



**AgEcon** SEARCH  
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

*The World's Largest Open Access Agricultural & Applied Economics Digital Library*

**This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.**

**Help ensure our sustainability.**

Give to AgEcon Search

AgEcon Search  
<http://ageconsearch.umn.edu>  
[aesearch@umn.edu](mailto:aesearch@umn.edu)

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

# North Dakota Pulse Crops

## Economic Contribution Analysis

### Summary Report

Dean Bangsund and Nancy Hodur, PhD

### Report Content

- ❖ Industry Highlights
- ❖ Industry Composition
- ❖ Understanding the Numbers
- ❖ Recent Production History
- ❖ Business Volume
- ❖ Employment
- ❖ Labor Income
- ❖ Value-added
- ❖ Government Revenues
- ❖ Supplemental Materials

### Preface

This report is one in a series of summary documents examining the role of agriculture in North Dakota. The summary reports cover only the highlights from an ongoing study of the agriculture industry in the state.

### Industry Highlights

The following figures combine all segments of the North Dakota pulse crop Industry. Crop production is a three-year average from 2018 through 2020, all other industry segments represent a three-year average from 2015 through 2017, and economic metrics include direct and secondary economic effects.

Annual average pulse crop production from 2018 through 2020

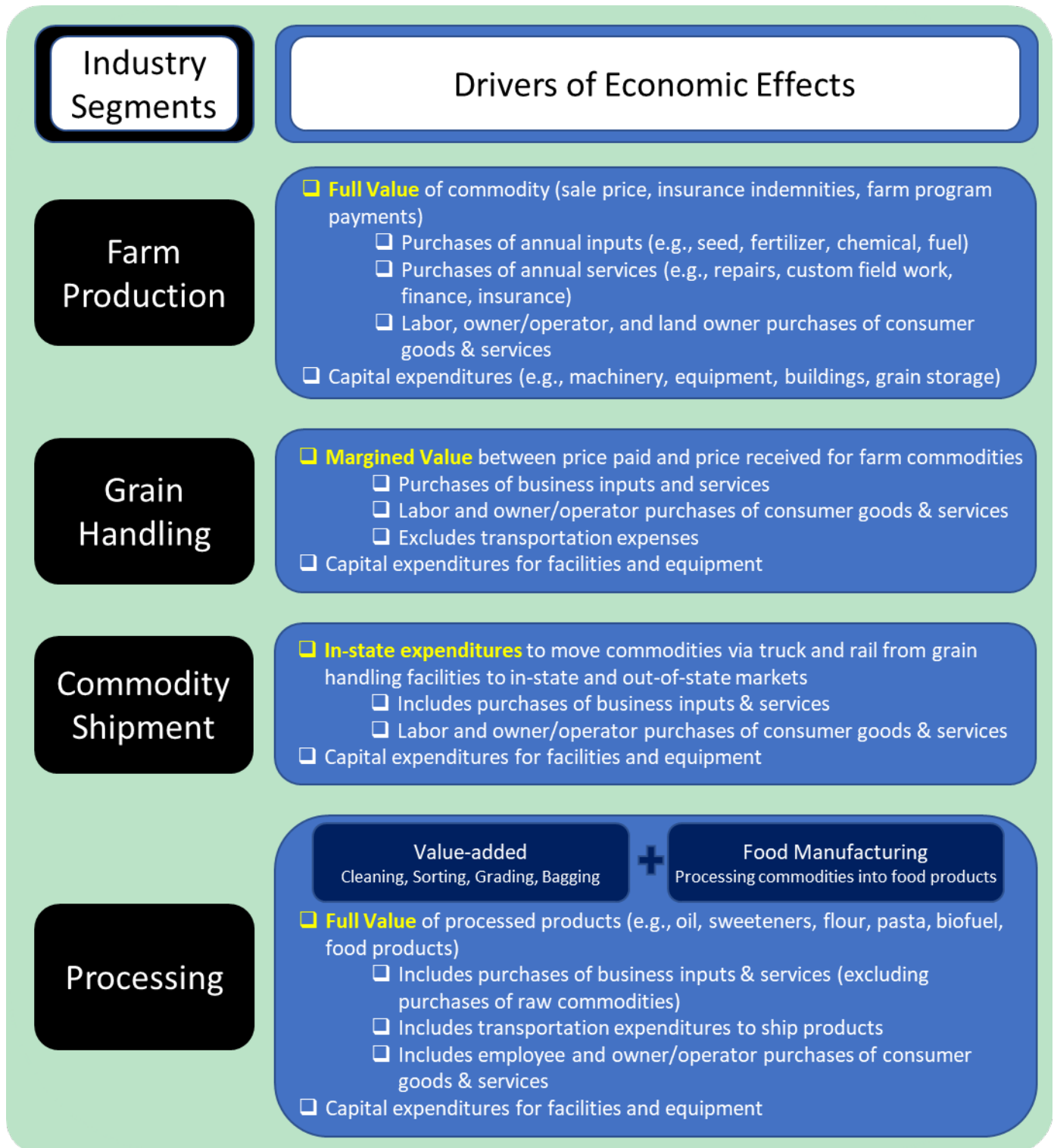
- ❖ 519,900 planted acres
- ❖ 10,019,000 cwt produced
- ❖ \$109,400,000 farm gate value
- ❖ \$163,000,000 combined farm gate value, insurance indemnities, farm program payments, and miscellaneous crop revenues

Economic metrics for the North Dakota pulse crop industry

- ❖ \$405 million in gross business volume
  - \$284 million from pulse crops production
  - \$121 million from grain handling, transportation, and processing
- ❖ 1,645 jobs
  - 1,125 jobs supported by production
  - 520 jobs supported by grain handling, transportation, and processing
- ❖ \$116 million in labor income
- ❖ \$220 million in value-added
- ❖ \$11.3million in local and state government revenues

# Industry Composition

The pulse crop industry in North Dakota includes farm production, grain handling, transportation, and processing. For each component, production expenditures, outlays for capital acquisitions, employment compensation, and owner/operator income are measured for their economic contribution to the state economy. Therefore, each segment is measured for direct effects and secondary effects relating to business-to-business transactions (indirect) and households to business expenditures (induced).



## Understanding the Numbers

**Economic contribution** assessments measure the gross size of an industry or economic sector.

*Size* is estimated by combining *direct* or first-round effects (i.e., sales, spending, and/or employment) with economic modeling to estimate secondary effects of business-to-business transactions (*indirect*) and household spending for goods and services (*induced*).

Economic measures frequently used in economic contribution assessments:

- ❖ **Labor Income** – earnings of workers and sole proprietors
- ❖ **Employment** – wage and salary jobs and sole proprietor/self-employed jobs
- ❖ **Gross Business Volume** – sum of all business-to-business and household-to-business transactions
- ❖ **Value-added** – represents share of gross state product

An overview and additional information on study methods, data sources, and economic definitions are appended to the end of this report.

## Recent Production History

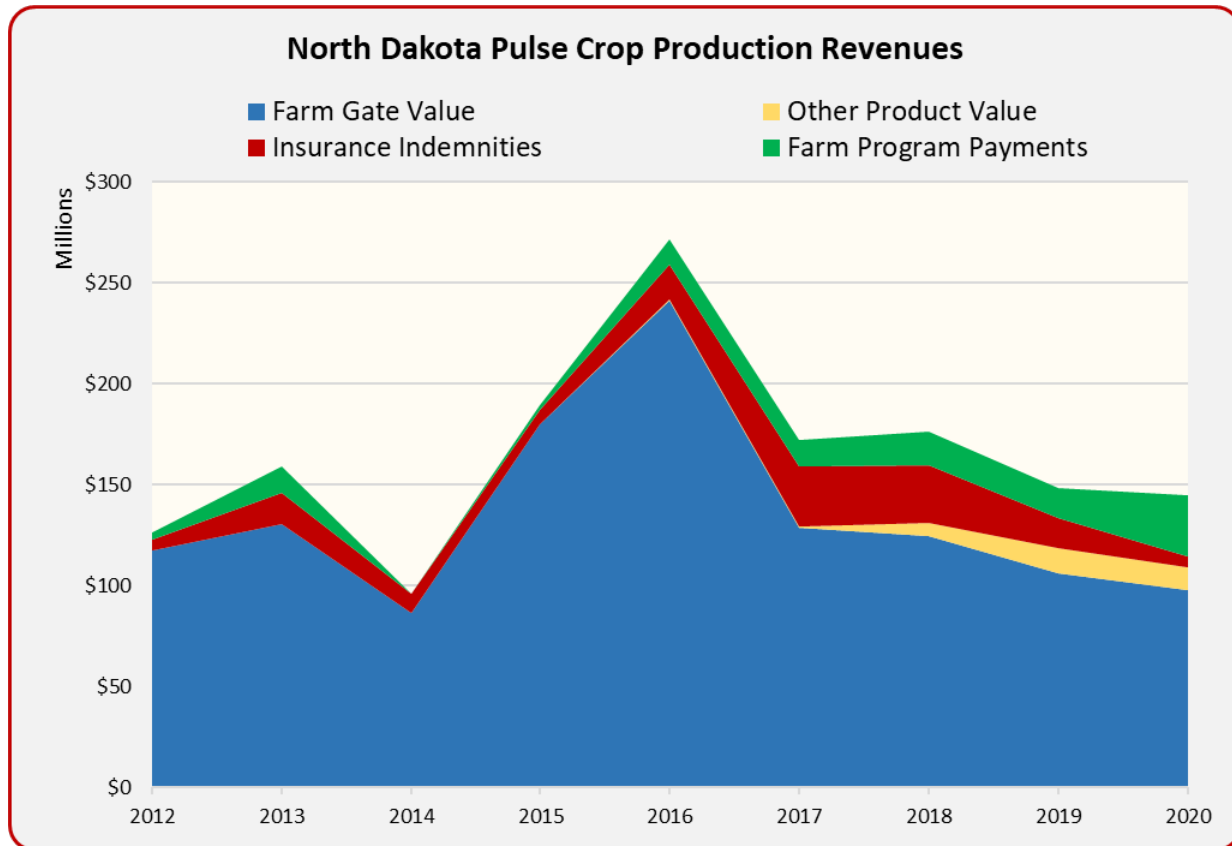
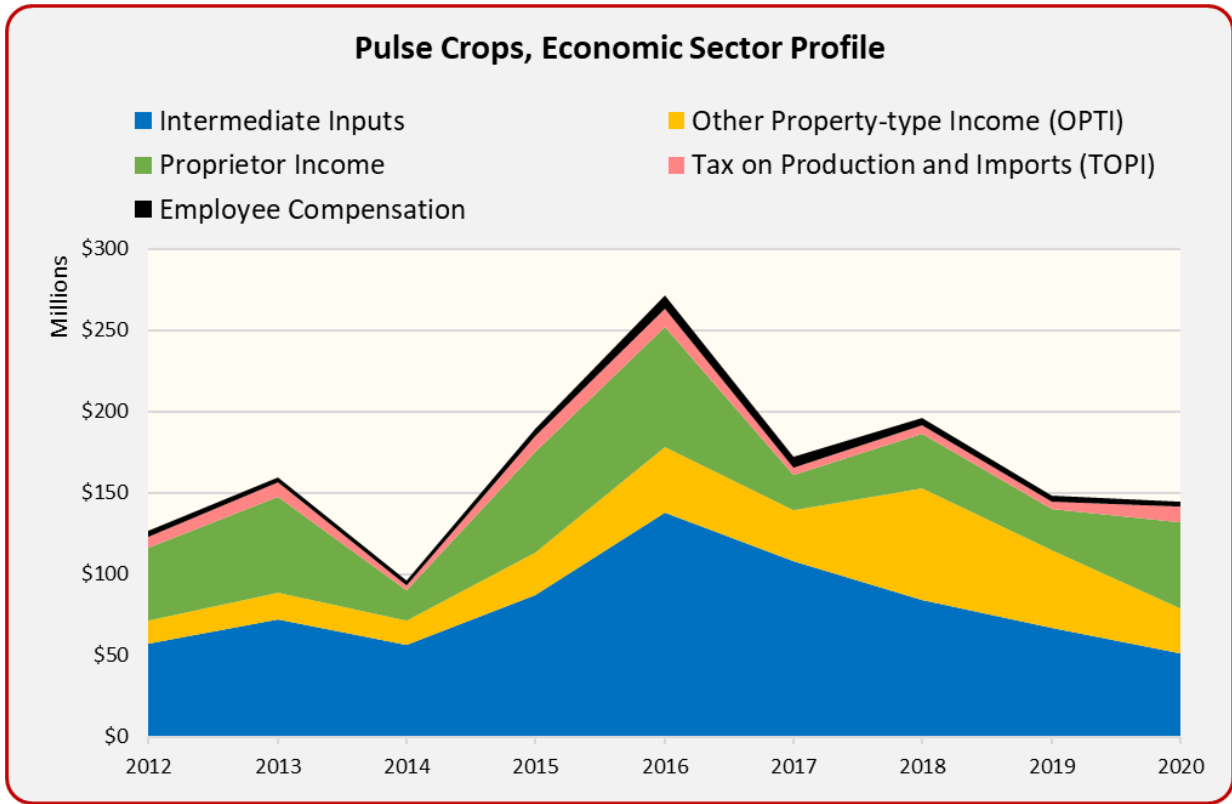
The study period for the economic contribution of pulse crop production was 2018 through 2020. The next three figures show how key economic information for pulse crop production in North Dakota compares from 2012 through 2020.

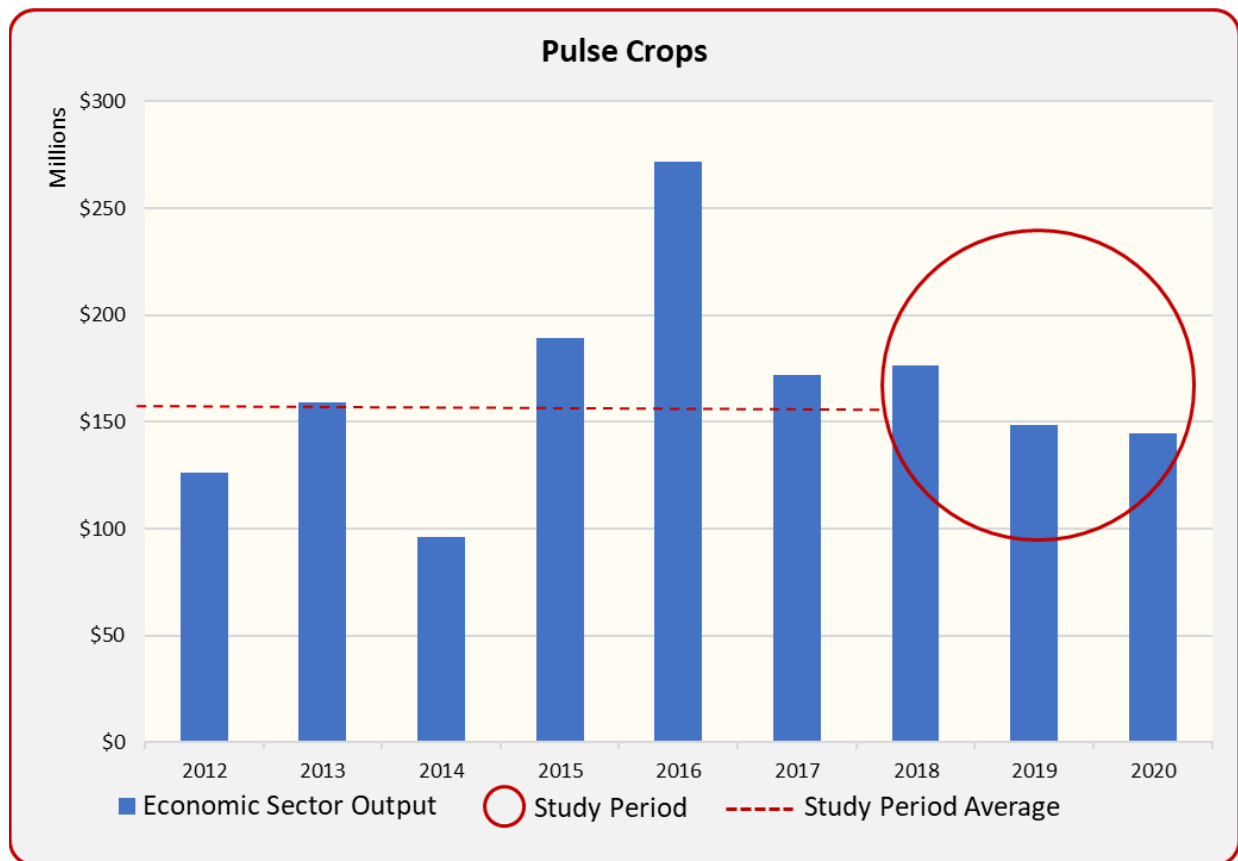
Economic sector profiles, part of the economic modeling requirements, show the relative financial values for proprietor income, paid labor, taxes, other property type income (cash rent, capital outlays), and intermediate inputs (term for inputs consumed during one production year such as seed, fertilizer, fuel, among others). As would be expected in farm production, production revenues varied considerably over the period.

Gross revenues for pulse crop production were comprised of farm gate value (price/bu x bushels), farm program payments, insurance indemnities, and other revenues. During the 2012 to 2020 period, farm gate values were the dominant source of revenues for pulse crop production.

Pulse crop production revenues in North Dakota averaged \$163 million from 2018 to 2020. The average from 2018 through 2020 was compared to the annual revenues for 2012 through 2017, and was considered reasonably representative of average revenues for pulse crop production over that period.

Pulse crop production averaged about \$68 million in production inputs, about \$37 million in proprietor income, and \$4 million in paid labor expenses annually from 2018 through 2020.





## Pulse Crop Production Statistics and Economic Profile, North Dakota, 2016 through 2020

	2016	2017	2018	2019	2020	Average 2018- 2020
<b>Production Statistics</b>						
Acreage	834,084	708,102	635,842	521,852	402,012	519,902
Yield (bu/ac)	1,860.3	1,224.6	1,718.1	2,062.1	2,082.7	1,927.1
Price (per bushel)	\$0.16	\$0.15	\$0.11	\$0.10	\$0.12	\$0.11
Farm Gate Value (millions \$)	241.3	128.9	124.4	105.9	97.8	109.4
Other Product Value (millions \$)	0.5	0.3	25.8	12.7	11.2	16.6
Insurance Indemnities (millions \$)	17.6	29.9	29.0	14.6	5.4	16.3
Farm Program Payments (millions \$)	12.3	12.8	16.7	15.0	30.3	20.7
<b>Economic Profile</b>						
	----- millions \$ -----					
Output	289.3	201.9	195.9	148.3	144.7	163.0
Employee Compensation	8.4	6.7	4.7	3.8	3.0	3.9
Proprietor Income	73.6	21.6	32.9	26.0	52.9	37.3
Other Property-type Income (OPTI)	57.6	61.0	68.8	47.2	27.5	47.8
Tax on Production and Imports (TOPI)	11.7	4.8	5.2	4.3	9.9	6.5
Intermediate Inputs	138.1	107.9	84.3	67.1	51.3	67.6

## Business Volume

Gross business volume for pulse crop production was estimated to be nearly \$285 million, with \$163 million in direct effects and \$120 million in secondary economic effects. The pulse crop industry, which included grain handling, commodity shipment, and processing was estimated to have direct output of \$240 million, and when combined with secondary economic effects, had an average annual total gross business volume of nearly \$405 million.

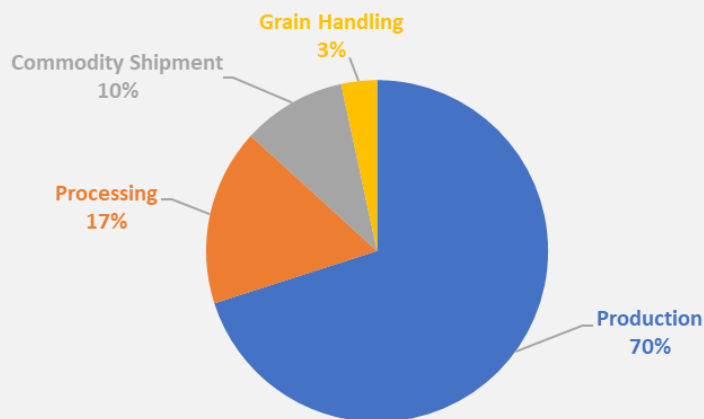
Pulse crop production represented 70 percent of the pulse crop industry's gross business volume in North Dakota. Economic output from commodity processing was 17 percent, with grain handling and shipment comprising the remaining 13 percent of the industry.

### Business Volume

Business volume, sometimes called output or economic output, is the value of goods or services produced by an economic sector, and is largely synonymous with sales or gross receipts.

Gross business volume (GBV) is the sum of direct output/sales and output/sales from indirect and induced economic activity in all economic sectors.

### Pulse Crop Industry, Share of Gross Business Volume



### Business Volume, Pulse Crop Industry, North Dakota, Annual Average 2018 through 2020

Economic Activity	Crop Production	Grain Handling	Commodity Shipments	Processing	Industry Totals
----- millions \$ -----					
Direct Sales	163.0	8.9	24.1	44.0	240.0
Indirect Activity	73.9	2.5	7.8	15.7	99.9
Induced Activity	46.8	2.3	8.1	8.0	65.2
Gross Business Volume	283.7	13.7	39.9	67.7	405.0

Notes: Crop production represents an annual average from 2018 through 2020. Grain handling, commodity shipments, and commodity processing represent an annual average from 2015 through 2017.

## Employment

Assigning direct farm employment to specific farm enterprises (i.e., individual crops or livestock operations) is difficult, if not inaccurate, as wage/salary labor and self-employment are assigned based on only one NAICS code. Farms and ranches are represented based on which enterprise provides one-half or more of the establishment's total production. Therefore, if a farm produces multiple crops, it is likely that wage/salary employment will be placed in only one NAICS code for a specific crop. In reality, some of the direct farm labor in some commodity assignments also contributes to the production of other commodities, but current labor tracking systems prevent the estimation of crop-shares for those employment values.

Direct employment for pulse crop production, using the limitations of NAICS assignments identified above, was estimated at about 410 jobs (wage/salary and sole proprietors). All

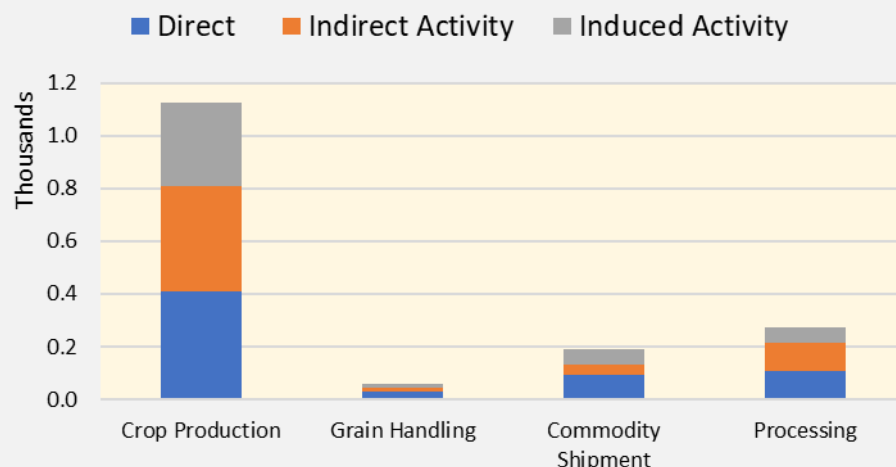
direct employment, across the industry's several segments, was estimated at 640 jobs. Over 100 jobs were in processing, and 95 jobs in commodity shipment, with the majority of those jobs in the truck transportation sector.

Secondary employment for pulse crop production, across all economic sectors, was estimated at 700 jobs. All secondary employment for the industry's other segments was estimated at nearly 290 jobs. The pulse crop industry, including production, grain handling, commodity shipment, and processing was estimated to support about 1,650 jobs.

### Employment

Employment represents jobs with paid compensation. Estimates of employment include both wage and salary positions and sole proprietors/ self-employed.

#### Employment, by Type, by Industry Segment



#### Employment, Pulse Crops Industry, North Dakota

Economic Activity	Crop Production	Grain Handling	Commodity Shipments	Processing	Industry Totals
----- jobs -----					
Direct	410	30	95	108	643
Indirect Activity	398	12	38	106	554
Induced Activity	316	16	58	58	448
<b>Total Jobs</b>	<b>1,125</b>	<b>58</b>	<b>191</b>	<b>272</b>	<b>1,646</b>

Notes: Crop production represents an annual average from 2018 through 2020. Grain handling, commodity shipments, and commodity processing represent an annual average from 2015 through 2017.



## Labor Income

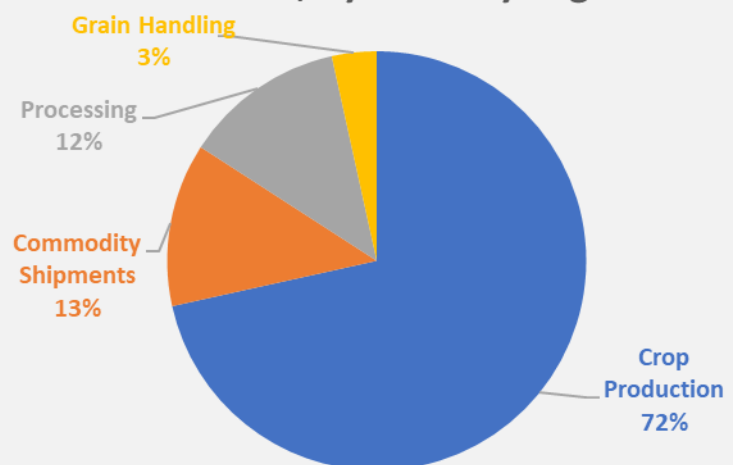
The pulse crop industry directly paid \$59 million for wage/salary and self-employed jobs across all industry segments. Labor income supported by indirect economic activity was estimated at \$36 million, and labor income for induced economic activity was estimated at \$21 million. The pulse crop industry supported nearly \$116 million in labor income across direct, indirect, and induced economic effects.

Pulse crop production comprised the largest share of labor income estimated at \$83 million or 72 percent of the industry's total labor income. Consistent with employment among the industry's segments, commodity shipment and processing were each responsible for \$14.5 million in labor income, followed by grain handling with \$4 million in labor income.

### Labor Income

Labor income represents financial compensation paid to workers, and includes wages, salaries, benefits and income of sole proprietors/ self-employed.

### Labor Income, By Industry Segment



### Labor Income, Pulse Crops Industry, North Dakota, Annual Average 2018 through 2020

Economic Activity	Crop Production	Grain Handling	Commodity Shipments	Processing	Industry Totals
----- millions \$ -----					
Direct	41.1	2.5	9.5	6.0	59.1
Indirect Activity	26.7	0.8	2.5	5.8	35.8
Induced Activity	15.1	0.7	2.6	2.6	21.0
All Labor Income	82.9	4.0	14.6	14.4	115.9

Notes: Crop production represents an annual average from 2018 through 2020. Grain handling, commodity shipments, and commodity processing represent an annual average from 2015 through 2017.

## Value-added

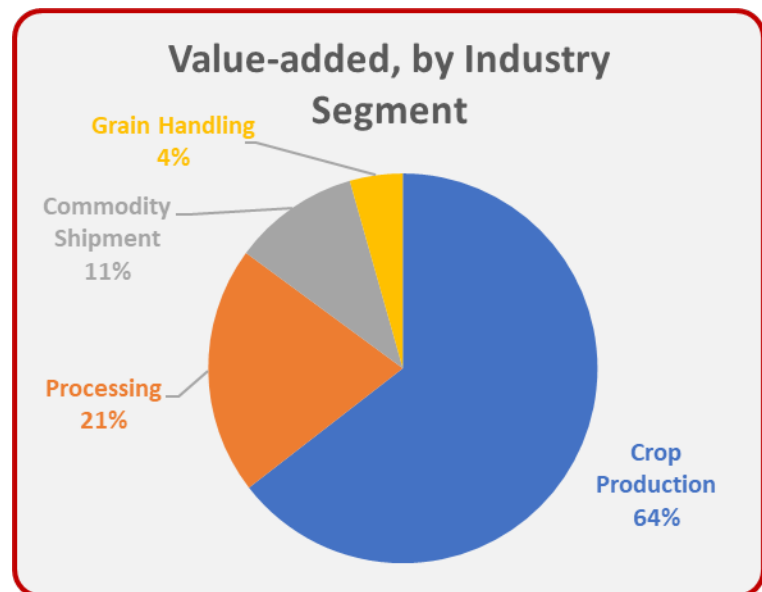
The pulse crop industry had an average annual value-added of nearly \$223 million. Pulse crop production comprised nearly two-thirds of the industry's total value added.

Of the \$223 million in value added, direct output in the industry produced about \$133 million, while secondary economic output generated \$90 million.

Contribution to gross state product was \$46 million for pulse crop processing, with handling and shipment combining for \$33 million.

### Value-added

Value-added is the contribution made to gross state product. Gross state product includes labor income, other property type income, and taxes on production and imports. It does not include the purchases of inputs and services (intermediate inputs) but does include capital consumption.



### Value-added, Pulse Crop Industry, North Dakota, Annual Average 2018 through 2020

Economic Activity	Crop Production	Grain Handling	Commodity Shipments	Processing	Industry Totals
----- millions \$ -----					
Direct	79.1	7.1	14.5	31.9	132.7
Indirect Activity	39.3	1.4	4.3	9.4	54.4
Induced Activity	25.3	1.3	4.6	4.5	35.7
<b>Total Value-added</b>	<b>143.6</b>	<b>9.8</b>	<b>23.4</b>	<b>45.8</b>	<b>222.6</b>

Notes: Crop production represents an annual average from 2018 through 2020. Grain handling, commodity shipments, and commodity processing represent an annual average from 2015 through 2017.

## Government Revenues

Pulse crop production paid nearly \$4.6 million in state and local government revenues. Property taxes were estimated at \$3.2 million of production's total direct payments.

Secondary business activity associated with production was estimated to generate \$4.1 million in state and local government tax revenues. Pulse crop production, through direct and secondary business volume, was estimated to generate \$8.7 million in state and local government revenues.

### Government Revenues

Government revenues represent industry payments for taxes, licenses, permits, fees, penalties, and fines.

#### Government Revenues, Pulse Crop Production, North Dakota, Annual Average 2018 through 2020

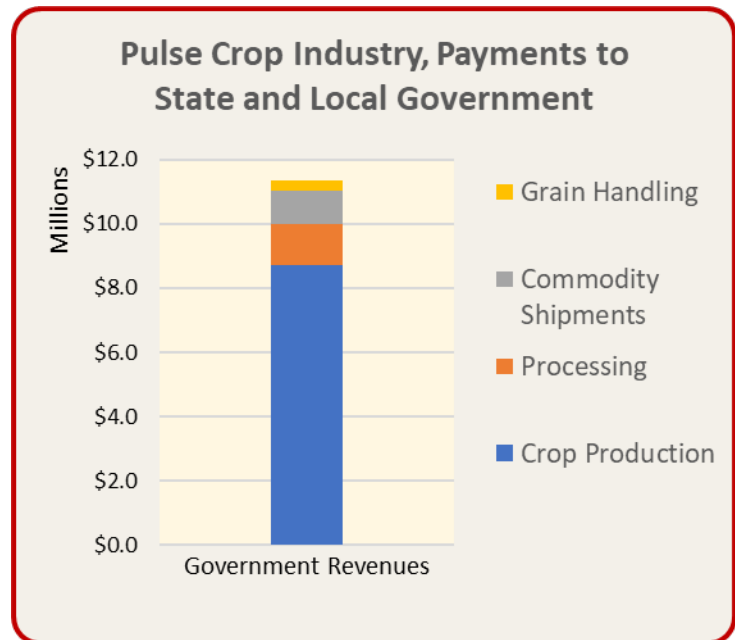
Government Jurisdiction and Type of Revenue	Government Revenues
	--- 000s \$ ---
<b>Paid Directly by Pulse Crop Production<sup>1</sup></b>	
Federal Government	6,316.5
State and Local Governments	4,553.7
<b>Total</b>	<b>10,870.2</b>
<b>Paid Directly by Pulse Crop to State and Local Government<sup>1</sup></b>	
Social Insurance Taxes	51.5
Sales and Use Tax	526.9
Property Tax	3,180.9
Corporate Income Tax	116.9
Personal Income Tax	359.2
Misc. Taxes and Revenues	318.3
<b>Total</b>	<b>4,553.7</b>
<b>Paid by Secondary Business Activity to State and Local Government<sup>2</sup></b>	
Social Insurance Taxes	211.7
Sales and Use Tax	1,308.8
Property Tax	1,877.0
Corporate Income Tax	96.5
Personal Income Tax	239.7
Misc. Taxes and Revenues	412.7
<b>Total</b>	<b>4,146.4</b>
<b>Total State and Local Revenues</b>	
Paid by Pulse Crop Production	4,553.7
Paid from Secondary Business Activity	4,146.4
<b>Total</b>	<b>8,700.1</b>

<sup>1</sup> Payments made by producers, farm workers, and owners of farm land.

<sup>2</sup> Payments associated with indirect (business spending) and induced (household spending) activity generated by pulse crop production, land rent, Federal Crop Insurance Administrative and Operational outlays, and producers' capital expenditures.

Sources: IMPLAN LLC (2021), FINBIN (multiple years), ND Office of State Tax Commissioner (multiple years).

Overall, the pulse crop industry made direct payments of nearly \$5.4 million to state and local governments. Across all industry segments, the industry contributed an additional \$6 million in government revenues from secondary business activity. Direct and secondary business activity resulted in state and local government revenues of \$11.3 million.



### Government Revenues, Pulse Crops Industry, North Dakota, Annual Average 2018 through 2020

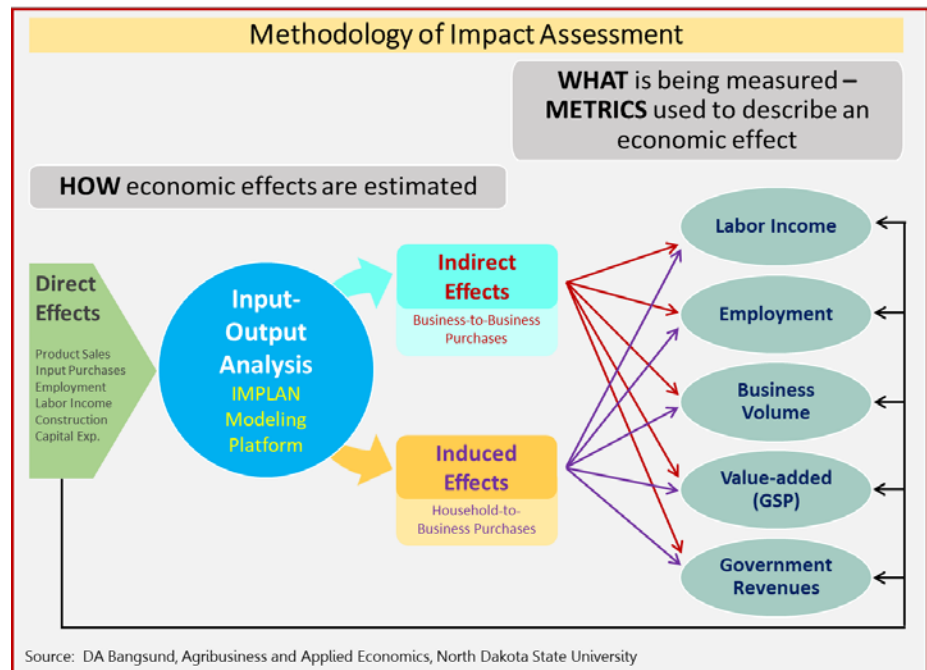
Economic Activity	Crop Production	Grain Handling	Commodity Shipments	Processing	Industry Totals
----- 000s \$ -----					
Direct	4,553.7	169.4	318.8	315.5	5,357.4
Indirect Activity		83.0	353.8	710.9	
Induced Activity	4,146.4	76.5	353.2	273.3	5,997.1
<b>Total Revenues</b>	<b>8,700.1</b>	<b>329.0</b>	<b>1,015.6</b>	<b>1,299.7</b>	<b>11,344.4</b>

Notes: Crop production represents an annual average from 2018 through 2020. Grain handling, commodity shipments, and commodity processing represent an annual average from 2015 through 2017.

# Supplemental Materials

## Economic Contribution Analysis

An economic contribution assessment measures the gross size of some aspect or component of an economy, and is usually measured in conjunction with the overall size of a given economy over a specified period. Size is estimated by combining direct or first-round effects (e.g., industry expenditures, business sales, new employment) with economic modeling to estimate how those first round effects generate business-to-business transactions and household spending on consumer goods and services. Both of those conduits for economic output can be framed using labor income, employment, value-added, gross business volume and government revenues.



## Key Terms and Concepts

**Direct Effects:** First-round of payments for services, labor, and materials and/or sales of an industry's products.

**Indirect Effects:** Economic activity created through purchases of goods and services by businesses.

**Induced Effects:** Economic activity created through purchases of goods and services by households.

**Industry Output and Gross Business Volume:** Industry output is the value of all goods and services produced and supported by an industry. In most industries, output is largely synonymous with sales; however, for some sectors output also includes changes in product inventory. For production agriculture, direct output includes both sales and inventory adjustments.

When output from business-to-business transactions (*indirect*) and households-to-businesses (*induced*) are measured, they also are described as the *sum of gross receipts* as annual adjustments to inventories are largely unquantified and not distinguished from sales. *Gross business volume* (GBV) therefore includes direct output/sales and includes secondary sales from indirect and induced economic activity.

**Value-added:** Value-added is synonymous with measures of gross domestic product (GDP) and gross state product (GSP), are some of the most commonly used economic measures to indicate the economic size and change in economic output. However, official government estimates of GDP and GSP do not include secondary economic effects generated by any industry. For agriculture, official government estimates are primarily limited to crop, livestock, and forestry sectors. Economic contribution assessments include secondary economic effects, and include GSP from those effects, thereby providing a more realistic and representative portrait of an industry.

Key components of value-added include labor income, consumption of fixed capital, profits, business current transfer payments (net), income derived from dividends, royalties, and interest. In nontechnical terms, value-added is equal to product value minus production inputs. For example, value-added from growing wheat would be the value of wheat produced less the value of the inputs consumed in raising that crop, such as fertilizer, chemical, repairs, fuel, etc. Depreciation charged to durable assets (e.g., tractors) are not included in value-added measures.

Employment Compensation: Wages, salaries, and benefits earned by an employee.

Proprietor Income: Payments received by self-employed individuals and unincorporated business owner/operators.

Labor Income: Wages, salaries, and benefits for employees and compensation for self-employed individuals.

Input-output Analysis (IO): Mathematical application of the interdependence among producing and consuming sectors in an economy.

IO Matrix: Depiction of an economy using a grid of rows and columns that represents consumption and production for each economic sector in an economy.

Intermediate Inputs: Goods and services consumed in one year to produce another good or service. Intermediate inputs do not include expenditures for capital inputs used for multiple production seasons (e.g., machinery, buildings).

Capital Inputs: Represent the use of inputs to produce another good or service that are not consumed in one production season and are subject to depreciation. *Capital expenditures* represent the purchase of those depreciable assets.

Industry Balance Sheet: Dividing an industry or economic sector into various components for use in estimating the economic effects using input-output analysis. Components of the balance sheet include measures of output, wage and salary employment, self-employment, payroll and proprietor income, other property type income, taxes on production and imports, and intermediate inputs.

Institutions: Represent governments and other non-private entities consuming goods and services in an economy.

Households: Represent one or more individuals in a specific living arrangement for which income from all sources is used to purchase goods and services.

North American Industry Classification System (NAICS): Government classification system for all goods and services produced in the economy.

## Employment Sources and Measures

Employment is broadly measured in two distinct categories: covered and uncovered. Covered workers are those that are employed by a business, institution, or government agency, receive a wage or salary, and are subject to unemployment insurance (UI). Jobs that fall under an UI program are called 'covered' employment. Quarterly Census of Employment and Wages (QCEW) employment reported by Job Service ND is 'covered' employment. QCEW data are collected for each state and reported by the US Bureau of Labor Statistics (BLS). Therefore, employment statistics for self-employed farmers and ranchers cannot be derived from QCEW data.





input to create a customized IO matrix. The process of developing study-specific economic profiles and then modifying an IO matrix is time consuming and requires considerable empirical analysis, but the results from those efforts produce a credible and transparent evaluation of an industry's role in an economy.

To the extent possible, other economic sectors (e.g., manufacturing) were customized using financial information from an industry-wide survey conducted in 2017-2018. Survey data also was used to estimate capital expenditures for various manufacturing and processing sectors. Ethanol producers were surveyed in 2022, and information from that survey provided a custom economic profile for ethanol production and produced a three-year average of capital expenditures.

Farm Production Records and Government Data	Components of IO Sector	General Function in IO Matrix
Yields	Output	-) Sets level of direct effects -) Counted in gross business volume
Prices	Payroll (wages, salaries, benefits)	-) Component of value-added -) Creates consumption of goods and services (household spending)
Insurance Indemnities	Proprietor Income	-) Driver of <b>Induced</b> effects -) Induced effects counted in gross business volume
Farm Program Payments	Other Property Type Income	-) Component of value-added -) No other economic effect in matrix
Disaster Payments	Taxes on Production and Imports	-) Component of value-added -) No other economic effect in matrix
Other Crop Income	Intermediate Inputs	-) Creates consumption of goods and services (business-to-business) -) Driver of <b>Indirect</b> Effects -) Counted in gross business volume
Gross Input Requirements (seed, fertilizer, etc.)		
Sourcing of Inputs (inside and outside of study region)		
Acreage		
BEA, BLS, and IMPLAN Data		
Revenue less all expenses		
Cash Rent		
Depreciation		
Sales Tax		
Property Tax		
Income Tax		

Source: DA Bangsund, Agribusiness and Applied Economics, North Dakota State University

### What Economic Activities are Included in Crop and Livestock Production?

The following activities were included for crop and livestock sectors:

- ❖ Production
- ❖ Capital Expenditures
- ❖ Cash Rent
- ❖ Insurance Industry A&O

**Crop and livestock production** generate economic effects from spending of labor income and purchase of production inputs to produce a crop or raise livestock, and first-round effects are driven by the custom economic profiles.



By definition, **capital expenditures** would arise from use of Other Property Type Income (OPTI); however, OPTI does not generate any indirect or induced effects. Capital expenditures were modeled independently from the custom crop and livestock sectors to estimate the economic effects from purchases of new buildings and structures, tractors, combines, machinery, equipment, and other durable goods not consumed in one production cycle.

**Cash rent** can be included as proprietor income within an ag production sector, assigned to a real estate sector as an intermediate input, or placed in OPTI. Cash rent was placed in OPTI, and a share of cash rent paid by producers, net of property tax, was modeled as a revenue stream to in-state landowners.

The revenue stream to landowners was modeled as a labor income event within the custom IO matrix. Federal crop insurance generates additional revenue to the state from **Administrative and Operating (A&O) subsidies**. A&O subsidies were modeled as separate industry spending events since those revenue streams affect financial sectors and are not internally linked in the IO matrix to crop and livestock production sectors.

## Study Parameters

- ) Crop and livestock production was based on 2018 through 2020 data.
- ) All other segments of the industry were based on 2015 to 2017 data, except ethanol production, which was based on 2021 production.
- ) Expenses associated with summer fallow and prevent plant were included in crop production.
- ) Sale barns/livestock exchanges were estimated separately in the study, but are presented in this summary as part of commodity handling.
- ) Default IMPLAN data was used for all forestry activities in the state.
- ) Data for the study came from surveys of industry firms, state and federal government agencies, NDSU Extension, and other secondary sources. Survey and secondary data were used to develop industry balance sheets (i.e., profiles) for the Agriculture's numerous economic sectors.

## Treatment of Traditional Ag Sectors Supporting Production Agriculture

This summary omits specific details of how the secondary economic effects are distributed among the state's numerous sectors and sub-sectors. Several economic sectors support production agriculture by providing inputs and services to crop and livestock producers. Examples include implement sales, custom field work and applications, seed companies, and supply stores. Under some definitions, those activities and sectors are presented as "direct" segments of the Agriculture Industry, much like crop production and grain handling are considered stand-alone components of the industry. However, from the perspective of how this study's input-output analysis was structured, those sectors represent "indirect" economic output of the industry, meaning those sectors are supported and sustained from purchases relating to crop and livestock production.

Sectors traditionally considered core components of Agriculture, but defined as indirect components of the industry in this assessment, are identified in the following table and with corresponding NAICS codes for those activities.

## Key Economic Sectors Representing Components of Production Agriculture Whose Output and Employment are Contained (grouped) within Indirect Economic Effects

Industry Segment	Economic Sector Description	NAICS <sup>1</sup>
<b>Agricultural Production</b>		
	Support activities for agriculture and forestry	1151
	Construction of new commercial structures, including farm structures	2362
	Support activities for transportation	4882
	Warehousing and storage	4931
	Securities and commodity contracts intermediation and brokerage	5231
	Insurance agencies, brokerages, and related activities	5242
	Commercial and industrial machinery and equipment rental and leasing	5234
	Veterinary services	5419
	Commercial and industrial machinery and equipment repair and maintenance	8113
<b>Wholesale Trade</b>		
	Agricultural chemicals merchant wholesalers	424910
	Agricultural machinery and implement merchant wholesalers	423820
	Animal feeds (except pet food) merchant wholesalers	424910
	Auction markets, tobacco, horses, mules	424590
	Beans, dry, merchant wholesalers	424510
	Berries, fresh, merchant wholesalers	424480
	Cattle, hog, sheep merchant wholesalers	424520
	Doughs, frozen, merchant wholesalers	424420
	Dried foods (e.g., fruits, milk, vegetables) merchant wholesalers	424490
	Dry beans merchant wholesalers	424510
	Eggs merchant wholesalers	424440
	Elevators merchant wholesalers	423830
	Farm supplies merchant wholesalers	424910
	Feed additives merchant wholesalers	424910
	Fertilizer and fertilizer materials merchant wholesalers	424910
	Flour merchant wholesalers	424490
	Grain elevators, merchant wholesalers grain	424510
	Honey merchant wholesalers	424490
	Irrigation equipment merchant wholesalers	423820
	Land preparation machinery, construction, merchant wholesalers	423810
	Livestock equipment, merchant wholesalers	424470
	Storage bins merchant wholesalers	423820
	Veterinarians' equipment and supplies merchant wholesalers	423390
	Veterinarians' medicines merchant wholesalers	423490
	Wool, raw, merchant wholesalers	424210
<sup>1</sup> North American Industrial Classification System		

## Economic Sectors for Processing, Manufacturing, and Transportation included in the Agriculture Industry, Defined by North American Industry Classification System

Industry Segment	Sector Description	NAICS <sup>1</sup>
<b>Crop and Livestock Commodity Processing</b>		
	All other food manufacturing	3119
	Animal, except poultry, slaughtering	3116
	Beet sugar manufacturing	3113
	Bottled and canned soft drinks & water	3121
	Bread and bakery product, except frozen, manufacturing	3118
	Breweries	3121
	Canned fruits and vegetables manufacturing	3114
	Confectionery manufacturing from purchased chocolate	3113
	Creamery butter manufacturing	3115
	Dehydrated food products manufacturing	3114
	Distilleries	3121
	Dry pasta, mixes, and dough manufacturing	3118
	Fats and oils refining and blending	3112
	Flour milling	3112
	Fluid milk manufacturing	3115
	Frozen cakes and other pastries manufacturing	3118
	Frozen fruits, juices and vegetables manufacturing	3114
	Frozen specialties manufacturing	3114
	Malt manufacturing	3112
	Meat processed from carcasses	3116
	Nonchocolate confectionery manufacturing	3113
	Other animal food manufacturing	3111
	Other basic organic chemical manufacturing (ethanol)	3251
	Rendering and meat byproduct processing	3116
	Roasted nuts and peanut butter manufacturing	3119
	Soybean and other oilseed processing	3112
	Spice and extract manufacturing	3119
	Tobacco product manufacturing	3122
	Wet corn milling	3112
	Wineries	3121
<b>Agricultural Manufacturing</b>		
	Pesticide and other agricultural chemical manufacturing	3253
	Farm machinery and equipment manufacturing	3331
<b>Transportation</b>		
	Truck transportation	4841
	Railroad transportation	4821
<sup>1</sup> North American Industrial Classification System		

# Acknowledgments

Several organizations and individuals were instrumental in providing leadership throughout the study. The authors express their appreciation and thanks to the following individuals and organizations:

Nancy Johnson, North Dakota Soybean Growers Association  
 Stephanie Sinner, Executive Director, North Dakota Soybean Council  
 Deana Wiese, Executive Director, North Dakota Ethanol Council  
 Brenda Elmer, Executive Director, North Dakota Corn Growers Association  
 Matt Perdue, Government Relations Director, North Dakota Farmers Union  
 Mitch Coulter, Executive Director, Northharvest Bean Growers Association

The authors sincerely appreciate the financial support provided by the following organizations.

American Crystal Sugar Company  
 Minn-Dak Farmers Cooperative  
 North Dakota Corn Utilization Council  
 North Dakota Dry Bean Council  
 North Dakota Ethanol Council  
 North Dakota Farmers Union  
 North Dakota Soybean Council  
 North Dakota Stockmen's Association  
 Northern Canola Growers Association  
 Northern Pulse Growers Association  
 Red River Valley Sugarbeet Growers Association

The authors also wish to thank all the individuals, companies, organizations, and associations that participated in numerous capacities to make this study comprehensive and representative of the industry.

We wish to thank Edie Nelson, Department of Agribusiness and Applied Economics, for document preparation.

The authors assume responsibility for any errors of omission, logic, or otherwise. Any opinions, findings, and conclusions expressed in this publication are those of the authors and do not necessarily reflect the view of the NDSU Department of Agribusiness and Applied Economics or the NDSU Center for Social Research.

North Dakota State University does not discriminate on the basis of age, color, disability, gender expression/identity, genetic information, marital status, national origin, public assistance status, race, religion, sex, sexual orientation, or status as a U.S. veteran. This publication is available electronically at this web site: <http://ageconsearch.umn.edu/record/329994>. Please address your inquiries regarding this publication to: Department of Agribusiness & Applied Economics, P.O. Box 6050, Fargo, ND 58108 6050, Phone: 701 231 7441, Fax: 701 231 7400, Email: [ndsu.agribusiness@ndsu.edu](mailto:ndsu.agribusiness@ndsu.edu).

NDSU is an equal opportunity institution.

Copyright 2022 by Bangsund and Hodur. All rights reserved. Readers may make verbatim copies of the document for non-commercial purposes by any means, provided this copyright notice appears on all such copies.

