population growth in these areas has directly competed with agriculture on that side of the interstate. This has been compounded by the county’s location to the south of the Raleigh-Durham metropolitan area. As urban/suburbanization spreads south and the land increases in value, the incentive to retain it for agriculture decreases. These changing demographics and land usage issues have spurred the county to develop a three pronged plan to preserve the economically important agricultural economy through Agricultural Development and Marketing, Training and Education, and Public Policy and Regulation.

**Figure 16: Johnston County Land Use Map<sup>78</sup>**



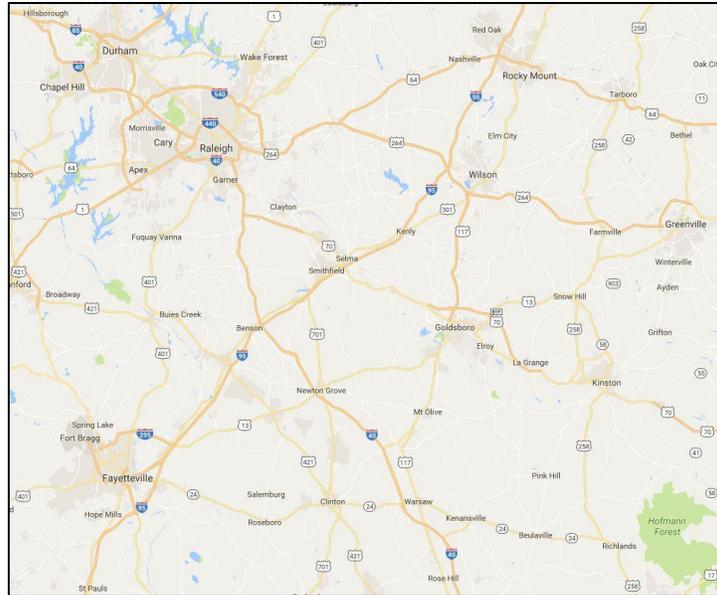
### Transportation

In addition to having adequate agricultural space, Johnston County is also in a prime location to facilitate the transportation of oilseed and refined oil into and out of the facility to major regional hubs. I-95, a major interstate running from Florida to Maine, passes through the middle of the county as seen in the map below. Another interstate, I-40, also runs through Johnston County connecting to the Raleigh-Durham metropolitan region to the north and the Wilmington area along the southern North Carolina coast. Another major road through the county, US-70, runs slightly parallel to I-40, connecting Goldsboro to the south with Raleigh. This places Johnston County in a prime regional transportation network. The county’s location in the eastern portion of the state is a positive asset to a potential canola processing facility. Not only is the majority of the state’s agriculture located in this region, possibly allowing the facility to attract business from canola growers in nearby counties, but the transportation network in eastern North Carolina

<sup>78</sup> “2030 Comprehensive Plan” *Johnston County Planning and Zoning*.

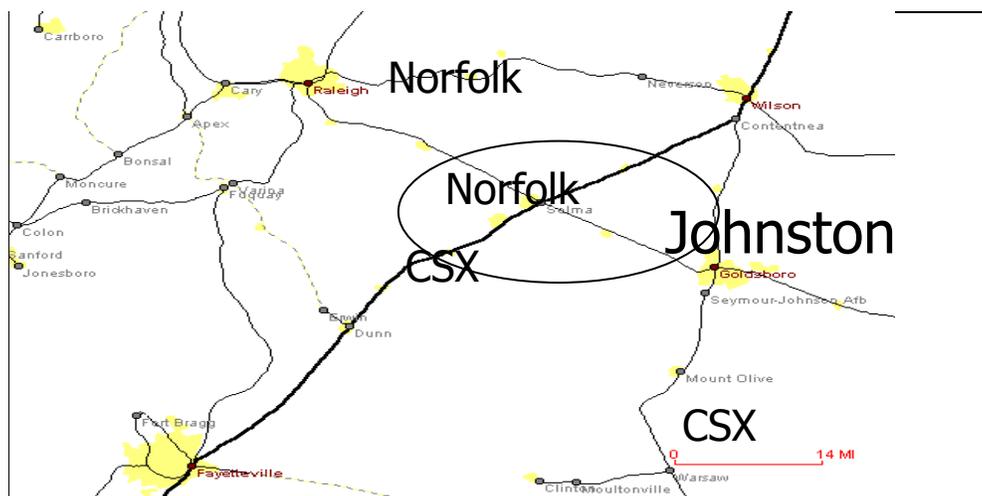
allows for easy movement of processed canola oil to a number of potential marketing points throughout North Carolina and surrounding states.

**Figure 17: Eastern North Carolina Highway Access**



Additionally, the town of Selma in Johnston County sits at the junction of two railroads, a Norfolk Southern line running east-west across the state, and a CSXT line running north-south. Bailey Feed Mill, an industrial and agricultural transportation business who currently works with large scale oilseed ventures, operates in Selma along the railway and I-95 corridor. Locating the facility near their operations would allow for a reduction in transportation and logistical fees involved in moving product from the crushing facility to a viable distribution network. CSX had previously proposed constructing a train-to-truck railroad hub in the county, but the idea was met with opposition from area residents and was ultimately unsuccessful.

**Figure 18: Railway Access<sup>79</sup>**

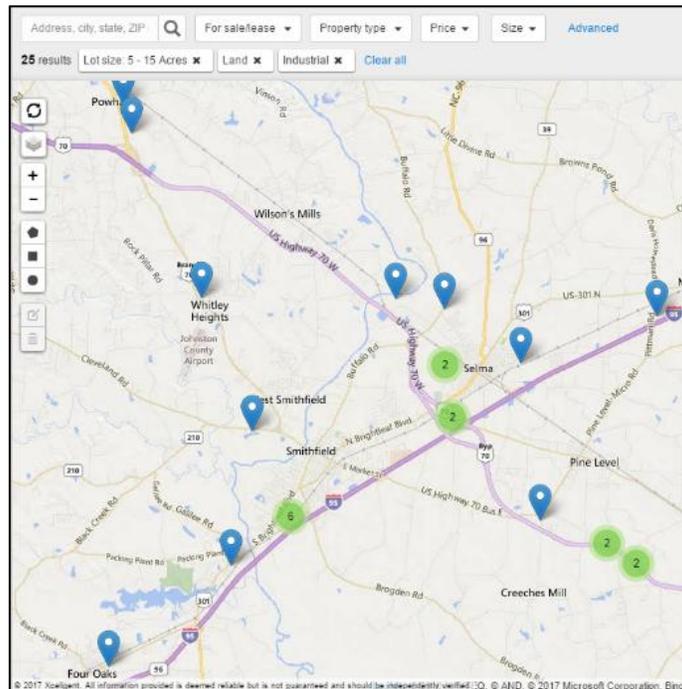


<sup>79</sup> (2002) Frazier, Barnes & Associates. "Identity-Preserved Soybean Processing Feasibility Study."

## Location

A proper facility location will be between seven and fifteen acres in size, and will provide proper proximity to both growers and transportation networks. Establishing a site near the Selma or Smithfield regions of the county would provide easy access to I-95, highway 70, highway 301, and both the east-west and north-south railway lines. There are numerous available property locations in the area as seen in Figure 19 from the Johnston County Economic Development website.

**Figure 19: Available Properties<sup>80</sup>**



The sites shown above range from five to fifteen acres and are all zoned for industrial use. These sites are all in close proximity to highway and railway transportation networks, as well as the Bailey Feed Mill. Prices on these land parcels vary from around \$20,000 per acre for a 10 acre lot in an area such as the Oak Tree Corporate Park, to over \$300,000 per acre for an 8 acre lot on Outlet Center Drive directly between I-95, Highway 70, and the CSX rail line. A site choice will have to take into account not only proximity to rail lines and highways, but also surrounding properties.

Additionally, Selma Crossings, located at exit 98 on I-95 is a large piece of commercial property that is prepared to be subdivided, and is serviced by both the CSX and Norfolk Southern rail lines. This property is conveniently located across the street from Bailey Feed Mill, and the area could work to serve as a hub for oilseed crushing and transportation for Johnston County and the surrounding region. The area is serviced by Johnston County water system, the Town of Selma waste water facilities, and electricity through Selma's agreement with Electricities of North Carolina.

<sup>80</sup> Johnston County Economic Development-Available Land and Buildings Interactive Map Screenshot. <http://www.jcnecd.com/>

**Figure 20: Selma Crossings<sup>81</sup>**

	Date Available:	02/03/2017
	Sales Price:	\$0
	Terms:	\$15,000 TO \$85,000 Per Acre
<b>Utilities</b>		
<b>Electricity</b>		
Service Provider:	Selma	
Distance to Transmission System		
Distance to Closest Substation		

## Operations

The proposed crushing facility in Johnston County would utilize an expeller press method of extracting canola oil from seeds brought into the facility by local farmers. Seeds will be stored on site in grain silos where they can be kept cool and moisture controlled to maintain freshness while they await crushing. Canola harvest occurs in late spring/early summer. The facility will coordinate with growers to establish delivery times.

Once the canola seeds are on site, they will be processed through a separator to remove any field debris, and a dryer to preheat the seed and prevent shattering during the crushing process. A flaking process is used to rupture the seed hull before crushing making for easier oil extraction.

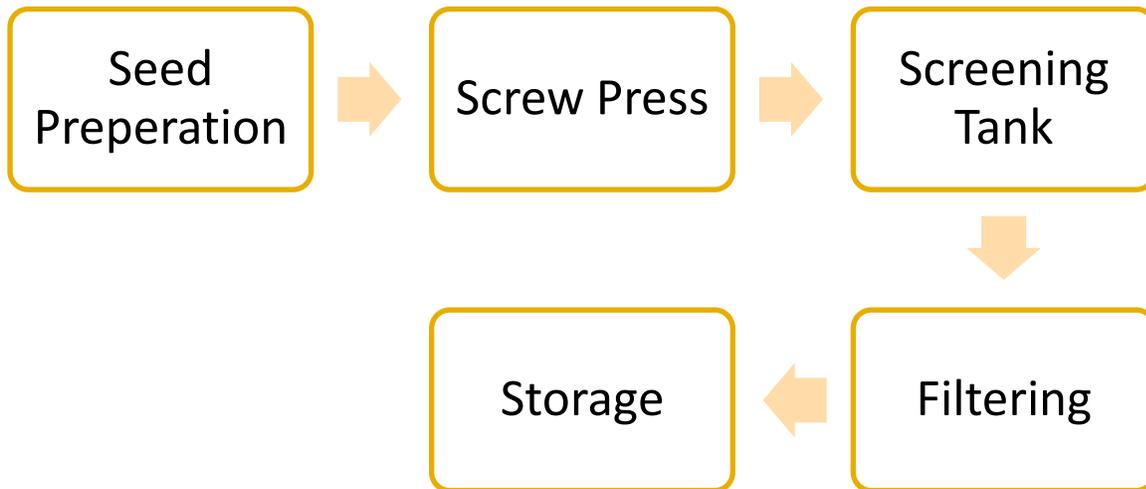
Seeds will be fed by conveyor belts and elevators into a mechanical screw press which removes the oil from the seed and expels the remains in meal cakes. Unlike hexane, which removes more of the oil from the seed through a chemical process, mechanical expelling creates a more oil rich meal for animal feed and eliminates chemical contact with the oil.

Once crushed, the seed meal will be ejected from the press and ready to be sent for processing. The oil will be collected in a tank and filtered to remove any physical impurities left over from the crushing process. This raw oil will then be de-gummed to remove phosphatides that create a sludge layer during storage. The raw oil will then be stored in storage tanks to await pickup by buyers who will refine the oil to create either cooking oil or biodiesel. Figure 21 reiterates the oilseed crushing process described in the General Operations section, and offers a simple visualization of the process which the proposed facility in Johnston County will follow as well.

<sup>81</sup> Selma Crossings. *AccessNC*.

[http://accessnc.commerce.state.nc.us/NCDOC/Search/PropertyViewHTML.do?site\\_id=13739&site=true](http://accessnc.commerce.state.nc.us/NCDOC/Search/PropertyViewHTML.do?site_id=13739&site=true)

**Figure 21: Basic Expeller Process**



### Multi-Crop Setup

Soybeans, another oilseed crop, are already successfully growing in North Carolina. In 2016 the state harvested over 1.6 million acres of soybeans yielding over 60 million bushels.<sup>82</sup> Unlike North Carolina canola which has yet to establish itself on a large-scale, soybeans are already being crushed and processed in the state by a number of facilities both large and small such as Cargill and Perdue. According to the USDA’s National Agricultural Statistics Service, in 2015 Johnston County ranked 14<sup>th</sup> in the state in soybean production, producing almost 1.4 million bushels on more than 56,000 acres.<sup>83</sup> This developed and stable oilseed crop has the potential to help offset the risks of establishing a canola-only facility by providing additional revenue and a larger pool of inputs.

While canola is primarily a winter crop that is harvested in late spring, soybeans planted in late spring and are harvested in late summer and early fall depending on the growing region. This season difference offers growers and press operators the opportunity to produce and process oilseed crops year round for sale to oil refineries and feed meal producers.

Soybeans, like other oilseed crops, follow a crushing process similar to canola and utilize the same equipment. Constructing a facility capable of crushing both oilseeds on a small scale would allow the operation to run year round and allow local growers to make use of either crop as a source of revenue. According to conversation with Mark Ash of the USDA-ERS, an Archer Daniels Midland canola plant in Velva, North Dakota has been set up to allow for multi-crop crushing, proving the feasibility of this system.<sup>84</sup> The company has also added soybean crushing capabilities to its Enderlin, North Dakota plant that has already been crushing both canola and sunflowers seeds.<sup>85</sup> While creating a multi-crop facility will lower the risks associated with

<sup>82</sup> (2016) “Crop Production.” *USDA NASS*. [www.usda.gov/nass/PUBS/TODAYRPT/crop1116.pdf](http://www.usda.gov/nass/PUBS/TODAYRPT/crop1116.pdf)

<sup>83</sup> (2016) “North Carolina Annual Statistics Bulletin - p.117 Johnston County.” *USDA NASS*. [www.nass.usda.gov/Statistics\\_by\\_State/North\\_Carolina/Publications/Annual\\_Statistical\\_Bulletin/AgStat/Back50/JohnstonJones.pdf](http://www.nass.usda.gov/Statistics_by_State/North_Carolina/Publications/Annual_Statistical_Bulletin/AgStat/Back50/JohnstonJones.pdf)

<sup>84</sup> From phone conversation with Mark Ash. *USDA-ERS*. January 2017.

<sup>85</sup> (April 27, 2015) “ADM to add soy crushing at North Dakota, Ontario plants.” *Reuters Market News*. [www.reuters.com/article/archer-daniels-soybeans-idUSL1N0XO1A320150427](http://www.reuters.com/article/archer-daniels-soybeans-idUSL1N0XO1A320150427)

canola, it will also require additional knowledge, experience, and labor to handle the logistics and management of the two operations.

An additional factor in creating an efficient two-crop input system for the facility will be determining the ratio of canola to soy that will need to be grown in order to produce the desired amount of oil during both seasons. The table below shows Johnston County’s soybean yield and national canola yield, along with a price expected to be received for each category based on winter 2016 national average prices. Actual yields which farmers can receive may be higher or lower depending on the variety of canola, weather, and other factors during the year.

**Table 8: Average Canola and Soybean Yield Comparison**

	Canola		Soybean	
<b>Pounds per bushel</b>	<b>50</b>	<b>\$8.10/bu</b>	<b>60</b>	<b>\$9.46/bu</b>
<b>Average Seed Yield per Acre (lbs.)</b>	<b>2,100</b>	<b>\$340.20</b>	<b>1,500</b>	<b>\$236.50</b>
<b>Average Oil Yield per Acre (gal.)</b>	<b>100</b>	<b>\$321.60</b>	<b>45</b>	<b>\$128.05</b>
<b>Average Meal Yield per Acre (lbs.)</b>	<b>1,260</b>	<b>\$153.28</b>	<b>1,200</b>	<b>\$192.61</b>

Compared to canola, soybeans produce more feed meal, but less oil per bushel. In order to create a balanced production schedule, the crushing facility and growers will need to establish a canola-soybean ratio that will result in the proper amount of oil or meal yield that is best suited for profits. The following graphs compare prices for soybean and canola products over the past year. As with the yield data displayed above, price information shows that neither canola nor soybeans are entirely more profitable than the other. Soybeans and soybean meal have historically fetched a higher price than canola seeds and canola meal. On the other hand, canola oil regularly receives a higher price than soybean oil on average nationally.

On a state level, North Carolina soybean prices fluctuate between higher and lower than national average throughout the year. The state and national averages roughly correspond with each other; however North Carolina’s peak price comes about a month before the national average. This is due to seasonal differences between the warmer, more humid weather of North Carolina and the cooler upper Midwest and Great Plains region where the majority of soy is grown. For soybean meal, prices in North Carolina are about 1.11 times higher than national average. The state has a large number of livestock animals such as pigs, poultry, and cattle that utilize soy meal in their feed. Because feed producers in the state are able to save on transportation costs by purchasing locally produced soy meal for their feed, the soy producers are able to make a higher premium on their product than the national average. The following graphs utilize USDA Oilseed Outlook and Oil Crop Yearbook data.

Figure 22 compares the national prices for soybeans and canola seed with the North Carolina average price for soybeans from October 2015 to December 2016. The graph shows that the two crops follow similar pricing trends, but soybeans are able to obtain a higher value. North Carolina soybeans receive prices comparable to the national average; however, the price lows and peaks occur about two months before the national average and are slightly lower and higher respectively.

**Figure 22: Comparison of Soybean and Canola Seed Prices**

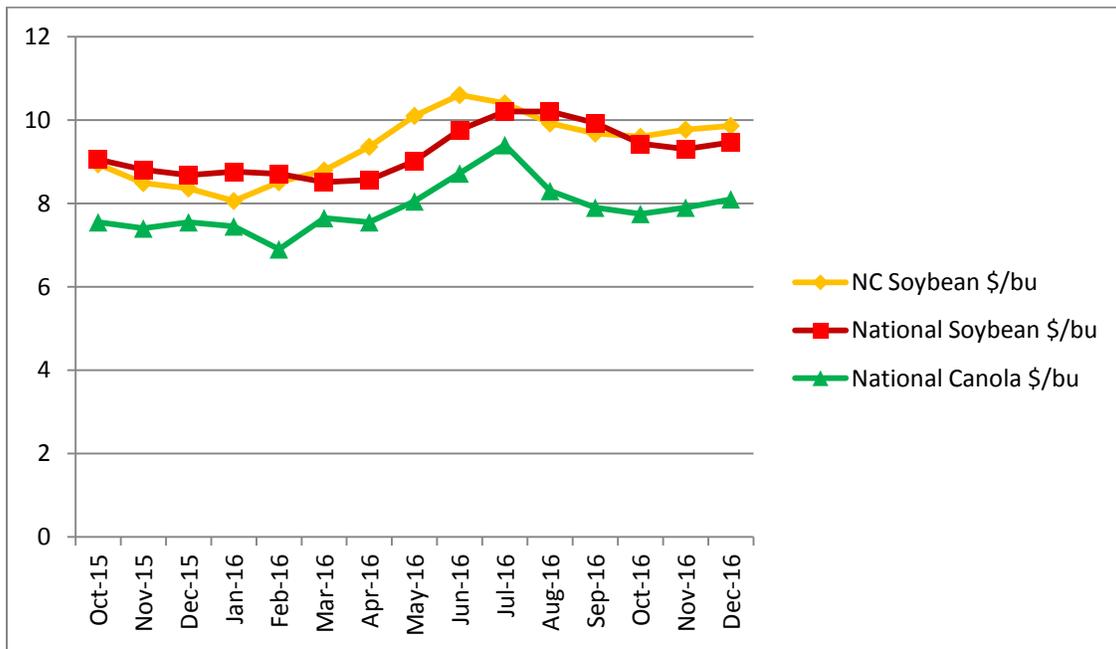


Figure 23 includes an example canola meal price curve for North Carolina that is based on the ratio of NC soy meal prices to the national soy meal average of 1.11 to 1. The graph shows that North Carolina soy meal and canola meal follow trends consistent with the national average, but are able to consistently receive a higher value. The graph also demonstrates that soy meal is of higher value than canola meal both nationally and in North Carolina.

**Figure 23: Comparison of Soy and Canola Meal Prices**

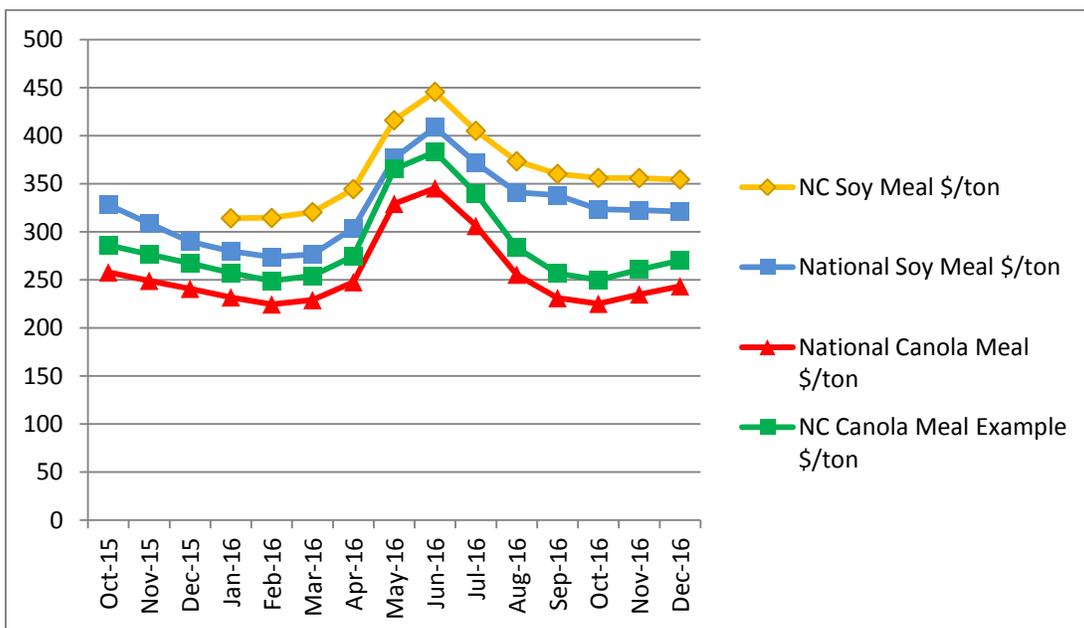
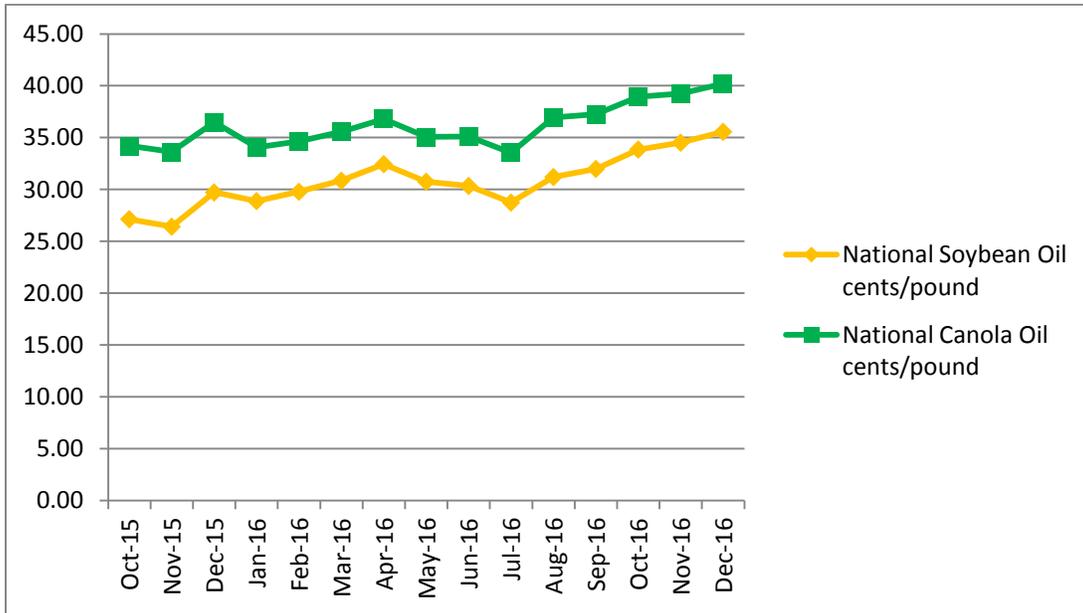


Figure 24 looks at the prices for soy and canola oil. The graph displays matching price trends for both oils from October 2015 to December 2016. Unlike the meal prices shown above, canola oil is consistently able to obtain a higher price per pound than soy oil.

**Figure 24: Comparison of Soy and Canola Oil Prices**



**Equipment Specifications**

The facility will crush canola seeds into unrefined oil and meal for sale. The following table presents a preliminary model of equipment necessary to process seeds into crude oil and meal cakes.

**Table 9: Equipment Needed**

Item	Equipment
1	Magnetic separator
2	Seed cleaner
3	Flaking mill/Extruder
4	Vertical stacked conditioner to dry the seed
5	Heavy duty mechanical screw press for extracting oil from flaked and conditioned canola seed
6	Horizontal cake cooler to cool cake from screw presses to 20 degrees F above ambient
7	Cake grinder to grind the press cake
8	Decanter centrifuge to extract solids from the crude oil
9	Pumps for handling liquids in mechanical screw press process
10	Storage tanks/bins
11	Electrical components for operation of process equipment
12	Additional instrumentation required for monitoring of the equipment and tanks
13	Conveyors and elevators required within full press plant building

A magnetic separator and seed cleaner will be needed to remove debris from the seeds upon entering the facility. Conveyor belts will transport the materials from one step of the process to

the next. A flaking mill or extruder will perform the initial crush of the seeds to prepare them for the screw press which will remove the oil from the hulls. Once the oil is extracted, the facility will need storage tanks to hold the oil. The crushed seed remnants will be moved to a grinder and then a cake cooler to prepare them for sale as an animal feed ingredient. A centrifuge will be used to separate any solids from the unrefined oil.

An equipment listing and pricing estimates from InstaPro have been included in the appendix. Below are examples of the equipment necessary to operate an oil and meal production line. They have been sourced from Henan Kingman M&E Complete Plant Company.<sup>86</sup>



Vibrating Separator



Cold Press Expeller



Oil Filter Press



Horizontal Dryer/cooler<sup>87</sup>

## Quality Control and Regulatory Framework

The facility will need to lay out quality control and regulatory guidelines in order to meet industry standards, ensure a safe work environment, and consistently provide a high-quality product to consumers.

### Plant Regulations

The U.S. Environmental Protection Agency (EPA) regulates the vegetable oil processing industry and since 1972 has had in place the Compilation of Air Pollutant Emissions Factors (AP-42). The AP-42 section 9.11.1 Supplement A, from November 1995 deals with the processing operation using soybeans as an example for other oilseeds. Updates are routinely published. It describes the various process operations, a characterization of emission sources and pollutants emitted, and a description of the technology used to control emissions resulting from these sources. It also includes a review of emission data collection procedures. Section 9.11.1.3 specifically deals with emissions and controls.<sup>88</sup>

The SF-83 Supporting Statement to EPA covers solvent extraction from vegetable oil production. A vegetable oil production process is only subject to regulation if it is a major source of hazardous air pollutant (HAP) emissions. New plants using solvent extraction method need to apply for permission in writing for construction, as well as provide notification of construction commencement, notification of anticipated startup date and notification of actual startup.

The U.S. Department of Labor, through its Occupational Safety and Health Administration, deals with workers' safety. Regulation standards 29 CFR covers flammable and combustible liquids 1910.106. The U.S. Department of Agriculture and the Food and Drug Administration are also responsible for food safety and information, and consequently they regulate factory practices and inspections as well as product labeling.

<sup>86</sup> Oil Mill Machinery. *Henan Kingman M&E Complete Plant Co., LTD.* [www.oilmillequipment.com/Oil-Mill-Machinery/](http://www.oilmillequipment.com/Oil-Mill-Machinery/)

<sup>87</sup> Horizontal Dryer/Cooler. *California Pellet Mill Equipment.* [www.cpm.net/equipment/coolers/horizontal-dryer-cooler](http://www.cpm.net/equipment/coolers/horizontal-dryer-cooler)

<sup>88</sup> <http://www.epa.gov/ttn/chief/ap42/ch09/final/c9s11-1.pdf>

## FUNDING SOURCES

There are a variety of avenues through which the oilseed processing venture and associated producers could obtain additional funds and assistance for establishing and growing the business. Many grant programs, ranging from the national to the state level, specialize in assisting a business such as the one proposed for this study. While certainly not comprehensive, the following are some examples of these types of organizations.

### National Funding and Aid

#### Federal State Marketing Improvement Program Funds (FSMIP)



The program provides matching funds to State Departments of Agriculture, State agricultural experiment stations, and other appropriate State agencies to assist in exploring: new market opportunities for U.S. food and agricultural products, research and innovation aimed at improving the efficiency and performance of the marketing system, and address barriers, challenges, and opportunities in marketing, transporting, and distributing U.S. food and agricultural products domestically and internationally.

[www.ams.usda.gov/services/grants/fsmip](http://www.ams.usda.gov/services/grants/fsmip)

#### Value-Added Producer Grant Program (VAPG)

The program is designed to assist producers and associations that engage in value-added activities to develop strategies and create marketing opportunities for their value-added agriculture products, and/or for marketing or processing activities that add value to the commodities they raise, or for on-farm renewable energy generation projects. The goal of the program is to expand market opportunities for producers and increase the producer's share of revenue from their commodities.

[www.rd.usda.gov/programs-services/value-added-producer-grants](http://www.rd.usda.gov/programs-services/value-added-producer-grants)

#### Rural Economic Development Loan and Grant (REDLG)

The REDLG program provides funding to rural projects through local utility organizations. Under the REDL program, the USDA provides zero interest loans to local utilities, which they, in turn, pass through to local businesses (ultimate recipients) for projects that will create and retain employment in rural areas. The ultimate recipients repay the lending utility directly. The utility is responsible for repayment to the Agency. Projects are intended to be completed in rural areas with a population of 50,000 or less.

[www.rd.usda.gov/programs-services/rural-economic-development-loan-grant-program](http://www.rd.usda.gov/programs-services/rural-economic-development-loan-grant-program)

#### Farm Storage Facility Loan Program (FSFL)

The FSFL program provides financing for producers to build or upgrade on-farm storage facilities for a number of commodities including grains, oilseeds, peanuts, hay, honey, biomass commodities, fruits and vegetables, and pulse crops. Grain bins, hay barns, and cold storage facilities are among the eligible facility types. This program has been key in increasing the storage capacity of farmers around the country. Since May 2000, over 33,000 loans have been issued through this program.

[www.fsa.usda.gov/programs-and-services/price-support/facility-loans/farm-storage/](http://www.fsa.usda.gov/programs-and-services/price-support/facility-loans/farm-storage/)

### **Sustainable Agriculture Research & Education (SARE)**



SARE covers numerous aspects related to research and education in agriculturally related fields. Since 1988, the SARE grants and education program has advanced agricultural innovation that promotes profitability, stewardship of the land, air and water, and quality of life for farmers, ranchers and their communities. SARE grants fund research and education projects exploring areas such as:

- |   |                              |
|---|------------------------------|
| On-farm renewable energy                | Marketing                    |
| Pest and weed management                | Sustainable communities      |
| Pastured livestock & rotational grazing | Systems research             |
| No-till and conservation tillage        | Crop and livestock diversity |
| Nutrient management                     | and others                   |
| Agro-forestry                           |                              |

Since 1988, SARE has funded more than 5,000 projects with grants for farmers, ranchers, extension agents and educators, researchers, nonprofits, students, communities and others.  
[www.sare.org/Grants](http://www.sare.org/Grants)

### **Business and Industry Guarantee Loan Program (B&I)**

The purpose of the B&I Guaranteed Loan Program is to improve, develop, or finance business, industry, and employment and improve the economic and environmental climate in rural communities. This purpose is achieved by bolstering the existing private credit structure through the guarantee of quality loans, which will provide lasting community benefits. It is not intended that the guarantee authority will be used for marginal or substandard loans or for relief of lenders having such loans. Approved lenders may request a guarantee for a number of types of borrowers including for-profits, nonprofits, cooperatives, public bodies, and individuals.

[www.rd.usda.gov/programs-services/business-industry-loan-guarantees](http://www.rd.usda.gov/programs-services/business-industry-loan-guarantees)

### **Rural Microentrepreneur Assistance Program (RMAP)**

The purpose of the RMAP program is to support the development and ongoing success of rural micro-entrepreneurs and microenterprises. Direct loans and grants are made to select Microenterprise Development Organizations (MDOs) for the benefit of rural micro-entrepreneurs and micro-enterprises. RMAP funding may be used to provide fixed interest rate microloans or to provide eligible MDOs with micro-lender technical assistance grants to provide technical assistance and training to micro-entrepreneurs that have received or are seeking a microloan under RMAP.

Individual citizens, nonprofits, micro-entrepreneurs, or micro-enterprises, as defined by the program and who are in need of business based technical assistance and training, are generally eligible to apply for loans from MDOs, provided they owe no delinquent debt to the Federal Government.

[www.rd.usda.gov/programs-services/rural-microentrepreneur-assistance-program](http://www.rd.usda.gov/programs-services/rural-microentrepreneur-assistance-program)

### **Small Business Administration Loan Program (SBA)**

The Small Business Administration offers multiple loans for a variety of different business needs. SBA's most common loan is the 7(a) Loan Program which is a general small business loan. There are many eligibility requirements for this loan program, some requirements include operating as a for profit business and fitting the SBA's definition of small business. Some basic

uses of SBA 7(a) loans include paying operational expenses, purchase inventory, seasonal financing, purchase equipment and supplies, and to purchase land and buildings.

[www.sba.gov/loanprograms](http://www.sba.gov/loanprograms)

## North Carolina Assistance

### NC Agriculture Development & Farmland Preservation Trust Fund (NC ADFP)

The ADFP fund was created in 2005 in order to “support the farming, forestry, and horticulture communities within the agriculture industry.” The fund is designed to assist North Carolina agricultural development through funding agricultural easements, supporting small farm development programs, growing interest in agritourism and local foods, and promoting other agricultural initiatives throughout the state.

[www.ncadfp.org/](http://www.ncadfp.org/)

### NC State and NC A&T University Cooperative Extension



The North Carolina Cooperative Extension helps to link the resources of NC State University and NC A&T State University to individuals and groups within the state. Working through collaborations between the Universities and other organizations, the Cooperative Extension

program provides services in all 100 counties. Johnston County’s Extension office can offer assistance in a number of areas including food processing, specialty crops, community involvement, and more.

[www.ces.ncsu.edu/](http://www.ces.ncsu.edu/)

## **RISKS, REGISTRATION, REGULATIONS, AND POTENTIAL ISSUES**

The canola processing facility faces many potential risks as it continues to develop and attempts to increase sales. Though it may be difficult to quantify a specific dollar value of these risks, it is useful to present them and permit the venture to determine their own level of risk tolerance.

- **Capital Risks**

The project will continue to require capital outlay. Insufficient access to capital funds is a major reason for new businesses to fail. The assumptions in this study do not include much leeway for unexpected cost overruns that could endanger the venture.

- **Cash Flow Risks**

There may be periods during the year that the venture experiences negative cash flow. This should be closely monitored for business liquidity. A small change in price or payment period could quickly turn a profit into a loss or exacerbate this cash flow risk.

- **Management Experience Risks**

Businesses can “fly or die” based on the caliber of management. It is imperative that management has experience in the industry. The selection and oversight of management, both at the business as well as the operational level, are critical for the success of the venture.

- **Legal Liabilities and Risks**

The venture will face legal liabilities and potential risks due to the nature of the product, visitor risk, transport of the product, worker safety, and environmental risks. Because the facility will utilize powerful machinery and potentially chemicals during the oil processing, great care should be exercised to minimize risks from potential workplace hazards resulting from accidents or malfunctions. Risk should be reduced with insurance and written policies where possible.

- **Regulatory Risks**

There are a large number of regulatory risks that the venture will need to continue to address as it moves forward. There is a potential that these factors could substantially constrict the ability of the venture to operate profitably. Additionally, regulations are in constant flux; statutes that may not affect the operation today could have a dramatic impact on it in the future. For example, environmental regulations for hexane emissions might change, labor and farm operation regulations may change, and changes enacted in the regulatory framework of oilseed could affect the entire organization of the sector within the state.

- **Operational Risks**

Due to the newness of the expansion, several operational issues that do not proceed along the lines of the assumptions of this study could occur. The quality of the company’s oil is highly dependent on the skill of the production personnel, the production practices used, and sales are in turn dependent on proper distribution chains and success in reaching the oil’s target market.

The owner could face operational risks in equipment handling and processing if the human resources are not enough to cover the minimum management requirements. For example, if the quality of the equipment such as presses, or analysis of seed or oil handling is not in compliance with state and federal regulations, it could risk the failure of the whole operation.

- **Market Development Risks**

The processing facility will need to establish itself in a competitive industry with previously established players. There is no guarantee that the venture will succeed in encountering sufficient buyers to purchase its oil. It is assumed that buyers have a tangible interest in oil processed in a specific way such as mechanically or GMO free; this may not be a true assumption.

- **Food Contamination Risks**

Although oil pressing has been produced for centuries, food contamination has been a recent area of great concern in the agriculture and food industry. Various forms of contamination could occur, causing possible illness, product recalls, or simply leading to a poor reputation and damage to the brand. Careless bottling and storage techniques by the facility could also cause the risks previously mentioned. Care must be taken to ensure the oil is processed and stored properly.

- **Production Risks**

Should the processing facility experience commodity access issues due to adverse weather conditions, the plant could be highly dependent on other producers providing it with necessary canola seed. The facility could also be at risk of machinery failures or other interruptions to seed processing capabilities. In such situations, the processing plant must be able to source suitable oilseed from other producers to fill shortages, or be able to fill oil quotas and purchase orders while unable to operate processing equipment. This may be done by maintaining relationships with other growers and processing facilities in the region.

## **Disclaimer**

It is the responsibility of the owner of a business to become familiarized with the federal, state, county, and local laws governing his or her business. Failure to do so may result in penalties, fines, and cessation of business. The proceeding sections are intended to provide a general overview in an attempt to highlight possible considerations that could affect a business, and are not intended to be exhaustive.

## **General Business Registration**

The registration needs of a venture can vary depending on federal, state, and local laws. Some registration processes are free of charge, but certain types of business are subject to various registration fees and permits.

Businesses can form under another business or the owner's name, or they can choose to do business under a fictitious name, which requires the filing of a DBA (Doing Business As). Sometimes known as an "assumed name" certificate, a DBA is a document that provides owner identification when a business is operating under any name other than their legal name. Ventures organized as corporations may also need a DBA if they plan to use a different name than the one provided on their corporation paperwork (legal name).

## **Registration of Food Facilities**

Facilities that process, store, or ship food for human or animal consumption are required to register with the FDA. First, a person must establish, at no cost, an on-line account at [www.fda.gov/Food/GuidanceRegulation/FoodFacilityRegistration/ucm2006831.htm](http://www.fda.gov/Food/GuidanceRegulation/FoodFacilityRegistration/ucm2006831.htm). Once an account is established, a person can register his or her farm or company, and edit the registration

information. The Food Safety and Inspection Service (FSIS) of USDA have prepared a guideline with good practices for food processors to take into account. It is available at [www.fsis.usda.gov](http://www.fsis.usda.gov).

### **Brand Registration and Trademark**



According to the U.S. Patent and Trademark Office (USPTO) a trademark includes any word, name, symbol, or device, or any combination, used, or intended to be used, in commerce to identify and distinguish the goods of one manufacturer or seller from goods manufactured or sold by others, and to indicate the source of the goods. In short, a trademark is a brand name.

The name and logo design of the processing entity needs to be trademarked and registered at the national level if applicable. Failure to obtain appropriate intellectual property protection invites others to pirate the plant's work. The practical purpose of a trademark is to prevent consumers from becoming confused about who provided the goods or services they purchased.

### **Taxes**

Federal, state, and local level authorities all have tax requirements that affect the formation or expansion of a business.

### **Taxpayer ID and Employer Identification Numbers**

The Federal (Employer) Identification Number, also known as a Tax Identification Number or EIN, is a number issued by the IRS for the purposes of identifying businesses. If the business has no employees or the business is a type other than a corporation, a Social Security number generally functions as the EIN. Nearly all business structures that employ individuals, as well as other business entities use EINs. To apply for an EIN use form SS-4: Application for Employer Identification Number, or over the phone by contacting the IRS at: 1-800-829-1040, or online at: [www.irs.gov](http://www.irs.gov).

It is necessary to do recordkeeping for tax purposes (bank deposits, sales receipts and other elements of support) and to have the record available for examination by IRS.

Some of the most complex issues facing small business owners today are the various taxes and tax structures. The business may be subject to, or responsible for, collecting or withholding:

- Taxes on the business itself
- Ad Valorem Taxes (Taxes on Property)
- Sales and Use taxes
- Employment and Income Taxes.

### **Federal**

For specific information regarding federal tax requirements, contact the Internal Revenue Service to obtain a copy of the Small Business Resource Guide. This guide contains information on federal tax obligations as well as various publications for starting a business.

### **Required Federal Employment Taxes**

- Federal Income Tax Withholding
- Social Security and Medicare Taxes (FICA)
- Federal Unemployment Tax (FUTA)

### Forms and Employees

It is required that all employers have their employees fill out the following forms: Form I-9 and Form W-4. More information explaining the Federal tax responsibilities of the employers can be found in the IRS' Publication 15, Circular E, Employer's Tax Guide.

- **Form I-9:** Employment Eligibility Verification. This document is available from the Immigration and Naturalization Service by calling 800-357-2099 or online at [www.bcis.gov](http://www.bcis.gov).
- **Form W-4:** Employee's Withholding Allowance Certificate. This form is available from the Internal Revenue Service. Call FORMS/PUBLICATIONS at 800-829-3676, or INFORMATION at 800-829-1040. The form can also be downloaded by visiting [www.irs.gov](http://www.irs.gov).

Certain agricultural employers are required to fill out specialized forms depending on their type of work or they may be exempt from certain laws. For more information, see [www.irs.gov](http://www.irs.gov).

### State and Local

In addition to business taxes required by the federal government, some state and local taxes will normally have to be paid. Each state and locality has its own tax laws. Having knowledge of state tax requirement can help avoid problems and save money.

- **Tax Permit:** In most states, business owners are required to register their business with a state tax agency and apply for certain tax permits. For example, in order to collect sales tax from customers, many states require businesses to apply for a state sales tax permit.
- **Income Taxes:** Nearly every state levies a business or corporate income tax. The tax requirement depends on the legal structure of the business. For example, if the business is a Limited Liability Company (LLC), the LLC gets taxed separately from the owners, while sole proprietors report their personal and business income taxes using the same form. Consult a tax advisor/CPA for specific requirements for the business.
- **Employment Taxes:** In addition to federal employment taxes, business owners with employees are also responsible for paying certain taxes required by the state. All states require payment of state workers' compensation insurance and unemployment insurance taxes. Also some states require a business to pay for temporary disability insurance.
- **Sales Tax and Resellers:** In the case of a business purchasing items that are intended for resale, many states that collect sales taxes allow a business to purchase resale items tax free. The requirements and guidelines vary from state to state; check with the locality for specific information.

## Business Regulation

### USDA



The United States Department of Agriculture (USDA) is responsible for overseeing federal policy regarding farming, agriculture, and food products. Distribution, labeling and packaging, quality, recalls, safety, and security are all functions governed by the USDA. Regulations and requirements of the USDA must be met in order to be in compliance with applicable laws.

### FSIS



The Food Safety and Inspection Service (FSIS) is the public health agency in the U.S. Department of Agriculture responsible for ensuring that the nation's commercial supply of meat, poultry, and egg products is safe, wholesome, and correctly labeled and packaged.

### Environmental Constraints (EPA)



The U.S. Environmental Protection Agency (EPA) and state environmental agencies regulate the impact of businesses on the environment. EPA develops and enforces regulations that implement environmental laws enacted by Congress. Likewise, state agencies enforce regulations that implement laws enacted by the state legislature.

The U.S. Small Business Administration divides the environmental regulations into different areas such as air pollution, basics of environmental compliance, cleanup, ecosystems, environmental management (odor control, etc.), environmental permits and planning, pollutants and chemicals, pollution prevention, storage tanks, waste and water (preventing contamination of water supplies, etc.). More specifics on each case are available at [www.sba.gov](http://www.sba.gov).

The owner of the facility needs to consider environmental constraints related to the use of natural resources as well as in processing and waste disposal. Thus, the environmental effects of food processing are intimately linked with the type of product and processing technique and the effluents from that process. It is necessary to determine the characteristics of the effluent to identify the best option for treatment according to the end purpose (for example land application). The Environmental Protection Agency, as well as FDA and Department of Agriculture coordinate efforts to enforce laws in agri-food activities.

### FDA



The US Food and Drug Administration (FDA) oversee much of the nation's food supply, as well as drugs and medical devices. The agency is also responsible for interpreting the law and writing regulations concerning specific food products and processes. Rules and regulations established by the FDA are published in Title 21 of the Code of Federal Regulations (CFR) which can be found at [www.ecfr.gov](http://www.ecfr.gov). These laws are intended to assure that foods are safe to eat, pure, wholesome, and produced under sanitary conditions.

FDA inspectors have the authority to inspect any establishment where food is processed, packaged, or held for shipment in interstate commerce. They can also inspect products after

shipment, vehicles used to transport food in interstate commerce, equipment, finished products, containers, and labeling.

### **Food Safety Modernization Act (FSMA)**

The FSMA, the broadest reform of the food safety laws in more than 70 years, was signed into law on January 4, 2011. It aims to ensure the U.S. food supply is safe by shifting the focus from responding to contamination to preventing it, and requires that food from abroad be as safe as domestically produced goods.

FDA has redesigned its webpage dedicated to the Food Safety Modernization Act (FSMA): [www.fda.gov/FSMA](http://www.fda.gov/FSMA). The agency encourages consumers, industry and food-safety professionals, local and state regulators, and international trading partners to get more involved in implementing the new law by learning what the FDA is doing, as well as providing feedback to help guide the FDA in the future. Key elements of the page include:

- A link to the new web-based search engine for recalled foods
- Frequently asked questions about the landmark food-safety legislation
- Videos and graphics explaining how the law will be implemented
- Information about public meetings on these reforms

A new rule strengthens the FDA's ability to prevent potentially unsafe food from entering commerce. It allows the FDA to administratively detain food the agency believes has been produced under unsanitary or unsafe conditions. Previously, the FDA's ability to detain food products applied only when the agency had credible evidence that a food product presented was contaminated or mislabeled in a way that presented a threat of serious adverse health consequences or death to humans or animals. Full implementation of the law will take time; however, beginning July 2011, the FDA is able to detain food products that it has reason to believe are adulterated or misbranded for up to 30 days, if needed, to ensure they are kept out of the marketplace.

Preventive controls, that is, systems that a manufacturer of foods would put in place to identify the hazards associated to the product, and the scientific controls to minimize the risk of occurrence of those hazards are the manufacturer's responsibilities, though FDA can provide guidance. The legislation provides some exemptions based on size, who the facility distributes to (for example to a retailer grocery facility, etc.), and low risk activities, especially those that occur at the farm that may be manufacturing but are still considered low risk. This new law reinforces the need for farmers to tabulate and document procedures as well as evaluate the risks to human health from ingestion of the products they produce.

### **North Carolina Department of Agriculture**



According to their site, the N.C. Department of Agriculture and Consumer Services is involved in many regulatory, public service, and educational activities. All are intended to “provide services that promote and improve agriculture, agribusiness and forests; protect consumers and businesses; and conserve farmland and natural resources for the prosperity of all North Carolinians.”

The department is dedicated to ensuring the continued place of

agriculture as a vital component of North Carolina's economy and continued development. There are numerous county and district level offices located around the state which specialize in providing the proper assistance and resources to the state's citizens no matter where they are located. The agricultural department also serves as a conduit for federal resources and for policy information specific to the agricultural sector so as to ensure proper communication and coordination between state and federal agencies.

### **Traceability**

The federal Bioterrorism Act (BTA) is driving significant changes in food regulation. This federal law mandates regulations regarding record-keeping and product traceability. The FDA has published a guidance document that summarized the recordkeeping and traceability requirements. More information is available at [www.fda.gov](http://www.fda.gov).

Producers will be required to trace ingredients one step backward in the food chain and tie the ingredients to finished products one step forward in the chain if the products are being sold through retailers or wholesale distributors.

### **Food Handling Regulations**

Any person that handles food should be aware of food legislation. The primary enabling legislation states the aims and objectives of the law. This provides the power to the relevant U.S. Departments of State to introduce specific regulations. For example, the Food Safety Modernization Act is a legislation approved by Congress and later allows the Food and Drug Administration to write a regulation/s for that particular law.

In general, food legislation has two objectives:

1. To ensure that the food offered is of the quality it is supposed to be.
2. To ensure that the food will not be harmful to the consumer.

For food processors, there are parameters for minimum standards with which products have to comply. For example, in bacteriological quality terms, tests done by laboratories have to follow the specifications as stated in the Bacteriological Analytical Manual (BAM) of the U.S. Department of Health & Human Services, U.S. Food and Drug Administration (FDA). This manual is available at [www.fda.gov](http://www.fda.gov).

### **Labor Regulations**



It is vital to choose the right method for recruiting and selection that best adapts to a business venture. Having clear and defined objectives, duties, and responsibilities for each position will ensure proper selection of personnel, as well as avoid costly lawsuits related to discrimination and sexual harassment.

Many additional labor laws and regulations will begin to affect the business should the venture approach 50 employees. It is important to monitor operations carefully to determine if the extra labor is feasible, given the additional cost that new regulations may carry. Affirmative Action, Equal Employment Opportunity, the Family and Medical Leave Act, and the Affordable Care Act all have provisions and regulations that are triggered once a business reaches the "50 or more" employee mark.

### **Employment Eligibility Verification**

Workers must have valid work permits if they are not U.S. citizens. Each farm labor contractor, agricultural employer, and agricultural association which is subject to the MSPA and who employs any migrant or seasonal agricultural worker(s) shall post and keep posted in a conspicuous place at the place of employment a poster prepared by the Department of Labor which explains the rights and protections for workers required under the Migrant and Seasonal Agricultural Worker Protection Act (source: DOL).

### **Safety Issues and OSHA**



The Occupational Safety and Health Administration, or OSHA, is responsible for enforcing compliance with US laws regarding safety and workplace conditions. Compliance is expected to be voluntary, with inspections as a consequence for extended non-compliance.

Employers have the responsibility to provide a safe workplace. Employers must provide their employees with a workplace that does not have serious hazards and follow all OSHA safety and health standards. Employers must find and correct safety and health problems. OSHA further requires that employers try to eliminate or reduce hazards first by making changes in working conditions rather than just relying on masks, gloves, ear plugs or other types of personal protective equipment (PPE). Switching to safer chemicals, enclosing processes to trap harmful fumes, or using ventilation systems to clean the air are examples of effective ways to get rid of or minimize risks.

If there are laboratories in the firm, then a manual with clear procedures for each quality test must be in place and in compliance with FDA and USDA regulations. Safety globes, hats, industrial aprons, boots and glasses should be available for workers in the processing areas. In this context, having accident insurance for workers is an important matter as well.

Exit signs, easy access in and out of the building, fire extinguishers, evaluation, medical supplies and procedures are also important considerations. Other issues include hazard prevention and control, safety and health recordkeeping, and injury/illness records. It is important to develop an action plan to cover these types of situations. More details are available at [www.osha.gov](http://www.osha.gov).

### **Transportation Regulations<sup>89</sup>**



The processing facility must comply with certain federal transportation regulations in regards to the pickup and delivery of products. Any pick-ups or deliveries made with-in a 60 mile radius of the facility may fall under several exceptions designated by the Federal Motor Carrier Safety Administration (FMCSA).

An air mile is a term used by the FMCSA to define a unit of measurement used in transportation. An air mile is longer than a statute mile, with 100 air miles equally 115.08 statute miles. The 100 air mile radius exemption may apply to a facility if all pick-ups and deliveries occur within 100 air miles of the facility and no driver works more than 12 hours in one day, the drivers are not required by law to maintain a logbook of their on and off duty hours.

<sup>89</sup> [www.fmcsa.dot.gov/rules-regulations/truck/driver/hos/fmcsa-guide-to-hos.PDF](http://www.fmcsa.dot.gov/rules-regulations/truck/driver/hos/fmcsa-guide-to-hos.PDF)>

Drivers are required to hold a commercial driver's license (CDL) if the load of the truck is greater than 26,001 pounds. Drivers of any semi-trucks used to transport product will be required to hold a CDL.

In general, commercial drivers must abide by the 14 hour consecutive duty period limit, meaning that they cannot have more than 14 hours of drive time in a 24 hour period. For drivers who fall under the 16 hour short haul exemption, an allowance is made to extend the 14 hour per day drive time limit to 16 hours once every seven consecutive work days or after 34 hours off duty.

Deliveries not utilizing a truck that requires a CDL will not be subject to certain restrictions. In order to qualify for this exemption the driver must operate a truck that does not require a CDL and work within 150 air miles of their reporting locations.

Under this exemption, drivers are not required to keep a log book. They are also allowed to maintain 16 hour duty periods twice every 7 days or after 34 hours of off duty time.

### **Processing Procedures**

Written product specifications, processing flow diagrams, and processing procedures should be constructed both for the ease of tabulation for the owner of the venture, as well as for use in inspection and regulation aspects of the business. In some cases, detailed diagrams and other information regarding processing procedures may be required. Product differentiating processes such as cold pressing or non-GMO oil should also be detailed to ensure accountability and accurate brand representation.

### **Emissions**

A production plant utilizing a solvent extraction method must take into consideration Federal and state emissions standards regulating hexane and similar waste products leaving the facility. Failure to follow emissions rules can result in fines and possible plant closure. As these standards can change, it is the responsibility of the facility's owners to keep up to date on all regulations. Emissions can originate during transportation and storage of hexane to and at the facility, as well as during the desolventization of both the oil and meal. As hexane is an EPA recognized air pollutant, controlling its release is important. To aid in minimizing environmental impact, as well as costs, condensers and mineral oil scrubbers can be used to recover hexane from exhaust emissions to be recycled. While control of emissions is important, much of the hexane loss comes from leaks and breaks in piping and storage systems requiring constant oversight and responsible upkeep.

### **Food Safety and Quality Assurance**

The production of safe, high-quality products are of primary concern to the owners of the project. Food safety begins with an appreciation for cleanliness through the entire supply chain. Good agricultural practices, an understanding of microbiology, good manufacturing practices, safe procedures for cleaning and sanitizing, and a thorough understanding of the principles of Hazard Analysis and Critical Control Point (HACCP) development all matter to the project.

### **Good Manufacturing Practices**

There are basic sanitation principles that food manufacturers have to comply with. These are contained in the Good Manufacturing Practices as detailed in Title 21 of the Code of Federal

Regulations Subpart E-- Production and Process Controls. The CFR is accessible on-line via [www.ecfr.gov](http://www.ecfr.gov).

Good Manufacturing Practices (GMP) has two meanings when used in the context of a food processing facility. The first refers to actual federal code sections of GMPs, and the second is a set of operating procedures based upon these codes. The actual codes provide the basis for both the federal and state food processing regulations that serve as guidance for facility construction, equipment and utensil selection, sanitation, personnel hygiene, food handling, and production and processing controls.

While these GMPs are generic, they provide an excellent overview of most facets of sanitary facility operation. Once these practices are understood, a facility operator can use these codes as to develop GMPs for their own facility. A typical GMP program consists of several parts, each of which has a written set of policies and a checklist based upon those policies.

A written GMP program should also include sanitation/pest control policies and documentation. The sanitation program should include information about the cleaning chemicals used in the plant, how effective they are handled and stored, and how the Material Safety Data Sheets (MSDS) are maintained. Additionally, the sanitation program should detail weekly, monthly, and periodic cleaning schedules and how that cleaning is to be conducted, monitored and recorded.

The pest control program should be developed in conjunction with a professional pest control operator who will assist in recordkeeping as well as making facility recommendations that will help to exclude pests and reduce harborage areas.

The GMP plan should include a section on "Production and Process Controls" that addresses the methods of preventing contamination of the cheese being produced, processing time, temperature controls, and other critical factors such as moisture, salinity and acidity.

The firm must have a means of lot coding each batch of product so that a product recall can be initiated, if necessary.

### **Hazard Analysis Critical Control Point**

HACCP is a widely recognized system for increasing safe food production. A HACCP Program is designed to identify the steps within a food process that contain the greatest hazards, identify scientifically validated steps that can reduce these hazards to an acceptable level, institute these control measures, and document their use and effectiveness.

Developing and implementing a HACCP plan requires a major commitment of time, money and effort. It is important to recognize that a HACCP plan only works if an effective sanitation program and documented GMP's are in place. A HACCP program is not designed to compensate for generally poor practices, but rather to use solid practices as a basis for a food safety program that can provide the highest assurance of safety.

A HACCP system is a way to address food safety requirements for third party audits, federal and state inspections, and wholesale customer requirements. Providing this type of written analysis documentation can address the food safety requirements outlined by these various agents, and also serve as a benchmark for quality assurance.

## Potential Issues

### Product Liability Insurance

Similar to other food products intended for sale and consumption, oilseed oil may be subject to various contamination risks and the potential for recalls and food safety issues carry a risk of liability. The operation will need to have a product liability insurance policy in place. This type of insurance is available through most commercial insurance carriers. Insurance carriers should be contacted to provide actual quotes.

### Internet



The Internet Corporation for Assigned Names and Numbers (ICANN) is responsible for managing and coordinating the Domain Name System (DNS) to ensure that every address is unique and internet users can find all valid addresses. For more information see [www.icann.org](http://www.icann.org).

Domain names can be registered through many different companies (known as "registrars") that compete with one another. A listing of these companies appears in the Registrar Directory available at [www.internic.net/regist.html](http://www.internic.net/regist.html).

Regardless of the sales channel, all foods sold in the U.S. must be in full compliance with FDA food labeling requirements that are specified in the U.S. Code of Federal Regulations. The FDA monitors websites of companies on the internet so companies have to comply with all regulations and claims that are made about the foods and/or its ingredients.

### Water & Sewer

Specific regulations govern the sources of water used in the production of food products. When locating any agricultural business that includes the production of large amounts of waste or byproducts, it is essential to address the regulations and constraints of disposal. Should a facility utilize a municipal water and sewer source, specific regulations governing the allowable limit of dissolved solids, as well as chemicals, nutrients, and PH levels allowed in wastewater will need to be addressed prior to production.

Should the facility be located in a region that does not include access to a municipal or other standardized water and sewer supply, environmental regulation may affect the disposal of production waste or by-products.

Many pretreatment protocols mandate that the facility treat the wastewater, either by the use of physical, chemical, or biological processes, to reduce the amount of pollutants, or alter pollutants to a less harmful state prior to discharging to the sewer system.

Programs and regulations also often include rules stating that the facility must self-test their effluent water on a regular basis, and provide records and result of this monitoring to the governing sewer authority. In addition to self-monitoring, the facility may be subject to annual local government testing. Failure to abide by applicable laws and regulations in this arena may result in fines or the cessation of business if they are not properly addressed.

**Consumer Protection Concerns**



The Federal Trade Commission (FTC) is the nation's consumer protection agency. The FTC's Bureau of Consumer Protection works for the consumer to prevent fraud, deception, and unfair business practices in the marketplace. More information is available at [www.ftc.gov](http://www.ftc.gov). The owner is responsible to provide a safe environment both for employees and the general public. Examples include:

- Security elements set in place, such as clear exit signs at the facility, fire extinguishers, access for disabled persons, first aid kits, and emergency procedures.
- Laboratories providing designated areas for sample analysis, where special ventilation systems must be in place if chemical substances are used.
- Using “caution hot” signs after burners have been used.
- Using “caution wet floor” signs after floors are washed.
- Protecting processing facilities to prevent vermin from entering the production area.
- Ensuring customers do not get intoxicated during an alcoholic tasting.
- Access/entrance to the farm. What was once acceptable as access to a farm for agricultural purposes, may no longer be legal access for the general public.

**Zoning – General Requirements**

It is important that the business remains current with any zoning requirements related to the proposed venture and any expansion in the future. For the sake of the study, basic zoning information follows as a reminder of the steps that may need to be taken as the project moves ahead. If the owner decides to expand the facility, she will need to address a number of issues including, but not limited to, the following:

- Visual impact - including the need for buffering, screening and landscaping of the facility
- The impact of noise from the plant (limited)
- Traffic study addressing the intersection design, turnaround areas, and car parking
- Management of additional wastewater
- Additional requirements for water and power to the site
- Soil suitability in regards to building foundation, erosion control and absorption

**Table 10: Standard Requirements for Site Development.**

1	Grade the site to a 2 to 4 percent slope
2	Slope the site toward a collection pond
3	Add minimal paving under the facility
4	Build beams around the perimeter to control run-off and run-on, if required
5	Plan areas for raw material storage, if applicable
6	Set up equipment in locations convenient to the process
7	Construct retainer walls and footings
8	Develop a screen/landscaping around the site
9	Install appropriate utilities depending on the method and process
10	Obtain proper permits (mandatory) —Local: zoning, building, and land use —State: water discharge, access, air, and health department

For more information on zoning, see [www.sba.gov/content/basic-zoning-laws](http://www.sba.gov/content/basic-zoning-laws) or contact your city, municipality, or county zoning official.

Zoning is a critical factor. The key to securing local approvals is a combination of sound site planning, presentation and persistence. A properly zoned site makes it easier to provide continued protection against incompatible uses.

Vegetative controls that may need to be implemented include: tree protection tape, permanent and temporary seeding, and erosion control. Erosion control would include blanket/matting on steep slopes. Structural controls that may be implemented include: construction entrances, silt fencing, diversion dikes, temporary sediment traps, rock check dams, storm drain inlet & outlet protection, and surface roughening. The preceding Table presents the requirement for site development of a typical facility. Local requirements and the exact type of facility to be constructed will determine the exact site requirements.

## **PRELIMINARY BREAK EVEN MODEL FINANCIAL PROJECTIONS, ASSUMPTIONS, AND METHODS**

This analysis contains basic financial models and scenarios for the first three years of operation for an oilseed production facility in North Carolina. Estimations based upon similarly sized operations and industry research has been modeled in Excel spreadsheets to approximate the venture's potential expense and revenue.

*This model attempts to be as realistic as possible while still permitting ease in interpretation. Though attempts have been made to make the tables as transparent as possible, several key project descriptions will be presented here. Due to the unique nature and newness of this proposed venture, actual revenues and expenses are likely to be different were the facility put into operation. The analysis presented here is intended to be estimates only, based upon industry research, similar sized operations, and the consultant's knowledge.*

### **General Information**

The proposed venture will sell meal and oil from local producers to wholesale buyers, with peak business occurring in the months of June-November. The business will operate year round, depending on product availability.

**Seasonality:** Canola is planted around the beginning of October and generally harvested between late spring and early summer. Once harvested, the seed is stored in a cool and dry location with a moisture content of below 10 percent. Depending on humidity and temperature, the seed can be stored for about 4 or 5 months. Extended periods of storage will require additional cooling and a moisture content of below 8 percent to avoid mold and insect infestation. Crushing operations will begin in the late spring as the canola harvest begins, and wind down as winter approaches, so most oil sales will occur during the summer and fall months.

**Tons of Oilseed:** During the first three years of operations, the oilseed facility will process approximately 63,000 tons (126,000,000 pounds). The number of tons sold per month will vary depending on seasonal sales and availability as indicated in the table above.

**Waste:** It is assumed that 5% of oilseed that comes through the facility will be unsellable due to low quality, errors in handling and processing, errors in transport, etc.

### **Project Timing**

A 6 month startup period will be required before opening the facility. During this time, contact will be made with local oilseed producers, wholesale customers, and retail outlets. The facility will be organized and prepared, employees will be hired and trained, and general operating procedures will be laid out with input from ownership and management.

A general manager will be hired at the beginning of this startup period to oversee general startup activities, plant operations and procedures, employee training, and other responsibilities as designated by ownership. Additional staff (marketing, general labor, administrative, etc.) will be brought in during this period for training, equipment familiarization, and other operations. The goal of these startup activities and training is to minimize errors upon opening so that operations may begin as smoothly as possible. A strong beginning is vital to the long-term success and financial viability and sustainability of this operation.

## Revenue

The business will obtain revenue through the sale of oil and meal. The operation will charge wholesale accounts approximately \$700 per ton of oil (\$0.35 per pound) and \$260 per ton of meal (\$0.13 per pound). The financial model reflects a 5% increase per year in price to account for inflation, changing economies and markets, etc.

Oil and meal yield of canola seed varies by variety, location, weather effects, and other factors. About 40 percent of seed weight is oil while around 60 percent will become meal. Oil yields average to about 100 gallons of oil per acre of seed, with 2015/16 estimates of seed yields at about 2,000 pounds of seed per acre.

National average prices for raw seeds are around 16 cents per pound, or \$320 per ton. Unrefined oil prices are around 35 cents per pound, or \$700 per ton. Meal prices are currently at an estimated \$260 per ton.

Processing revenue from one month would be collected by the end of the following month. The total lag estimated, on average, for payment is 30 days at 8.5% interest in the model.

## Expenses

Expenses are presented for both variable and fixed costs. Variable costs are those that change with production and are directly associated with sales. Fixed costs are the overhead costs that are required for the business to function, examples of which include loan interest payments and management salaries.

### Variable Costs

**1) Variable Labor:** Efficiently operating a venture of this type requires numerous roles to be filled. In many cases, multiple roles are filled by one employee, which can help save on staffing costs. In addition, full-time staff is frequently supplemented with part-time seasonal labor as well as volunteer staff.

- **Delivery Driver** Part time delivery drivers will be paid approximately \$15.00 an hour for around 25-80 hours a month from June-November, with varying hours based upon availability of product, number of deliveries required, and drive distance. These delivery drivers are not expected to be hired until later in the model, with year three being the earliest.
- **General Laborers** Over the three year period of the model, the facility will employ several general laborers (4 in year one, 5 in year two, and 6 in year three). They will be responsible for receiving product from producers, packaging it, helping load delivery trucks, etc. This position will pay approximately \$10.50 an hour in year one, with a \$0.50 increase per hour per year thereafter. Management will determine the number of employees necessary during the startup period of the business. The model will assume four general laborers in year one, increasing by one per year as the needs of the operation grows.
- **Processing Labor** Over the three year period of the model, the facility will employ several processing employees, whose responsibility will be to work with production

management on operating the equipment, processing the oilseed into meal and oil as it comes into the facility, equipment repairs, and other processing duties as assigned. These laborers will be paid approximately \$14.00 per hour and will work full-time. Based upon similar sized ventures and the consultants' knowledge of the equipment necessary, it is estimated the operation will need 8 production and processing employees in year one, rising to 10 by year three.

- **Administrative Staff** Several administrative/secretary positions will be filled at the beginning of the three year period and will be brought in for training during the startup period of the business. These individual will handle communication between the facility and clients, assisting the managers with any office needs, and other duties as assigned. These individual will be paid approximately \$15.00 an hour. Administrative staff will be employed the entire year.
- **Bookkeeper** A full-time bookkeeper will be employed. The bookkeeper will be responsible for working with the general manager to ensure all financial data is properly tracked, transcribed, and appropriately calculated in accordance with generally accepted accounting principles. The bookkeeper will receive \$12.00 an hour.

The labor positions, number of employees, and wages used in this study were determined using industry research. Employee expense assumptions are comparable to figures of operations which are similar in size and scale.

**2) Salaried Labor:** The oil seed operation will employ several salaried labor positions throughout the model. These positions include: general manager, production managers, and selling/marketing manager. The general manager will be hired at the beginning of the startup period to oversee plant operations and setup as well as hiring other staff and employee training. The general manager will receive \$100,000 per year.

The production manager will be responsible for overseeing processing employees and production methods/procedures as well as working with the general manager on plant operations and the selling/marketing manager on meeting production requirements and quotas. These individuals will be hired during the startup period and will be paid \$75,000 per year.

A selling and marketing manager will also be hired during the startup period. This manager will be responsible for finding wholesale/retail clients, forming relationships with producers, working with the production manager on production quotas and product quality, and other duties as needed by the general manager. This individual will also be responsible for the creation of marketing materials/promotional items such as business cards, signs, website, etc. Annual pay for this employee will be \$75,000 per year. For model purposes, this manager will be paid from the promotional and marketing budget.

### Fixed Costs

For the purposes of this study, the five main fixed expense categories are as follows:

#### **1) General Administrative Expenses:**

- **Salaried Labor** Salaried labor is categorized as an administrative expense and is comprised of several salaried positions including: general manager, production manager(s), and selling/marketing manager.
- **Office Supplies and Telephone** Office supplies and computer service charges are estimated to be \$500 a month. This figure is based upon moderate monthly usage. It is assumed that the management staff will also use cellular phones at a cost of \$500 a month on. These costs are estimated to be a year-round expense.
- **Pest Control** This cost is estimated at \$300 per month and will be a year-round expense. The oilseed facility will hire an outside service and will ensure that all chemicals and practices used comply with federal, state, and local regulations.
- **Software** There will be an initial startup expense of \$5,000 for software. This purchase will ensure all administrative computers are able to run properly and that employees are able to adequately perform their assigned duties. It is assumed that there will be a \$2,000 yearly expense for software related items after the initial startup period.
- **Legal and Accounting Fees** There will be an annual expense of approximately \$5,000 to account for the cost of a yearly audit as well as legal fees, etc. During the startup period of the study, an additional expense of \$5,000 will be incurred to account for trade marking and other legal costs tied to the initial opening of a business.

**2) Facility Expenses:** There are four subcategories within this section: rent expense, utilities, facility supplies, and facility insurance.

- **Facility Payment** An 8,500 square foot facility will be built by the operation and will have sufficient space necessary for processing equipment, storage, and other warehouse operations as well as receiving/shipping areas. Additionally, there will be administrative and break room space. The payment is estimated to be \$2,800 per month (\$34,000 per year)
- **Utilities** Rates are calculated as approximately (\$10,000) per month, totaling (\$120,000) per year.
- **Facility Supplies** The cooperative will need basic warehouse supplies such as pallets, cleaning materials, hand trucks, ladders, and hoses. Facility supplies are expected to be \$45,000 per year.
- **Insurance** The financial model includes an annual insurance expense of \$15,000; this cost is meant to encompass items such as workman's compensation, general liability, property insurance, an umbrella policy, and product recall. The actual expense incurred

by the facility may vary depending on such items as employee liability, and dependent on the employee position, but the cost included in the model falls in line with the charges incurred by similar ventures.

**3) Marketing:** The oilseed operation will primarily rely on word of mouth and agricultural industry contracts as a method of marketing. The salary of the sales and marketing manager is the largest portion of marketing expense at (\$75,000), as discussed above. The rest of the marketing budget (\$40,000) will be spent on promotional materials, advertisements, signage, web design, and other activities as designated by management.

**4) Equipment Costs:** This cost will cover any necessary expenses associated with keeping the facility’s equipment up and running. Based on equipment manufacturer estimates and other feasibility studies, for moderately heavy use, this expense is estimated to be \$70,000 per month and will be a twelve month expense.

For the purpose of this study, the equipment and building are depreciated using the straight-line method. This equipment and building was valued at approximately \$2.5 million, and the annual depreciation figure totals \$150,000. The equipment is assumed to have a 10% salvage value and a fifteen year life.

A variety of equipment will be necessary for the facility to run. Examples of the equipment required are as follows:

Item	Equipment Examples
1	Magnetic separator
2	Seed cleaner
3	Flaking mill
4	Vertical stacked conditioner to dry the seed
5	Heavy duty mechanical screw press for extracting oil from flaked and conditioned canola seed
6	Horizontal cake cooler to cool cake from screw presses to 20 degrees F above ambient
7	Cake grinder to grind the press cake
8	Decanter centrifuge to extract solids from the crude oil
9	Pumps for handling liquids in mechanical screw press process
10	Storage tanks/bins
11	Electrical components for operation of process equipment
12	Additional instrumentation required for monitoring of the equipment and tanks
13	Conveyors and elevators required within full press plant building

The venture will be financed using both owner equity as well as loans. Additionally, ownership will look into any grant programs available to them and their operation. It is assumed that the equipment will be purchased during the startup period of the model and will be purchased using 35% owner equity and 65% debt. The terms of the loan are 10 years at 6.5% interest. The annual payment on this equipment will be approximately \$225,000. The actual interest rate for this operation may be different, but as this is a new venture in the area with no credit history in a fledgling industry, creditors may be hesitant to offer standard rates until the facility is established and reaches an area of financial viability.

**Table 11: Equipment and Building Financing**

<b>Oilseed Equipment and Building</b>	
<b>Total Cost</b>	<b>\$2,493,108</b>
Percent by Debt	65%
Loan Amount	\$1,620,520
Interest Rate	6.5%
Loan Length	10 years
Payment	\$225,422
Owner Equity	\$872,588

It should be noted that the payments, lengths, and interest rates will vary based on how the venture chooses to finance each cost. The terms and interest rates that have been applied to this model are based upon industry averages. Depending on the economic conditions of the country, actual interest rates may be higher or lower at inception of this facility.

**Equity** Initial equity of \$975,000 will be provided by investors into the oilseed facility. Each of these investors will provide \$25,000. At this amount per investor, about 40 investors will be necessary to meet cash flow and equity requirements. Management will research grant funding that the business may be eligible for to offset some of the equity amount required. This startup equity has been included in the financial model.

**5) Unforeseen and Contingency:** Unforeseen costs and contingency expenses are reported separately from the total fixed costs. These expenses are calculated as 3% and 3% of sales respectively, covering any unexpected costs that may arise or payment defaults from customers. These two categories are calculated at a minimal level. As this is a new venture and is unique for its area, actual rates may vary once the operation is underway.

The economic model created for this oilseed feasibility analysis demonstrates that, under the right conditions, the project can be feasible, given the right amount of time and market conditions. Pro Forma statements, expense and revenue statements, cash flow statements, and the balance sheet are all discussed and presented in the section below.

### **Income**

The facility will sell both canola oil and canola meal. Both of these products will be brought into the facility as oilseed and will be separated into the meal and oil. These will be sold by the ton to wholesalers. The prices received per ton and per pound are from current price estimates in spring 2017 and are detailed in the chart below:

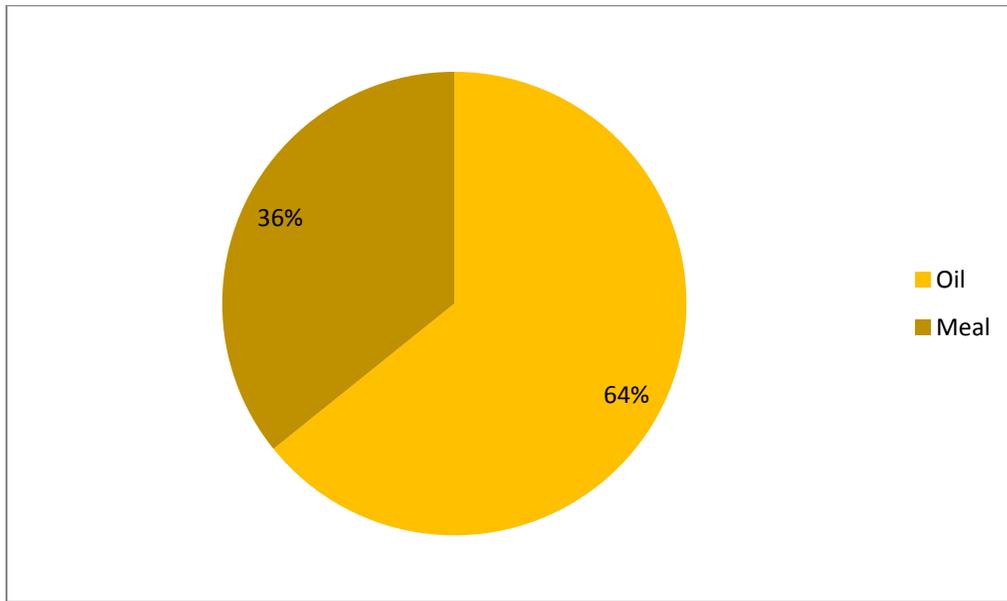
**Table 12: Canola Oil and Meal Sales Prices**

<b>Product</b>	<b>Seed Weight %</b>	<b>Per Ton</b>	<b>Per Pound</b>
<b>Canola Oil</b>	40%	\$700.00	\$0.35
<b>Canola Meal</b>	60%	\$260.00	\$0.13

During the ongoing period of the model before operations begin, the facility will incur a number of expenses as preparation begins. The facility will not process any oilseed during this ongoing period but will make equipment payments, pay salaries, incur utilities bills, etc. These are accounted for in the model and contribute to the loss in year one.

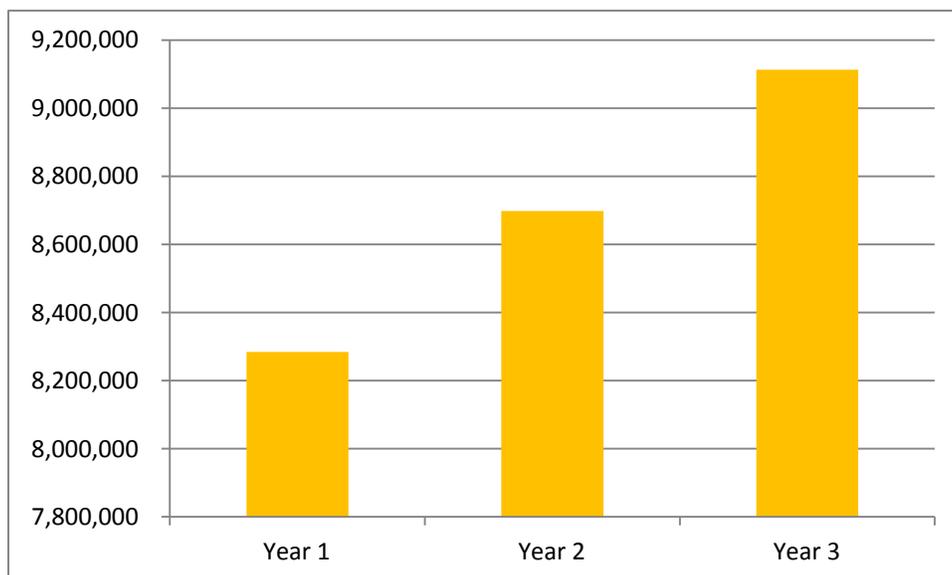
The following chart shows a breakdown of average sales distribution between oil and meal for all three years of the study.

**Figure 25: Sales Distribution**



Over the three year period of the model, canola oil accounts for approximately 64% of sales despite being only 40% of the weight of the seed as it comes into the facility.

**Figure 26: Annual Sales**



In year one of the model, the facility will process and sell approximately 20,000 total tons of oil and meal. Total meal sales for this year will be 12,000 tons and will generate just under \$3.0

million in revenue (approximately 36% of revenue). Total oil sales for this year will be about 8,000 tons and will generate more than \$5.3 million in sales (approximately 64% of revenue). Total revenue for year one will be just under \$8.3 million.

Year two processing and production will increase as growers become more efficient and more growers participate in the project. Total tonnage for year two will be about 21,000 with meal accounting for 12,600 tons and oil accounting for 8,400 tons. Meal revenue in year two will be about \$3.1 million (36% of sales) while oil revenue in this year will be just under \$5.6 million (64% of sales). Total sales for this year will be just under \$8.7 million, an increase of \$400,000 over year one.

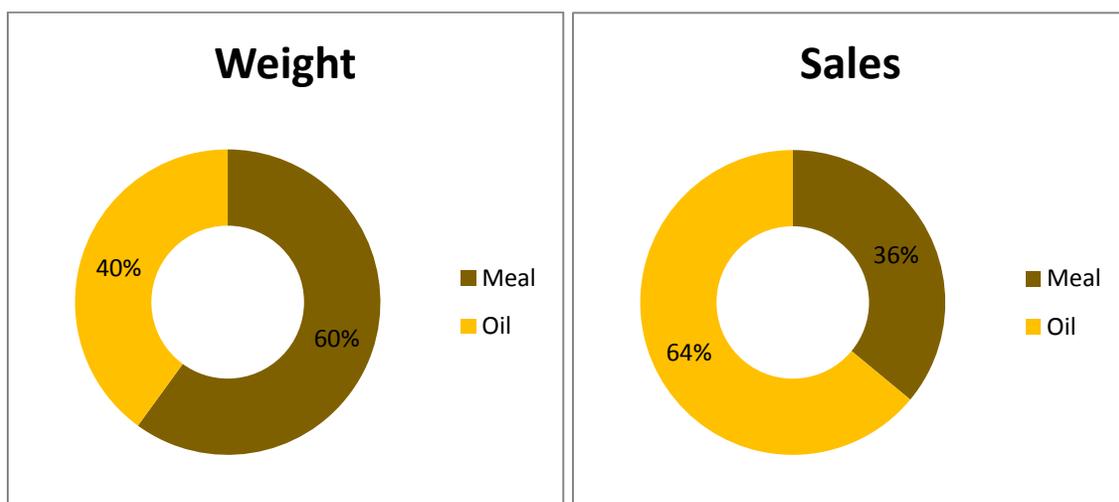
Sales numbers will again grow in year three at a steady pace. Sales distribution for this year will remain the same with oil accounting for 64% of sales and meal accounting for 36% of sales. Total tonnage for year three will be 22,000, with 13,200 devoted to meal and 8,800 devoted to oil. Revenue numbers again increase, with total sales in year three being more than \$9.1 million. Meal sales total just under \$3.3 million while oil sales total more than \$5.8 million.

In summary, the three year period of the model will see the processing facility sell 63,000 tons of oil and meal which equates to more than \$26 million in sales. Total meal sales of 37,800 tons will generate about \$9.3 million in sales while total oil sales of 25,200 tons will generate \$16.7 million of revenue.

Although oil sales account for 64% of sales revenue, oil is only 40% of production while meal accounts for only 36% of revenue despite being 60% of total production. Canola oil is worth significantly more per ton than canola meal and this is shown in the sales figures.

The following figure shows the differences in production for each line versus the percent of revenue the products bring into the oilseed facility.

**Figure 27: Canola Oil and Meal Production and Sales Breakdown**



As shown in the charts above, the distribution of sales to seed weight is vastly different. Despite being only 40% of seed weight, canola oil accounts for 64% of sales. This shows just how much

more valuable canola oil is as a whole compared to the 60% of seed weight but 36% of sales of canola meal.

## Expenses

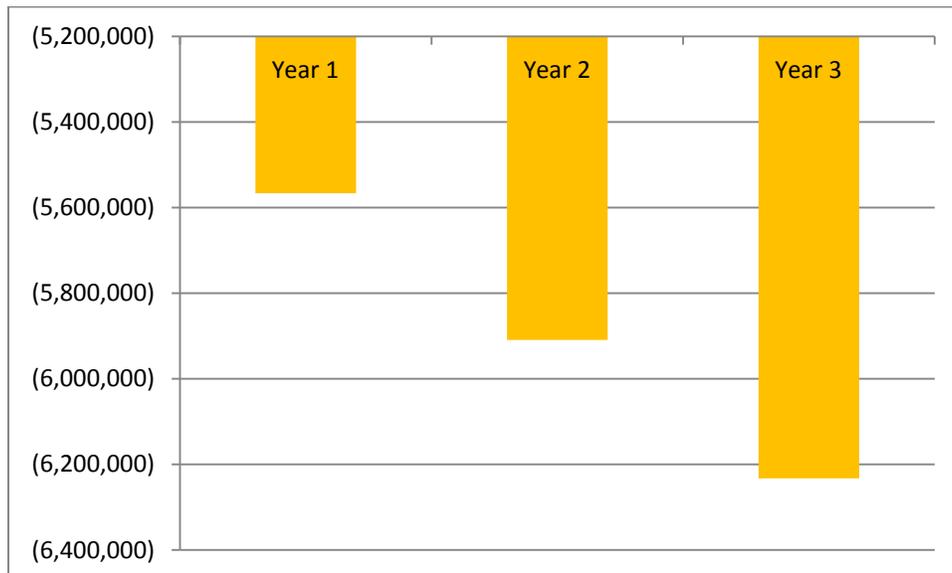
Expenses are presented for the variable and fixed costs of the business. Variable costs are those which change with production and are directly associated with sales. Fixed costs are the overhead costs required for the venture to exist and function, with examples including business insurance and management salaries.

### Variable Expenses

The amount spent by the facility to cover variable costs ranges from (\$5.5 million) in year one to (\$6.2 million in year three). Costs categorized as variable in this economic model include the input costs of oilseed, variable labor, and more.

The following figure shows the fluctuations in variable costs across the three years of the project.

**Figure 28: Total Variable Costs**



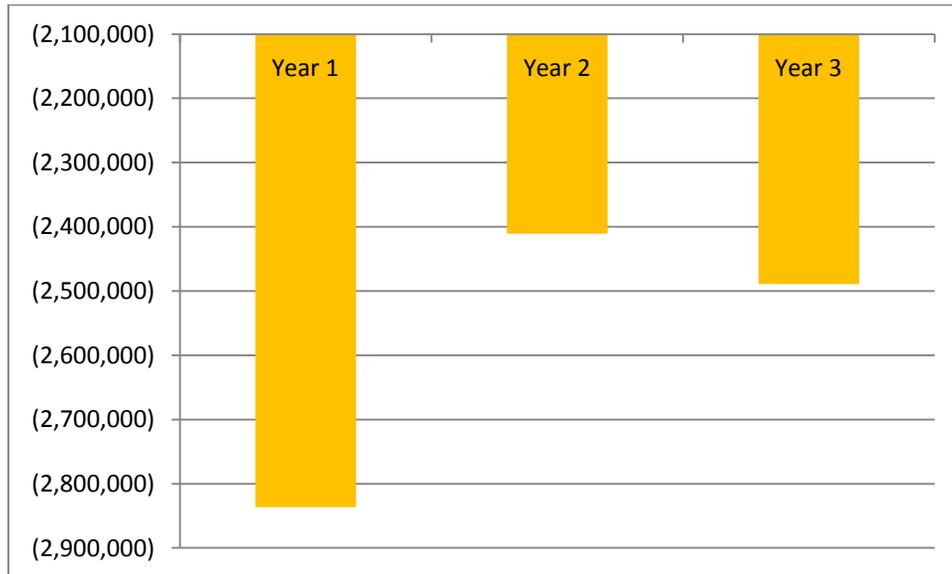
The largest variable cost faced by the facility is oilseed inputs, followed by variable labor, product loss/returns, and delivery/transportation expenses. Oilseed inputs (cost of growing, transporting, receiving, etc.) are a significant portion of overall expenses of the operation accounting for about (58%, \$4.8 million) of sales each year. Variable labor is a much smaller portion, only accounting for about (\$440,000 and more than 5%) of sales each year. Variable labor falls in percentage but increases in cost each year, ending year three with about (\$590,000) and (6.5%) of sales. Product loss in processing and handling totals about (\$320,000, 4% of sales in year one), rising to about (\$350,000) by year three.

Total variable costs for year one are about (\$5.5 million) or (67%) of revenue. Variable costs rise slightly in percentage throughout the duration of the project, reaching (\$6.2 million) and more than (68%) of sales by the end of year three.

**Fixed Expenses**

Fixed expenses are those overhead costs that do not directly vary with production or sales. For the purposes of this study, there are four main fixed expense categories: equipment, marketing, general/administrative costs, and unforeseen expenses. Of these, the largest amount of sales dollars are spent on the expenses associated with equipment costs.

**Figure 29: Total Fixed Costs**



Once all variable costs have been accounted for, an average of 32% of sales dollars remain to cover fixed expenses. In the first year, the facility will spend about (34%) of sales on fixed costs and is equivalent to about (\$2.8 million). This first year of fixed expenses is significantly higher than the following years due to the startup costs associated with the beginning of this business. The facility will incur a number of expenses during the startup period that contribute to this total. In the second year, (\$2.4 million, 28%) of total revenue, will be spent on fixed costs. By the end of year three, about (\$2.5 million, 27%) will be allotted to covering the fixed costs of the oilseed facility.

In year one of the study, equipment costs account for the largest portion of fixed costs. Within this equipment cost, repairs and maintenance of the processing equipment is the most expensive. A quote from Insta-Pro who manufactures the equipment necessary for this facility to run, it is estimated the business will incur maintenance costs of \$6.00 per ton processed. This will total about (\$740,000) in year one, rising to (\$814,000) in year three as tons processed rises.

In years two and three, unforeseen expenses and bad debt account for the largest portion of fixed costs. As sales increase, the situations faced by the operation will change as will the number of customers unable to cover their debts to the company. These two categories total about (\$870,000) in year two and (\$910,000) in year three.

There are three other fixed costs categories that include: facilities costs, selling and marketing costs, and general/administrative expenses. On average, facilities expenses account for nearly (3%) of sales dollars. These expenses include: facility payments, facility insurance, utilities, pest control, and supplies. Selling and marketing costs which include the salary of the sales and

marketing manager and the promotional campaign account for about (1.5%) of sales dollars on average. General and administrative expenses which includes: management salaries, overhead, legal fees, accounting fees, telecommunications, and office supplies account for nearly (5%) of sales yearly on average.

A budget for unforeseen costs and bad debt of sales has been included in the financial model. Bad debt of sales is considered to be 5% of revenue, while unforeseen costs are calculated as 5% of revenue. These two total about (\$830,000) in year one, rising to (\$910,000) by year three.

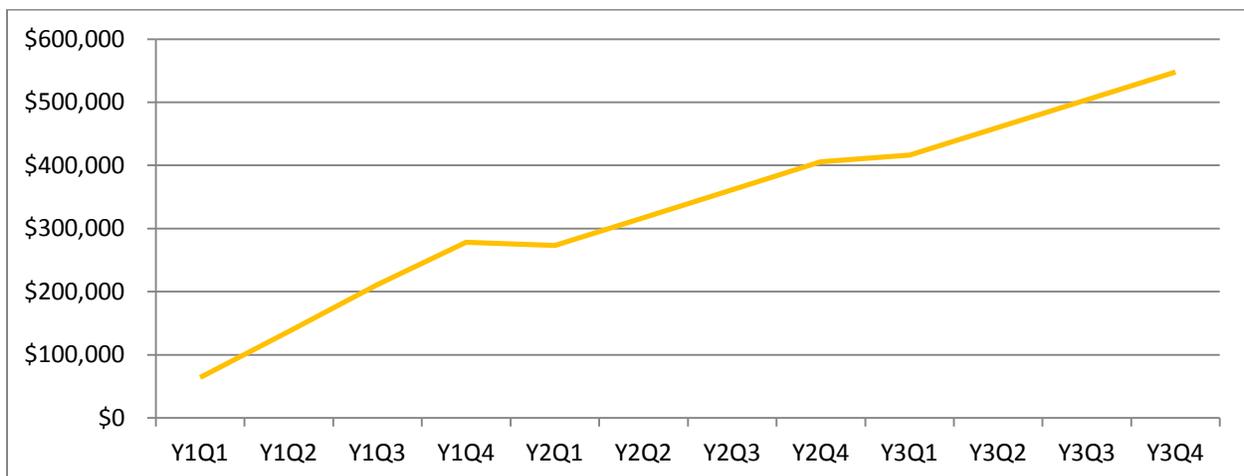
Reporting of depreciation and receivables interest expense is separated from the total fixed costs reported above. For the purpose of this study, equipment and buildings are depreciated using the straight-line method. Depreciation each year on this equipment is about (\$150,000). The accounts receivables period will be 30 days and interest rates apply to sales during this period is about 8.5%.

### Cash Flow

Cash on hand and cash flow are critical factors to project success. As discussed below, investor equity is necessary for this venture to have the correct amount of cash to cover its startup costs. Included within these startup costs are: land, building, equipment, and other facility costs incurred during the 6 month startup period. However, with this investor equity as well as financing of the items listed above, the venture will remain above zero cash on hand and increase steadily throughout the project. This supplemental cash will be used to cover cash flow issues in year one until the business can begin to stand on its own as time progresses. The most important factor for this operation is time to pay off the initial costs.

Cash on hand increase consistently throughout the project, reaching more than \$275,000 by the end of year one, and rising to nearly \$550,000 by the end of year three. The lowest point of cash on hand occurs in year one quarter one, with about \$64,000. This quickly rises as sales increase and continues to steadily rise. The slight stagnations at the beginning of each year are due to one-time yearly expenses such as taxes and bulk-supply buying.

**Figure 30: Cash on Hand**



## Pro Forma Operating Statements

The *Pro Forma* operating statements are presented below and in the Appendix. These statement shows the annual sales, expenses, and income of operations over the three years included in the financial model. The oilseed facility will experience a significant net loss in year one, mainly due to startup costs, and small net gains in years two and three. Net loss in year one of the model will be (\$325,000), with net income in years two and three being \$170,000 and \$176,000, respectively.

**Table 13: Pro Forma Operating Statement**

	Y1	Y2	Y3
<b>Revenues (Sales)</b>	8,284,000	8,698,200	9,112,400
<b>Total Variable Operating Costs</b>	(5,566,760)	(5,908,972)	(6,232,616)
<b>Total Variable Marketing Costs</b>	-	-	-
<b>Variable Margin (Loss)</b>	2,717,240	2,789,228	2,879,784
<b>Total Equipment Costs</b>	(1,077,391)	(834,534)	(846,782)
<b>Total Facilities Costs</b>	(262,500)	(228,918)	(236,758)
<b>Total Selling and Marketing Costs</b>	(143,750)	(126,806)	(133,192)
<b>General and Administrative Expenses</b>	(524,100)	(350,818)	(361,343)
<b>Unforeseen and Contingency Expenses</b>	(828,400)	(869,820)	(911,240)
<b>Wholesale Baseline Earnings EBITDA (Loss)</b>	(118,901)	378,332	390,469
<b>Interest Expense</b>	(58,678)	(61,612)	(64,546)
<b>Depreciation Expense</b>	(149,586)	(149,586)	(149,586)
<b>Net Wholesale Baseline Venture Income (Loss)</b>	(327,166)	167,133	176,336

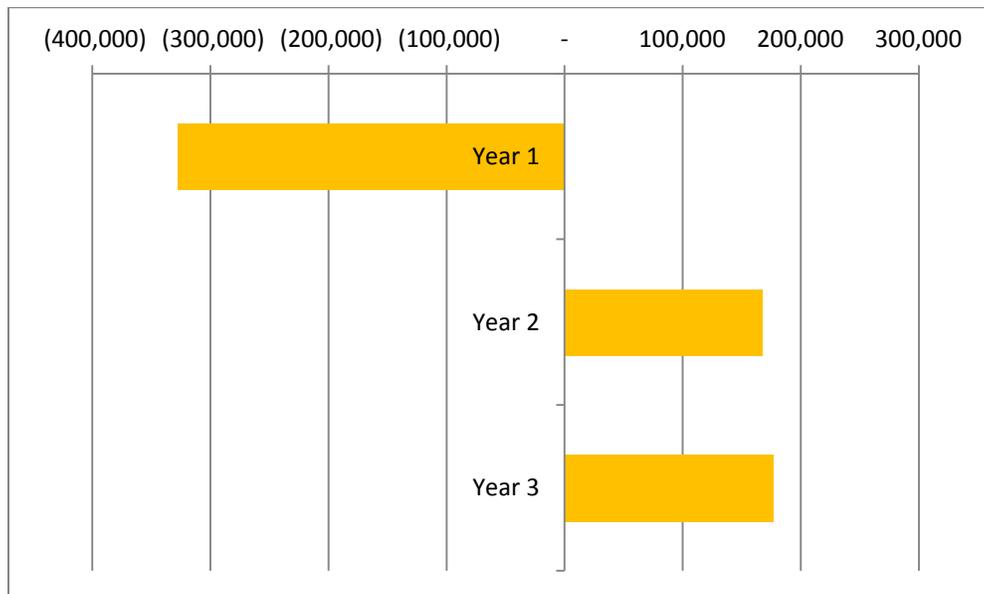
Year one annual sales total just under \$8.3 million. Once all variable costs have been accounted for, the model reports a variable margin of just over \$2.7 million. Operational income, also known as EBITDA, is defined as earnings or losses before interest, taxes, depreciation, and amortization. EBITDA in year one of the oilseed facility operations is (\$119,000). Once the two non-cash expenses of interest and depreciation are accounted for, this net loss in year one grows significantly more, reaching more than (\$325,000). Profit margin (loss) in year one is about (4%).

Sales grow in year two by about \$415,000, reaching just under \$8.7 million for the year. The variable margin grows slightly, only about \$72,000 in this year, reaching a total of about \$2.8 million. EBITDA for year two is more than \$375,000. After non-cash expenses have been subtracted from year two EBITDA, year two net income is about \$165,000. Profit margin for year two of operations is just under 2%.

The third year of operations for the oilseed processing facility shows sales of more than \$9.1 million, a growth of \$415,000. The variable margin for this third year of operations is just under \$2.9 million. EBITDA and net income in year three are \$390,000 and \$175,000, respectively. Profit margin increases ever so slightly in year three but still remains just under 2%.

Total sales for this oilseed processing facility are about \$26.1 million, with an average of \$8.7 million per year. Total net income for the three year period is just over \$16,000 with an average net income of \$5,500. What this analysis shows is that under the right conditions, and with the right amount of time, this facility *can* be feasible. However, getting to the point of financial viability puts the venture in a precarious position for a number of years until certain levels are reached.

**Figure 31: Yearly Net Income**



The above chart showcases just how much startup costs affect the first year operations of the oilseed facility. The net income in years two and three should be used to recoup losses in year one. While beyond the scope of this study, it is believed the oilseed plant will continue small but incrementally increasing gains as it becomes more efficient, a brand is built, and the benefits of growing canola are shown to more producers.

## Balance Sheet

The balance sheet increases steadily over the three year period of the model, as shown in the table below.

**Table 14: Balance Sheet**

	Year 1	Year 2	Year 3
<b>ASSETS</b>			
Cash and Equivalents	278,277	405,991	547,866
Accounts Receivables	690,333	724,850	759,367
Inventories	0	0	0
<b>TOTAL CURRENT ASSETS</b>	968,611	1,130,841	1,307,233
<b>BUILDINGS AND EQUIPMENT, Net of Depreciation</b>	2,343,521	2,193,935	2,044,348
<b>OTHER ASSETS, Net of Amortization</b>	0	0	0
<b>TOTAL ASSETS</b>	<b>\$3,312,132</b>	<b>\$3,324,776</b>	<b>\$3,351,581</b>
<b>LIABILITIES AND MEMBERS' EQUITY</b>			
<b>CURRENT LIABILITIES</b>			
Accounts Payable and Accrued Expenses	0	0	0
Accrued Interest	58,678	(61,612)	(64,546)
Current Maturities of Long-Term Debt	(80,362)	(70,933)	(60,891)
<b>TOTAL CURRENT LIABILITIES</b>	<b>(\$21,683)</b>	<b>(\$132,545)</b>	<b>(\$125,437)</b>
<b>LONG-TERM DEBT</b>			
Senior Debt	1,091,271	936,781	772,250
Less Current Maturities of Long-Term Debt	(80,362)	(70,933)	(60,891)
<b>MEMBERS' EQUITY</b>			
Member Equity and Equity Equivalents	2,650,071	2,424,339	2,589,322
Dispersed Member Equity	0	0	0
Retained Earnings (Losses)	(327,166)	167,133	176,336
<b>TOTAL LIABILITIES AND MEMBERS' EQUITY</b>	<b>\$3,312,132</b>	<b>\$3,324,776</b>	<b>\$3,351,581</b>

Cash and cash equivalents rise steadily throughout all three years, with about \$280,000 in year one, rising to \$550,000 by the end of year three. Accounts receivable grows slower than cash, with about \$690,000, rising to \$760,000 by year three. Total assets rise very little from year to year. Retained earnings (losses) coincide with the net income (loss) of the oilseed operation. Retained earnings are (\$330,000) in year one. This significant loss is mostly due to startup costs incurred by the operation. The business will retain earnings in years two and three with about \$165,000 and \$175,000, respectively.

Member equity and equity equivalents fluctuate throughout the three year period as the business moves forward, beginning with about \$2.6 million in year one, falling to \$2.4 million in year two, and rising to just under \$2.6 million in year three. Senior debt falls as land, building, and equipment loan payments are made throughout the model.

## SCENARIO ANALYSIS

The financial data presented in the above section is considered to be “baseline” model of the oilseed facility. This baseline model is used as a stable projection of the expected outcome of the business as whole under the stated conditions. Actual operations are likely to vary due to real world circumstances such as changes in market conditions, ideas for the business, weather, etc. To view the potential effects that some external changes might have on the business, the consultants have provided multiple scenarios to highlight a number of possible outcomes in comparison to the baseline model.

All variations are compared to the baseline model to show how a change in production, price, or the addition of another product can affect the earnings or losses of the business. For example, one scenario examines the addition of soybean crushing to the facility during oilseed downtime, allowing for increased facility usage, changes in revenue, etc. This allows facility ownership and the consultants to examine how stable the initial assumptions in the baseline model may be.

Comparisons have been completed for the four scenarios detailed below. These scenarios provide a robust and detailed view of potential outcomes for this crushing operation.

- **Soybeans and Canola:** Addition of soybean crushing to oilseed crushing during the 6 months per year of canola downtime.
- **Variations in Oilseed Sales Prices:** Observing the effects of price changes on the earnings of the business and how volatile earnings become when even small price changes are made.
- **Variation in Oilseed Production Quantities:** Varying of production quantities to show what happens to the business as production is moved up and down.
- **Revenue to Producers:** Examining the effects of paying producers 40% of the revenue of the oilseed operation.

### What is Cash on Hand?

In addition to net income, cash on hand is also examined for each scenario. Cash on hand is the total amount of cash available at the end of a month or quarter. Should cash on hand ever dip below zero, the business will have insufficient funds to maintain operations, resulting in possibility of business failure. These observations will show ownership where additional equity (outside investors, grants, owner’s equity, loans, etc.) may be required to sustain operations and allow them to plan accordingly. This figure will also show how much cash is available for growth and reinvestment into the crushing facility.

**Scenario: Addition of Soybean to the Canola Facility**

With canola growing and harvesting only taking place about half the year, ownership would like to examine the effects on the business should soybeans be crushed into oil and meal during the half year that the canola is not. Depending on weather, canola is generally planted in October and November, and is harvested once it matures around May or June. Soybean planting generally occurs between May and July, and the beans are harvested around November. The equipment required for soybean crushing is identical to that of canola with only difference being the need for additional storage tanks as canola oil and soybean oil cannot be stored together.

The addition of soybean crushing to the facility would change the financial situation of the facility as soybean meal sells for nearly 47% more per ton (\$381 per ton soybean meal vs. \$260 per ton of canola meal) while soybean oil sells for about 14% less than canola oil (\$600 per ton soybean oil vs. \$700 per ton canola oil). The overall acreage required for the model is the same with 63,000 acres. However, the yearly distribution of acreage is different as is the growth rate year-to-year.

**Figure 32: Soybean and Canola Acreage**

Acreage			
Canola	6,000	11,000	16,000
Soy	5,000	10,000	15,000

As shown in the table above, canola acreage will be about 52% of total acreage with soybean taking up the remaining 48%. With this distribution and growth, it allows the facility more time to source the required inputs. As compared to the baseline model, year one of the soybean/canola scenario will require 9,000 less acres. However, the growth rate will mean that 9,000 more acres will be needed by year three. Total acres for the baseline model in year three are 23,000 while the soybean/canola scenario requires 31,000 acres for this year.

As discussed in the study’s implementation plan, the yields of meal/oil and total yield per acre differ between canola and soybean. Weather and crop variety can have a large impact on the yield per acre of seed for both canola and soy. Canola generally produces over 2,000 pounds of seed per acre compared to around 1,500 for soybean. Because of their composition and the difference in pounds produced per acre, canola and soy also produce different amounts of oil and meal per acre. Canola can yield over 100 gallons of oil per acre while soybeans generally produce less than 50 gallons. Their meal yields per acre are more comparable at around 1,200 pounds; however, soy’s lower seed yield means that they create significantly more meal per pound of seed than canola.

The Pro Forma below highlights the expected financial situation of the oilseed facility as presented in the baseline analysis.

**Table 15: Canola Pro Forma**

	Y1	Y2	Y3
<b>Revenues (Sales)</b>	8,284,000	8,698,200	9,112,400
<b>Total Variable Operating Costs</b>	(5,566,760)	(5,908,972)	(6,232,616)
<b>Total Variable Marketing Costs</b>	-	-	-
<b>Variable Margin (Loss)</b>	2,717,240	2,789,228	2,879,784
<b>Total Equipment Costs</b>	(1,077,391)	(834,534)	(846,782)
<b>Total Facilities Costs</b>	(262,500)	(228,918)	(236,758)
<b>Total Selling and Marketing Costs</b>	(143,750)	(126,806)	(133,192)
<b>General and Administrative Expenses</b>	(524,100)	(350,818)	(361,343)
<b>Unforeseen and Contingency Expenses</b>	(828,400)	(869,820)	(911,240)
<b>Wholesale Baseline Earnings EBITDA (Loss)</b>	(118,901)	378,332	390,469
<b>Interest Expense</b>	(58,678)	(61,612)	(64,546)
<b>Depreciation Expense</b>	(149,586)	(149,586)	(149,586)
<b>Net Wholesale Baseline Venture Income (Loss)</b>	(327,166)	167,133	176,336

Total sales for the operation at the baseline level are about \$26.1 million with a net income of \$16,000.

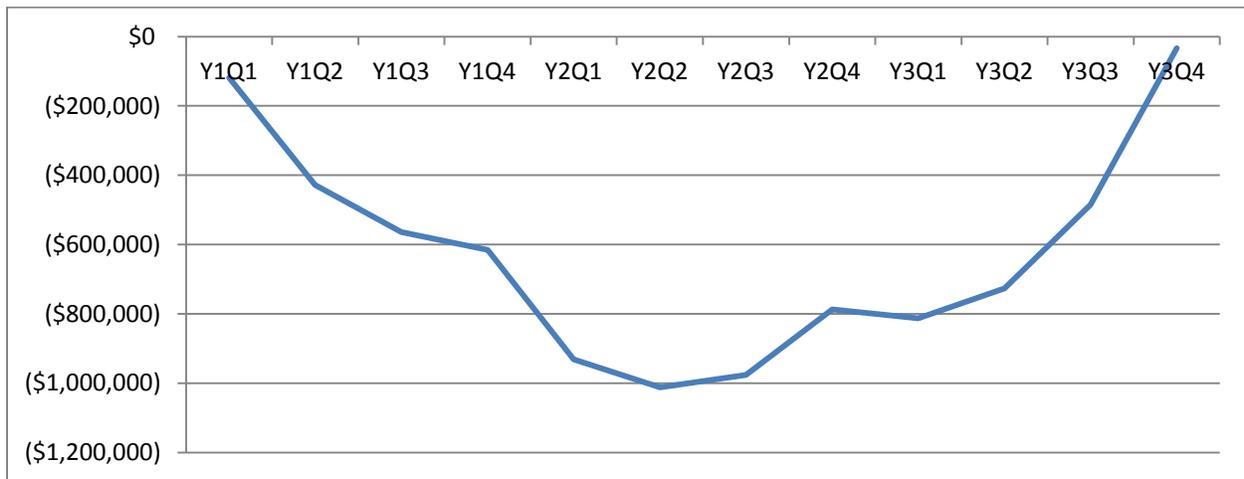
The Pro Forma below highlights the expected financial situation of the facility should it add soybean crushing to its operations.

**Table 16: Soybean and Canola Pro Forma**

	Y1	Y2	Y3
<b>Revenues (Sales)</b>	4,099,440	8,173,914	12,043,416
<b>Total Variable Operating Costs</b>	(3,155,011)	(5,792,281)	(8,351,634)
<b>Total Variable Marketing Costs</b>	-	-	-
<b>Variable Margin (Loss)</b>	944,429	2,381,633	3,691,782
<b>Total Equipment Costs</b>	(614,891)	(464,534)	(465,682)
<b>Total Facilities Costs</b>	(205,933)	(179,890)	(186,260)
<b>Total Selling and Marketing Costs</b>	(168,750)	(148,436)	(155,471)
<b>General and Administrative Expenses</b>	(541,100)	(356,998)	(367,708)
<b>Unforeseen and Contingency Expenses</b>	(409,944)	(817,391)	(1,204,342)
<b>Wholesale Baseline Earnings EBITDA (Loss)</b>	(996,190)	414,383	1,312,320
<b>Interest Expense</b>	(20,834)	(57,899)	(85,308)
<b>Depreciation Expense</b>	(149,586)	(149,586)	(149,586)
<b>Net Wholesale Baseline Venture Income (Loss)</b>	(1,166,610)	206,898	1,077,426

Total sales for the operation with the addition of soybeans are actually less than that of the baseline model, however, total net income is higher. Total sales for the three year period with the addition of soybeans are about \$24.3 million, with a net income of about \$118,000. This is (\$1.8 million) less in sales compared to the baseline model but more than \$102,000 higher in net income. The difference between the baseline model and the soybean/canola model comes from the differential in prices between oil and meal. Soybean meal sells for significantly more (47%) than canola meal while soybean oil sells for slightly less (14%) than canola oil. The price differential for soybean meal over canola meal more than offsets the price differential between soybean oil and canola meal.

**Figure 33: Soybean and Oilseed Scenario Cash on Hand Years 1-3**



A significant issue with this scenario is cash on hand. Cash on hand does not go above zero at any point during the twelve quarters examined here. It is expected to go above zero beyond year three as sales reach a level where cash on hand would start to be accrued, however, that still does not solve the issue presented above. Significant amounts of equity/loans/grants/etc. would be required to sustain operations during the initial three years of operation of this business in this scenario.

A potential solution to the cash situation could be for the operation to begin by crushing only canola. Once the facility has been established, protocols and procedures are quantified, and staff are fairly stable, management could then begin seeking out soybean contributors and move towards a soybean/canola facility. As the baseline model does not face any cash issues, there would be income and cash available at the end of year three to begin soybean crushing in addition to the canola crushing.

**Scenario: Variation in Oilseed Sales Prices**

Price points used in the baseline model are based on industry research and comparisons, historical data analysis, and the consultants’ knowledge. Given the volatile price nature of the industry, it is expected prices will fluctuate continually. The following examination of price changes is designed to highlight what earnings (or losses) the facility could expect should the market change as anticipated.

The following scenario presents the potential effects such increases or decreases would have on overall profitability. The following table presents a comparison of net income results based on oil and meal price increases and decreases relative to the baseline price model.

**Table 17: Canola Oil and Meal Pricing Chart**

Prices Per Ton	Oil	Meal
20% Decrease	\$560	\$208
10% Decrease	\$630	\$234
<b>Baseline</b>	<b>\$700</b>	<b>\$260</b>
5% Increase	\$735	\$273
10% Increase	\$809	\$286
20% Increase	\$840	\$312

The chart above shows the different prices used throughout the creation of this scenario and its subsequent variations. Prices were decreased by 10% and 20%, respectively, and increased by 5%, 10%, and 20%. Both oil and meal prices were increased/decreased as the market for these products tends to fluctuate throughout the year and year-to-year. The lowest prices charged for oil and meal in this scenario would be \$560 and \$208 per ton, respectively. The highest prices charged would \$840 for oil and \$312 for meal. Realistically, the operation can expect market prices to fluctuate 5%-10% during the three year period, based on historical data and market expectations.

**Table 18: Variation in Oil and Meal prices**

Pricing Scenario Net Income			
	Year 1	Year 2	Year 3
20% Decrease in Prices	(\$1,740,582)	(\$1,316,954)	(\$1,378,422)
10% Decrease in Prices	(\$1,033,874)	(\$574,910)	(\$601,043)
<b>Baseline (Breakeven)</b>	<b>(\$327,166)</b>	<b>\$167,133</b>	<b>\$176,336</b>
5% Increase in Prices	\$26,189	\$538,155	\$565,026
10% Increase in Prices	\$379,543	\$909,177	\$953,715
20% Increase in Prices	\$1,086,251	\$1,651,221	\$1,731,094

**Pricing Decreases:** Decreases in prices without changes to production result in significant losses across both variations with the 10% decrease and the 20% decrease. While the baseline model (breakeven) shows net income of about \$16,000, the 10% decrease results in total losses of (\$2.2 million). These losses become even larger with a 20% decrease in prices with total losses for the three year period being (\$4.4 million). At no point in the three year period would the operation be able to survive price decreases without some other means of increasing income. Methods for income increases could come from additional production, lowering of expenses, or finding other means of revenue. The management of this operation should avoid price decreases at all costs without other means of increasing income. This highlights just how volatile the business is to price changes.

**Pricing Increases:** Should prices rise instead of fall, the business would see significant higher returns as compared to the baseline model. With just a 5% increase in prices of oil and meal, the facility's net income would increase from the \$16,000 in the baseline model to more than \$1.1 million in net income. This pricing increase would keep the price of oil and meal well within the range of any competitors and would still be in the median range of market prices. Should

management feel that they would be able to sell their product at these prices, they should attempt it when and where possible. This price increase is realistic whereas further increases in price such as 20% increases, may be less realistic for customers and the canola market as a whole.

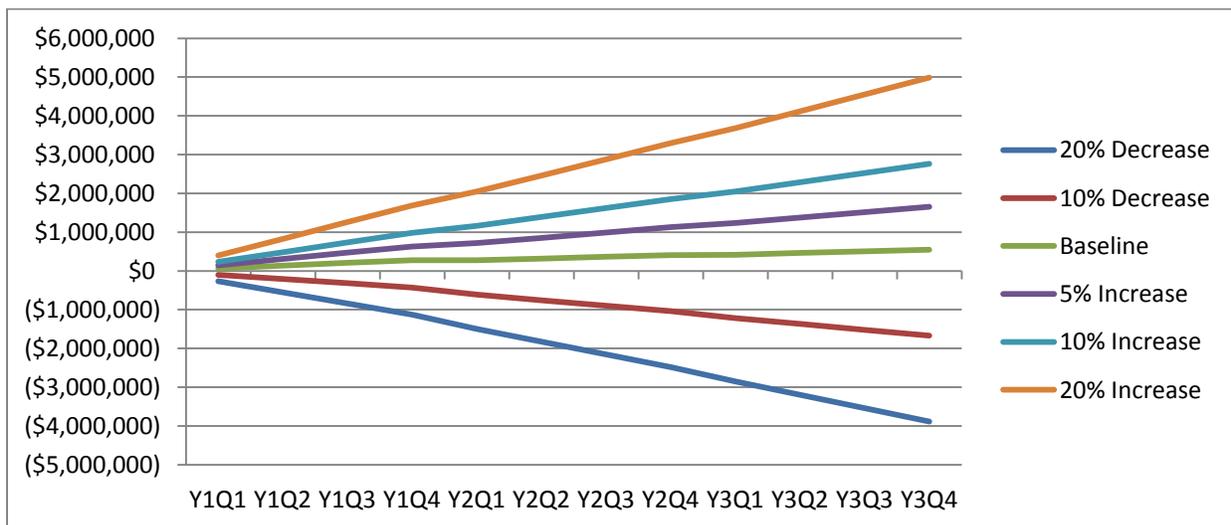
A pricing increase of 10% sees net income increase significantly over the baseline model and the 5% increase model. Total net income for this three year period would be around \$2.2 million. This pricing increase is less realistic than that of the 5% model but still well within the higher range of industry standards. This price, should it be achieved, would result in significant earnings that should be used for growth and reinvestment. Management should take into account their location as well as customers when considering this price increase as it may be more than their local clients are willing to pay. They should also pay close attention to any competitors' prices to ensure they are not overcharging comparatively.

With a 20% increase in prices, the oilseed processing operation would net income over three years of more than \$4.4 million. This price increase while excellent on paper is not realistic for the purposes of this operation. It is unlikely to be obtainable without significant changes in the economy for canola products.

**Pricing Effects on Oilseed Income:** This scenario showcases a critical factor for ownership to consider. Price changes have an extremely volatile effect on the earnings of the business. Something as simple as 5% increase in prices results in more than \$1.0 million more in net income over the same three year period, while a 10% decrease in prices results in losses of more than \$2.2 million. The prices used in the baseline model are an average price for canola oil and meal as compared to the rest of the industry. Should the market for canola oil and meal change even slightly, ownership will need to be prepared for their financial situation to be incredibly different, regardless of whether prices move up or down.

Pricing variations will also affect cash on hand over the first three years of the operation. The following chart depicts cash on hand for first three years of operations for each pricing scenario.

**Figure 34: Canola Oil and Meal Prices Scenario Cash on Hand Years 1-3**



As discussed already, price changes have volatile effects on the net income of the business. This statement remains true for cash on hand as well. Cash on hand follows a general decline/incline

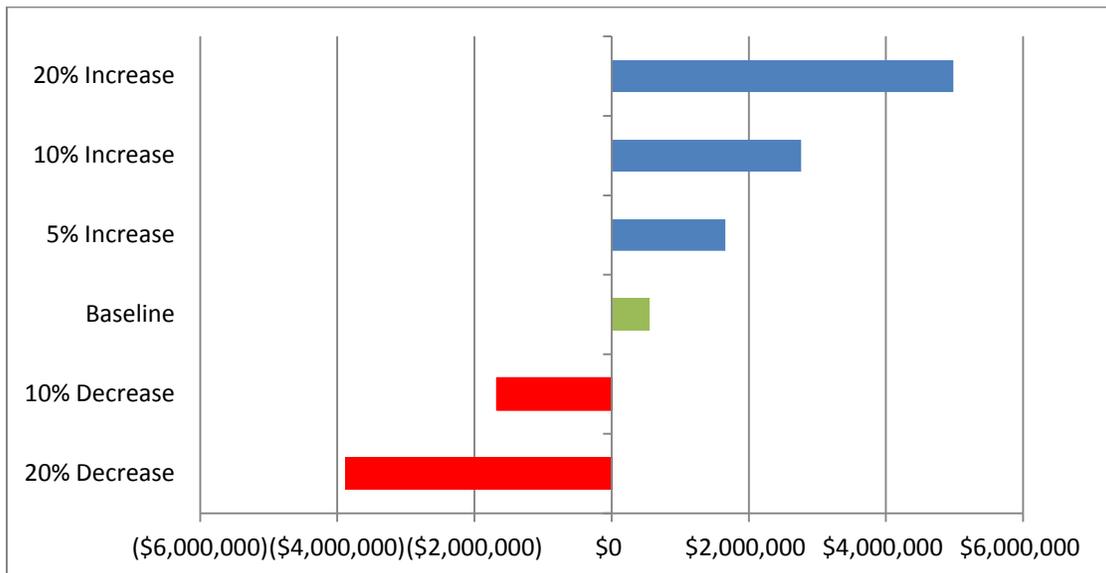
Matson Consulting Page 89 March 2017

with very little fluctuation from quarter to quarter. If the prices have been increased, it steadily trends upwards with no downward trends. If the prices have been decreased, it steadily trends downwards with no upward trends. The differential between cash on hand is significant. With a 20% decrease in prices, year three quarter four is nearly (\$3.9) million while a 20% increase in prices shows cash on hand of just under \$5.0 million, a range of nearly \$9.0 million dollars.

Cash on hand remains below zero for all 12 quarters in both price decrease variations, however, the 20% decrease in prices shows significantly higher deficits than the 10% decrease variation. Ending cash on hand with a 20% decrease in prices is nearly (\$3.9 million) while the 10% price decrease is much less with (\$1.6 million). At no point during either of these variations would the business be able to sustain operations. Large amounts of cash would need to be infused through some kind of equity or debt to supplement the cash losses.

All three price increases show the opposite trend of the decreases. Cash starts above zero and continually rises throughout all twelve quarters. There would be no financial distress for the facility in terms of cash at any point throughout the three year period. Significant reserves would be available should any situation arise where cash would need to be supplemented. At this price level, management should seriously consider significant growth opportunities as their available cash would allow for more employees, higher quality products, and increased production/sales.

**Figure 35: Canola Prices Scenario Cash on Hand End of Year Three**



The chart above highlights the difference in cash on hand and cash deficits for each variation of the pricing scenario. Cash deficits would reach their lowest point with a 20% decrease in prices with about (\$3.9 million) while the cash on hand would reach its highest point in the 20% price increase variation with nearly \$5.0 million.

**Scenario: Variation in Oilseed Production Quantities**

The production levels assumed for the baseline model of this facility represent a small-to-medium size operation. At the baseline level, personnel numbers should be adequate to operate the facility and equipment, management should be adequate to handle all aspects of running the facility, and no constraints are present. Variations in production numbers may affect personnel needs, equipment constraints, or storage constraints and result in more/less of the aforementioned factors being needed. For the purposes of this scenario analysis, only production numbers are examined and not their potential effects on the rest of the operation.

**Table 19: Variation in Production Quantities Net Income**

Production Scenario Operating Income			
	Year 1	Year 2	Year 3
Production Decrease 20%	(\$567,565)	(\$113,545)	(\$99,160)
<b>Baseline (Breakeven)</b>	<b>(\$327,166)</b>	<b>\$167,133</b>	<b>\$176,336</b>
Production Increase 20%	(\$86,766)	\$447,812	\$451,833

**Table 20: Variation in Production Quantities in Tons**

Production Scenario Quantity Variation in Tons			
	Year 1	Year 2	Year 3
	<b>Tons</b>		
Production Decrease 20%	16,000	17,000	18,000
<b>Baseline (Breakeven)</b>	<b>20,000</b>	<b>21,000</b>	<b>22,000</b>
Production Increase 20%	24,000	25,000	26,000

**Baseline (Breakeven Point):** The baseline model was created with the idea of showing at what production and sales level the facility would need to breakeven. As shown in the charts above, the baseline model has total income over the three year period of \$16,000, with production totals of about 63,000 acres. Losses would occur in year one due to startup costs (equipment purchases, facility building, etc.) Years two and three would see net income of about \$167,000 and \$176,000.

**Production Decrease 20%:** A 20% decrease in production results in significant losses across all three years of the financial model. Total tonnage for this three year period with 20% production decreases is 50,000. Total net losses for the three year period at this production level are nearly (\$780,000). At no point during the three year period would the facility be able to survive financially. This highlights just how precarious the baseline model is. Should the facility be unable to source inputs at the levels described in the baseline, the facility will fail. Even a 20% decrease in production (such as producers having a down year, weather damaging crops, market conditions changing, etc.) results in significant losses for the facility.

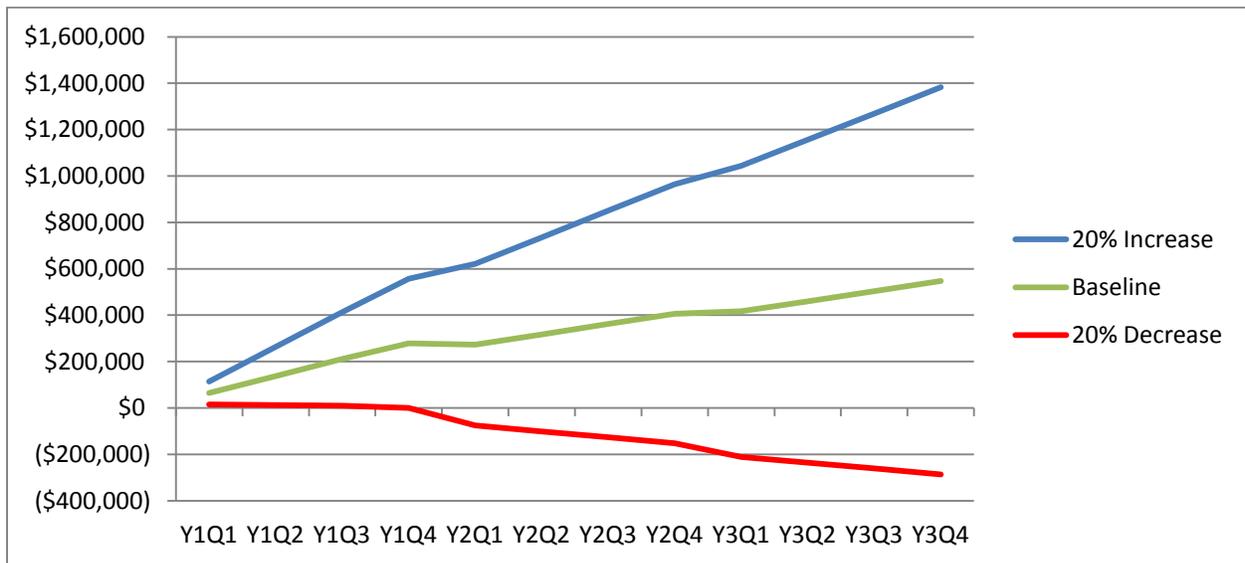
**Production Increase:** A 20% increase in production results in significant increases to net income throughout all three years of the model. Total tonnage with a 20% increase in production is about 75,000 tons. This increase of 12,000 tons results in a nearly \$800,000 increase in net income across the three year period. Total net income in this variation is almost \$813,000. Net

income at this level would allow for significant reinvestment and growth for the facility. At this level of operations, management should use the available retained earnings to improve the facility, increase the marketing budget, buy new equipment, etc. In addition, management should also keep a cash reserve in case of any financial misfortunes, unexpected expenses (increase in taxes, insurance, etc.) or bad debt of sales. This increase in production should theoretically not require additional crushing equipment; however, management should monitor the capacity of their production equipment to ensure this would not become an issue. An increase in production at this level would likely require additional labor, storage, or other constraints but is outside the scope of this analysis.

Overall, while changes in production do have effects on the net income of the operation, they are not very volatile compared to changes in price as discussed in the price scenario. Production changes are an important part of the operation and quotas should be met and maintained, however, prices play a more important role in the business' earnings (or losses).

Additionally, changes in production quantities have effects on the cash on hand of the facility. The figure below details cash on hand for both variation models and the baseline model for all three years of operation.

**Figure 36: Production Quantities Scenario Cash on Hand Years 1-3**



**Cash on Hand Analysis:** Cash on hand for all three years of the production quantity scenario are presented above. Cash on hand is an important factor for the ownership to consider as cash is required to pay bills, employees, provide reserves, etc. As shown in the baseline cash on hand, it increases gradually throughout the year each year, with a small dip and stagnation in quarter one of years two and three. This small dip is due to beginning of the year bills coming due and one-time yearly expenses. The baseline model has its lowest cash on hand in year one month one with \$14,000, ending with its highest in year three quarter four at just under \$550,000.

Cash on hand for the 20% decrease variation stays right at zero for all of year one, and quickly falls below zero as the cash provided at the beginning of the project is used. At no point during the second and third year of the 20% decrease variation would the business be able to sustain

operations. Significant cash infusions or loans would be necessary to keep operations going and the downward trend shown above means that it would be unlikely for the business to be able to turn the trend upward at any point, even beyond the three year period. The cash on hand would reach its lowest point in year three quarter four at just over (\$285,000). At this level, loans, grants, additional equity, reduction of expenses, or other means of cash increases would be required for the business to operate.

The 20% increase in production variation shows significant growth in cash on hand from quarter to quarter throughout all three years of the study. Cash on hand reaches its highest point in year three quarter four with about \$1.4 million. Ending cash on hand for this variation is 152% higher than the ending cash on hand in the baseline model. This amount of cash should be put towards significant reinvestment and growth of the operation. Management should also maintain adequate reserves with this amount.

### Scenario: Revenue to Producers

For the purposes of this scenario, the facility will examine paying its contributors (producers) out of the revenue of the business. The producers will be paid approximately 40% of all revenue generated by the oilseed facility, from the sales of both meal and oil. The goal of this scenario is to show how large the facility would need to grow to be able to pay the producers 40% of revenue while still reaching breakeven.

Total acreage and sales in the baseline model are about 63,000 acres of oilseed with about \$26.1 million in sales. In this scenario, the oilseed processing facility will need to grow to about 135,000 acres of oilseed and \$57.9 million in sales.

The Pro Forma detailed below shows the financial position of the business as expected in the baseline model.

**Table 21: Oilseed Pro Forma**

	Y1	Y2	Y3
<b>Revenues (Sales)</b>	8,284,000	8,698,200	9,112,400
<b>Total Variable Operating Costs</b>	(5,566,760)	(5,908,972)	(6,232,616)
<b>Total Variable Marketing Costs</b>	-	-	-
<b>Variable Margin (Loss)</b>	2,717,240	2,789,228	2,879,784
<b>Total Equipment Costs</b>	(1,077,391)	(834,534)	(846,782)
<b>Total Facilities Costs</b>	(262,500)	(228,918)	(236,758)
<b>Total Selling and Marketing Costs</b>	(143,750)	(126,806)	(133,192)
<b>General and Administrative Expenses</b>	(524,100)	(350,818)	(361,343)
<b>Unforeseen and Contingency Expenses</b>	(828,400)	(869,820)	(911,240)
<b>Wholesale Baseline Earnings EBITDA (Loss)</b>	(118,901)	378,332	390,469
<b>Interest Expense</b>	(58,678)	(61,612)	(64,546)
<b>Depreciation Expense</b>	(149,586)	(149,586)	(149,586)
<b>Net Wholesale Baseline Venture Income (Loss)</b>	(327,166)	167,133	176,336

The Pro Forma detailed below shows the financial position of the business as expected in the model where producers are paid 40% of revenue.

**Table 22: Revenue to Producers Pro Forma**

	Y1	Y2	Y3
<b>Revenues (Sales)</b>	16,568,000	19,570,950	21,745,500
<b>Total Variable Operating Costs</b>	(12,523,885)	(14,530,382)	(16,153,959)
<b>Total Variable Marketing Costs</b>	-	-	-
<b>Variable Margin (Loss)</b>	4,044,115	5,040,568	5,591,541
<b>Total Equipment Costs</b>	(2,002,391)	(1,574,534)	(1,608,982)
<b>Total Facilities Costs</b>	(402,500)	(352,518)	(364,066)
<b>Total Selling and Marketing Costs</b>	(143,750)	(126,806)	(133,192)
<b>General and Administrative Expenses</b>	(524,100)	(350,818)	(361,343)
<b>Unforeseen and Contingency Expenses</b>	(1,656,800)	(1,957,095)	(2,174,550)
<b>Revenue to Producers Earnings EBITDA (Loss)</b>	(685,427)	678,798	949,408
<b>Interest Expense</b>	(117,357)	(138,628)	(154,031)
<b>Depreciation Expense</b>	(149,586)	(149,586)	(149,586)
<b>Net Revenue to Producers Venture Income (Loss)</b>	(952,370)	390,584	645,791

As discussed above, the baseline model requires approximately 63,000 acres total to breakeven. With the addition of the revenue to producers expense, the model requires 135,000 acres to breakeven; more than double that of the baseline model. Total sales in year one of the revenue to producers model shows sales that are double that of the baseline, totaling about \$16.5 million for the year. This rises to more than \$21.7 million in year three as compared to the baseline model of just over \$9.1 million. Net income for this three year period of revenue to producers is about \$88,000. While small, this does show that the business, at the projected level, can continue to operate while still paying producers a premium price for the products they provide to the facility.

**Table 23: Variation in Revenue to Producers in Tons**

Revenue to Producers Scenario in Tons			
	Year 1	Year 2	Year 3
	<b>Tons</b>		
40% Revenue to Producers	40,000	45,000	50,000
<b>Baseline (Breakeven)</b>	<b>20,000</b>	<b>21,000</b>	<b>22,000</b>

It is recommended that the business not exceed 40% of revenue to producers *at the current price level*. Beyond the scope of this analysis, should the prices of oilseed rise, additional percentages of revenue may be paid to producers. However, at the current price level, any payments to producers beyond 40% of revenue send the operation into financial distress, resulting in its failure.

While it may not be feasible from the onset to pay producers due to required acreage being so large and oilseed not being a main crop produced in the area. Beyond the three year period as the facility grows, word spreads among potential producers, and marketing is completed, management may be able to begin paying producers a percentage of revenue.

## OBSERVATIONS

*During the process of this study, a number of factors that may impact the processing venture have been observed. Some of these factors, which have been presented below for consideration by the owner, may need to be addressed for the venture have a better chance of success. The consultants have also identified a number of related recommendations.*

### **Canola Industry**

Canola prices like other oilseeds, have not maintained a stable price point in the past decade, however production has continued to increase indicating growing farmer interest in the crop despite the lack of consistency.

The current demand for canola oil outpaces U.S. production at a ratio of approximately 3:1, leaving room for new growers to enter the market.

The North Carolina canola industry is still underdeveloped compared to more established crops such as soybeans, corn, and wheat.

Smaller, independent oilseed crushing ventures have been attempted in the state before but most have been purchased by larger corporations such as Cargill, Perdue, and Bunge or have closed.

North Carolina has a large population of farm animals and a large feed manufacturing industry which the canola meal can be directed towards. It should be noted that canola meal is not ideal for all animal species. Dietary needs will need to be accounted for.

Canola oil can be refined into biodiesel which can be done in both an industrial scale and at an on-farm level to reduce the fuel costs associated with farming.

Rapeseed, a crop related to canola, is currently being grown in North Carolina. The two crops are known to cross pollinate, which can negatively affect the canola crop. Care must be taken to ensure canola is grown far enough away from rapeseed crops to avoid this problem.

### **Facility Operations**

Site location will be vital to a facility to allow farmers to easily transport their seed to the facility and for the finished oil and meal to be transported to customers. Highway and rail access as well as a centralized location in the county will be important. Johnston County is well situated in North Carolina's transportation network, having access to multiple interstates and highways, as well as main rail lines that can aid in transportation of the oil or meal to consumers.

The area canola crop must become large enough to supply the facility year round with seed before the operation can begin. The facility will require approximately 63,000 acres (20,000 in year one, ending with 22,000 in year three) to breakeven financially.

The higher humidity in North Carolina can lead to issues with seed storage. Moisture content must be consistently monitored and kept in check to prevent issues such as pests, mold, and rot.

A marketing plan for the canola oil is beneficial in determining how to best get the product to customers and create a profit. The facility will need to build relationships with large scale distributors and acquire oil contracts.

### **Financial Observations**

#### *Startup*

Startup costs are a significant factor to this operation. Land, building, and equipment will cost millions of dollars and will need to be recouped through equity and the retained earnings of the business. It seems though that one facility could be used for both canola and soybeans with minimal conversion

The equipment costs are based on industry and production estimates. Actual equipment costs may vary greatly depending on actual production and personnel/space available.

Actual building and land costs may vary according to what is available at the time of the project's inception. Current costs may not be reflective of costs years down the line.

Finding the initial growers and investors willing to work with the facility will be paramount at the beginning of the project. At individual contributions of \$25,000, approximately 40 investors will be necessary to reach the equity requirements for the financial model to ensure smooth cash flow.

#### *Management and Employees*

Experienced management will be critical to the project's success as a venture of this projected size requires a high level of management expertise. The challenges of managing an operation this large from both a volume standpoint and a personnel standpoint are strenuous and may require additional help.

The insurance expense is estimated. Actual insurance cost may vary widely depending on what is offered by the facility beyond the basic umbrella policy and property insurance. The facility may choose to offer healthcare or other options that would increase the insurance cost significantly.

#### *Sales and Production*

The expected growth rate of sales and production in the model is conservative. Additional acreage may be sourced or grown by current/potential producers through marketing or word of mouth of the facility's success.

Canola oil is much more valuable than canola meal. Despite being 40% of seed weight, canola oil accounts for about 64% of revenue on average yearly.

#### *Expenses and Cash Flow*

Fixed expenses are irregularly high in year one due to the startup expenses faced by the operation such as facility and equipment, general manager salary, initial supplies and marketing, software and computer setup, etc.

Cash available is not an issue currently faced in the baseline model. This may change if the financial situation of the facility does not go as foreseen.

As shown in the Pro Forma statement in the financial section, the project can be feasible under the right circumstances and market conditions, but this is very sensitive to changes in operational factors

### **Scenario Observations**

#### *Soybean and Canola*

Soybeans are a commonly grown crop in the Johnston County area. While it may be easy to source this crop to crush in addition to canola, it does change the financial situation of the facility due to yields per acre and price situations. Canola oil yields significantly more per acre and sells for more than soybean oil.

There is significant cash flow issues associated with soybeans being added right away. Without large amounts of equity/grants/or other outside funding, the addition of soybeans at the inception of plant would result in its failure.

#### *Price Changes*

This operation is *extremely* sensitive to price changes. A price increase of just 5% takes the operation from breakeven levels to more than \$1.1 million in net income over the three year period. Conversely, a price decrease of just 10% results in losses of more than (\$2.0 million).

At no point would the operation be able to survive a decrease in prices without cash infusion from outside sources/additional investors or significant reductions in expenses. These expense cuts could be accomplished in a number of ways but are likely to affect the facility in a negative manner, resulting in lower quality product or labor.

#### *Production Changes*

Changes to production are significantly less volatile on the earnings of the business as compared to the volatility of changes in price.

The business would be able to survive one year, in terms of cash available, with a 20% decrease in production; however, it quickly falls below zero as the operation moves forward into year two.

#### *Revenue to Producers*

Paying producers is often a strategy employed by facilities like this to encourage participation, promote industry growth, and attract more growers to work with the business. Approximately 135,000 acres of canola (40,000 acres in year one, rising to 50,000 acres by year three) would be necessary

## RECOMMENDATIONS

*The consultants have identified a number of recommendations for the business to consider going forward. These recommendations are based on operational, marketing, and regulatory observations made during the completion of the study.*

### **Canola Inputs**

Before construction of the facility begins, canola first needs to be accepted into local crop rotations and its growth potential proven. The ability to source sufficient canola inputs is vital to the success of the project.

Farmer interest and crop yields will need to be gauged in order to determine the profitability and success of the crushing plant. Canola yields vary greatly by variety, weather, and soil conditions. There should be a stable annual canola crop before the crushing venture begins to ensure that enough revenue can be generated to overcome the large startup expenses.

Meet with local farmers or integrators who have soybean storage facilities to investigate setting up and reserving storage specifically for canola (given that canola demands greater attention and storage-requirements than soybeans).

### **Operations**

Establishing relationships with individuals and companies who are currently involved in canola production or processing could help to jump start the project.

Investigate potential transporters who could haul or back-haul a trial quantity of canola to the nearest processors. Establishing the facility nearby Bailey's Feed Mill in Selma would allow for easy access to an established transportation network and reduce costs associated with moving both the meal and oil to market.

Facility construction and startup will take some time to complete. It will be necessary to plan ahead in order to line up equipment purchases, building times, staffing needs, etc., with the growing season to ensure the plant is up and running by the time the first planned harvest occurs.

### **Financial Recommendations**

Management may need to lower the entry requirement of \$25,000 (which subsequently require additional investors) or look for investors in a wider range than just the immediate Johnston County area.

Labor requirements can and will change as the project moves forward. Some positions may need to have their number of employees increased, some positions may need to be removed from the operation entirely, or new positions may need to be created as the business finds its identity.

Ownership may need to consider additional managers as the operation grows due to time constraints and stress.

The marketing manager will need to work with the general manager to establish a more accurate marketing budget. It may turn out that word of mouth and networking prove far more useful to the facility than traditional marketing techniques such as advertisements and signs. Contrarily,

additional traditional marketing materials may help propel the business forward and reach customers that word of mouth and networking could not have reached.

Management should closely monitor all processing equipment for production constraints, especially early in the operation's life. As staff and management become more familiar with the equipment and its capacities and capabilities, it will be easier to manage these constraints as growth occurs.

Where possible, a reduction in variable costs will result in significantly increased income for the operation. Finding opportune ways for the growers to plant and harvest their canola for a reduced price will in turn impact the facility in a positive way.

Equipment maintenance and repairs are costly. Training employees to properly care for the equipment as it is used each day will result in this expense being reduced.

### **Scenario Recommendations**

#### *Soybean and Canola*

It is recommended that, while soybeans can be a useful addition to operation, the facility become financially stable and well marketed before adding soybeans at inception. The differences in oil and meal prices as well as the logistics involved with crushing and selling two different crops make the operation more difficult to manage as well as more costly. The addition of soybeans takes the facility a longer time to ramp up, resulting in significant cash flow issues.

Sometime after the initial three year period when the facility has had a chance to retain earnings, become familiar with the canola and the crushing equipment, it should then look to local producers for soybeans and implement them into the facility's processes.

#### *Price Changes*

Price increases should be sought after wherever possible, however, ownership should be careful to ensure they are not charging more than what the local market can bear. Buyers can and will seek other sources if they believe the prices being charged by facility are too high.

#### *Production Changes*

If possible, an increase in total acreage does result in significant earnings for the business over the three year period of more than \$800,000. Ownership should consider marketing in a wide area as well as talking directly to local growers about the benefits of growing canola.

#### *Revenue to Producers*

The processing facility can support paying producers up to 40% of revenue; however, significant local growth would need to take place in order for the business to be able to pay producers while still maintaining some measure of financial stability and viability.

It is recommended that business not exceed 40% of revenue to producers *at the current price levels*. It could support lower amounts of revenue to producers with slightly lower prices. Should prices rise, the facility would be able to pay producers additional portions of revenue. Ownership should keep a close watch on price levels and what it would take to entice additional growers to participate in the operation.

While it may not be feasible from the beginning to pay producers revenue of the business, it is definitely possible with further growth and most importantly more time. Beyond the three year period, once the facility is established financially and firmly entrenched in the local market, it should take steps to reach out to producers for both the purposes of paying them portions of revenue as well as encouraging soybean production to add to the facility's product line.

Overall, as shown throughout the financial section of this feasibility analysis, this business has the potential to be profitable *under the right conditions*. As is the case with most businesses, projections rarely mirror real world circumstances. Ownership, should they decide to begin this facility, should keep a careful watch on all the items discussed above, as well as market conditions locally, regionally, and nationally.

## APPENDICES

### APPENDIX A: SELECTED RESOURCES

#### *Entities:*

- **AgStrong**

AgStrong is a canola and sunflower crusher company based in Georgia. They have two facilities, one in Bowersville, GA, and one in Trenton, KY. AgStrong focuses on building relationships with local growers through contract production for non-gmo canola and sunflower. Their product has additional value through being both GMO free as well as expeller pressed, meaning their seeds do not undergo chemical solvent extraction.

<http://www.agstrong.com/>

- **Green Circle**

Green Circle NC is an organization in Johnston County that converts used canola oil into biodiesel. They source their oil from schools, restaurants, and other facilities. Their business could be a consumer of canola oil produced in a Johnston County processing facility. Green Circle offers free containers to businesses interested in selling their oil, in sizes ranging from 100 to 300 gallons. Their focus is on their eco-friendly mission, and helping both those selling their oil and those interested in clean-burning biodiesel.

<http://greencirclenc.com/>

- **North Carolina Small Grain Growers Association**

The North Carolina Small Grain Growers Association was established in 1986 to represent and support producers and businesses involved in the production of wheat, oats, rye, barley, canola, and grain sorghum in the state. Their goals include increasing yields and profits, expanding market opportunities, supporting grain/oilseed research, and encouraging environmental conservation among producers.

<http://ncwheat.com/>

- **Bailey Feed Mill**

Bailey Feed Mill of Selma, North Carolina, operates a grain and seed storage and transportation facility complete with grain elevator, truck fleet, and rail access. Established in 1952, Bailey Feed Mill provides a link between growers and consumers, holding grain and seed for sale to processors across the region. Their facilities could help support canola farmers producing for the canola processing facility if it was not capable of providing transportation services to farmers itself.

<http://www.baileyfeedmill.com/>

- **Cargill**

Cargill operates a multinational agricultural and manufacturing corporation responsible for over \$100 billion in sales. Their oilseed and grains division involves 11 businesses involved in sourcing, trading, processing, and distribution of a number of oilseeds and grains such as wheat, corn, canola, barely, soy, and others.

<http://www.cargill.com/company/businesses/cargill-grain-oilseed-supply-chain/>

**General:**

- **Incorporating Your Business in North Carolina**

From the North Carolina Department of the Secretary of State, this document includes all requirements and regulations on establishing and incorporating a business in North Carolina. While only one of a number of potential operational and organizational structures available, incorporation offers many distinct benefits that may fit into a potential processing plan.

<https://www.sosnc.gov/corporations/pdf/businesscorporation.pdf>

**County Plans, Examples, and Templates:**

- **Johnston County 2030 Comprehensive Plan**

The Johnston County 2030 Comprehensive Plan was developed in 2009 by the county to establish a plan of action for guiding the growth and expansion of the County in terms of zoning and land usage. The plan will serve as the “blueprint” to form a backdrop to the county’s decision making. As the county grows, the need to balance population growth, housing, agricultural needs, environmental conservation, transportation, and intergovernmental cooperation and coordination. The plan includes a number of maps detailing the county’s zoning and plans for future development.

<http://www.johnstonnc.com/files/planning/comprehensive%20plan%2003-02-09.pdf>

- **Johnston County Agricultural Development Plan**

Adopted in 2009, the Johnston County Agricultural Development Plan further develops on the agricultural future of the county laid out in the Comprehensive Plan. Its purpose is to put the agricultural economy of the county at the forefront of future development so that as the county grows residentially and commercially, its traditional economic staple does not suffer. The plan is divided into two main sections, one dealing with land usage while the other focuses on agricultural economic development.

<http://www.johnstonnc.com/files/planning/Johnston%20Agricultural%20Development%20Plan.pdf>

- **Growing Agribusiness**

In 2013, the University of Virginia’s Weldon Cooper Center for Public Service published *Growing Agribusiness: The Contribution and Development Potential of Agriculture and Forest Industry in the Danville Metropolitan Area*, a study that “examines trends in the Danville metropolitan area economy with particular attention to the changing size and composition of the agribusiness sector.” “It measures the economic and government tax revenue footprint of the agribusiness industry using input-output analysis to illustrate its linkages with and continuing importance to the economy of the region. It also describes strengths, weaknesses, opportunities, and threats to agribusiness in the region with information elicited from three focus groups drawn from the agribusiness industry and the general public and individual interviews with Pittsylvania County Agricultural Board members. This information is used to develop strategic priorities and policy recommendations to expand the size and influence of the agribusiness industry in a way that promotes the economic growth of the region and the well-being of area residents.”

[www.coopercenter.org/node/2/publications/growing-agribusiness-contribution-and-development-potential-agriculture-and-fore](http://www.coopercenter.org/node/2/publications/growing-agribusiness-contribution-and-development-potential-agriculture-and-fore)

- **An Analytical Review of State & Regional Strategic Agriculture Plans**

The Washington State Department of Agriculture created a comparison and review guide for strategic agriculture plans. This guide is useful for groups wishing to create a strategic plan by allowing them to compare other approaches and create a plan best suited to their organization and needs. This document helps groups assess what sections or issues are vital to their work, including timelines and evaluation processes.

<http://agr.wa.gov/FoF/docs/AgPlansReview.pdf>

***Agricultural Protection:***

- **Agricultural and Forestal Districts**

The Valley Conservation Council completed a comprehensive study of Virginia AFDs in 2009 titled Agricultural and Forestal Districts: Their Use and Applicability Across the Commonwealth. The study offers the benefits and drawbacks of establishing Ag and Forestal Districts and their impacts on agricultural protection.

<http://www.valleyconservation.org/wp-content/uploads/2015/10/Ag-Forestal-District-Report.pdf>

- **Sustaining Agriculture in Urbanizing Counties**

Sustaining Agriculture in Urbanizing Counties, a 2009 report containing 15 case studies of counties from across the US, was completed to “identify conditions under which farming may remain viable in agriculturally important areas that are subject to substantial development pressures.” The report also contains sections on various zoning and urban growth policies, PDR and TDR programs, and relevant survey questions posed to participants.

<http://ofp.scc.wa.gov/wp-content/uploads/2013/03/Sustaining-Agriculture-in-Urbanizing-Counties.pdf>

***Canola and other Oilseeds:***

- **Oilseed Farming and Biodiesel Plant Integration Considerations**

Oilseed Farming and Biodiesel Plant Integration Considerations, published in 2013, looks at the three major processes in the oilseed to biodiesel chain: farming, oilseed crushing, and biodiesel production. The document is intended to provide a basic overview of processes and considerations which individuals and entities interested in canola production should make sure to incorporate into their project planning. The plan also looks at scenarios bringing together producers and processors through equipment/resource sharing; something which could offer examples of ways county planning or extension agencies could incorporate oilseed cooperative efforts into their activities.

<http://sustec.appstate.edu/sites/sustec.appstate.edu/files/OilseedFarmingandBiodieselPlantIntegrationConsiderations.pdf>

- **North Carolina Canola Production**

North Carolina Canola Production is a 2011 publication which details the benefits and processes involved in growing Canola in North Carolina, including input costs and uses compared with other crops and oilseeds already grown in the state. As introducing a new crop into a region requires a wide range of knowledge on fertilization, soil requirements, diseases, plant information, and more, this document offers a concise canola overview for any area considering canola expansion.

<https://nccleantech.ncsu.edu/wp-content/uploads/2011/09/Canol-Guide-Final.pdf>

- **Table 25. Field Crops: 2012 and 2007**

From the 2012 Census of Agriculture State Level Data, Table 25. Field Crops: 2012 and 2007 includes the canola harvests for both 2012 and 2007. In addition to comparing canola between the two years, the table shows the number of farms, acres of canola, and pounds produced. The data is broken down by U.S. total and by individual states.

[https://www.agcensus.usda.gov/Publications/2012/Full\\_Report/Volume\\_1,\\_Chapter\\_2\\_US\\_State\\_Level/st99\\_2\\_025\\_025.pdf](https://www.agcensus.usda.gov/Publications/2012/Full_Report/Volume_1,_Chapter_2_US_State_Level/st99_2_025_025.pdf)

***Canola Oil:***

- **Vegetable Oil Processing Final Report**

This 1995 document from the Environmental Protection Agency (EPA), discusses solvent extraction processes for multiple oilseed varieties. The report focuses on emissions related to chemical extraction, and proper procedures to use when dealing with operating a processing plant using this method. The purpose of this document is to explain industry emissions standards, sources of emissions during the extraction process, and ways to control solvent emissions.

<https://www3.epa.gov/ttn/chief/ap42/ch09/bgdocs/b9s11-1.pdf>

- **Vegetable Oil Production: Industry Profile**

Vegetable Oil Production: Industry Profile is a 1998 study by the EPA on oilseed production emissions. This full study looks at the oilseed industry as a whole, including supply and demand factors, the oilseed market, and how oilseed companies operate. The document is a useful in-depth look at the oilseed industry covering production to sales and all aspects in between. While market information is outdated, the industry organization and product information remains relevant to entities interested in entering into oilseed processing.

[https://www3.epa.gov/ttnecas1/regdata/IPs/Vegetable%20Oil\\_IP.pdf](https://www3.epa.gov/ttnecas1/regdata/IPs/Vegetable%20Oil_IP.pdf)

- **Economic Impact Analysis for the Final Vegetable Oil Processing NESHAP**

Economic Impact Analysis for the Proposed Vegetable Oil Processing NESHAP is a further 2001 study conducted for the EPA on the canola

[https://www3.epa.gov/ttn/ecas/docs/eia\\_ip/vegetable-oil\\_eia\\_neshap\\_final\\_01-2001.pdf](https://www3.epa.gov/ttn/ecas/docs/eia_ip/vegetable-oil_eia_neshap_final_01-2001.pdf)

## APPENDIX B: SAMPLE STAFF DESCRIPTIONS

**Plant Manager** – A full time position that reports to the Owners or Board of Directors. The Plant Manager is responsible for planning, directing, and coordinating all operations. The position is also responsible for developing policies and managing the daily operation of the business for the most efficient use of inputs and human resources. The position also shares the responsibility of financial reporting accuracy with the Owner or Board.

In addition, the Plant Manager:

- Develops the business plan according to the Co-chairmen’s objectives
- Develops a sales plan with objectives and strategies to increase revenue while acquiring new accounts
- Is responsible for coordinating grain procurement
- Is responsible for inventory maintenance
- Develops customer relations including sales leads, research, qualifying leads, developing leads and customer service
- Maintains and develops client relations
- Maintains member relations; monthly reporting
- Seeks opportunities to expand business with current clients and possible new clients
- Attends conventions, conferences and trade shows as needed; prepares post event reports and analysis
- Maintains employee files
- Develops a plan for effective Preventive Maintenance
- Is responsible for equipment maintenance and parts purchasing
- Is responsible for spare parts inventory
- Is responsible for employee safety
- Is responsible for environmental compliance with NC State Environmental Law

Qualifications and Experience:

- Bachelor’s Degree B.A or B.S. or equivalent
- Five years of sales experience preferred
- Good judgment and ability to make sound decisions
- Strong organizational, problem solving and analytical skills
- Excellent written and verbal communications skills
- Demonstrated ability to make presentations to individuals or groups at all levels
- Ability to work independently or as a team member
- Ability to calculate figures and amounts such as discounts, interest, commissions and percentages
- Proven ability to handle multiple projects and meet deadlines
- Proficient in Microsoft Word, Excel, Power-point and Outlook
- Valid Driver’s License

**Office Manager** – The Office Manager is a Full time position that reports directly to the Plant Manager. This position is responsible for performing general clerical services as well as accounts receivable and accounts payable.

Duties and Responsibilities:

- Handles switchboard operations – answer, direct, problem solve, pick-up and forward messages
- Reception of guests
- General clerical tasks (e.g. prepare letters, assist with mailings, compile material, etc.)
- E-mail communications – May prepare and send standardized communications
- Reception Documentation – Maintains and updates reception resources (e.g. phone lists, emergency contact numbers, etc.)
- Grain grading – Must be able to pass the USF&G grain grading class
- Accounts Receivable – Must be able to receive payment and prepare deposits
- Accounts Payable – Must be able to organize file and make payments on time
- Other duties as assigned

Qualifications and Experience:

- Proven, well developed interpersonal skills
- Excellent written and communication skills
- Excellent organizational skills with attention to detail; especially accuracy with numbers
- Reliable; calm under pressure
- Ability to handle information in a confidential and sensitive manner
- Valid Driver's License
- Receptionist and clerical training a plus
- Quick-books training a plus
- MS Office basic (Word, Excel)
- Ability to manage multiple/competing tasks and to exercise independent judgment while seeking supervision where appropriate
- Ability to maintain a positive work atmosphere by behaving and communicating in a professional manner (i.e. gets along with customers, co-workers and management)

**Technicians** –The plant technicians support the operation of the plant. Their routine duties include sampling in process product, loading outbound trucks, unloading inbound trucks, maintenance, cleaning and daily paperwork.

Qualifications and Experience:

- Experience in one of the following fields is a benefit: agriculture, electrical, mechanical, plumbing, pipefitting, industrial construction and maintenance.
- Able to read, understand, and follow safety procedures, and work safely in an industrial setting
- Education: High School Diploma, College level courses are beneficial
- Able to climb ladders and work on elevated structures
- Able to operate valves and carry 50 pound bags

- Able to read and understand operating instructions for the plant
- Applicant/s must be able to successfully pass a drug test and background check prior to employment
- Must be fluent in English

**Quality Control and Laboratory Manager** – The quality control and laboratory manager will be a full time position that analyzes the input and output products to ensure they meet the standards set forth by the Plant manager.

Duties and responsibilities:

- Responsible for the management and execution of quality control programs and systems at the plant. Manage appropriate Quality Control (QC) staff and direct functional area budgets
- Develops, implements, and maintains Quality Control systems to assure the highest possible quality standards in all incoming raw materials, outgoing finished products and the manufacturing environment
- Identifies critical control points (CCPs); continually monitors these CCPs to validate/verify compliance to raw materials and finished product specifications
- Oversees all QC laboratory procedures, equipment needs, and staffing
- Frequently makes on-going audits /inspections of the facility, audits quality control analysis/testing equipment, and evaluates QC employee performance to assure that all QC policies, procedures, programs and systems are being fully implemented and/or maintained
- Assures that all QC procedures and associated documentation (QC charts, graphs, audits, manuals, etc.) are properly developed, reviewed, and updated
- Makes quality related recommendations to the General Manager and implements policies, procedures, programs, and systems that will enhance the plant to produce high quality finished products in safe and wholesome environments
- Develops specific quality-related employee training programs aimed at meeting plant quality needs and/or standards
- Assists in the development, implementation, and maintenance of quality related training that will also include train-the-trainer programs
- Reviews and analyzes quality standards on an on-going basis
- Manages Audit Reports and HACCP Plans
- Implements a best practices approach to plant quality programs; installs those quality policies, procedures, programs, and/or systems that have the greatest potential for success and/or implementation
- Manages customer quality assurance reports so as to monitor performance and to optimize current expertise and skills; maximize capabilities and human resources to match / meet current workloads and plant quality needs

## Johnston County Feasibility Study

- Provides customer complaint responses or assistance to customer service representatives requiring a higher-level technical expertise or higher order detail to consumer / customer complaints
- Communicate to relevant personnel all information essential to ensure the effective implementation and maintenance of the quality systems
- She/he is responsible for all plant regulatory inspections, customer audits and third party audits
- She/he is responsible for managing all interactions required with outside analytical and microbiological laboratories
- Responsible for immediately reporting all food safety and quality issues to the General Manager
- Other duties and responsibilities as assigned

### Qualifications and experience:

- Bachelor of Science Degree in Laboratory Science, Chemical Engineer, a Food Science or Technology Science (such as biology, chemistry or physics, etc.) is required
- 7 plus years of experience in managing quality operations in a biodiesel or food-manufacturing environment required
- Must be HACCP Certified
- Must be a strong communicator with comprehensive hands-on experience in both food manufacturing /operations and QC laboratory environments
- Highly proficient Microsoft Office: Word, Excel, Outlook, Visio, etc.)

**APPENDIX C: LABORATORY CANOLA ANALYSIS**



North Carolina Department of Agriculture and Consumer Services  
 Food and Drug Protection Division Laboratory  
 4000 Reedy Creek Road, Raleigh, NC 27607

Steve Troxler  
 Commissioner

Daniel Ragan  
 Director

**TEST REPORT**

<p><b>TIM BRITTON</b>                  2736 NC 210 HWY                  SMITHFIELD, NC 27577</p> <p>County: JOHNSTON      Telephone: 919 989-5380</p>	<p><b>Sample Submitted To Laboratory By:</b>                  NCDA&amp; CS Feed/Forage Office                  1070 Mail Service Center                  Raleigh, NC 27699 - 1070</p> <p><b>Sample Submitted Date:</b> 08/27/2014  <b>LIMS #:</b> AA51022  <b>Transcript #:</b> 2014-0446  <b>Page Number:</b> Page 1 of 1</p>
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Final Report     
  Interim Report     
  Amended Report

**Sample Description:** CONOLA     
 **Ext. Assistance:** N     
 **Production Status:** Multiple Stages  
**Forage Form:** N/A     
 **Maturity:** N/A  
**Species:** Dairy Beef Poultry     
 **Special Treatment:**  
**Forage Type:** Other Roughages

Species	Analyte	Unit	As Submitted Basis	Dry Matter Basis
	Dry Matter	%	96.62	
	Crude Protein	%	31.49	32.59
	Unavailable Protein	%	2.23	2.31
	Adjusted Crude Protein	%	31.49	32.59
	Neutral Detergent Fiber	%	27.88	28.86
	Acid Detergent Fiber	%	16.60	17.18
	Non-fiber Carbohydrate	%	19.48	20.17
	Fat	%	11.77	12.18
	Calcium	%	0.53	0.55
	Phosphorus	%	1.00	1.03
	Sulfur	%	0.72	0.74
	Magnesium	%	0.48	0.50
	Sodium	%	0.00	0.00
	Potassium	%	1.20	1.24
	Copper	ppm	5.00	5.00
	Iron	ppm	96.00	99.00
	Manganese	ppm	59.00	61.00
	Zinc	ppm	56.00	58.00
	Ash	%	6.00	6.21
	Aflatoxin	ppb	0.00	0.00

Approved by: <i>Kevin Page</i>	Date: 09/05/2014
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\*Interim reports serve only as a notification of preliminary results. Interim results are not final. This document can not be reproduced except in full without the written approval of the NCDA&CS FDPD Laboratory. The results listed in this report pertain only to the samples as provided to the lab by the customer.

**End of Report**

**APPENDIX D: TENNESSEE 2016 CANOLA BUDGET**

The following budget was developed by the University of Tennessee Extension and offers an example of expenses faced by farmers growing canola in the state. The budget compares the state average price for various expenses to a baseline of \$8.00 per bushel of seed, and then offers two yield and price scenarios which lead to different results. This document is only meant to be used as a guide for growers looking to create their own budget and prices should be adjusted to match their region-specific numbers. Yield, price received, and cost of expenses will vary.

<b>2016 Canola, Conventional Tillage, Non-Irrigated Budget</b>					
	<u>Unit</u>	<u>Quantity</u>	<u>Price</u>	<u>Total</u>	<u>Your Farm</u>
<b>Revenue</b>					
Canola	Bu	50	\$8.00	\$400.00	_____
				<b>Gross Revenue (\$/Acre)</b>	_____
				<b>Total Revenue</b>	<b>\$400.00</b>
<b>Variable Expenses</b>					
Seed <sup>2</sup>	lbs	5	\$6.30	\$31.50	_____
Fertilizer & Lime (Table 1.)	Acre	1	\$178.31	\$178.31	_____
Chemical (Table 2.) <sup>3</sup>	Acre	1	\$47.59	\$47.59	_____
Crop Scout	Acre	1	\$6.00	\$6.00	_____
Repair & Maintenance (Table 3.) <sup>4</sup>	Acre	1	\$28.01	\$28.01	_____
Fuel, Oil & Filter (Table 3.) <sup>4</sup>	Acre	1	\$11.61	\$11.61	_____
Operator Labor (Table 3.) <sup>4</sup>	Acre	1	\$7.94	\$7.94	_____
Machinery Rental	Acre	1	\$0.00	\$0.00	_____
Custom Work	Acre	1	\$0.00	\$0.00	_____
Drying (Fuel/Electric)	Bu	50	\$0.00	\$0.00	_____
Cash Rent <sup>5</sup>	Acre	1	\$98.00	\$98.00	_____
Crop Insurance <sup>6</sup>	Acre	1	\$13.82	\$13.82	_____
Operating Interest <sup>7</sup>	%	\$422.78	6.00%	\$12.68	_____
Other Variable Costs	Acre	1	\$0.00	\$0.00	_____
				<b>Total Variable Expenses</b>	<b>\$435.46</b>
				<b>Return Above Variable Expenses</b>	<b>-\$35.46</b>
<b>Fixed Expenses</b>					
Machinery <sup>4</sup>					_____
Capital Recovery (Table 3.)	Acre	1	\$45.40	\$45.40	_____
Other Fixed Machinery Costs	Acre	1	\$0.00	\$0.00	_____
Property Taxes	Acre	1	\$0.00	\$0.00	_____
Insurance (Non-Machinery)	Acre	1	\$0.00	\$0.00	_____
Management Labor <sup>8</sup>	Acre	2	\$15.00	\$30.00	_____
Other Fixed Costs <sup>9</sup>	Acre	1	\$0.00	\$0.00	_____
				<b>Total Fixed Expenses</b>	<b>\$75.40</b>
				<b>Return Above All Specified Expenses</b>	<b>-\$110.86</b>
<b>Breakeven Price For Selected Yield</b>			<b>Breakeven Yield for Selected Price</b>		
Yield (bu)	Variable Cost (\$/bu)	Total Specified Cost (\$/bu)	Price (\$/bu)	Variable Cost (bu)	Total Specified Cost (bu)
30	\$14.52	\$17.03	\$7.00	62	73
35	\$12.44	\$14.60	\$7.25	60	70
40	\$10.89	\$12.77	\$7.50	58	68
45	\$9.58	\$11.35	\$7.75	56	66
50	<b>\$8.71</b>	<b>\$10.22</b>	<b>\$8.00</b>	<b>54</b>	<b>64</b>
55	\$7.92	\$9.29	\$8.25	53	62
60	\$7.26	\$8.51	\$8.50	51	60
65	\$6.70	\$7.86	\$8.75	50	58
70	\$6.22	\$7.30	\$9.00	48	57

<http://economics.ag.utk.edu/budgets/2016/Crops/2016FieldCropBudgets.pdf>

**APPENDIX E: INSTAPRO EQUIPMENT LISTING**

**Estimate for 2 tons per hour PRESS-EXPRESS**

**BUDGETARY LISTING**

ITEM NO:	DESCRIPTION	HP	QT Y	PRICE-EACH	PRICE-TOTAL
----------	-------------	----	------	------------	-------------

**CLEANING**

1	CLEANER SURGE BIN	-	1	\$5,103	\$5,103
2	MODEL 568 AIR SCREEN CLEANER	13.5	1	\$84,567	\$84,567
3	AIR SYSTEM FOR CLEANER (INCLUDED IN ITEM 2)	1	1	-	-
4	9" X 12' X 17' SCREW ELEVATOR	7	1	\$25,966	\$25,966
5-8	ITEMS 5-8 REMOVED	-	-	-	-
9	9" X 30' DISCARD SCREW CONVEYOR	3	1	\$11,389	\$11,389
10-21	ITEMS 10-21 REMOVED	-	-	-	-
		<b>TOTAL HP CLEANING:</b>	<b>24.5</b>		
		<b>TOTAL PRICE CLEANING:</b>			<b>\$127,025</b>

**PRESS/EXPRESS**

22	9" X 25' COLD PRESS FEED SCREW	2	1	\$10,376	\$10,376
22.1	VARIABLE SPEED PRESS FEEDERS	2	2	\$8,349	\$16,698
23	INSTA-PRO #5005 OIL PRESS	67	1	\$189,940	\$189,940

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24	9" X 20' EXTRUSION FEED SCREW	2	1	\$8,238	\$8,238
25	INSTA-PRO 2000 EXTRUDERS W/ SIDE FEEDERS	152	1	\$56,150	\$56,150
26	10" X 30' EXTRUSION DISCHARGE SCREW	3	1	\$11,058	\$11,058
27	9" X 20' HOT PRESS FEED SCREW	2	1	\$15,527	\$15,527
27.1	VARIABLE SPEED PRESS FEEDERS	2	1	\$7,479	\$7,479
28	INSTA-PRO #5005 OIL PRESS	67	1	\$189,940	\$189,940
29	9" X 30' HOT PRESS RERUN SCREW CONVEYOR (OPTIONAL)	2	1	\$11,640	\$11,640
29.1	RERUN SIDE FEEDER (OPTIONAL)	2	1	\$6,645	\$6,645
30	12" X 30' CUT&FOLD SCREW CONVEYOR	5	1	\$15,628	\$15,628
31	12"X24' CUT & FOLD SCREW CONVEYOR TO CRUSHER	5	1	\$12,744	\$12,744
32	CR18-18 CAKE CRUSHER	15	1	\$35,667	\$35,667
33	9" X 10' X 17' SCREW ELEVATOR	7	1	\$26,200	\$26,200
34	9" X 10' COOLER FEED CONVEYOR	1	1	\$6,398	\$6,398
35	MODEL 8-87-4A COUNTER FLOW COOLER	3	1	\$78,456	\$78,456
36	AIR SYSTEM FOR COOLER (INCLUDED IN ITEM 35)	16	1	-	-
37	9" X 15' X 12' SCREW ELEVATOR/FEEDER W/ VS DRIVE	7	1	\$25,487	\$25,487
38	E-22095-TF CAKE HAMMER MILL	15	1	\$28,438	\$28,438

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39	FOODEC 200 DECANTING CENTRIFUGE	25	1	\$185,349	\$185,349
40	SPARE PARTS PACKAGE FOR EXTRUDER	-	1	\$4,871	\$4,871
41	SPARE PARTS PACKAGE FOR PRESS	-	2	\$7,834	\$15,668
42	EXHAUST FAN W/HOOD FOR EXTRUDER STEAM VENTING	5	1	\$8,825	\$8,825
43	STEAM VENTILATION FOR HOT PRESSES AND VENTED CONVEYORS	5	1	\$8,825	\$8,825
44	INSTA-PRO SCREW PULLER	1	1	\$7,815	\$7,815
	<b>TOTAL HP PRESS/EXPRESS:</b>	<b>413</b>			
	<b>TOTAL PRICE PRESS/EXPRESS:</b>				<b>\$984,062</b>
			<b>437.</b>		
	<b>TOTAL HP REQUIRED:</b>		<b>5</b>		
	<b>TOTAL PRICE:</b>				<b>\$1,111,087</b>

**APPENDIX F: LABOR**

Year 1													
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>Driver</b>	# Emp.	1	1	1	1	1	1	1	1	1	1	1	1
Rate/Hr.	Total Hrs.	10	10	10	10	10	10	10	13	13	13	11	11
\$15.00	Cost	\$154	\$154	\$154	\$154	\$154	\$154	\$154	\$191	\$191	\$191	\$163	\$163
			<b>Total Cost</b>	<b>\$3,519</b>									
<b>General Labor</b>	# Emp.	4	4	4	4	4	4	4	4	4	4	4	4
Rate/Hr.	Total Hrs.	107	107	107	107	107	107	107	107	107	107	107	107
\$10.50	Cost	\$4,500	\$4,500	\$4,500	\$4,500	\$4,500	\$4,500	\$4,500	\$4,500	\$4,500	\$4,500	\$4,500	\$4,500
			<b>Total Cost</b>	<b>\$54,000</b>									
<b>Production Workers</b>	# Emp.	8	8	8	8	8	8	8	8	8	8	8	8
Rate/Hr.	Total Hrs.	171	171	171	171	171	171	171	171	171	171	171	171
\$14.00	Cost	\$19,200	\$19,200	\$19,200	\$19,200	\$19,200	\$19,200	\$19,200	\$19,200	\$19,200	\$19,200	\$19,200	\$19,200
	Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
			<b>Total Cost</b>	<b>\$230,400</b>									
<b>Total Cost Production:</b>		<b>\$23,854</b>	<b>\$23,854</b>	<b>\$23,854</b>	<b>\$23,854</b>	<b>\$23,854</b>	<b>\$23,854</b>	<b>\$23,854</b>	<b>\$23,891</b>	<b>\$23,891</b>	<b>\$23,891</b>	<b>\$23,863</b>	<b>\$23,863</b>
<b>Bookkeeper</b>	#Emp.	2	2	2	2	2	2	2	2	2	2	2	2
Rate/Hr.	Total Hrs.	171	171	171	171	171	171	171	171	171	171	171	171
\$12.00	Cost	\$4,114	\$4,114	\$4,114	\$4,114	\$4,114	\$4,114	\$4,114	\$4,114	\$4,114	\$4,114	\$4,114	\$4,114
			<b>Total Cost</b>	<b>\$49,371</b>									
<b>Office/Admin.</b>	# Emp.	3	3	3	3	3	3	3	3	3	3	3	3
Rate/Hr.	Total Hrs.	171	171	171	171	171	171	171	171	171	171	171	171
\$15.00	Cost	\$7,714	\$7,714	\$7,714	\$7,714	\$7,714	\$7,714	\$7,714	\$7,714	\$7,714	\$7,714	\$7,714	\$7,714
			<b>Total Cost</b>	<b>\$92,571</b>									
<b>Total Labor Cost P 1:</b>							<b>\$429,862</b>						

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Year 2						Year 3					
		P2 Q1	P2 Q2	P2 Q3	P2 Q4			P3 Q1	P3 Q2	P3 Q3	P3 Q4
<b>Driver</b>	# Emp.	1	1	1	1	<b>Driver</b>	# Emp.	1	1	1	1
Rate/Hr.	Total Hrs.	34	38	38	36	Rate/Hr.	Total Hrs.	34	38	38	38
\$15.50	Cost	\$524	\$592	\$592	\$564	\$16.00	Cost	\$542	\$613	\$613	\$613
			<b>Total Cost</b>	<b>\$2,804</b>					<b>Total Cost</b>	<b>\$2,928</b>	
<b>General Labor</b>	# Emp.	5	5	5	5	<b>General Labor</b>	# Emp.	6	6	6	6
Rate/Hr.	Total Hrs.	321	321	321	321	Rate/Hr.	Total Hrs.	321	321	321	321
\$11.00	Cost	\$17,679	\$17,679	\$17,679	\$17,679	\$11.75	Cost	\$22,661	\$22,661	\$22,661	\$22,661
			<b>Total Cost</b>	<b>\$72,000</b>					<b>Total Cost</b>	<b>\$91,929</b>	
<b>Production Workers</b>	# Emp.	9	9	9	9	<b>Production Workers</b>	# Emp.	10	10	10	10
Rate/Hr.	Total Hrs.	514	514	514	514	Rate/Hr.	Total Hrs.	514	514	514	514
\$14.50	Cost	\$67,114	\$67,114	\$67,114	\$67,114	\$15.00	Cost	\$77,143	\$77,143	\$77,143	\$77,143
	Cost	\$0	\$0	\$0	\$0		Cost	\$0	\$0	\$0	\$0
			<b>Total Cost</b>	<b>\$268,457</b>					<b>Total Cost</b>	<b>\$308,571</b>	
<b>Total Cost Production:</b>		<b>\$85,450</b>	<b>\$85,518</b>	<b>\$85,518</b>	<b>\$85,490</b>	<b>Total Cost Production:</b>		<b>\$100,483</b>	<b>\$100,553</b>	<b>\$100,553</b>	<b>\$100,553</b>
Bookkeeper	# Emp.	2	2	2	2	Bookkeeper	# Emp.	2	2	2	2
Rate/Hr.	Total Hrs.	514	514	514	514	Rate/Hr.	Total Hrs.	514	514	514	514
\$12.50	Cost	\$12,857	\$12,857	\$12,857	\$12,857	\$13.00	Cost	\$13,371	\$13,371	\$13,371	\$13,371
			<b>Total Cost</b>	<b>\$51,429</b>					<b>Total Cost</b>	<b>\$53,486</b>	
<b>Office/Admin</b>	# Emp.	4	4	4	4	<b>Office/Admin</b>	# Emp.	4	4	4	4
Rate/Hr.	Total Hrs.	514	514	514	514	Rate/Hr.	Total Hrs.	514	514	514	514
\$15.50	Cost	\$31,886	\$31,886	\$31,886	\$31,886	\$16.00	Cost	\$32,914	\$32,914	\$32,914	\$32,914
			<b>Total Cost</b>	<b>\$127,543</b>					<b>Total Cost</b>	<b>\$185,143</b>	
<b>Total Labor Cost P 2:</b>				<b>\$522,232</b>		<b>Total Labor Cost P 3:</b>				<b>\$642,057</b>	

**APPENDIX G: REVENUE AND EXPENSES**

Year 1 Revenue and Expenses														
Wholesale Baseline	Start Up	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Y1 Annual Total
Oil		667	667	667	667	667	667	667	667	667	667	667	667	8,000
Meal		1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	12,000
<b>Total Sales (pounds)</b>		<b>1,667</b>	<b>20,000</b>											
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
<b>Income</b>														
Oil		443,333	443,333	443,333	443,333	443,333	443,333	443,333	443,333	443,333	443,333	443,333	443,333	5,320,000
Meal		247,000	247,000	247,000	247,000	247,000	247,000	247,000	247,000	247,000	247,000	247,000	247,000	2,964,000
<b>Total Sales All Types</b>	<b>0</b>	<b>690,333</b>	<b>8,284,000</b>											
<b>Variable Costs</b>														
Product Lost in Transport/Handling & Returns	0	(26,600)	(26,600)	(26,600)	(26,600)	(26,600)	(26,600)	(26,600)	(26,600)	(26,600)	(26,600)	(26,600)	(26,600)	(319,200)
Oilseed Inputs	0	(400,000)	(400,000)	(400,000)	(400,000)	(400,000)	(400,000)	(400,000)	(400,000)	(400,000)	(400,000)	(400,000)	(400,000)	(4,800,000)
Credit Card Processing	0	(887)	(887)	(887)	(887)	(887)	(887)	(887)	(887)	(887)	(887)	(887)	(887)	(10,640)
Variable Labor & Delivery Expense	(7,161)	(35,803)	(35,803)	(35,803)	(35,803)	(35,803)	(35,803)	(35,803)	(35,839)	(35,839)	(35,839)	(35,812)	(35,812)	(436,920)
<b>Total Variable Operations</b>	<b>(7,161)</b>	<b>(463,289)</b>	<b>(463,326)</b>	<b>(463,326)</b>	<b>(463,326)</b>	<b>(463,298)</b>	<b>(463,298)</b>	<b>(5,566,760)</b>						
<b>Total Variable Costs</b>	<b>(7,161)</b>	<b>(463,289)</b>	<b>(463,326)</b>	<b>(463,326)</b>	<b>(463,326)</b>	<b>(463,298)</b>	<b>(463,298)</b>	<b>(5,566,760)</b>						
<b>Variable Margin</b>	<b>(7,161)</b>	<b>227,044</b>	<b>227,007</b>	<b>227,007</b>	<b>227,007</b>	<b>227,035</b>	<b>227,035</b>	<b>2,717,240</b>						

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Year 1 Revenue and Expenses Cont.		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	First Year Annual Total
<b>Fixed Costs</b>														
Equipment Loan Interest Pmnts	(40,181)	(6,697)	(6,697)	(6,697)	(6,697)	(6,697)	(6,697)	(6,697)	(6,697)	(6,697)	(6,697)	(6,697)	(6,697)	(120,542)
Business Personal Property Tax	0	(11,612)	0	0	0	0	0	0	0	0	0	0	0	(11,612)
Tools, Dies, Fixtures, Maint/Repairs	(185,000)	(61,667)	(61,667)	(61,667)	(61,667)	(61,667)	(61,667)	(61,667)	(61,667)	(61,667)	(61,667)	(61,667)	(61,667)	(925,000)
Fixed Vehicle Expenses and Forklift Rental	(6,746)	(1,124)	(1,124)	(1,124)	(1,124)	(1,124)	(1,124)	(1,124)	(1,124)	(1,124)	(1,124)	(1,124)	(1,124)	(20,237)
<b>Total Equipment Costs</b>	<b>(231,926)</b>	<b>(81,099)</b>	<b>(69,488)</b>	<b>(1,077,391)</b>										
<b>Facilities</b>														
Facility Payment	(17,000)	(2,833)	(2,833)	(2,833)	(2,833)	(2,833)	(2,833)	(2,833)	(2,833)	(2,833)	(2,833)	(2,833)	(2,833)	(51,000)
Facility Expenses and Insurance	(1,750)	(1,750)	(1,750)	(1,750)	(1,750)	(1,750)	(1,750)	(1,750)	(1,750)	(1,750)	(1,750)	(1,750)	(1,750)	(22,750)
Utilities	(20,000)	(10,000)	(10,000)	(10,000)	(10,000)	(10,000)	(10,000)	(10,000)	(10,000)	(10,000)	(10,000)	(10,000)	(10,000)	(140,000)
Facility Supplies	(3,750)	(3,750)	(3,750)	(3,750)	(3,750)	(3,750)	(3,750)	(3,750)	(3,750)	(3,750)	(3,750)	(3,750)	(3,750)	(48,750)
<b>Total Facility Costs</b>	<b>(42,500)</b>	<b>(18,333)</b>	<b>(262,500)</b>											
<b>Fixed Sales and Marketing</b>														
Promotional Costs and Marketing Employee	(28,750)	(9,583)	(9,583)	(9,583)	(9,583)	(9,583)	(9,583)	(9,583)	(9,583)	(9,583)	(9,583)	(9,583)	(9,583)	(143,750)
<b>Total Selling and Marketing Costs</b>	<b>(28,750)</b>	<b>(9,583)</b>	<b>(143,750)</b>											
<b>General/Administrative</b>														
Mgmt./Admin. Support	(125,000)	(20,833)	(20,833)	(20,833)	(20,833)	(20,833)	(20,833)	(20,833)	(20,833)	(20,833)	(20,833)	(20,833)	(20,833)	(375,000)
Fringe and Overhead (0.3)	(37,500)	(6,250)	(6,250)	(6,250)	(6,250)	(6,250)	(6,250)	(6,250)	(6,250)	(6,250)	(6,250)	(6,250)	(6,250)	(112,500)
Legal Fees	(10,000)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(11,800)
Audit/Accounting Fees	(5,000)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(150)	(6,800)
Telecommunications	(3,000)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(9,000)
Office Supplies and Miscellaneous	(3,000)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(500)	(9,000)
<b>Total General/Administrative Costs</b>	<b>(183,500)</b>	<b>(28,383)</b>	<b>(524,100)</b>											

Johnston County Feasibility Study

Year 1 Revenue and Expenses Cont.		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	First Year Annual Total
<b>Unforeseen/Contingency</b>														
Unforeseen Expenses and Bad Debt	0	(69,033)	(69,033)	(69,033)	(69,033)	(69,033)	(69,033)	(69,033)	(69,033)	(69,033)	(69,033)	(69,033)	(69,033)	(828,400)
<b>Total Fixed Costs</b>	<b>(486,676)</b>	<b>(206,433)</b>	<b>(194,821)</b>	<b>(2,836,141)</b>										
<b>Wholesale Baseline EBITDA</b>	<b>(493,837)</b>	<b>20,611</b>	<b>32,223</b>	<b>32,223</b>	<b>32,223</b>	<b>32,223</b>	<b>32,223</b>	<b>32,223</b>	<b>32,186</b>	<b>32,186</b>	<b>32,186</b>	<b>32,214</b>	<b>32,214</b>	<b>(118,901)</b>
Total Depreciation	0	(12,466)	(12,466)	(12,466)	(12,466)	(12,466)	(12,466)	(12,466)	(12,466)	(12,466)	(12,466)	(12,466)	(12,466)	(149,586)
Receivables Interest (30 days @ 0.085)	0	(4,890)	(4,890)	(4,890)	(4,890)	(4,890)	(4,890)	(4,890)	(4,890)	(4,890)	(4,890)	(4,890)	(4,890)	(58,678)
<b>Net Wholesale Baseline Income</b>	<b>(493,837)</b>	<b>3,256</b>	<b>14,868</b>	<b>14,868</b>	<b>14,868</b>	<b>14,868</b>	<b>14,868</b>	<b>14,868</b>	<b>14,831</b>	<b>14,831</b>	<b>14,831</b>	<b>14,858</b>	<b>14,858</b>	<b>(327,166)</b>

Johnston County Feasibility Study

<b>Years 2 &amp; 3 Revenue and Expenses</b>										
<b>Wholesale Baseline</b>	<b>Y2Q1</b>	<b>Y2Q2</b>	<b>Y2Q3</b>	<b>Y2Q4</b>	<b>Y3Q1</b>	<b>Y3Q2</b>	<b>Y3Q3</b>	<b>Y3Q4</b>	<b>Annual Total Year 2</b>	<b>Annual Total Year 3</b>
Oil	2,100	2,100	2,100	2,100	2,200	2,200	2,200	2,200	8,400	8,800
Meal	3,150	3,150	3,150	3,150	3,300	3,300	3,300	3,300	12,600	13,200
<b>Total Sales (units)</b>	<b>5,250</b>	<b>5,250</b>	<b>5,250</b>	<b>5,250</b>	<b>5,500</b>	<b>5,500</b>	<b>5,500</b>	<b>5,500</b>	<b>21,000</b>	<b>22,000</b>
	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$
<b>Income</b>										
Oil (\$)	1,396,500	1,396,500	1,396,500	1,396,500	1,463,000	1,463,000	1,463,000	1,463,000	5,586,000	5,852,000
Meal (\$)	778,050	778,050	778,050	778,050	815,100	815,100	815,100	815,100	3,112,200	3,260,400
<b>Total Sales All Types</b>	<b>2,174,550</b>	<b>2,174,550</b>	<b>2,174,550</b>	<b>2,174,550</b>	<b>2,278,100</b>	<b>2,278,100</b>	<b>2,278,100</b>	<b>2,278,100</b>	<b>8,698,200</b>	<b>9,112,400</b>
<b>Variable Costs</b>										
Product Lost in Transport/Handling & Returns	(83,790)	(83,790)	(83,790)	(83,790)	(87,780)	(87,780)	(87,780)	(87,780)	(335,160)	(351,120)
Oil and Meal Inputs	(1,260,000)	(1,260,000)	(1,260,000)	(1,260,000)	(1,320,000)	(1,320,000)	(1,320,000)	(1,320,000)	(5,040,000)	(5,280,000)
Credit Card Processing	(2,793)	(2,793)	(2,793)	(2,793)	(2,926)	(2,926)	(2,926)	(2,926)	(11,172)	(11,704)
Variable Labor & Delivery Expense	(130,616)	(130,684)	(130,684)	(130,656)	(147,395)	(147,466)	(147,466)	(147,466)	(522,640)	(589,792)
<b>Total Variable Operations</b>	<b>(1,477,199)</b>	<b>(1,477,267)</b>	<b>(1,477,267)</b>	<b>(1,477,239)</b>	<b>(1,558,101)</b>	<b>(1,558,172)</b>	<b>(1,558,172)</b>	<b>(1,558,172)</b>	<b>(5,908,972)</b>	<b>(6,232,616)</b>
<b>Total Variable Costs</b>	<b>(1,477,199)</b>	<b>(1,477,267)</b>	<b>(1,477,267)</b>	<b>(1,477,239)</b>	<b>(1,558,101)</b>	<b>(1,558,172)</b>	<b>(1,558,172)</b>	<b>(1,558,172)</b>	<b>(5,908,972)</b>	<b>(6,232,616)</b>
<b>Variable Margin</b>	<b>697,351</b>	<b>697,283</b>	<b>697,283</b>	<b>697,311</b>	<b>719,999</b>	<b>719,928</b>	<b>719,928</b>	<b>719,928</b>	<b>2,789,228</b>	<b>2,879,784</b>

Johnston County Feasibility Study

Years 2 & 3 Revenue and Expenses Cont.	Y2Q1	Y2Q2	Y2Q3	Y2Q4	Y3Q1	Y3Q2	Y3Q3	Y3Q4	Annual Total Year 2	Annual Total Year 3
<b>Fixed Costs</b>										
Equipment Loan Interest Payments	(17,733)	(17,733)	(17,733)	(17,733)	(15,223)	(15,223)	(15,223)	(15,223)	(70,933)	(60,891)
Business Personal Property Tax	(15,118)	0	0	0	(14,162)	0	0	0	(15,118)	(14,162)
Tools, Dies, Fixtures, Maint/Repairs	(185,515)	(185,515)	(185,515)	(185,515)	(191,080)	(191,080)	(191,080)	(191,080)	(742,060)	(764,322)
Fixed Vehicle Expense and Forklift Rental	(1,606)	(1,606)	(1,606)	(1,606)	(1,852)	(1,852)	(1,852)	(1,852)	(6,424)	(7,408)
<b>Total Equipment Costs</b>	<b>(219,972)</b>	<b>(204,854)</b>	<b>(204,854)</b>	<b>(204,854)</b>	<b>(222,317)</b>	<b>(208,155)</b>	<b>(208,155)</b>	<b>(208,155)</b>	<b>(834,534)</b>	<b>(846,782)</b>
<b>Facilities</b>										
Facility Payment	(8,755)	(8,755)	(8,755)	(8,755)	(9,018)	(9,018)	(9,018)	(9,018)	(35,020)	(36,071)
Facility Expenses and Insurance	(5,408)	(5,408)	(5,408)	(5,408)	(5,570)	(5,570)	(5,570)	(5,570)	(21,630)	(22,279)
Facility Supplies	(12,167)	(12,167)	(12,167)	(12,167)	(12,775)	(12,775)	(12,775)	(12,775)	(48,668)	(51,101)
Utilities	(30,900)	(30,900)	(30,900)	(30,900)	(31,827)	(31,827)	(31,827)	(31,827)	(123,600)	(127,308)
<b>Total Facility Costs</b>	<b>(57,229)</b>	<b>(57,229)</b>	<b>(57,229)</b>	<b>(57,229)</b>	<b>(59,190)</b>	<b>(59,190)</b>	<b>(59,190)</b>	<b>(59,190)</b>	<b>(228,918)</b>	<b>(236,758)</b>
<b>Fixed Sales and Marketing</b>										
Promotional Costs and Marketing Employee	(31,701)	(31,701)	(31,701)	(31,701)	(33,298)	(33,298)	(33,298)	(33,298)	(126,806)	(133,192)
<b>Total Selling and Marketing Costs</b>	<b>(31,701)</b>	<b>(31,701)</b>	<b>(31,701)</b>	<b>(31,701)</b>	<b>(33,298)</b>	<b>(33,298)</b>	<b>(33,298)</b>	<b>(33,298)</b>	<b>(126,806)</b>	<b>(133,192)</b>
<b>General/Administrative</b>										
Mgmt./Admin. Support	(64,375)	(64,375)	(64,375)	(64,375)	(66,306)	(66,306)	(66,306)	(66,306)	(257,500)	(265,225)
Fringe and Overhead (0.3)	(19,313)	(19,313)	(19,313)	(19,313)	(19,892)	(19,892)	(19,892)	(19,892)	(77,250)	(79,568)
Legal Fees	(464)	(464)	(464)	(464)	(477)	(477)	(477)	(477)	(1,854)	(1,910)
Audit/Accounting Fee	(464)	(464)	(464)	(464)	(477)	(477)	(477)	(477)	(1,854)	(1,910)
Telecommunications	(1,545)	(1,545)	(1,545)	(1,545)	(1,591)	(1,591)	(1,591)	(1,591)	(6,180)	(6,365)
Office Supplies and Miscellaneous	(1,545)	(1,545)	(1,545)	(1,545)	(1,591)	(1,591)	(1,591)	(1,591)	(6,180)	(6,365)
<b>Total General/Administrative Costs</b>	<b>(87,705)</b>	<b>(87,705)</b>	<b>(87,705)</b>	<b>(87,705)</b>	<b>(90,336)</b>	<b>(90,336)</b>	<b>(90,336)</b>	<b>(90,336)</b>	<b>(350,818)</b>	<b>(361,343)</b>
<b>Unforeseen/Contingency</b>										
Unforeseen Expenses and Bad Debt	(217,455)	(217,455)	(217,455)	(217,455)	(227,810)	(227,810)	(227,810)	(227,810)	(869,820)	(911,240)
<b>Total Fixed Costs</b>	<b>(614,062)</b>	<b>(598,945)</b>	<b>(598,945)</b>	<b>(598,945)</b>	<b>(632,950)</b>	<b>(618,788)</b>	<b>(618,788)</b>	<b>(618,788)</b>	<b>(2,410,896)</b>	<b>(2,489,315)</b>
<b>Wholesale Baseline EBITDA</b>	<b>83,289</b>	<b>98,338</b>	<b>98,338</b>	<b>98,367</b>	<b>87,049</b>	<b>101,140</b>	<b>101,140</b>	<b>101,140</b>	<b>378,332</b>	<b>390,469</b>
Equipment Depreciation	(37,397)	(37,397)	(37,397)	(37,397)	(37,397)	(37,397)	(37,397)	(37,397)	(149,586)	(149,586)
Receivables Interest (30 days @ 0.085)	(15,403)	(15,403)	(15,403)	(15,403)	(16,137)	(16,137)	(16,137)	(16,137)	(61,612)	(64,546)
<b>Net Wholesale Baseline Income</b>	<b>30,489</b>	<b>45,539</b>	<b>45,539</b>	<b>45,567</b>	<b>33,516</b>	<b>47,607</b>	<b>47,607</b>	<b>47,607</b>	<b>167,133</b>	<b>176,336</b>

Johnston County Feasibility Study

Years 1-3 Averages and Percent of Revenue								
Wholesale Baseline	First Year Monthly Avg.	First Year Annual Total	Percent of Revenue	Quarterly Averages Year 2&3	Annual Total Year 2	Percent of Revenue P2	Annual Total Year 3	Percent of Revenue P3
Oil	667	8,000		2,150	8,400		8,800	
Meal	1,000	12,000		3,225	12,600		13,200	
<b>Total Sales (units)</b>	<b>1,667</b>	<b>20,000</b>		<b>5,375</b>	<b>21,000</b>		<b>22,000</b>	
	\$	\$	\$	\$	\$	\$	\$	\$
<b>Income</b>								
Oil (\$)	443,333	5,320,000	64.22%	1,429,750	5,586,000	64.22%	5,852,000	64.22%
Meal (\$)	247,000	2,964,000	35.78%	796,575	3,112,200	35.78%	3,260,400	35.78%
<b>Total Sales All Types</b>	<b>690,333</b>	<b>8,284,000</b>	<b>100.00%</b>	<b>2,226,325</b>	<b>8,698,200</b>	<b>100.00%</b>	<b>9,112,400</b>	<b>100.00%</b>
<b>Variable Costs</b>								
Product Lost in Transport/Handling & Returns	(26,600)	(319,200)	(3.9%)	(85,785)	(335,160)	(3.9%)	(351,120)	(3.9%)
Oil and Meal Inputs	(400,000)	(4,800,000)	(57.9%)	(1,290,000)	(5,040,000)	(57.9%)	(5,280,000)	(57.9%)
Credit Card Processing	(887)	(10,640)	(0.1%)	(2,860)	(11,172)	(0.1%)	(11,704)	(0.1%)
Variable Labor & Delivery Expense	(35,813)	(436,920)	(5.3%)	(139,054)	(522,640)	(6.0%)	(589,792)	(6.5%)
<b>Total Variable Operations</b>	<b>(463,300)</b>	<b>(5,566,760)</b>	<b>(67.2%)</b>	<b>(1,517,699)</b>	<b>(5,908,972)</b>	<b>(67.9%)</b>	<b>(6,232,616)</b>	<b>(68.4%)</b>
<b>Total Variable Costs</b>	<b>(463,300)</b>	<b>(5,566,760)</b>	<b>(67.2%)</b>	<b>(1,517,699)</b>	<b>(5,908,972)</b>	<b>(67.9%)</b>	<b>(6,232,616)</b>	<b>(68.4%)</b>
<b>Variable Margin</b>	<b>227,033</b>	<b>2,717,240</b>	<b>32.8%</b>	<b>708,626</b>	<b>2,789,228</b>	<b>32.1%</b>	<b>2,879,784</b>	<b>31.6%</b>

Johnston County Feasibility Study

Years 1-3 Averages and Percent of Revenue Cont.	First Year Monthly Avg.	First Year Annual Total	Percent of Revenue	Quarterly Averages Year 2&3	Annual Total Year 2	Percent of Revenue P2	Annual Total Year 3	Percent of Revenue P3
<b>Fixed Costs</b>								
Equipment Loan Interest Payments	(6,697)	(120,542)	(1.5%)	(16,478)	(70,933)	(0.8%)	(60,891)	(0.7%)
Business Personal Property Tax	(968)	(11,612)	(0.1%)	(3,660)	(15,118)	(0.2%)	(14,162)	(0.2%)
Tools, Dies, Fixtures, Maint/Repairs	(61,667)	(925,000)	(11.2%)	(188,298)	(742,060)	(8.5%)	(764,322)	(8.4%)
Fixed Vehicle Expense and Forklift Rental	(1,124)	(20,237)	(0.2%)	(1,729)	(6,424)	(0.1%)	(7,408)	(0.1%)
<b>Total Equipment Costs</b>	<b>(70,455)</b>	<b>(1,077,391)</b>	<b>(13.0%)</b>	<b>(210,165)</b>	<b>(834,534)</b>	<b>(9.6%)</b>	<b>(846,782)</b>	<b>(9.3%)</b>
<b>Facilities</b>								
Facility Payment	(2,833)	(51,000)	(0.6%)	(8,886)	(35,020)	(0.4%)	(36,071)	(0.4%)
Facility Expenses and Insurance	(1,750)	(22,750)	(0.3%)	(5,489)	(21,630)	(0.2%)	(22,279)	(0.2%)
Utilities	(10,000)	(140,000)	(1.7%)	(12,471)	(48,668)	(0.6%)	(51,101)	(0.6%)
Facility Supplies	(3,750)	(48,750)	(0.6%)	(31,364)	(123,600)	(1.4%)	(127,308)	(1.4%)
<b>Total Facility Costs</b>	<b>(18,333)</b>	<b>(262,500)</b>	<b>(3.2%)</b>	<b>(58,209)</b>	<b>(228,918)</b>	<b>(2.6%)</b>	<b>(236,758)</b>	<b>(2.6%)</b>
<b>Fixed Sales and Marketing</b>								
Promotional Costs and Marketing Employee	(9,583)	(143,750)	(1.7%)	(32,500)	(126,806)	(1.5%)	(133,192)	(1.5%)
<b>Total Selling and Marketing Costs</b>	<b>(9,583)</b>	<b>(143,750)</b>	<b>(1.7%)</b>	<b>(32,500)</b>	<b>(126,806)</b>	<b>(1.5%)</b>	<b>(133,192)</b>	<b>(1.5%)</b>
<b>General/Administrative</b>								
Mgmt./Admin. Support	(20,833)	(375,000)	(4.5%)	(65,341)	(257,500)	(3.0%)	(265,225)	(2.9%)
Fringe and Overhead (0.3)	(6,250)	(112,500)	(1.4%)	(19,602)	(77,250)	(0.9%)	(79,568)	(0.9%)
Legal Fees	(150)	(11,800)	(0.1%)	(470)	(1,854)	(0.0%)	(1,910)	(0.0%)
Audit/Accounting Fee	(150)	(6,800)	(0.1%)	(470)	(1,854)	(0.0%)	(1,910)	(0.0%)
Telecommunications	(500)	(9,000)	(0.1%)	(1,568)	(6,180)	(0.1%)	(6,365)	(0.1%)
Office Supplies and Miscellaneous	(500)	(9,000)	(0.1%)	(1,568)	(6,180)	(0.1%)	(6,365)	(0.1%)
<b>Total General/Administrative Costs</b>	<b>(28,383)</b>	<b>(524,100)</b>	<b>(6.3%)</b>	<b>(89,020)</b>	<b>(350,818)</b>	<b>(4.0%)</b>	<b>(361,343)</b>	<b>(4.0%)</b>
<b>Unforeseen/Contingency</b>								
Unforeseen Expenses and Bad Debt	(69,033)	(828,400)	(10.0%)	(222,633)	(869,820)	(10.0%)	(911,240)	(10.0%)
<b>Total Fixed Costs</b>	<b>(195,789)</b>	<b>(2,836,141)</b>	<b>(34.2%)</b>	<b>(612,526)</b>	<b>(2,410,896)</b>	<b>(27.7%)</b>	<b>(2,489,315)</b>	<b>(27.3%)</b>
<b>Wholesale Baseline EBITDA</b>	<b>31,245</b>	<b>(118,901)</b>	<b>(1.4%)</b>	<b>96,100</b>	<b>378,332</b>	<b>4.3%</b>	<b>390,469</b>	<b>4.3%</b>
Equipment Depreciation	(12,466)	(149,586)	(1.8%)	(37,397)	(149,586)	(1.7%)	(149,586)	(1.6%)
Receivables Interest (30 days @ 0.085)	(4,890)	(58,678)	(0.7%)	(16,137)	(61,612)	(0.7%)	(64,546)	(0.7%)
<b>Net Wholesale Baseline Income</b>	<b>13,889</b>	<b>(327,166)</b>	<b>(3.9%)</b>	<b>42,934</b>	<b>167,133</b>	<b>1.9%</b>	<b>176,336</b>	<b>1.9%</b>

Johnston County Feasibility Study

**APPENDIX H: CASH FLOWS**

Cash Flows Year 1	Ongoing	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year 1
<b>OPERATING ACTIVITIES</b>														Annual
Net Income (Loss)		3,256	14,868	14,868	14,868	14,868	14,868	14,868	14,831	14,831	14,831	14,858	14,858	166,671
Non cash charges to net income (loss)														
Depreciation	12,466	12,466	12,466	12,466	12,466	12,466	12,466	12,466	12,466	12,466	12,466	12,466	12,466	149,586
(Increase) Decrease in current assets														0
Accounts receivable	0	(138,067)	0	0	0	0	0	0	0	0	0	0	0	(138,067)
Increase (decrease) in current liabilities														0
Accounts payable and accrued expenses														0
Accrued interest	3,912	4,890	4,890	4,890	4,890	4,890	4,890	4,890	4,890	4,890	4,890	4,890	4,890	58,678
<b>NET CASH PROVIDED BY (USED IN) OPERATING ACTIVITIES</b>	<b>\$16,377</b>	<b>(\$117,455)</b>	<b>\$32,223</b>	<b>\$32,223</b>	<b>\$32,223</b>	<b>\$32,223</b>	<b>\$32,223</b>	<b>\$32,223</b>	<b>\$32,186</b>	<b>\$32,186</b>	<b>\$32,186</b>	<b>\$32,214</b>	<b>\$32,214</b>	<b>\$236,870</b>
<b>INVESTING ACTIVITIES</b>														0
Purchases of property and equipment	(2,493,108)													(2,493,108)
<b>FINANCING ACTIVITIES</b>														0
Member contributions (distributions)	2,595,520	0	0	0	0	0	0	0	0	0	0	0	0	0
Other contributions		4,890	4,890	4,890	4,890	4,890	4,890	4,890	4,890	4,890	4,890	4,890	4,890	58,678
Net borrowings (payments) on short-term loans or notes		0	0	0	0	0	(2,000)	0	0	(1,000)	0	(11,000)	3,000	(11,000)
Principal payments on long-term loans		(12,088)	(12,088)	(12,088)	(12,088)	(12,088)	(12,088)	(12,088)	(12,088)	(12,088)	(12,088)	(12,088)	(12,088)	(145,060)
Proceeds from long-term debt borrowings	0													0
<b>NET CASH PROVIDED BY (USED IN ) FINANCING ACTIVITIES</b>	<b>102,412</b>	<b>(7,199)</b>	<b>(7,199)</b>	<b>(7,199)</b>	<b>(7,199)</b>	<b>(7,199)</b>	<b>(9,199)</b>	<b>(7,199)</b>	<b>(7,199)</b>	<b>(8,199)</b>	<b>(7,199)</b>	<b>(18,199)</b>	<b>(4,199)</b>	<b>(97,382)</b>
<b>NET INCREASE IN CASH</b>	<b>\$118,790</b>	<b>(\$124,654)</b>	<b>\$25,025</b>	<b>\$25,025</b>	<b>\$25,025</b>	<b>\$25,025</b>	<b>\$23,025</b>	<b>\$25,025</b>	<b>\$24,988</b>	<b>\$23,988</b>	<b>\$24,988</b>	<b>\$14,015</b>	<b>\$28,015</b>	<b>\$139,488</b>
<b>CASH -beginning of period</b>	<b>\$20,000</b>	<b>\$138,790</b>	<b>\$14,136</b>	<b>\$39,161</b>	<b>\$64,185</b>	<b>\$89,210</b>	<b>\$114,234</b>	<b>\$137,259</b>	<b>\$162,283</b>	<b>\$187,271</b>	<b>\$211,259</b>	<b>\$236,247</b>	<b>\$250,262</b>	<b>\$138,790</b>
<b>CASH - end of period</b>	<b>\$138,790</b>	<b>\$14,136</b>	<b>\$39,161</b>	<b>\$64,185</b>	<b>\$89,210</b>	<b>\$114,234</b>	<b>\$137,259</b>	<b>\$162,283</b>	<b>\$187,271</b>	<b>\$211,259</b>	<b>\$236,247</b>	<b>\$250,262</b>	<b>\$278,277</b>	<b>\$278,277</b>

Johnston County Feasibility Study

Year 2 and Year 3 Cash Flow	Y2Q1	Y2Q2	Y2Q3	Y2Q4	Y3Q1	Y3Q2	Y3Q3	Y3Q4	Annual Total Year 2	Annual Total Year 3
<b>OPERATING ACTIVITIES</b>										
Net Income (Loss)	30,489	45,539	45,539	45,567	33,516	47,607	47,607	47,607	167,133	176,336
Non cash charges to net income (loss)									-	-
Depreciation	37,397	37,397	37,397	37,397	37,397	37,397	37,397	37,397	149,586	149,586
(Increase) decrease in current assets									-	-
Accounts receivable	(34,517)	-	-	-	(34,517)	-	-	-	(34,517)	(34,517)
Inventories										
Increase (decrease) in current liabilities									-	-
Accounts payable and accrued expenses									-	-
Accrued interest	(15,403)	(15,403)	(15,403)	(15,403)	(16,137)	(16,137)	(16,137)	(16,137)	(61,612)	(64,546)
<b>NET CASH PROVIDED BY (USED IN) OPERATING ACTIVITIES</b>	<b>\$17,966</b>	<b>67,532</b>	<b>\$67,532</b>	<b>\$67,561</b>	<b>\$20,259</b>	<b>\$68,867</b>	<b>\$68,867</b>	<b>\$68,867</b>	<b>\$220,591</b>	<b>\$226,860</b>
<b>INVESTING ACTIVITIES</b>										
Purchases of property and equipment	-				-				-	-
Sale of Property and Equipment					-				-	-
<b>FINANCING ACTIVITIES</b>										
Member contributions (distributions)	-	-	-	-	15,000	-	-	-	-	15,000
Other contributions	15,403	15,403	15,403	15,403	16,137	16,137	16,137	16,137	61,612	64,546
Grants									-	-
Net borrowings (payments) on short-term loans or notes	-	-	-	-	-	-	-	-	-	-
Principal payments on long-term loans	(38,622)	(38,622)	(38,622)	(38,622)	(41,133)	(41,133)	(41,133)	(41,133)	(154,489)	(164,531)
Proceeds from long-term debt borrowings	-								-	-
<b>NET CASH PROVIDED BY (USED IN) FINANCING ACTIVITIES</b>	<b>(23,219)</b>	<b>(23,219)</b>	<b>(23,219)</b>	<b>(23,219)</b>	<b>(9,996)</b>	<b>(24,996)</b>	<b>(24,996)</b>	<b>(24,996)</b>	<b>(92,877)</b>	<b>(84,985)</b>
<b>NET INCREASE IN CASH</b>	<b>(\$5,253)</b>	<b>\$44,313</b>	<b>\$44,313</b>	<b>\$44,341</b>	<b>\$10,263</b>	<b>\$43,871</b>	<b>\$43,871</b>	<b>\$43,871</b>	<b>\$127,714</b>	<b>\$141,875</b>
<b>CASH -beginning of period</b>	<b>\$278,277</b>	<b>\$273,024</b>	<b>\$317,337</b>	<b>\$361,650</b>	<b>\$405,991</b>	<b>\$416,254</b>	<b>\$460,125</b>	<b>\$503,996</b>	<b>\$278,277</b>	<b>\$405,991</b>
<b>CASH - end of period</b>	<b>\$273,024</b>	<b>\$317,337</b>	<b>\$361,650</b>	<b>\$405,991</b>	<b>\$416,254</b>	<b>\$460,125</b>	<b>\$503,996</b>	<b>\$547,866</b>	<b>\$405,991</b>	<b>\$547,866</b>

**APPENDIX I: PRO FORMA OPERATING STATEMENT**

	<b>Y1</b>	<b>Y2</b>	<b>Y3</b>
<b>Revenues (Sales)</b>	8,284,000	8,698,200	9,112,400
<b>Total Variable Operating Costs</b>	(5,566,760)	(5,908,972)	(6,232,616)
<b>Total Variable Marketing Costs</b>	-	-	-
<b>Variable Margin (Loss)</b>	2,717,240	2,789,228	2,879,784
<b>Total Equipment Costs</b>	(1,077,391)	(834,534)	(846,782)
<b>Total Facilities Costs</b>	(262,500)	(228,918)	(236,758)
<b>Total Selling and Marketing Costs</b>	(143,750)	(126,806)	(133,192)
<b>General and Administrative Expenses</b>	(524,100)	(350,818)	(361,343)
<b>Unforeseen and Contingency Expenses</b>	(828,400)	(869,820)	(911,240)
<b>Wholesale Baseline Earnings EBITDA (Loss)</b>	(118,901)	378,332	390,469
<b>Interest Expense</b>	(58,678)	(61,612)	(64,546)
<b>Depreciation Expense</b>	(149,586)	(149,586)	(149,586)
<b>Net Wholesale Baseline Venture Income (Loss)</b>	(327,166)	167,133	176,336

**APPENDIX J: BALANCE SHEET**

	Year 1	Year 2	Year 3
<b>ASSETS</b>			
Cash and Equivalents	278,277	405,991	547,866
Accounts Receivables	690,333	724,850	759,367
Inventories	0	0	0
<b>TOTAL CURRENT ASSETS</b>	968,611	1,130,841	1,307,233
<b>BUILDINGS AND EQUIPMENT, Net of Depreciation</b>	2,343,521	2,193,935	2,044,348
<b>OTHER ASSETS, Net of Amortization</b>	0	0	0
<b>TOTAL ASSETS</b>	\$3,312,132	\$3,324,776	\$3,351,581
<b>LIABILITIES AND MEMBERS' EQUITY</b>			
<b>CURRENT LIABILITIES</b>			
Accounts Payable and Accrued Expenses	0	0	0
Accrued Interest	58,678	(61,612)	(64,546)
Current Maturities of Long-Term Debt	(80,362)	(70,933)	(60,891)
<b>TOTAL CURRENT LIABILITIES</b>	(\$21,683)	(\$132,545)	(\$125,437)
<b>LONG-TERM DEBT</b>			
Senior Debt	1,091,271	936,781	772,250
Less Current Maturities of Long-Term Debt	(80,362)	(70,933)	(60,891)
<b>MEMBERS' EQUITY</b>			
Member Equity and Equity Equivalents	2,650,071	2,424,339	2,589,322
Dispersed Member Equity	0	0	0
Retained Earnings (Losses)	(327,166)	167,133	176,336
<b>TOTAL LIABILITIES AND MEMBERS' EQUITY</b>	\$3,312,132	\$3,324,776	\$3,351,581

## APPENDIX K: DESCRIPTION OF CONSULTANTS



For over fifteen years, Matson Consulting has excelled in its mission of offering business expertise that enables rural business to succeed. The firm has worked in multiple industries and with hundreds of entities to provide valuable analysis in the creation of studies, plans, and reports. Based in South Carolina, Matson Consulting works with individual farmers, groups, government agencies, and rural development agencies across the nation.

The firm has a long history of creating feasibility studies. In 2000 James Matson, the principal of Matson Consulting created “Cooperative Feasibility Study Guide” which was published by the United States Department of Agriculture in October of the same year. After this publication he started Matson Consulting and authored a feasibility study as his first document with the firm. Since then, the firm has worked with a countless number of clients to produce feasibility studies, and although each one study differs for each client, Mr. Matson has maintained his original methodology that has proven its worth over the years.

Through the firm’s work over the years, Matson Consulting has become the expert in numerous areas including local foods and value-added agricultural projects. Past projects have included working with farm markets, processing facilities, wineries, and cideries. In 2012, the firm, along with the Virginia Foundation for Agriculture, Innovation, and Rural Sustainability, published “Feasibility Study for a Small Farm Cidery in Nelson County, VA” and in 2015, published “Beyond Barrels & Bottles: A Spirited Guide for On Farm Distilling.” Both of these documents can be found at [www.matsonconsult.com](http://www.matsonconsult.com).

**James Matson** is the founder and principal of Matson Consulting and has more than twenty years of experience in marketing, developing, researching, writing, and teaching for government, private, and non-profit organizations. He has assisted more than 400 producer organizations creating business plans and feasibility studies. He has authored over 125 feasibility studies, and assisted with more than 150. He has worked with more than 150 business plans, and helped with the legal organization of more than 100 farmer organizations.

Mr. Matson has worked on cooperative development throughout the US and in 19 countries on four continents. He has a Master of Science degree in Agricultural Economics from the University of California, Davis and a Bachelor of Science degree in Agricultural Business Management and a Bachelor of Arts degree in Economics from NCSU and has served as a professor of Marketing and Economics.