The Contribution of Agricultural Exports to Arizona's Economy

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Claudia Montanía, Dari Duval, George Frisvold

Department of Agricultural & Resource Economics

University of Arizona Cooperative Extension

COLLEGE OF AGRICULTURE & LIFE SCIENCES
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Executive Summary

What is the issue?

This study quantifies the contribution of agricultural and food exports to Arizona's economy in 2022. This includes bulk crop and livestock commodities, agricultural inputs (e.g. agricultural chemicals, farm machinery), and finished food and fiber manufacturing products. The study estimates the direct contribution of exports in these industries to the state economy. In addition, it estimates economic activity supported through multiplier effects in industries outside of agriculture and agribusiness. Indirect multiplier effects capture economic activity in non-agricultural industries that provide goods and services as inputs to Arizona agribusinesses. Induced multiplier effects capture economic activity in industries that provide consumer goods and services to households. Direct, indirect, and induced effects combined measure the total economic contribution to the state economy.

This study compares and evaluates different sources of data on Arizona's agricultural exports, discussing differences in how exports are measured and identifying some limitations of data collection approaches. Our analysis provides a snapshot of the role of Arizona's agricultural exports at a specific point in time, 2022 (the most recent year with complete data available). Since March 2025, Arizona agriculture is facing the prospect of future new taxes on imported inputs (tariffs), along with retaliatory tariffs – new taxes on goods exported from Arizona to other countries. At the time of writing, the level and extent of these new taxes confronting Arizona businesses remains uncertain.

The economic modeling approach used in this study is **not** designed to estimate the myriad impacts of tariffs on Arizona's agricultural economy. However, it does identify agricultural sectors that depend more heavily on export revenues and those most sensitive to increases in input costs. This provides a baseline of data to inform future trade policy analysis.

What did the study find?

Including multiplier effects, Arizona exports of agricultural commodities and food and fiber products contributed $1.85 billion in output (sales) to the state economy in 2022.

The direct contribution of agricultural exports includes $571.4 million in sales by primary agriculture, $111.6 million by agricultural input suppliers, and $509.8 million by food and fiber processing industries. In addition, these exports directly and indirectly supported:

- 7,475 jobs and $373.2 million in labor income (business owner income plus employee compensation);
- $679 million in state GDP (value added); and
- $167 million in tax revenues.

Combined, China, Canada, and Mexico accounted for 62% of Arizona's agricultural exports. While Mexico is not a major export destination for Arizona agriculture, agricultural imports from Mexico contribute significantly to Arizona's economy. Prior research has found that in 2020, fresh produce shipments from Mexico through Nogales (including multiplier effects) contributed:

- $944 million in output (sales);

- $522 million in value added (GDP; and
- $362 million in labor income to Arizona's economy, while supporting 4,927 total jobs in the state.

Agricultural industries in the state vary widely in their dependence on exports for sales revenues.

- Exports account for 88% of Arizona cotton sales, 39% of fruit sales, 24% of other crops and hay sales, and 9% of vegetable and melon sales.
- Overall, exports account for 8% of Arizona agricultural sales, including primary agriculture (on-farm crop and livestock production), agricultural input suppliers, and food and fiber manufacturers.
- 48% of Arizona's agricultural exports come from primary agriculture, 43% from food and fiber manufacturing, and 9% from input suppliers.
- Because Arizona cotton production is the most export-dependent, this sector would be relatively more vulnerable to retaliatory tariffs or foreign import restrictions.

While it is beyond the scope of this analysis to measure how proposed tariffs might affect agricultural business owner income, we can measure how increases in non-labor input costs from tariffs (holding prices and other factors constant) would reduce business owner income.

- A 5% increase in non-labor input costs would lower business owner income by 16% for primary agriculture, 63% for farm input suppliers, and 69% for food and fiber manufacturers.
- An 8% increase would erase all business owner income for agricultural input suppliers and food and fiber manufacturers and reduce farm income by 25%.
- These negative income effects would be reduced if farmers and food and fiber manufacturers pass higher costs on to consumers through price increases, and if farm input suppliers raise the prices they charge farmers. While raising prices for Arizona food and agricultural commodities would reduce the negative business income effects of input cost increases, this would also contribute to food price inflation.

Arizona Food and Agricultural Export Sales

Foreign exports contribute to demand for Arizona-grown agricultural products. The main products exported by Arizona agriculture and agribusiness include crops such as grains (mainly Durum wheat), vegetables and melons (mainly lettuce, cauliflower, spinach, and celery), tree nuts (pistachios and pecans), fruit (dates), cotton, and alfalfa. Livestock exports, which are minor, are primarily comprised of beef cattle. Agricultural inputs like pesticides, fertilizers, and farm machinery are also exported, as well as processed food including dairy products, meat, and all other food products.

Table 1 presents the estimated value of exports for the three categories primary agriculture (on-farm production), food and fiber manufacturing, and agricultural input suppliers. The value of agricultural exports totaled nearly $1.2 billion in 2022. Appendix B of this report shows the details of how these estimates were calculated. Across these three categories, exports account for 8% of total sales. Yet, there are large differences in relative reliance on foreign markets. Exports account for 16% of total primary agriculture sales, but only 5% of food and fiber manufacturing sales. Cotton is the leading crop in agricultural exports, accounting for 14% of total agricultural exports, with 88% of Arizona's cotton (by value) destined to foreign markets. Because Arizona cotton production is the most export-dependent, this sector would be relatively more vulnerable to retaliatory tariffs or foreign import restrictions. Exports make up 39% of Arizona's total fruit sales, while exports account for 24% of sales of other crops and hay. Nearly half (48%) of Arizona's agricultural exports come from primary agriculture, with 43% of agricultural exports are from food and fiber manufacturing and 9% from input suppliers.

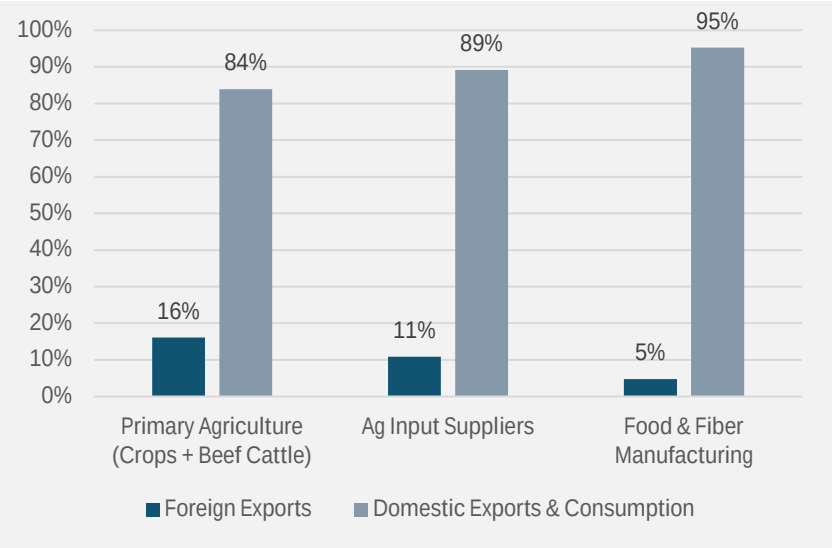
Table 1. Estimated Foreign Exports (Value), in 2022 USD

	Estimated Exports	Share of Total Agricultural Export Sales	Total Sales[3]	Exports as a Share of Total Sales
Primary Agriculture	**$571,370,000**	**48%**	**$3,572,670,000**	**16%**
Grains	$45,213,000	4%	$283,329,000	16%
Vegetables & melons	$132,263,000	11%	$1,432,139,000	9%
Fruit	$35,442,000	3%	$90,933,000	39%
Tree nuts	$19,750,000	2%	$142,228,000	14%
Cotton	$165,905,000	14%	$189,146,000	88%
All other crops & hay	$167,232,000	14%	$707,652,000	24%
Beef cattle	$5,565,000	0.5%	$727,243,000	1%
Food & Fiber Manufacturing [1]	**$509,834,000**	**43%**	**$10,926,429,000**	**5%**
Agricultural Input Suppliers[2]	**$111,562,000**	**9%**	**$1,026,434,000**	**11%**
Total Export Sales	**$1,192,766,000**	**100%**	**$15,525,533,000**	**8%**

Notes: [1] The complete list of industries included in this category can be found in Appendix A of this report.
[2] Include fertilizers, pesticides, and farm machinery
[3] Estimated sales data were taken from Arizona's Agribusiness System in the State Economy: An Economic Contribution Analysis for 2022, except cotton sales, which were taken from Arizona Agricultural Statistics 2023-2024.
Source: Own estimation with data from US Census Bureau, USA Trade Online; USDA ERS, IMPLAN LLC, 2025

In 2022, 16% of the sales generated by primary agricultural production in Arizona were derived from foreign exports. Agricultural input exports accounted for 11% of sales, while food and fiber manufacturing generated 5% of its sales from foreign markets (Figure 1). The category Domestic Exports and Consumption in Figure 1 includes sales made within Arizona (Consumption) and shipments made to other U.S. states outside of Arizona (Domestic Exports). Available trade data do not allow us to trace final sales of Arizona products once they are shipped to other U.S. states. Our Foreign Exports sales figures capture shipments made directly to foreign destinations. It is likely that some Arizona agricultural shipments to other states are eventually exported to other countries. To the extent this is happening, our estimates are undercounting the true sales volume of agricultural exports from Arizona. Therefore, results from Table 1 and Figure 1 are a conservative estimate of the value of Arizona agricultural exports.

Figure 1. Foreign Exports and Domestic Exports & Consumption, Share of Total Sales, in 2022 USD



Note: The total sales values were retrieved from Arizona's Agribusiness System in the State Economy: An Economic Contribution Analysis for 2022.

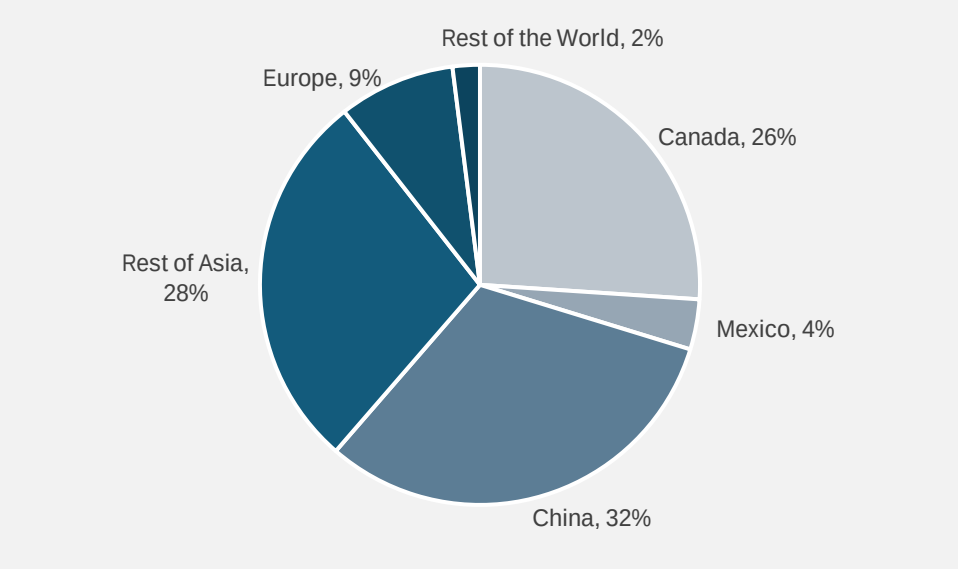
Destinations for Arizona's Agricultural Exports

China and Canada are major destinations for Arizona's agricultural exports, accounting for 32% and 26% of export sales, respectively (Figure 2). Combined, China, Canada, and Mexico account for 62% of Arizona's agricultural exports. The entire Rest of Asia accounts for 28% of export sales, followed by Europe (9%), Mexico (4%), and the Rest of the World (2%). Certain commodities have particularly specialized destinations. For instance, 100% of vegetables and melon (primarily lettuce) exports are destined for Canada and Mexico. Alfalfa is predominantly exported to China and Saudi Arabia, with 97% of total exports going to these two countries.

While Mexico is not a major export destination for Arizona agriculture, agricultural imports from Mexico contribute significantly to Arizona's economy. Economic activity related to shipment of fresh produce imports through the port of Nogales is a major employer in Santa Cruz County, Arizona, supporting 3,788 jobs in that county alone. Fresh produce shipments through Nogales (including multiplier effects)

contributed $944 million in output (sales), $522 million value added (GDP), and $362 million in labor income to Arizona's economy in 2020, while also supporting 4,927 total jobs in the state (Duval et al., 2022).

Figure 2. Destination of Arizona's Primary Agriculture Exports, in 2022 USD



Source: US Census Bureau, USA Trade Online, 2025

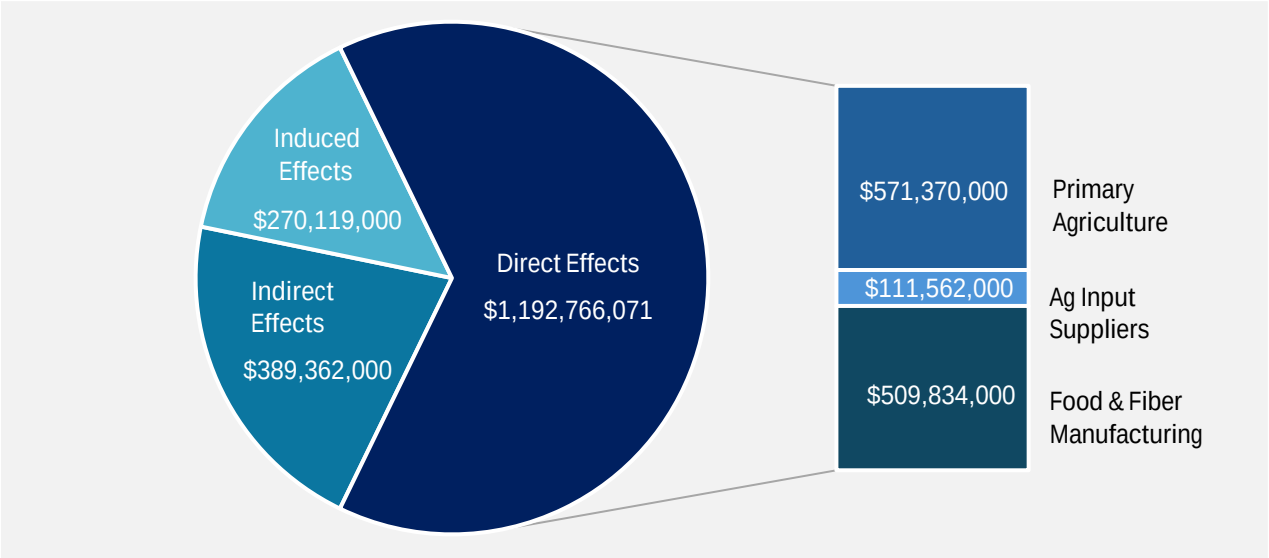
Economic Contribution of Arizona Agricultural Exports

The contribution of agricultural exports to Arizona's economy goes beyond immediate export sales. Exports generate subsequent rounds of economic activity in other industries. These effects are known as *indirect* and *induced multiplier effects*.

Indirect effects measure economic activity generated by the demand for inputs of goods and services to support food and fiber and agricultural exports. These effects represent business-to-business transactions that occur in other Arizona industries that provide goods and services as inputs to the production and sale of exported goods. *Induced effects* measure the economic activity generated when households employed by agricultural exporting firms spend their earnings on local goods and services. We use the IMPLAN input-output model (IMPLAN Group, LLC, 2022) to estimate the economic contribution of agricultural exports from Arizona, focusing on primary agriculture, agricultural input suppliers, and food and fiber processing. Appendix B offers more details about the estimation strategy.

Including direct, indirect, and induced effects, the total contribution of Arizona's agribusiness foreign exports to the state economy in 2022 was more than $1.85 billion in sales (Figure 3). Arizona's agribusiness exports directly contributed nearly $1.2 billion in sales and an additional $659 million was generated in the Arizona economy through indirect and induced multiplier effects. Of the nearly $1.2 billion in sales directly contributed to the state economy by the agribusiness exports, approximately $571 million was supported by primary agriculture – crops and beef cattle, $509 million by agricultural processing industries, and the remaining $111 million by agricultural input suppliers. An additional $659 million in sales was generated in the Arizona economy through indirect and induced effects.

Figure 3. Economic Contribution of Arizona Agribusiness Foreign Exports to State Sales, 2022 (Sales, in 2022 USD)



Direct production destined for export generated 4,422 jobs in 2022. But, via multiplier effects, Arizona's agribusiness exports directly and indirectly supported 7,475 jobs and $373.2 million in labor income (Table 2). These exports contributed $315.7 million to the state GDP (value added). Including multiplier effects, the value added generated by agribusiness exports was near $679 million in 2022. Exports also generated $167 million in tax revenues.

Table 2: Economic Contribution of Arizona Agribusiness Foreign Exports to State Economy, 2022 (Sales, in 2022 USD)

	Employment	Labor Income	Value Added	Output (Sales)	Taxes[1]
Direct Effects	4,422	$181,455,000	$315,788,000	1,192,766,000	$82,003,000
Primary Agriculture	3,432	$118,146,000	$213,190,000	$571,370,000	$60,977,000
Ag Input Suppliers	80	$5,909,000	$13,826,000	$111,562,000	$2,779,000
Food & Fiber Manufacturing	910	$57,400,000	$88,772,000	$509,834,000	$18,247,000
Indirect Effects	1,616	$108,200,000	$203,168,000	$389,362,000	$47,925,000
Induced Effects	1,437	$83,580,000	$159,739,000	$270,119,000	$37,075,000
Total Effects	**7,475**	**$373,235,000**	**$678,695,000**	**$1,852,247,000**	**$167,003,000**

Notes: [1]Includes Sub County General, Sub County Special Districts, County, State, and Federal taxes.

Agricultural Industry Sensitivity to Cost Increases

Figure 4 breaks down total output into non-labor input costs, employee compensation, taxes and business owner income. For business owners, the income generated by primary agriculture (farm income) is 20% of gross sales. This share is lower for agricultural input suppliers (7%) and food and fiber manufacturers (6%). It is beyond the scope of this current analysis to measure how proposed tariffs might affect business owner income in these three sectors. However, we can measure how increases in non-labor input costs (holding all the other variables constant) would reduce business owner income. First, Figure 4 illustrates that non-labor input costs are a much higher share of total sales for input suppliers (88%) and food and fiber manufacturers

(83%) than for farms (63%). This means that a given percent-increase in input costs will reduce the business owner income of input suppliers and food and fiber manufacturers by a greater percentage.

Figure 4. Components of Direct Effects of the Agribusiness Foreign Exports in Arizona, 2022 (Sales, in 2022 USD)

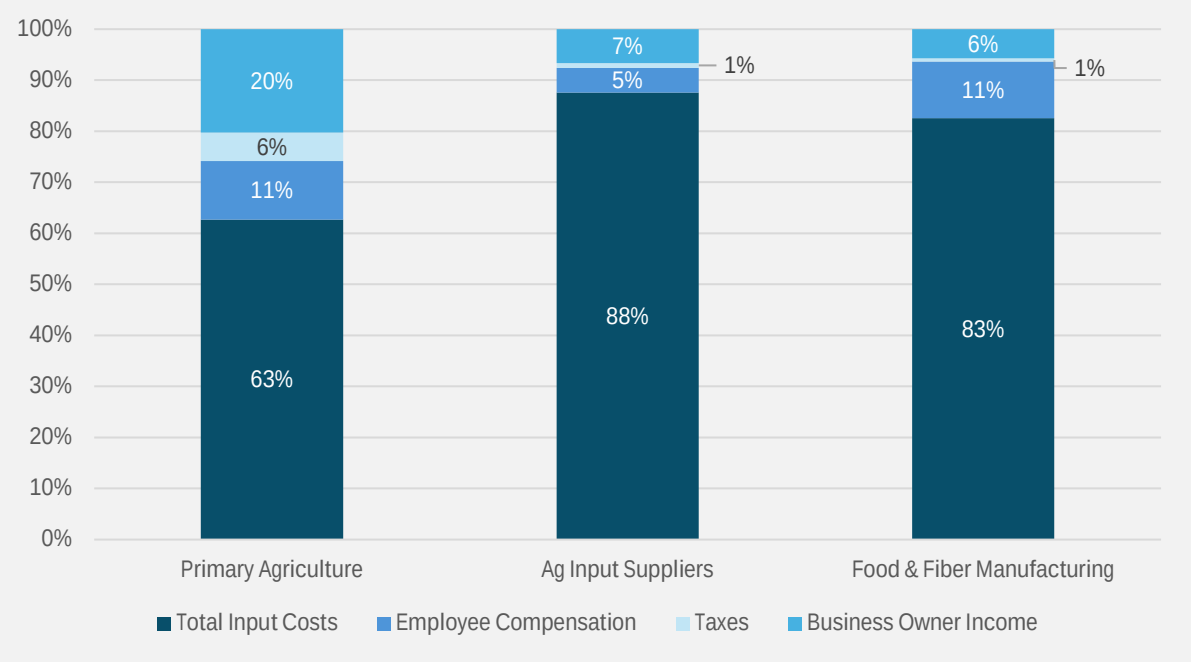


Table 3 shows how different percentage increases in non-labor input costs translate into percentage losses in business owner income. For example, a 1% increase in non-labor input costs would reduce primary agriculture business income (farm income) by 3%, agricultural input supplier income by 13%, and food and fiber manufacturer income by 14%. A 5% increase in input costs would lower business income by 16% for primary agriculture, 63% for farm input suppliers, and 69% for food and fiber manufacturers. Holding other factors constant, including output prices, an 8% increase in input costs would erase all business owner income of agricultural input suppliers and food manufacturers. Income for primary agriculture in this case would fall by 25%. This simple exercise measures potential losses to the businesses that have higher input costs, assuming they are **not** able to pass cost increases on to purchasers of their products in the form of higher prices.

Table 3: Percent Reductions in Business Owner Income for Every Percent Increase in Non-Labor Input Costs Holding Output Prices Constant

Percent Increase in Non-Labor Input Costs	Percent Reduction In Business Owner Income		
	Primary Agriculture	*Ag Input Suppliers*	*Food & Fiber Manufacturing*
1%	-3%	-13%	-14%
2%	-6%	-25%	-28%
3%	-9%	-38%	-42%
4%	-13%	-50%	-55%
5%	-16%	-63%	-69%
6%	-19%	-75%	-83%
7%	-22%	-88%	-97%
8%	-25%	-101%	-104%

The input-output model used for this analysis is a "price-fixed" model. It is not equipped to examine how imposition of taxes (tariffs) would change input and output prices. This would require use of a multi-market agricultural trade model (Robinson, et al., 2021) or a computable general equilibrium (CGE) model (Hertel, 1997). The simple analysis shown in Table 3, however, shows that agricultural input supply and food and fiber manufacturing industries operate on small profit margins and their business owner incomes are especially sensitive to cost increases. Even for primary agriculture, small percentage increases in input costs can translate into relatively large percentage reduction in farm income if cost increases are not passed on to consumers in the form of higher prices. The results suggest that agricultural input suppliers and food and fiber manufacturers could not operate profitably under 8% cost increases without raising their prices.

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Appendix A

Table A1. Arizona's Agribusiness System by IMPLAN Economic Sectors and NAICS Codes

IMPLAN Code	NAICS Codes	IMPLAN Description
1	11111-2, 111191*	Oilseed farming
2	11113-6, 111191*, 111199	Grain farming
3	1112	Vegetable and melon farming
4	111331-2, 111331-4, 111336*, 111339	Fruit farming
5	111335, 111336*	Tree nut farming
6	1114	Greenhouse, nursery, and floriculture production
7	11191	Tobacco farming
8	11192	Cotton farming
9	11193, 111991	Sugarcane and sugar beet farming
10	11194, 111992, 111998	All other crop farming
11	11211	Beef cattle ranching and farming, including feedlots and dual-purpose ranching and farming
12	11212	Dairy cattle and milk production
13	1123	Poultry and egg production
14	1122, 1124, 1125, 1129	Animal production, except cattle and poultry and eggs
19	115	Support activities for agriculture and forestry
63	311111	Dog and cat food manufacturing
64	311119	Other animal food manufacturing
65	311211	Flour milling
66	311212	Rice milling
67	311213	Malt manufacturing
68	311221	Wet corn milling
69	311224	Soybean and other oilseed processing
70	311225	Fats and oils refining and blending
71	31123	Breakfast cereal manufacturing
72	311313	Beet sugar manufacturing
73	311314	Sugar cane mills and refining
74	31134	Non-chocolate confectionery manufacturing
75	311351	Chocolate and confectionery manufacturing from cacao beans
76	311352	Confectionery manufacturing from purchased chocolate
77	311411	Frozen fruits, juices and vegetables manufacturing
78	311412	Frozen specialties manufacturing
79	311421	Canned fruits and vegetables manufacturing
80	311422	Canned specialties
81	311423	Dehydrated food products manufacturing
84	311511	Fluid milk manufacturing
82	311513	Cheese manufacturing

IMPLAN Code	NAICS Codes	IMPLAN Description
83	311514	Dry, condensed, and evaporated dairy product manufacturing
85	311512	Creamery butter manufacturing
86	31152	Ice cream and frozen dessert manufacturing
87	311813	Frozen cakes and other pastries manufacturing
88	311615	Poultry processing
89	311611	Animal, except poultry, slaughtering
90	311612	Meat processed from carcasses
91	311613	Rendering and meat byproduct processing
92	3117	Seafood product preparation and packaging
93	311811-2	Bread and bakery product, except frozen, manufacturing
94	311821	Cookie and cracker manufacturing
95	311824	Dry pasta, mixes, and dough manufacturing
96	31183	Tortilla manufacturing
97	311911	Roasted nuts and peanut butter manufacturing
98	311919	Other snack food manufacturing
99	31192	Coffee and tea manufacturing
100	31193	Flavoring syrup and concentrate manufacturing
101	311941	Mayonnaise, dressing, and sauce manufacturing
102	311942	Spice and extract manufacturing
103	31199	All other food manufacturing
107	31213	Wineries
110	3131	Fiber, yarn, and thread mills
111	31321	Broadwoven fabric mills
129	3161	Leather and hide tanning and finishing
167	325311	Nitrogenous fertilizer manufacturing
169	325314, 325315	Fertilizer mixing
170	32532	Pesticide and other agricultural chemical manufacturing
260	333111	Farm machinery and equipment manufacturing

Appendix B

Arizona's agribusiness foreign exports contribute to the state's economy through direct, indirect, and induced effects. **Indirect effects** measure economic activity generated by agriculture's demand for inputs or supplies, supporting local non-agricultural industries. **Induced effects** capture the economic activity created when households employed by Arizona farms and agricultural processing companies spend their earnings on local goods and services. This study uses the IMPLAN input-output model IMPLAN Group, LLC, 2022) to estimate the economic contribution of agricultural exports from Arizona, focusing on primary agriculture, agricultural input suppliers, and food and fiber processing.

Some modifications were made to the model to more accurately capture the economic activity generated by agricultural exports in Arizona's economy. First, we estimated the value of exports for each category considered in this analysis. The two main sources of data on state-level agricultural exports are the USDA Economic Research Service and USA Trade Online by the U.S. Department of Commerce. Both databases present some limitations. ERS does not directly track exports from states to destinations but assumes a state's share of U.S. exports is the same as its share of U.S. cash receipts. For example, if Arizona accounts for 3% of U.S. cotton production, it is assumed to account for 3% of U.S. cotton exports. This might not reflect actual trading patterns. ERS reports Arizona's total agricultural exports to be more than $1.1 billion in 2022, while USA Trade Online reported $959 million. In addition, USDA does not report estimates of state exports to specific countries.

USA Trade Online reports data on exports from states to individual countries. However, the main limitation of the methodology is that the origin of movement of the export does not always reflect the origin of transportation. This means that agricultural products arriving from other U.S. states, consolidated in Arizona, and shipped to Mexico could be counted as exports from Arizona. It also means that agricultural goods from Arizona consolidated in other U.S. states and then shipped to Canada would not count as Arizona exports to Canada. In other words, this database likely overestimates some Arizona agricultural exports to Mexico, while underestimating some Arizona exports to Canada.

To obtain the most accurate numbers possible, we compared the different databases. We analyzed in detail the commodities exported in each case, to identify the origin of the discrepancies. For example, for vegetables and melons, one of the most important agricultural industries for Arizona, ERS reports a value of $184 million in exports, while USA Trade Online reported $331 million in 2022. However, when reviewing the breakdown by commodity in USA Trade Online, we find that approximately 30% of this value corresponds to exports of bell peppers and tomatoes, commodities not produced in large quantities in Arizona, but imported in large volumes from Mexico. These exports represent transshipments of Mexico-grown produce from Mexico to Canada via Arizona businesses. For this reason, we re-estimated exports using as a reference the commodities produced locally. Table A1 reports the original values from each database and the final estimates, which are adjusted to measure exports by accounting for Arizona's productive structure.

Table B1: Export Estimates by Category, in 2022 USD

	IMPLAN	ERS	USA Trade Online	Estimation
Primary Agriculture	**$517,682,621**	**$892,885,388**	**$577,527,750**	**$571,370,272**
Grains	$45,212,745	$71,992,339	$41,090,420	$45,212,745
Vegetables and melons[1]	$120,373,020	$184,703,398	$331,156,625	$132,263,345
Fruit[2]	$16,349,537	$46,362,936	$182,463,667	$35,442,003
Tree nuts[3]	$121,409,326	$131,109,243	$21,381,893	$19,749,960
Cotton	$140,312,634	$201,226,988	$175,713,663	$165,905,000
All other crops[4]	$68,460,551	$245,762,234	$167,232,410	$167,232,410
Beef cattle	$5,564,808	$11,728,249	$6,035,949	$5,564,808
Food & Fiber Processing[5]	**$544,832,299**	**$594,700,000**	**$547,945,665**	**$509,833,865**
Agricultural Input Suppliers[6]	**$129,409,741**	**--**	**--**	**$111,561,935**

Notes:

[1] This category is limited to the following HS codes: **070519** (Lettuce, except head lettuce, fresh or chilled), **070410** (Cauliflowers and broccoli, fresh or chilled), **070511** (Head lettuce, fresh or chilled), **070970** (Spinach, New Zealand and Orache, fresh or chilled), and **070940** (Celery other than celeriac, fresh or chilled).

[2] This category is limited to the following HS codes: **080251** (Pistachios, in shell, fresh or dried), **080252** (Pistachios, shelled, fresh or dried), and **080299** (Other nuts, fresh or dried).

[3] 080410 This category is limited to the following HS codes: **080410** (Dates, fresh or dried).

[4] This category is limited to the following HS codes: **121490** (Forage products, nesoi, such as hay, clover, vetches) and **121410** (Alfalfa meal and pellets).

[5] The complete list of industries included in this category can be found in Appendix A

[6] This category includes fertilizers, pesticides, and farm machinery

If no specific HS codes are indicated, the category includes **all commodities** within that industry.

Modifications were made to IMPLAN's industry production functions for primary agriculture industries in Arizona, as national averages do not accurately reflect local production practices and spending patterns, particularly due to the limited use of dryland crop production. Farm expense data from the 2022 Census of Agriculture were used to adjust these spending patterns. Other modifications include changes in the ratio of Proprietor Income and Other Property Income to better estimate leakages. For more details, see Arizona's Agribusiness System in the State Economy: An Economic Contribution Analysis for 2022.

The economic contribution of exports of agricultural and agribusiness products was estimated using IMPLAN's multi-industry contribution analysis method. To ensure accuracy, Local Use of Local Supply (LULS) was set to zero, capturing only the portion of production exported outside the region. This approach isolates the impact of Arizona's agricultural exports without including local consumption and domestic exports.