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Economic Contributions of US Grain Exports on State and Congressional District Economies

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Acronyms

CGF	Corn Gluten Feed, an ethanol co-product
DDGS	Dried Distillers Grains with Solubles, an ethanol co-product
ERS	USDA Economic Research Service
FAS	USDA Foreign Agricultural Service
GDP	Gross Domestic Product
GRP	Gross Regional Product
NASS	USDA National Agricultural Statistics Service
USDA	United States Department of Agriculture

Table of Contents

Executive Summary	5
Introduction	6
Methodology	9
State Exports	10
State Production	10
Congressional District Production	10
Congressional District Exports	12
Corn Equivalent of Meat Exports	12
IMPLAN Economic Models	12
Results	13
United States Economic Contributions	13
State Economic Contributions	16
Congressional District Economic Contributions	17
State and Congressional District Rankings	18
Conclusions	22

List of Exhibits

Exhibit 1: Selected Congressional Districts Included in Study	7
Exhibit 2: Relative Size of U.S. States Grain and Grain Product Exports Value (\$ Million)	8
Exhibit 3: 2016 Grain and Grain Product Exports by Selected Congressional District (\$ Million)	9
Exhibit 4: Methodology for Estimating Select State and Congressional District Production and Export Values	11
Exhibit 5: Direct Economic Contributions of U.S. Grain and Grain Product Exports	13
Exhibit 6: Total Economic Contribution of U.S. Grain and Grain Products Exports	14
Exhibit 7: Top Ten Industries, Ranked by Employment Gains, Benefiting from Export of Grains and Grain Products	15
Exhibit 8: Top Ten Industries, Ranked by GDP Gains, Benefiting from Export of Grains and Grain Products	15
Exhibit 9: Total GDP Created by State from Grain and Grain Product Exports (\$ Million)	16
Exhibit 10: Total GDP Supported by Exports of Grain and Grain Products by Congressional Districts (\$ Million)	17
Exhibit 11: Grain and Grain Product Exports by State, 2018	18
Exhibit 12: Total Economic Output Created by Grain and Grain Product Exports by State	18
Exhibit 13: Total GDP Created by Grain and Grain Product Exports by State	19
Exhibit 14: Total Jobs Created by Grain and Grain Products Export by State	19
Exhibit 15: Grain and Grain Product Exports by Congressional District, 2018	20
Exhibit 16: Total Economic Output Created by Grain and Grain Product Exports by Congressional District	20
Exhibit 17: Total GDP Created from Grain Exports by Congressional District	21
Exhibit 18: Total Jobs Created from Grain Exports by Congressional District	21

Executive Summary

A long history of economic work has proven the value of export markets for the U.S. agricultural industry. The majority of agricultural producers and businesses relating to agriculture readily recognize the economic value of export markets and support policies that will encourage continued exports. What is less well known is how these same agricultural exports benefit the U.S. economy, or even state and congressional district economies.

This study examines the economic contributions provided by exports of malt barley, other barley, sorghum, corn, ethanol, dried distillers grains with solubles, corn gluten feed and meal, and the corn equivalent of meat on the U.S. economy. Specifically, the economic contributions provided by each U.S. state and 52 congressional districts are analyzed individually with the goal of quantifying the degree to which state and congressional district economies rely upon and benefit from grain exports.

Results from the analysis show that the \$22.7 billion in grain and grain products exported indirectly supported a total economic output of \$64.5 billion in 2018. In other words, access to international export markets for U.S. grains supported nearly an *additional* \$41.8 billion in business sales during 2018. Moreover, the export of grain products supported U.S. GDP by \$27 billion over what would have occurred without such exports. Finally, the number of jobs linked directly or indirectly to grain exports totalled roughly 295,000.

Further analysis shows that for every 1 job directly involved in the export of grain and grain products, an additional 3.2 jobs are indirectly supported elsewhere in the U.S. economy. Additionally, for every \$1 of grain product exports generated, through indirect and induced business activities, an additional \$1.84 in business sales are supported across the United States.

The positive impacts of grain exports extend well beyond the agricultural industry. Some of the industries receiving the greatest economic benefit and contribution from grain exports are the wholesale trade, real estate, oil and natural gas extraction, and pesticide and chemical manufacturing industries, among others. Also, receiving significant economic contributions from grain exports are the full- and limited-service restaurants, hospitals, and employment services industries.

These results highlight the important role grain and grain products play in the U.S. economy. Fair and transparent access to international markets creates economic benefits that extend well beyond the nation's farmlands, with the benefits reaching nearly every sector of the U.S. economy.

Introduction

It is well known that exports of agricultural products provide significant economic benefits to the agricultural industry and to states producing agricultural goods. Exports to international markets represent additional demand for agricultural products that would not exist otherwise and effectively shift the demand curve for U.S. grains outward. As a result, U.S. grain and grain products producers are able to market higher quantities of grain at higher prices directly because of the export demand. Accordingly, exports are critically important to the agricultural industry and to farmers and ranchers.

What is less widely known is how exports of agricultural products impact the rest of the U.S. economy. While agricultural industries clearly benefit from exporting products to international markets, it is less clear the degree to which other industries benefit from these same exports. Economic theory suggests that increased demand for U.S. grain products increases production of U.S. grains. This, in turn, would raise demand for inputs into grain product production (like fertilizer, farm machinery, etc.) and would result in a positive economic gain for these industries as well. This work quantifies the economic benefits grain product exports provide to the U.S. economy and its various sectors.

This study was commissioned by the U.S. Grains Council and the National Corn Growers Association to quantify the holistic economic contributions that exports of grains (barley, sorghum, and corn), ethanol and its co-products (dried distillers' grains with solubles, or DDGS, and corn gluten feed and meal), and the corn equivalent of meat provide to the U.S. economy. Furthermore, this study quantifies the economic contributions that the exports of grains and grain products provide to each individual state in the USA and to select congressional districts in those states. The objective of this work is to clearly demonstrate the degree to which individual states and congressional districts benefit from exports of agricultural products that are produced within their borders.

The economic benefits shown in this study include those that are gained in industries linked to industries producing grain and grain-related products, like the fertilizer industry that is linked to the corn farming industry. By determining the benefits that accrue along the entire value chain linked to grain and grain product exports, a clearer picture of grain exports true economic importance emerges.

This report first identifies the value of grain product exports originating from each U.S. state and from the selected congressional districts. Subsequently, a description of the specific data and methodologies used in the analysis is provided; followed by the results from the IMPLAN economic input-output models.

Per the request of the U.S. Grains Council and the National Corn Growers Association, 52 congressional districts were included in this analysis. The selected congressional districts were included due to the importance of agriculture in the district's economy. The complete list of the 52 selected congressional districts is shown in **Exhibit 1**.

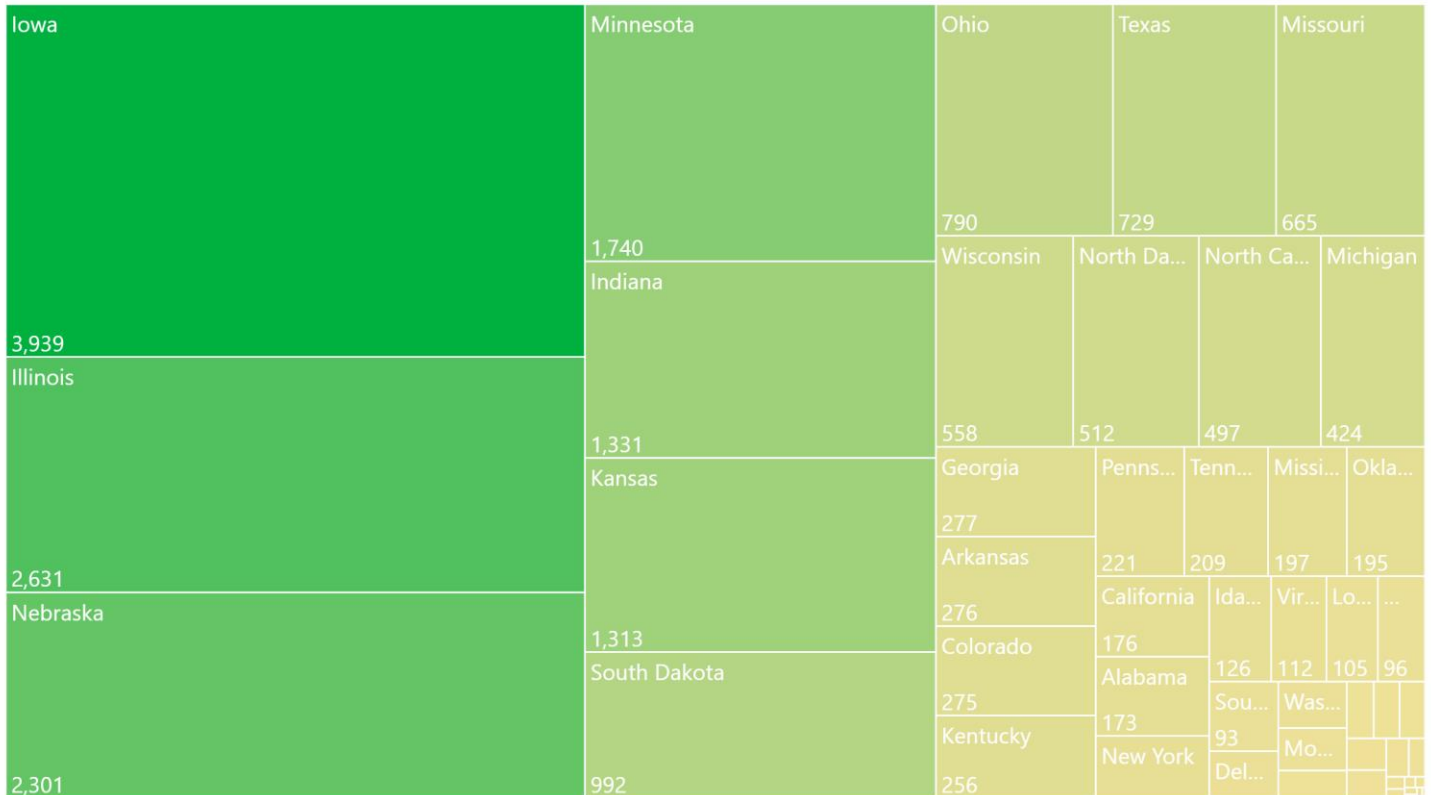
Exhibit 1: Selected Congressional Districts Included in Study

State	Congressional District
California	Sixteenth Congressional District
Colorado	Fourth Congressional District
Illinois	Twelfth Congressional District
Illinois	Thirteenth Congressional District
Illinois	Fifteenth Congressional District
Illinois	Sixteenth Congressional District
Illinois	Seventeenth Congressional District
Illinois	Eighteenth Congressional District
Indiana	Second Congressional District
Indiana	Third Congressional District
Indiana	Fourth Congressional District
Indiana	Fifth Congressional District
Indiana	Sixth Congressional District
Indiana	Eighth Congressional District
Indiana	Ninth Congressional District
Iowa	First Congressional District
Iowa	Second Congressional District
Iowa	Third Congressional District
Iowa	Fourth Congressional District
Kansas	First Congressional District
Kansas	Second Congressional District
Kansas	Fourth Congressional District
Kentucky	First Congressional District
Louisiana	Fifth Congressional District
Maryland	Fifth Congressional District
Michigan	Fourth Congressional District

State	Congressional District
Michigan	Sixth Congressional District
Michigan	Seventh Congressional District
Minnesota	First Congressional District
Minnesota	Second Congressional District
Minnesota	Seventh Congressional District
Missouri	Fourth Congressional District
Missouri	Fifth Congressional District
Missouri	Sixth Congressional District
Missouri	Eighth Congressional District
Nebraska	First Congressional District
Nebraska	Second Congressional District
Nebraska	Third Congressional District
North Carolina	Seventh Congressional District
Ohio	Second Congressional District
Ohio	Fourth Congressional District
Ohio	Fifth Congressional District
Ohio	Eighth Congressional District
Ohio	Tenth Congressional District
Texas	Eleventh Congressional District
Texas	Thirteenth Congressional District
Texas	Nineteenth Congressional District
Washington	Eighth Congressional District
Wisconsin	First Congressional District
Wisconsin	Third Congressional District
Wisconsin	Sixth Congressional District
Wisconsin	Seventh Congressional District

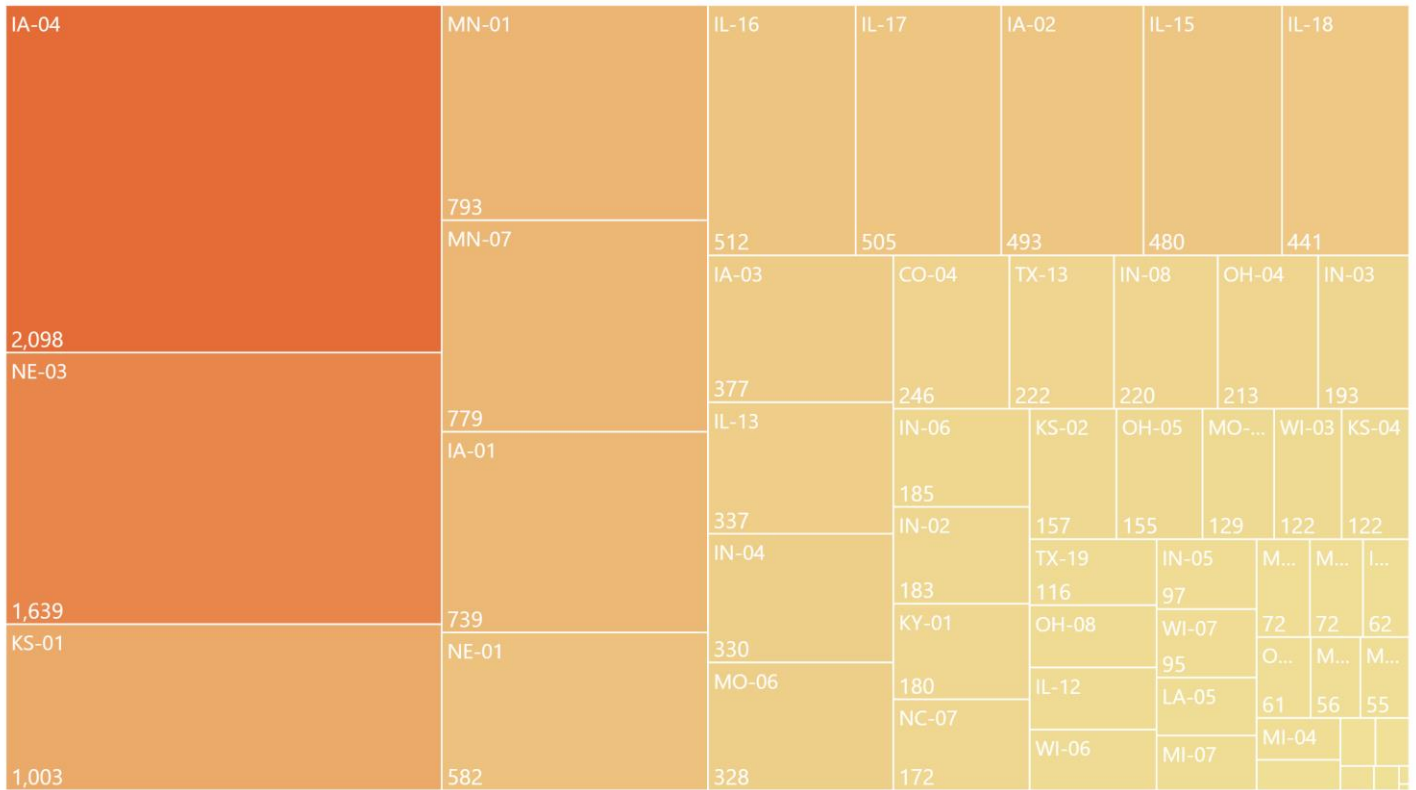
To graphically show the relative importance of each state's exports relative to other states, **Exhibit 2** shows the value of grain and grain products exports from each state. From this, it becomes clear that while all states contribute some form of grain and grain product exports, a handful of states control a significant portion of the overall value of grain exports. Again, for comparison of one congressional district relative to the others in the report, **Exhibit 3** shows the relative value of grain and grain product exports from each congressional district in the study.

Exhibit 2: Relative Size of U.S. States Grain and Grain Product Exports Value (\$ Million)



Note: Square size represents exports value in million \$USD
 Source: USDA NASS, USDA ERS, and IHS Markit

Exhibit 3: 2018 Grain and Grain Product Exports by Selected Congressional District (\$ Million)



Note: Square size represents exports value in million \$USD
 Source: USDA NASS, USDA ERS, and IHS Markit

Having identified the value of exports from each state and congressional district in this study, the remainder of this report is dedicated to explaining the methods used to quantify the economic contributions of grain exports and to exploring the results of the analysis.

Methodology

To estimate the economic impact of corn, barley, sorghum, ethanol, DDGS, corn gluten feed and meal, and meat exports on individual states and congressional districts, two key pieces of information were needed: grain and grain product exports, and grain and grain product production for each state and congressional district. Data on grain and grain product exports are readily available from USDA and from other private databases. This study used the information from USDA ERS and FAS to obtain U.S. state exports of barley, corn, sorghum, and meat (beef, pork, and poultry). Formulas provided by the U.S. Grains Council were used to convert meat exports into the corn equivalent of meat units (a measure that estimates the volume of corn used to produce a pound of meat). At the state level, U.S. census data can lead to overestimation of certain states where grain is consolidated at export terminals, such as Louisiana and Washington, and to an underestimation for various grain producing states. USDA ERS state level data results in a more accurate representation of grain exports applied to grain producing states. Additionally, a change was made to the IMPLAN methodology to more realistically reflect induced impacts in this report.

State Exports

Estimating the volume and value of grain and grain product exports by state was arguably the simplest step in this analysis. The USDA ERS maintains a database of U.S. agricultural product exports. For this analysis, information contained in the USDA ERS database was used to build grain, grain product, and meat (beef, pork, and poultry) exports by state. As mentioned, information provided by the U.S. Grains Council were used to convert these meat exports into the corn equivalent of meat. Additionally, Informa maintains its own database on ethanol production with information on individual facility capacity and location. This database was leveraged to develop state and congressional district shares of national exports of ethanol and ethanol by-products such as DDGS and corn gluten feed and meal.

State Production

The USDA's National Agricultural Statistics Service (NASS) maintains data on crop and other agricultural product production by state. Additionally, the Census of Agriculture (conducted every 5 years) provides detailed information of production and other economic variables by county. Both datasets (county level production and state level production) were used for this report. However, 2018 crop (barley, sorghum, and corn) production, as well as livestock and meat production data were acquired from the USDA NASS website and was subsequently used in this analysis.

Production for ethanol and its co-products (DDGS and corn gluten feed and meal), due to data constraints, was estimated using slightly different methods.

Informa maintains a database of ethanol production facilities along with their estimated production capacity and geographic information. This study leverages this database to build "from the ground up" state ethanol, DDGS, and corn gluten feed/meal production by state and congressional district. Informa's data on production by plant was aggregated into county and state production data.

Congressional District Production

For crop production by congressional district, 2018 county-level production (estimated by taking 2016 county share of state production and multiplying by 2018 state production data) data were aggregated into the appropriate congressional districts. Information on specific counties and which congressional district they fall within were available from the U.S. Census Bureau¹.

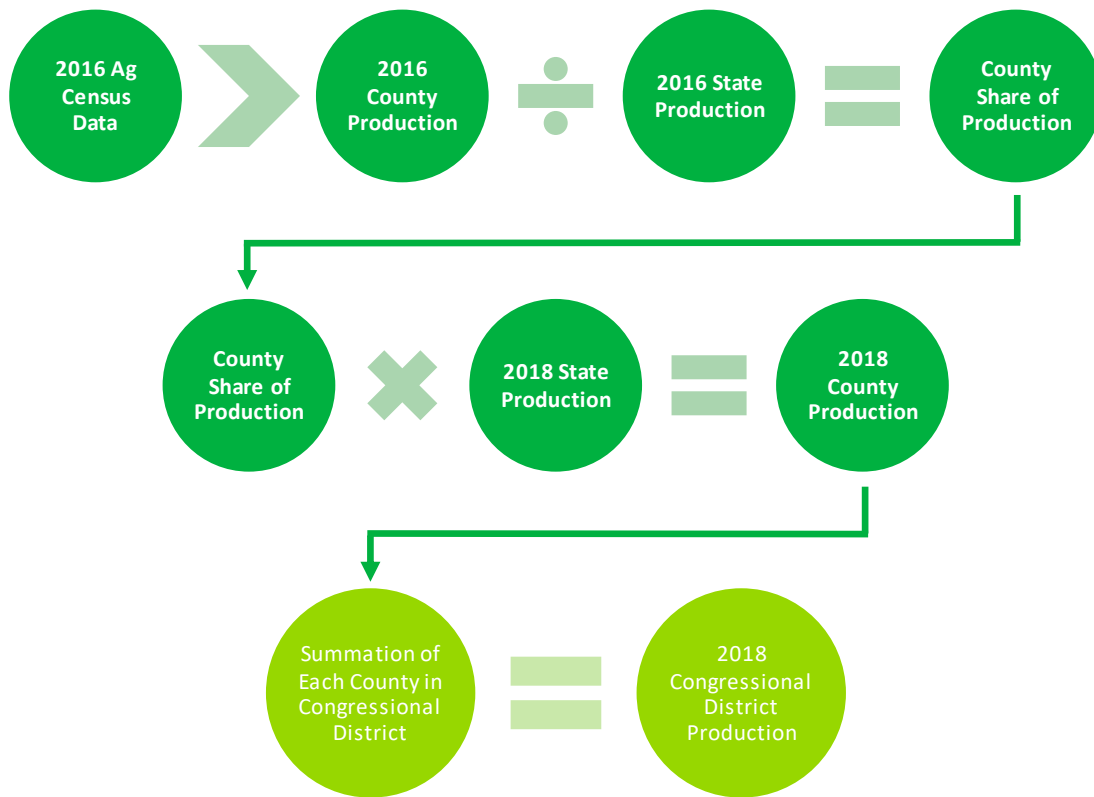
Following the same methods used for estimating state ethanol, DDGS, and corn gluten feed production; county-level production estimates from Informa Agribusiness Consulting were aggregated to the congressional district level.

Meat production by congressional district followed the same approach used for crop production. County-level production estimates were aggregated into the appropriate congressional districts.

When crop production and hog or poultry sales were not available for an individual county in the 2016 Agricultural Census dataset, values were estimated by dividing the difference between the state's total production less the sum of reported counties' production by the number of counties with non-reported or missing values.

Error! Reference source not found. provides a graphic depiction of how various data were used in the construction of state and congressional district production and export estimates.

Exhibit 4: Methodology for Estimating Select State and Congressional District Production and Export Values



Congressional District Exports

To estimate barley, sorghum, and corn exports by congressional district, the county share of production was multiplied by the state-level exports and then aggregated into congressional districts. For ethanol, DDGS, and CGF; county shares of production were multiplied by the reported exports and then aggregated into the appropriate congressional districts. Finally, meat exports at the congressional district were estimated similar to crop exports. First, state meat exports were multiplied by a county's production share and were then subsequently aggregated into the corresponding congressional districts.

Corn Equivalent of Meat Exports

Due to the high volume of corn included in livestock feeding rations, it can be argued that meat production and exports are actually the production and export of corn in a valued-added form. Accordingly, formulas provided by the U.S. Grains Council were used to convert volume and value of U.S. beef, pork, and poultry production into corn equivalent units. In essence, the formulas estimate how many pounds of corn were used to create one pound of U.S. meat exports. Such transformation allows for the analysis of the entire role that corn plays in the U.S. economy.

IMPLAN Economic Models

To estimate the "ripple effects" that U.S grain and grain product exports have on the entire U.S. economy, IMPLAN economic input-output software was used. Information gathered in previous chapters was used to quantify the economic impact of grain and grain product exports on the U.S. economy. Results from the models provide insight into the number of jobs, Gross Domestic Product (GDP) and output (industry sales) created via three different impacts. The different impacts estimated by IMPLAN are direct, indirect, and induced. Each impact is defined as:

- Direct impacts reflect the economic activity that occurs in the industries in which investments are made or changes occur. In the current case, the direct impacts are those that occur at the farm or the ethanol facility. For example, if a congressional district exports \$1 million in corn, the direct impact to that district is \$1 million in added 10 farming/ethanol manufacturing jobs.
- Indirect impacts are the additional economic impacts that occur to industries upstream (or through "backward linkages") to the industry that was directly impacted as it purchases inputs and services in order to produce its own product. For example, increased corn production due to higher export sales supports indirect (and positive) impacts on the farm equipment and fertilizer sales industries.
- Induced impacts are those impacts created by changes in the spending of labor income and profits generated by the direct and indirect impacts. In the case of corn exports, wages for the jobs directly supported by corn exports are spent on housing, medical treatments, groceries, etc. The spending in these industries creates induced (and positive) impacts for the housing, medical, and grocery store industries, along with other such industries.

For each state and congressional district included in the study, an IMPLAN model was created for each product in the study. Accordingly, it is possible to assess the relative importance of each commodity to an individual state and to assess each state or congressional district's importance in the export of a single commodity. Individual commodity, congressional district, and state results are

shown in individual reports that are separate from this document while the national results are presented here.

Results

United States Economic Contributions

Results from IMPLAN models examining the contributions of grain and grain product exports confirm the importance of international markets to the U.S. national economy. In 2018, the U.S. exported \$22.7 billion of grain and grain products to international destinations. The direct economic contributions of these exports were roughly 70,000 jobs and \$6.1 billion in GDP that was created because of grain and grain product exports (**Exhibit 5**). From this analysis of the direct impacts, it becomes clear that grain and grain products exports are large contributors to the U.S. economy, even before the economic “ripple effects²” are accounted for. If U.S. grain and grain product exports were suddenly halted, the figures in **Error! Reference source not found.** indicate that roughly 70,000 jobs and \$6.1 billion in GDP would be adversely impacted at the farm, ethanol production, and meat production levels before accounting for losses in linked industries.

Exhibit 5: Direct Economic Contributions of U.S. Grain and Grain Product Exports

Commodity	Jobs	Labor Income (\$ Million)	GDP (\$ Million)	Output (\$ Million)
Malting Barley	49	\$2	\$4	\$13
Other Barley	71	\$3	\$6	\$18
Malting (Barley Equiv)	492	\$20	\$38	\$128
Corn	49,679	\$1,992	\$3,875	\$12,908
Sorghum	3,101	\$124	\$242	\$806
Ethanol	1,218	\$160	\$408	\$2,544
Residual Milling Byproducts	1,249	\$164	\$418	\$2,610
Meat*	14,308	\$574	\$1,116	\$3,718
Total	70,166	\$3,039	\$6,107	\$22,744

Source: USDA NASS, USDA ERS, IMPLAN, and IHS Markit

Note*: Meat is in Corn Equivalent Value

The total economic contributions (direct, indirect, and induced contributions) created by the export of grain and grain products show the true importance of grain exports to the U.S. economy. By including the impacts to industries that are linked (either by indirect or induced spending) to grain exports the 2018 U.S. grain export value of \$22.7 billion is magnified to a figure of nearly \$64.5 billion in economic output (**Exhibit 6**). That is, the economic “ripple effects” of U.S. grain exports is 2.8 times as large as the value of grain exports. Another way to think of these effects is that for every \$1 of grain and grain product exports, another \$1.80 in economic output (industry sales) is indirectly supported across the United States.

Of course, the economic contributions of grain exports are not limited solely to economic output. As shown in **Exhibit 7**, the total impact of grain and grain product exports indirectly supported roughly 295,000 jobs across the U.S. and \$27.5 billion in GDP in 2018. For every job directly created by the export of grain and grain products, an additional 3.2 jobs were indirectly supported in the U.S.

Exhibit 6: Total Economic Contribution of U.S. Grain and Grain Products Exports

Commodity	Jobs	Labor Income (\$ Million)	GDP (\$ Million)	Output (\$ Million)
Malting Barley	180	\$9	\$16	\$36
Other Barley	262	\$13	\$23	\$53
Malting (Barley Equiv)	1,818	\$93	\$161	\$364
Corn	183,702	\$9,366	\$16,313	\$36,787
Sorghum	11,466	\$585	\$1,018	\$2,296
Ethanol	22,428	\$1,313	\$2,468	\$7,107
Residual Milling Byproducts	23,012	\$1,348	\$2,532	\$7,292
Meat*	52,909	\$2,698	\$4,698	\$10,595
Total	295,238	\$15,425	\$27,250	\$64,544

Source: USDA NASS, USDA ERS, IMPLAN, and IHS Markit
 Note*: Meat is in Corn Equivalent Value

The largest contributions by a single grain or grain product are those made by the export of corn. Corn exports, which totalled nearly \$13 billion in 2018, directly supported nearly 50,000 farm jobs across the United States and generated \$1.9 billion in salaries and wages for those same farmers and their employees. Corn exports also generated \$3.9 billion in direct GDP for the United States economy. By the time the indirect and induced effects of corn exports are included; corn exports supported over 183,000 jobs in the United States and added \$16.3 billion in GDP through increased economic output of \$36.8 billion (**Exhibit 6**).

As measured by GDP, the corn equivalent of meat exports is the second most significant contributor to the U.S. economy. The export of U.S. meats indirectly supported nearly 53,000 jobs in the United States, \$4.7 billion in GDP, and economic output of \$10.6 billion in 2018.

On a national level, none of the crops or products included in this study supports less than 2,200 jobs. Moreover, the export of each commodity supported at least \$200 million in GDP, indicating that each commodity in and of its own is a significant contributor to the U.S. economy.

The impact of grain and grain product exports does not benefit all industries to the same degree. **Exhibit 7** shows the top ten (ranked by employment gains) IMPLAN industries that benefit from the export of grains and grain products. As expected, a number of agriculturally-related industries rank near the top of the list for jobs supported by grain and grain product exports.

Exhibit 7: Top Ten Industries, Ranked by Employment Gains, Benefiting from Export of Grains and Grain Products

Industry	Jobs	Labor Income (\$ Million)	GDP (\$ Million)	Output (\$ Million)
Grain farming	67,699	\$937	\$5,281	\$17,590
Support activities for agriculture and forestry	45,708	\$1,535	\$1,751	\$2,103
Other real estate	19,378	\$293	\$1,681	\$3,961
Wholesale - Other nondurable goods merchant wholesalers	5,480	\$420	\$1,003	\$1,770
Full-service restaurants	4,388	\$116	\$183	\$309
Services to buildings	4,324	\$79	\$134	\$215
Limited-service restaurants	3,226	\$68	\$120	\$254
Hospitals	2,993	\$248	\$303	\$555
Employment services	2,831	\$130	\$211	\$316
Truck transportation	2,649	\$130	\$210	\$452

Source: USDA NASS, GATS, IMPLAN, and IHS Markit

As shown in **Exhibit 8**, many industries outside of agriculture benefit from the export of grain and grain products. The total GDP generated by industries linked (indirectly or through induced spending) benefits the wholesale trade, real estate, and other such industries. Across the U.S., the wholesale trade industry saw an additional \$1 billion in GDP supported because of grain and grain products exports in 2018. Similarly, \$1.7 billion in GDP was supported in the real estate sector due to activities related to the production and export of grain and grain products. Such findings highlight the importance of grain exports and access to export markets for industries beyond agriculture.

Exhibit 8: Top Ten Industries, Ranked by GDP Gains, Benefiting from Export of Grains and Grain Products

Industry	Jobs	Labor Income (\$ Million)	GDP (\$ Million)	Output (\$ Million)
Grain farming	67,699	\$937	\$5,281	\$17,590
Support activities for agriculture and forestry	45,708	\$1,535	\$1,751	\$2,103
Other real estate	19,378	\$293	\$1,681	\$3,961
Wholesale - Other nondurable goods merchant wholesalers	5,480	\$420	\$1,003	\$1,770
Owner-occupied dwellings	-	\$0	\$791	\$1,000
Monetary authorities and depository credit intermediation	1,641	\$156	\$430	\$675
Pesticide and other agricultural chemical manufacturing	814	\$95	\$370	\$1,400
Management of companies and enterprises	2,178	\$283	\$322	\$462
Hospitals	2,993	\$248	\$303	\$555
Insurance carriers, except direct life	807	\$92	\$270	\$584

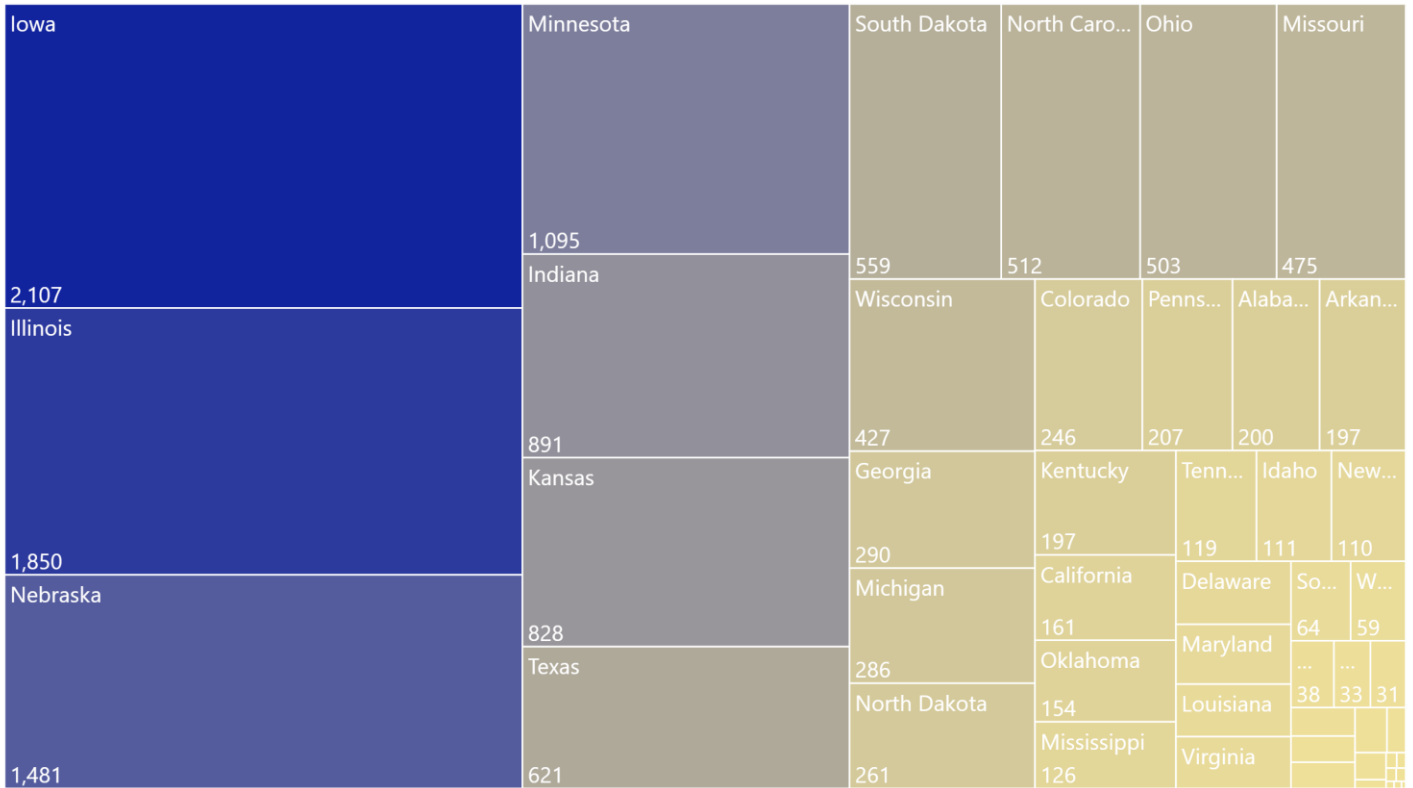
Source: USDA NASS, GATS, IMPLAN, and IHS Markit

State Economic Contributions

Exhibit 9 compares the total (direct, indirect, and induced) GDP that was supported across the United States in 2018 from the export of grains and grain products.

Specific and more detailed information on the economic contributions from exports of grain and grain products can be found in the individual state handouts associated with this report and in the state economic contribution ranking tables in this report.

Exhibit 9: Total GDP Created by State from Grain and Grain Product Exports (\$ Million)



Note: Square size represents GDP value in million \$USD
 Source: USDA NASS, USDA ERS, and IHS Markit

State and Congressional District Rankings

Exhibit 11: Grain and Grain Product Exports by State, 2018

Rank	State	Exports (\$ Million)
1	Iowa	3,938.6
2	Illinois	2,630.6
3	Nebraska	2,301.4
4	Minnesota	1,740.4
5	Indiana	1,331.3
6	Kansas	1,313.3
7	South Dakota	991.8
8	Ohio	789.5
9	Texas	728.8
10	Missouri	664.6
11	Wisconsin	558.4
12	North Dakota	512.1
13	North Carolina	496.5
14	Michigan	424.0
15	Georgia	276.5
16	Arkansas	275.8
17	Colorado	275.1
18	Kentucky	256.0
19	Pennsylvania	220.6
20	Tennessee	209.1
21	Mississippi	196.6
22	Oklahoma	194.9
23	California	176.2
24	Alabama	173.3
25	New York	137.1
26	Idaho	125.9
27	Virginia	112.2
28	Louisiana	104.7
29	Maryland	95.8
30	South Carolina	92.5
31	Delaware	63.0
32	Washington	61.3
33	Montana	56.3
34	Arizona	36.9
35	Florida	29.4
36	Utah	28.3
37	Wyoming	27.8
38	Oregon	24.2
39	New Mexico	21.6
40	West Virginia	16.7
41	New Jersey	12.0
42	Maine	4.3
43	Nevada	3.4
44	New Hampshire	2.2
45	Connecticut	2.0
46	Vermont	1.6
47	Hawaii	1.0
48	Massachusetts	0.9
49	Rhode Island	0.5
50	Alaska	0.3

Exhibit 12: Total Economic Output Created by Grain and Grain Product Exports by State

Rank	State	Total Output (\$Million)
1	Iowa	6,952.0
2	Illinois	4,948.7
3	Nebraska	4,109.5
4	Minnesota	3,175.2
5	Indiana	2,482.5
6	Kansas	2,372.0
7	South Dakota	1,685.6
8	Texas	1,490.1
9	Ohio	1,442.7
10	Missouri	1,258.0
11	North Carolina	1,017.5
12	Wisconsin	1,008.7
13	North Dakota	863.6
14	Michigan	802.1
15	Colorado	573.2
16	Arkansas	507.0
17	Kentucky	442.7
18	Georgia	434.3
19	Pennsylvania	376.4
20	Oklahoma	359.4
21	Tennessee	344.5
22	Mississippi	344.0
23	California	285.9
24	Alabama	281.8
25	Idaho	228.0
26	New York	216.3
27	Louisiana	192.3
28	Virginia	176.4
29	Maryland	165.4
30	South Carolina	158.3
31	Washington	144.4
32	Delaware	124.0
33	Montana	100.7
34	Arizona	66.5
35	Florida	55.6
36	Utah	52.2
37	Oregon	46.0
38	Wyoming	42.1
39	New Mexico	36.3
40	New Jersey	22.7
41	West Virginia	21.2
42	Maine	6.8
43	Nevada	5.9
44	Connecticut	3.5
45	New Hampshire	3.4
46	Vermont	2.4
47	Hawaii	2.1
48	Massachusetts	1.6
49	Rhode Island	0.9
50	Alaska	0.5

Exhibit 13: Total GDP Created by Grain and Grain Product Exports by State

Rank	State	Total GDP (\$ Million)
1	Iowa	2,107.5
2	Illinois	1,849.5
3	Nebraska	1,480.8
4	Minnesota	1,094.9
5	Indiana	890.9
6	Kansas	827.6
7	Texas	620.8
8	South Dakota	558.7
9	North Carolina	511.7
10	Ohio	502.6
11	Missouri	474.9
12	Wisconsin	427.2
13	Georgia	290.3
14	Michigan	285.7
15	North Dakota	261.3
16	Colorado	246.4
17	Pennsylvania	206.8
18	Alabama	199.9
19	Arkansas	197.3
20	Kentucky	197.0
21	California	160.9
22	Oklahoma	154.0
23	Mississippi	125.7
24	Tennessee	119.4
25	Idaho	111.1
26	New York	110.0
27	Delaware	97.1
28	Maryland	92.1
29	Louisiana	80.8
30	Virginia	79.8
31	South Carolina	63.5
32	Washington	58.5
33	Montana	38.4
34	Arizona	32.7
35	Florida	31.4
36	Utah	24.5
37	New Mexico	22.5
38	Oregon	22.5
39	Wyoming	19.3
40	West Virginia	11.3
41	New Jersey	11.2
42	Maine	3.7
43	Nevada	2.2
44	New Hampshire	1.8
45	Vermont	1.8
46	Connecticut	1.7
47	Hawaii	0.8
48	Massachusetts	0.7
49	Rhode Island	0.4
50	Alaska	0.1

Exhibit 14: Total Jobs Created by Grain and Grain Products Export by State

Rank	State	Total Jobs
1	Iowa	21,643.9
2	Illinois	19,883.9
3	Nebraska	13,860.1
4	Minnesota	12,745.7
5	Indiana	12,037.3
6	Kansas	9,508.0
7	Texas	9,071.2
8	Ohio	8,620.6
9	Missouri	7,809.0
10	South Dakota	5,536.3
11	Wisconsin	5,363.1
12	North Carolina	5,179.0
13	Michigan	4,555.8
14	Kentucky	3,609.8
15	Arkansas	3,400.1
16	North Dakota	3,114.6
17	Colorado	2,863.9
18	Pennsylvania	2,608.0
19	Tennessee	2,511.3
20	Oklahoma	2,223.1
21	Mississippi	2,163.3
22	Georgia	1,928.1
23	Alabama	1,679.7
24	Virginia	1,276.8
25	Maryland	1,109.7
26	New York	1,030.7
27	Louisiana	992.8
28	Idaho	985.7
29	South Carolina	974.5
30	California	817.7
31	Washington	743.8
32	Delaware	627.2
33	Montana	573.2
34	Utah	300.8
35	West Virginia	299.1
36	Florida	295.5
37	Wyoming	267.8
38	Arizona	266.9
39	Oregon	241.5
40	New Mexico	226.7
41	New Jersey	157.4
42	Maine	54.1
43	New Hampshire	35.8
44	Nevada	27.5
45	Connecticut	26.8
46	Hawaii	18.5
47	Vermont	16.9
48	Massachusetts	14.6
49	Rhode Island	9.8
50	Alaska	2.7

Exhibit 15: Grain and Grain Product Exports by Congressional District, 2018

Rank	State	Exports (\$ Million)
1	IA-04	2,097.6
2	NE-03	1,639.1
3	KS-01	1,003.0
4	MN-01	793.1
5	MN-07	779.5
6	IA-01	739.3
7	NE-01	582.1
8	IL-16	511.6
9	IL-17	504.6
10	IA-02	492.9
11	IL-15	479.8
12	IL-18	440.8
13	IA-03	376.7
14	IL-13	337.0
15	IN-04	330.3
16	MO-06	328.1
17	CO-04	246.3
18	TX-13	221.8
19	IN-08	220.3
20	OH-04	212.8
21	IN-03	193.0
22	IN-06	185.1
23	IN-02	182.7
24	KY-01	180.3
25	NC-07	171.9
26	KS-02	156.8
27	OH-05	155.3
28	MO-04	129.3
29	WI-03	122.0
30	KS-04	121.9
31	TX-19	115.9
32	OH-08	109.3
33	IL-12	109.0
34	WI-06	106.9
35	IN-05	96.8
36	WI-07	94.7
37	LA-05	80.4
38	MI-07	76.0
39	MN-02	72.1
40	MO-08	71.9
41	IN-09	62.5
42	OH-10	60.5
43	MI-06	55.6
44	MO-05	54.6
45	MI-04	48.5
46	WI-01	35.5
47	OH-02	23.2
48	CA-16	22.4
49	TX-11	11.4
50	NE-02	8.5
51	MD-05	2.5
52	WA-08	0.9

Exhibit 16: Total Economic Output Created by Grain and Grain Product Exports by Congressional District

Rank	State	Total Output (\$ Million)
1	IA-04	3,334.7
2	NE-03	2,490.1
3	KS-01	1,529.3
4	MN-01	1,147.2
5	IA-01	1,122.1
6	MN-07	1,094.7
7	NE-01	917.3
8	IN-04	750.4
9	IA-02	731.4
10	IL-16	685.7
11	IL-17	663.7
12	IL-15	644.9
13	IA-03	631.8
14	IL-18	585.0
15	MO-06	477.3
16	IL-13	426.5
17	TX-13	357.6
18	IN-08	345.2
19	CO-04	332.3
20	IN-03	298.3
21	NC-07	276.1
22	OH-04	273.5
23	IN-02	270.0
24	KY-01	252.9
25	IN-06	251.0
26	KS-02	231.8
27	OH-05	212.1
28	KS-04	199.5
29	TX-19	188.7
30	MO-04	181.4
31	WI-03	168.4
32	IL-12	157.3
33	IN-05	146.2
34	OH-08	146.0
35	WI-07	141.9
36	WI-06	140.4
37	LA-05	119.1
38	MN-02	108.3
39	MO-08	106.3
40	MI-07	97.6
41	IN-09	88.0
42	MO-05	87.9
43	MI-06	81.2
44	OH-10	77.5
45	MI-04	63.6
46	WI-01	45.3
47	OH-02	28.4
48	CA-16	26.3
49	TX-11	16.7
50	NE-02	16.5
51	MD-05	2.9
52	WA-08	1.1

Exhibit 17: Total GDP Created from Grain Exports by Congressional District

Rank	State	Total GDP (\$Million)
1	IA-04	905.5
2	NE-03	813.9
3	KS-01	486.4
4	IA-01	325.2
5	MN-01	324.6
6	MN-07	317.0
7	NE-01	311.1
8	IN-04	236.1
9	IA-02	211.6
10	IL-15	203.6
11	IL-16	196.7
12	IA-03	196.4
13	IL-17	186.6
14	IL-18	181.8
15	MO-06	155.9
16	NC-07	132.8
17	TX-13	131.6
18	IL-13	127.8
19	CO-04	122.4
20	IN-08	109.8
21	KY-01	105.2
22	IN-03	91.1
23	IN-02	81.6
24	IN-06	74.6
25	WI-03	73.8
26	KS-02	72.0
27	OH-04	68.5
28	KS-04	65.6
29	TX-19	63.4
30	OH-05	63.0
31	MO-04	59.6
32	WI-07	55.9
33	WI-06	50.7
34	IN-05	48.4
35	LA-05	47.8
36	IL-12	44.7
37	OH-08	40.0
38	MO-08	37.6
39	MN-02	36.0
40	MO-05	33.5
41	MI-07	28.7
42	MI-06	28.0
43	IN-09	27.5
44	MI-04	20.9
45	OH-10	20.3
46	WI-01	17.2
47	CA-16	11.8
48	OH-02	8.6
49	NE-02	7.0
50	TX-11	6.7
51	MD-05	1.5
52	WA-08	0.3

Exhibit 18: Total Jobs Created from Grain Exports by Congressional District

Rank	State	Total Jobs
1	IA-04	8,970.6
2	NE-03	7,516.5
3	KS-01	5,698.5
4	MN-07	4,337.4
5	IA-01	3,586.0
6	MN-01	3,507.0
7	NE-01	3,262.4
8	IN-04	3,120.9
9	IL-15	3,082.6
10	MO-06	2,942.9
11	IA-02	2,543.4
12	IL-16	2,433.6
13	IL-18	2,272.1
14	IA-03	2,209.9
15	IL-17	2,080.9
16	IN-08	2,024.3
17	KY-01	1,849.9
18	IL-13	1,647.5
19	IN-03	1,544.6
20	IN-06	1,366.9
21	TX-13	1,361.4
22	CO-04	1,358.6
23	OH-05	1,271.0
24	OH-04	1,228.8
25	IN-02	1,202.8
26	MO-04	1,186.8
27	NC-07	1,165.9
28	WI-03	1,037.5
29	KS-02	1,024.2
30	KS-04	802.5
31	OH-08	789.7
32	WI-07	765.1
33	IL-12	764.7
34	TX-19	733.1
35	LA-05	669.1
36	IN-09	659.4
37	MI-07	636.3
38	MO-08	617.1
39	WI-06	596.3
40	MO-05	569.6
41	MN-02	545.6
42	IN-05	536.1
43	MI-04	465.5
44	MI-06	418.4
45	OH-02	307.3
46	OH-10	277.6
47	WI-01	216.8
48	TX-11	144.2
49	NE-02	94.0
50	CA-16	44.5
51	MD-05	39.3
52	WA-08	7.4

Conclusions

This work examines and quantifies the economic contributions and benefits that are provided to each U.S. state and selected congressional districts through the export of barley, sorghum, corn, ethanol, DDGS, corn gluten feed and meal, and the corn equivalent of meats. By analyzing the impacts to individual states and congressional districts, it is possible for policy makers, businesses, and residents of a specific state or congressional district to know how much their economy benefits from and depends upon grain exports.

By using export sales, state and country crop production data, and IMPLAN economic input-output models, the number of jobs, GDP, and economic output (business sales) that are supported by grain exports was estimated. Economic input-output models were created for each commodity and each state/congressional district in the study. Additionally, a national model was created for the U.S. economy to determine the holistic impact grain exports have on the U.S. economy.

The results from this study indicate a total of \$64.5 billion in economic output was indirectly supported by the \$22.7 billion in grain exports that occurred during 2018. The GDP supported by these exports reached \$27 billion and nearly 295,000 jobs are supported by grain exports.

For every 1 job directly supported by grain exports, an additional 3.2 jobs are indirectly supported elsewhere the U.S. economy. For every \$1 of grain exports, the economic “ripple effects” support \$1.84 to the economy.

The positive impacts of grain exports extend well beyond the agricultural industry. Some of the industries receiving the greatest economic benefit and contribution from grain exports are the wholesale trade, real estate, oil and natural gas extraction, and pesticide and chemical manufacturing industries. Also, receiving significant economic contributions from grain exports are the full- and limited-service restaurants, hospitals, and employment services industries.

Agriculture plays a vital role in the U.S. economy in every state and congressional district. Exports of grains and grain products provide economic benefits to these regions as well. The results of this report help quantify the true economic contributions of exports and export markets to U.S. state and congressional district economies. Realization of the importance of export markets to state and regional economies is the first step to fair and consistent access to international export markets for U.S. grain products. In turn, the economic impacts of grain exports will extend beyond the farmlands and benefit nearly all sectors of state and regional economies.