3. INDUSTRIES & COMMODITIES

3. 1 Freight dependent industries | 3.2 Commodity movement | 3.3 Primary supply chains



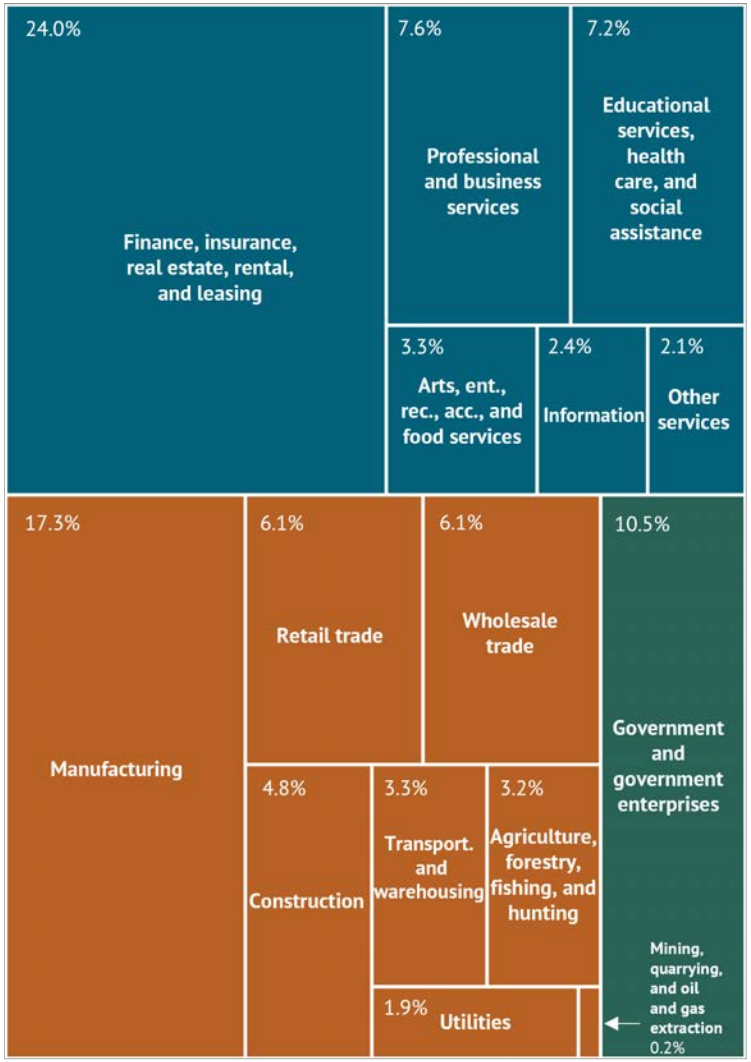
3.1 Freight-dependent Industries

Freight-dependent (or goods-dependent) industries are those that rely on transportation to receive raw materials or manufactured goods and then transport the finished products or goods to their intended market and eventual end users. Much of Iowa's economy depends on reliable freight transportation networks to reach the consumer in a timely and cost-effective manner. While not as dependent as goods-producing sectors, service industries depend on the movement of freight to receive the basic materials they need for their industry, such as office products and electronics.

Iowa's economy and transportation system are heavily influenced by freight-dependent industries. Grain production and its associated food and agricultural products and byproducts make up the bulk of these industries. The state continues to have a robust agricultural industry adding to the transportation demands of a greatly expanded value-added agricultural products sector. Combined with a geographically dispersed industrial base that includes large industrial sectors of manufacturing, trade, consumption, transportation, and warehousing, Iowa will continue to have significant transportation infrastructure needs and challenges.

Gross domestic product (GDP) is the total market value of all goods and services produced in the economy. In 2000, Iowa's GDP was $93 billion; by 2024, Iowa's current-dollar GDP had grown by 176% to $257 billion. Figure 3.1 details the proportion of GDP by each industry.

Figure 3.1: Iowa gross domestic product by industry, 2024



Source: U.S. Bureau of Economic Analysis

3.2 Commodity Movement

According to the Federal Highway Administration's Freight Analysis Framework (FAF) tool, freight tonnage moving in the U.S. will double in the next 20 years, which would prove to be a sizable challenge for the overall freight transportation system. This growth will be reflected in Iowa and likely won't be uniform across all modes.

FAF integrates data from a variety of sources (including the Commodity Flow Survey) to create a comprehensive picture of freight movement among states and major metropolitan areas. The tool estimates tonnage, value, and domestic ton-miles by region of origin and destination, commodity type, and mode for current and forecasted years. Understanding the flow of freight by weight provides insights into the infrastructure needs in Iowa; while understanding the flow of freight by value provides insights into the economic impact it has on the area.

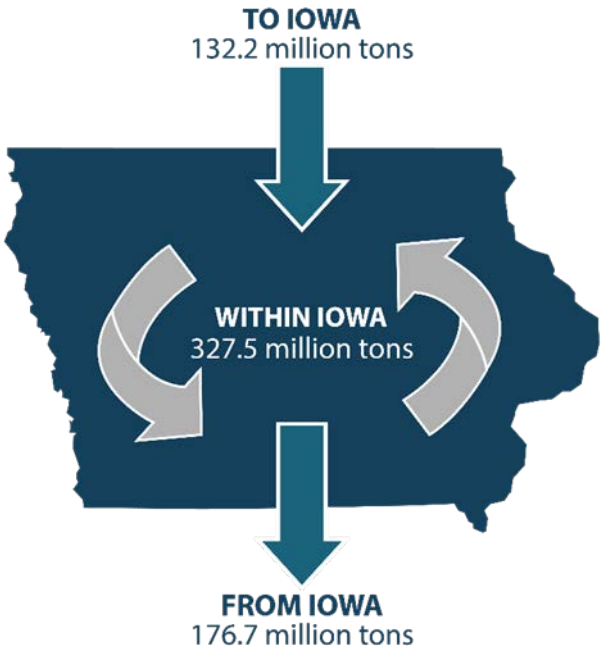
Iowa's transportation system facilitated the movement of over 636.3 million tons of freight with an estimated value of $509 billion in 2023 (Figure 3.2). Despite a slight decrease in total tonnage between 2017 and 2023, the total weight of goods imported into and exported out of the state is expected to grow (Figure 3.3).

Since the turn of the century, Iowa has remained an exporting state, meaning the state produces and exports more goods than it imports. This is true both in terms of tonnage and value. The gap between Iowa's imports and exports is projected to grow wider, from 45 million tons in 2023 to 121 million tons in 2050.

Figure 3.4 shows Iowa's freight tonnage and value by mode in 2023, and the projections for 2050. Truck, rail, and pipeline are the top three freight modes in Iowa, collectively transporting 93.6% of the total tonnage moved to, from, and within the state. These modes are expected to maintain their dominance through 2050. By then, truck's share of freight is projected to decrease slightly by 2%. Similarly, rail is expected to decline by less than 1%, while pipeline freight is projected to increase by 2% percent, as shown in Table 3.1.

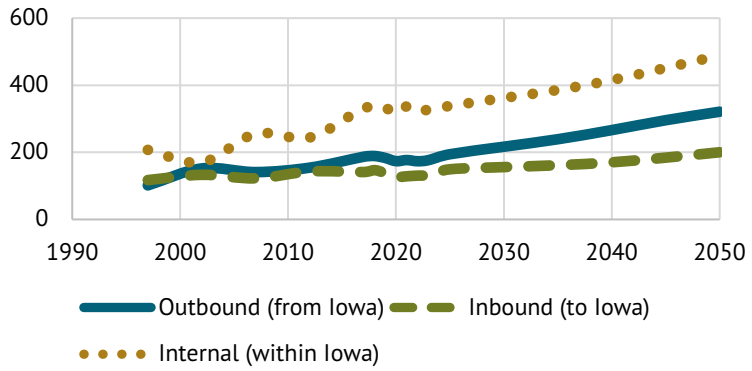
The continued prominence of trucks, alongside a projected 54% increase in road-transported tonnage by 2050, will place additional pressure on the state's highway system. This growth is expected to result in increased congestion and a faster rate of deterioration for pavement and highway structures.

Figure 3.2: Iowa freight movement, 2024



Source: Freight Analysis Framework

Figure 3.3: Projected Iowa freight movement by ton, 1997-2050



Source: Freight Analysis Framework

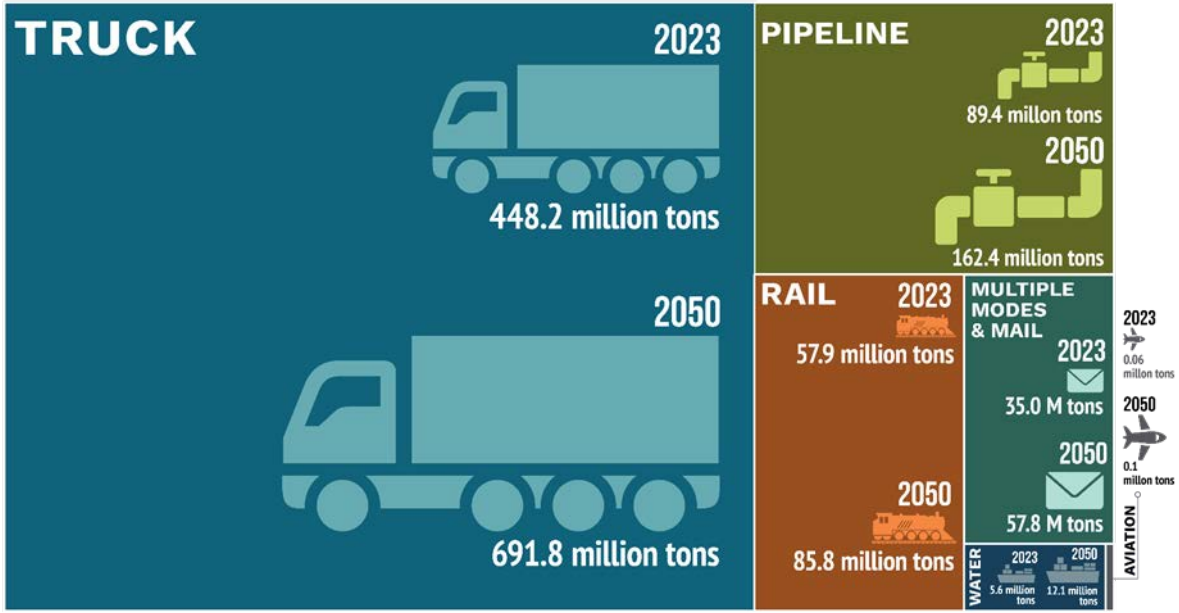
Table 3.1: Projected growth in share of tonnage of Iowa freight by mode, 2023-2050

Mode	Percent of total tonnage (2023)	Percent of total tonnage (2050)
Truck	70.4%	68.5%
Pipeline	14.1%	16.1%
Rail	9.1%	8.5%
Multiple modes & mail	5.5%	5.7%
Water	0.9%	1.2%

Aviation and Other Modes were excluded as they account for less than 1% of total tonnage.

Source: Freight Analysis Framework

Figure 3.4: Projected growth in tonnage and value of Iowa freight by mode, 2023-2050



Source: Freight Analysis Framework

Commodity Flow by Tonnage

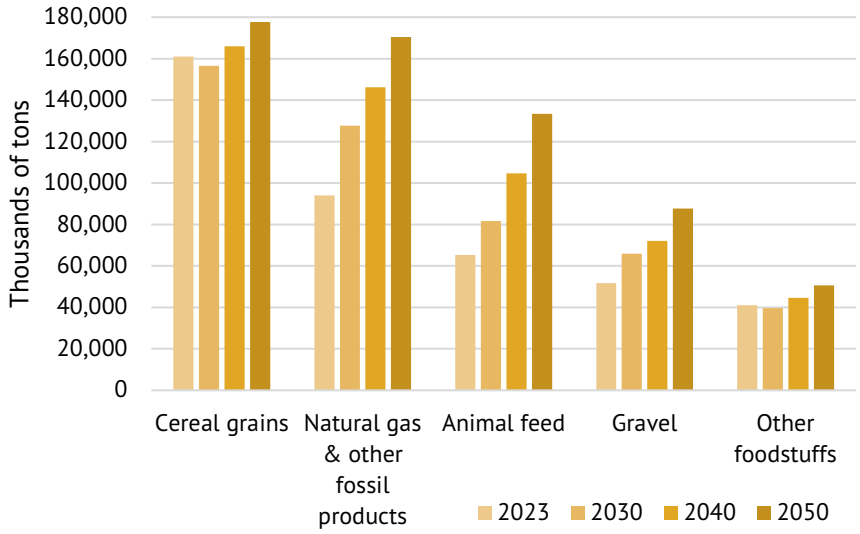
According to FAF, the total weight of Iowa freight (including freight moved within, exported from, and imported to the state) is expected to grow from roughly 636 million tons in 2023 to just over a billion tons in 2050.

In 2050, agricultural products are projected to remain the top freight commodities in Iowa, both as imports and exports. In 2023, natural gas and other fossil products were the highest-weight commodities entering and leaving the state, and they are expected to maintain this position through 2050. Cereal grains and animal feed ranked as the second and fourth-largest outbound commodities in both 2023 and 2050, with their positions reversed for inbound movements.

However, when considering all freight movement—including inbound, outbound, and within Iowa—cereal grains were the top commodity by tonnage in 2023 and are projected to remain the top commodity overall in 2050, as shown in Figure 3.5. Animal feed is projected to drop to third place, and other foodstuffs fall to fifth. These commodities are typically high-weight, low-value bulk shipments.

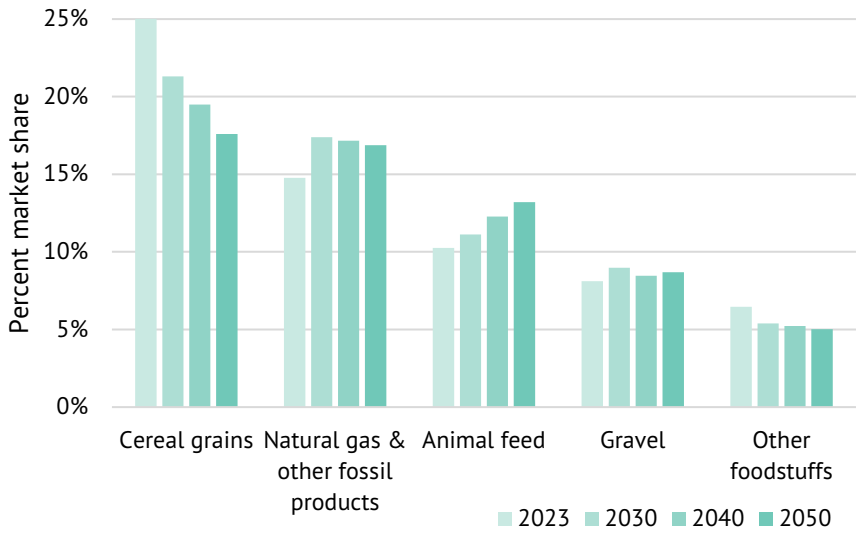
However, as shown in Figure 3.6, cereal grains are projected to become less prominent in part due to growth in other commodities such as animal feed, gravel, and natural gas/fossil products.

Figure 3.5: Iowa domestic freight by tonnage, 2023-2050



Source: Freight Analysis Framework

Figure 3.6: Iowa domestic freight tonnage by market share, 2023-2050



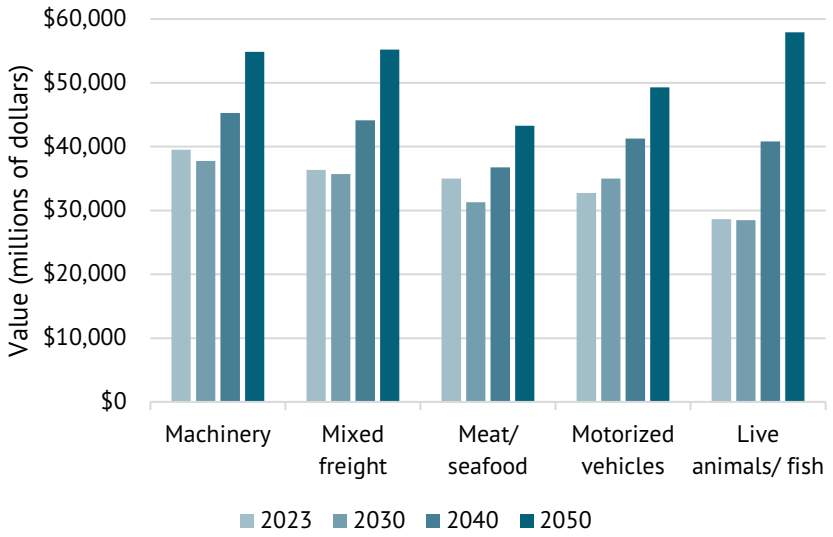
Source: Freight Analysis Framework

Commodity Flow by Value

The total value of Iowa freight (including freight moved within, exported from, and imported to the state) is expected to grow from $509 billion in 2023 to $745.7 billion in 2050.

In 2050, live animals (such as pork) mixed freight (including items for grocery stores, restaurants, and hardware stores), and machinery (including turbines, boilers, internal combustion engines, and other non-electric motors and engines) will be the top commodities by value, as shown in Figure 3.7. According to FAF, the total value of live animals/fish freight is expected to increase by 102% by 2050 from 2023.

Figure 3.7: Iowa domestic freight by value (millions of dollars), 2023-2050

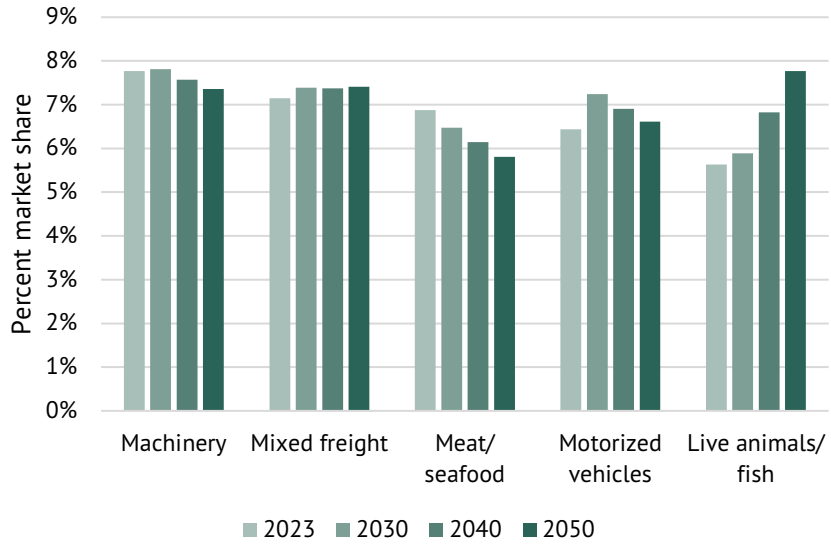


Source: Freight Analysis Framework

It is notable that in the 2022 State Freight Plan, cereal grains were the top commodity by value, but as of 2023 cereal grains has dropped to fifth place by value and will drop further to 14th by value in 2050. Machinery is ranked first in 2023 and will remain first until 2050, when it will be surpassed by live animals/fish and mixed freight, placing machinery as the third top commodity by value by 2050.

Live animals/fish will continue to increase its share of the state's freight by value consistently from 2023 to 2050, as shown in Figure 3.8. Motorized vehicles are projected to slightly increase its market share by 0.8% in 2030, followed by a decrease of 0.6% by 2050. Similarly, machinery is expected to slightly increase by 0.1% percent by 2030, before declining 0.5% percent by 2050.

Figure 3.8: Iowa domestic freight value (millions of dollars) by market share, 2023-2050



Source: Freight Analysis Framework

Trading Partners

Illinois stands as Iowa's top domestic trading partner in 2023 by value, shown in Table 3.2. Minnesota was Iowa's top trading partner by tonnage at 82 million tons traded between states.

Iowa receives most domestic imports from the Great Plains and Midwest regions, as shown in Figure 3.9. Texas is Iowa's largest domestic trading partner outside of the Midwest, boasting the fourth top trading partner position in both value and tonnage. A total of 17.3 million tons moves between the two states with a total value of $22.9 billion.

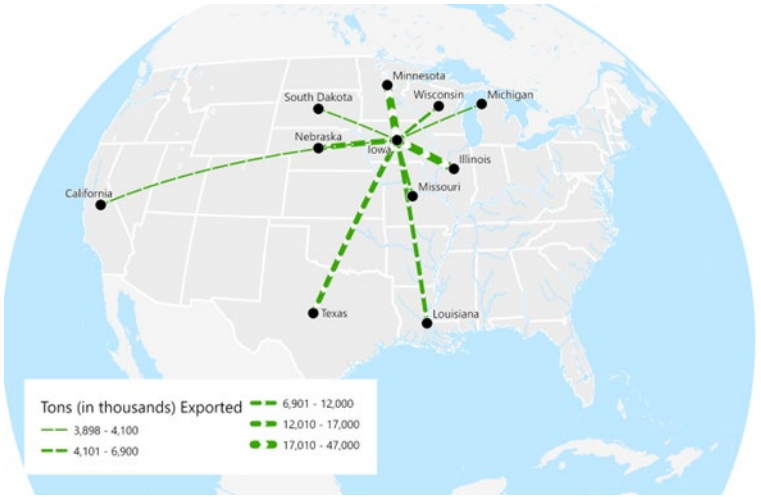
The Iowa DOT believes that with a large majority of Iowa's inbound and outbound freight involving states in the immediate vicinity, the coordination of network identification, regulation, infrastructure projects, and freight-related initiatives is crucial to economic growth and prosperity in the region.

Table 3.2: Iowa's top five domestic trading partners by value (millions of dollars), 2023

State	Imported from Iowa	Exported to Iowa	Total
Illinois	$23,284.95	$28,731.59	$52,016.54
Minnesota	$21,125.58	$22,532.13	$43,657.70
Nebraska	$13,034.45	$14,254.14	$27,288.59
Texas	$7,810.72	$15,085.71	$22,896.43
Missouri	$9,262.15	$10,056.03	$19,318.19

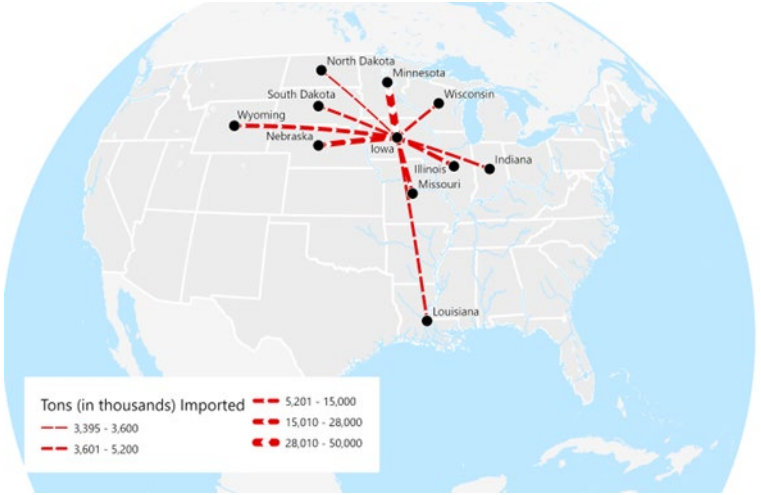
Source: Freight Analysis Framework

Figure 3.9: Top 5 domestic exporters to Iowa by tonnage, 2023



Source: Freight Analysis Framework

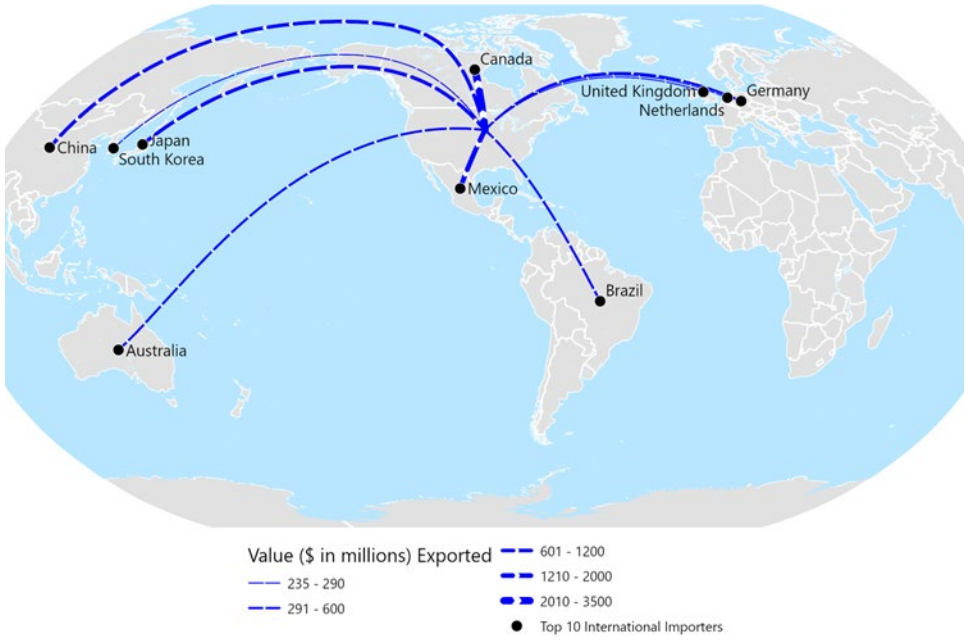
Figure 3.10: Top 5 domestic importers to Iowa by tonnage, 2023



Source: Freight Analysis Framework

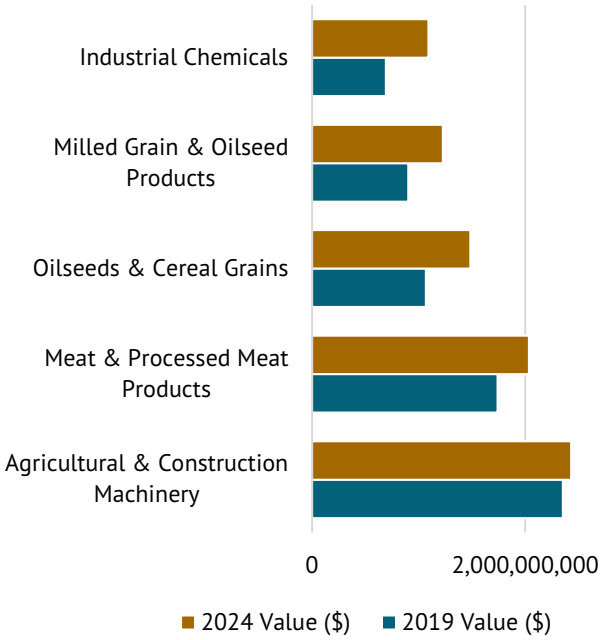
According to data from the U.S. Census Bureau and U.S. Trade Online, Iowa's top international trading partner was Canada at $5 billion of goods in 2024, followed by Mexico at almost $3.2 billion, and Japan at $971 million. Figure 3.11 shows the locations of Iowa's top ten international trading partners, and the value of goods exported. The state of Iowa exported roughly $17.1 billion goods in 2024. The top commodity in 2024 was agricultural machinery, followed by meat products, and oilseeds and grains. Figure 3.12 shows the top five commodities exported internationally. Since international trade is an important factor affecting freight transportation in Iowa, the Iowa DOT pays special attention to international trading lanes (such as the Panama Canal) and trading regulations. Due to evolving tariff policies, the export data presented in this report could change significantly if international demands shift.

Figure 3.11: Iowa's top 10 international trading partners (exports only) by value, 2024



Source: U.S. Census Bureau and U.S. Trade Online

Figure 3.12: Iowa's top 5 exported commodities by value, 2024



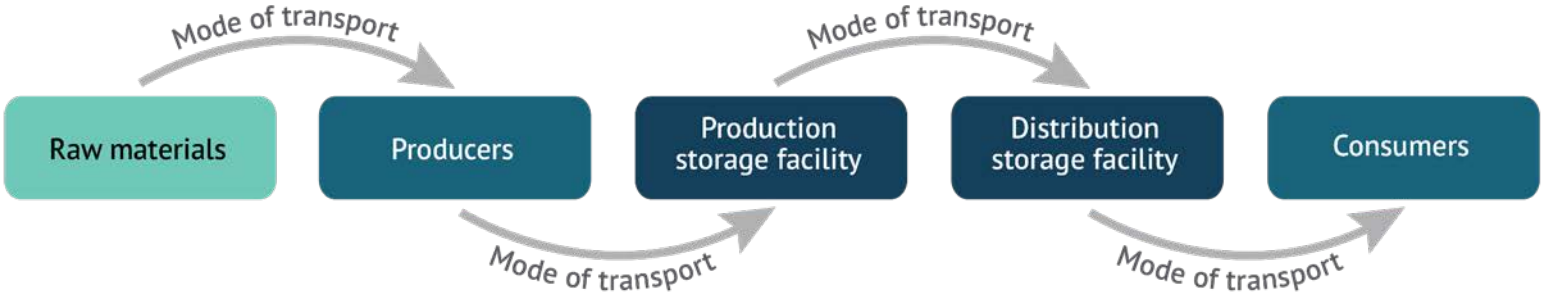
Source: U.S. Census Bureau and U.S. Trade Online

3.3 Primary Supply Chains

Although Iowa has a diverse economy made up of many service and freight-dependent industries, agriculture-related products dominate the state's imports and exports. Whether it is corn, products made from corn, farm machinery, meat, animal health products, or agricultural chemicals, many products moving on the freight transportation system are closely tied to the agricultural industry.

The movement of these commodities from origin to destination is reliant on efficient and profitable supply chains. Supply chains encompass the myriads of transportation legs and logistics functions associated with the complete process of bringing commodities from production to market. They incorporate a network of individuals, processes, and physical entities involved in producing, handling, and/or distributing a specific commodity, all of which are linked together by information and transportation infrastructure. Figure 3.13 shows a basic example of a supply chain that goes from the production of a commodity through various stops and using multiple modes of transportation before reaching the market and ultimately, consumers.

Figure 3.13: Basic supply chain diagram



Source: Iowa DOT

Iowa is fortunate to have transportation infrastructure that has long provided Iowa producers and businesses with a strong comparative advantage, fostering the ability to efficiently and competitively serve domestic and global markets. As a producer-state, it is extremely valuable to have transportation flexibility that includes an advanced highway network, well-developed rail system, two navigable rivers, extensive pipeline grid, and several commercial airports that open the door to multiple options for producers and businesses to optimize their supply chains.

This section will provide an overview for a few of the major supply chains in Iowa. These commodities are not an exhaustive list of important commodities in the state but are major imports and exports by weight and value (see Section 3.2, Commodity Movement) and have a large impact on the freight transportation system.



Corn

According to the U.S. Department of Agriculture (USDA), Iowa corn farmers produced 2.5 billion bushels of corn on 12.6 million acres of land in 2022, accounting for around 18% of total U.S. corn production. This is a consistent trend as the state has produced the largest corn crop of any state each year for two decades. Figure 3.14 shows the number of acres of corn harvested in each U.S. County in 2022 with the darkest green, representing the most acres, being concentrated in and around Iowa.

With constant innovation, Iowa corn and corn byproducts are used to produce countless products in the state and worldwide, including food, fuel, pharmaceuticals, oils, sweeteners, starches, and plastics, with most dedicated to food and fuel. Iowa is a national leader in ethanol, dried distilled grains (DDGs), and other livestock feed production. One-third of the corn used to produce ethanol becomes DDGs—a high-value livestock feed byproduct. Millions of bushels of corn or corn byproducts are consumed annually by Iowa livestock, primarily hogs, cattle, and poultry. This readily available feed has helped Iowa consistently lead national egg, pork, and beef production, all major Iowa and U.S. exports to markets such as Japan, Mexico, and China. Another byproduct of corn production is corn stover, the above-ground portion of the plant remaining after harvest, used for ethanol production, cattle feed, livestock bedding, and building materials.

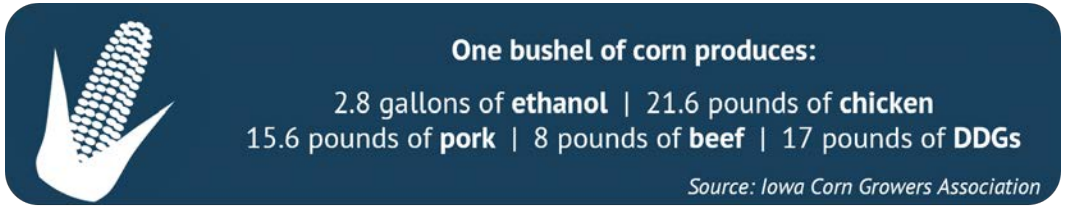
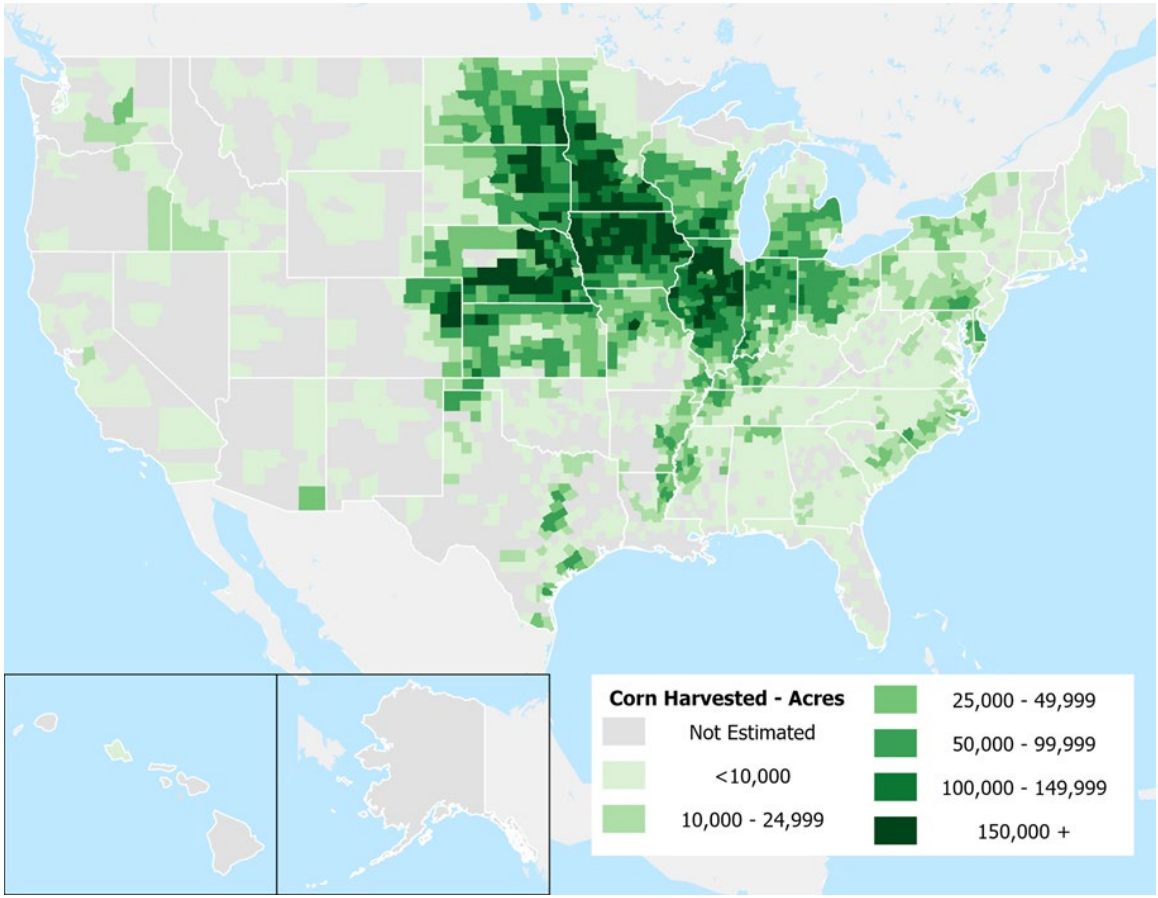
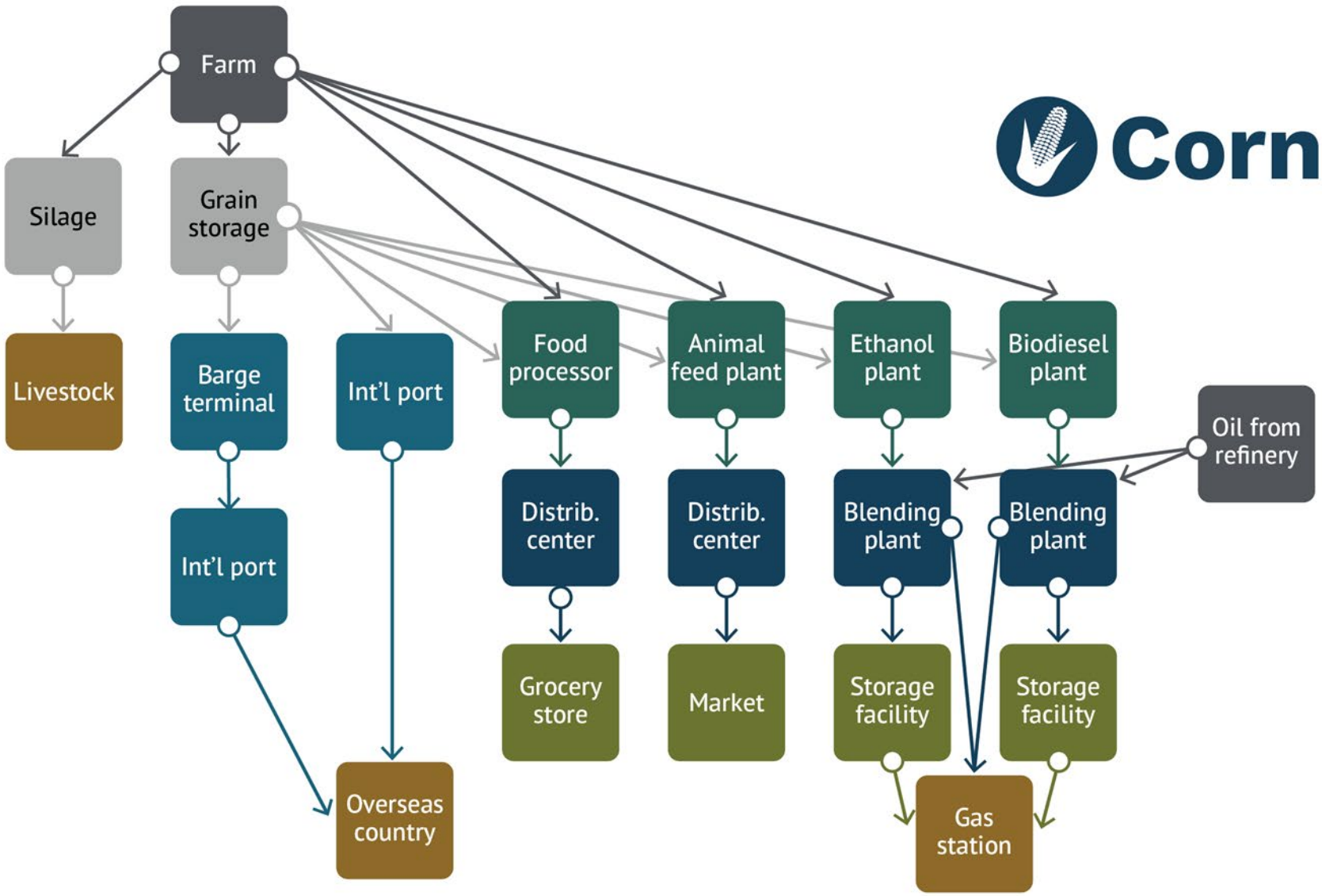


Figure 3.14: Corn for grain acres harvested, 2022



Source: U.S. Department of Agriculture via BRAG.Utah.Gov

Figure 3.15: Corn supply chain



Source: Iowa DOT

Soybeans

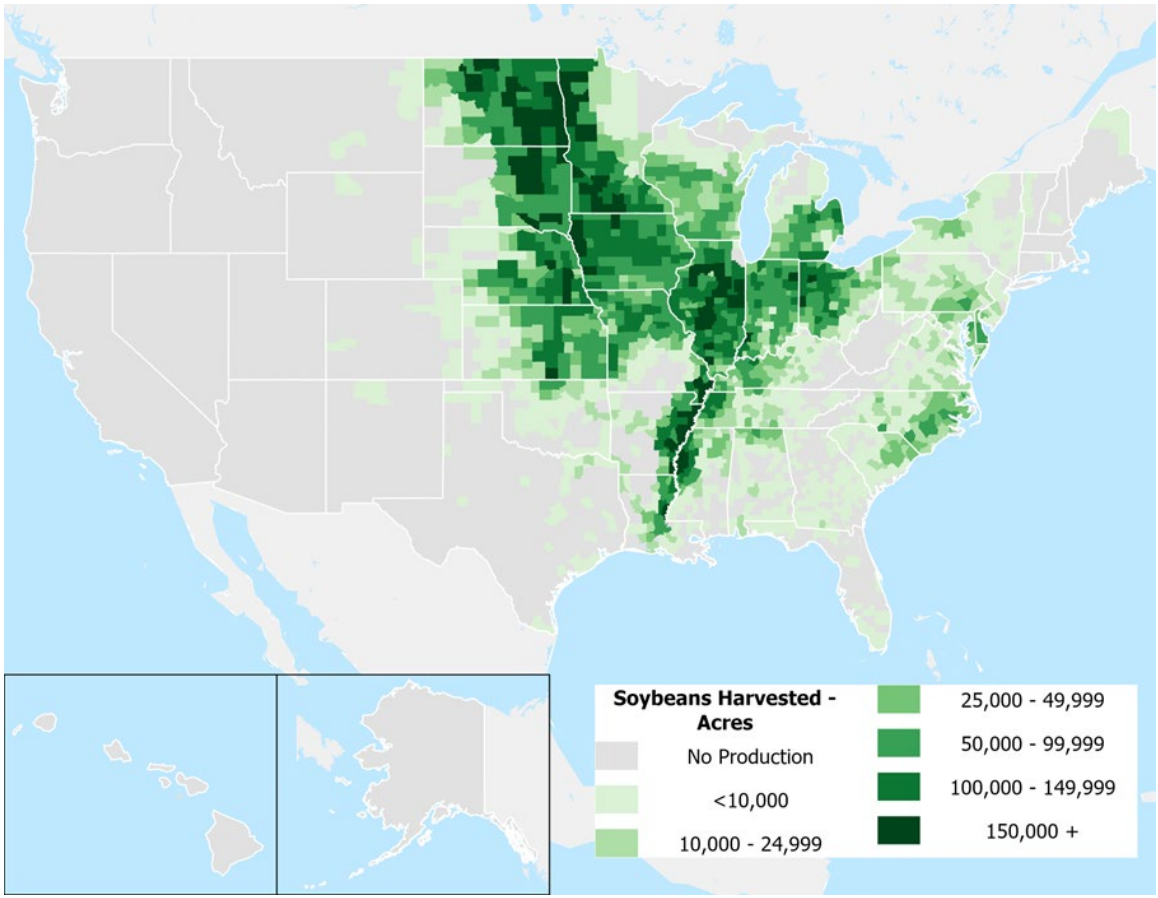
Iowa is a leader in the production of soybeans, consistently ranking in the top three states in the nation each year. Iowa farmers produced 542 million bushels on 9.5 million acres in 2022. This translates to 13% of the nation's soybean production. Figure 3.16 shows the number of acres of soybeans harvested in each U.S. County in 2022 with the darkest green, representing the most acres, being concentrated in and around Iowa.

Soybeans are processed into numerous forms such as soy meal and soybean oil used to make valuable products consumed domestically and internationally. Soy meal is a major ingredient in animal feed for pork and poultry and makes up most of the soybean production. Soybean oil, the second most consumed oil in the world, is used to produce food products such as margarine, salad dressings, and cooking oils, as well as industrial products like plastics and biodiesel fuel.

Like corn, soybeans are a major Iowa and U.S. export to countries around the world. Top buyers of soybeans include China, Mexico, and Japan; top markets of soy meal are Mexico, Philippines, and Canada; and the top destinations for soybean oil are China, Mexico, and India.

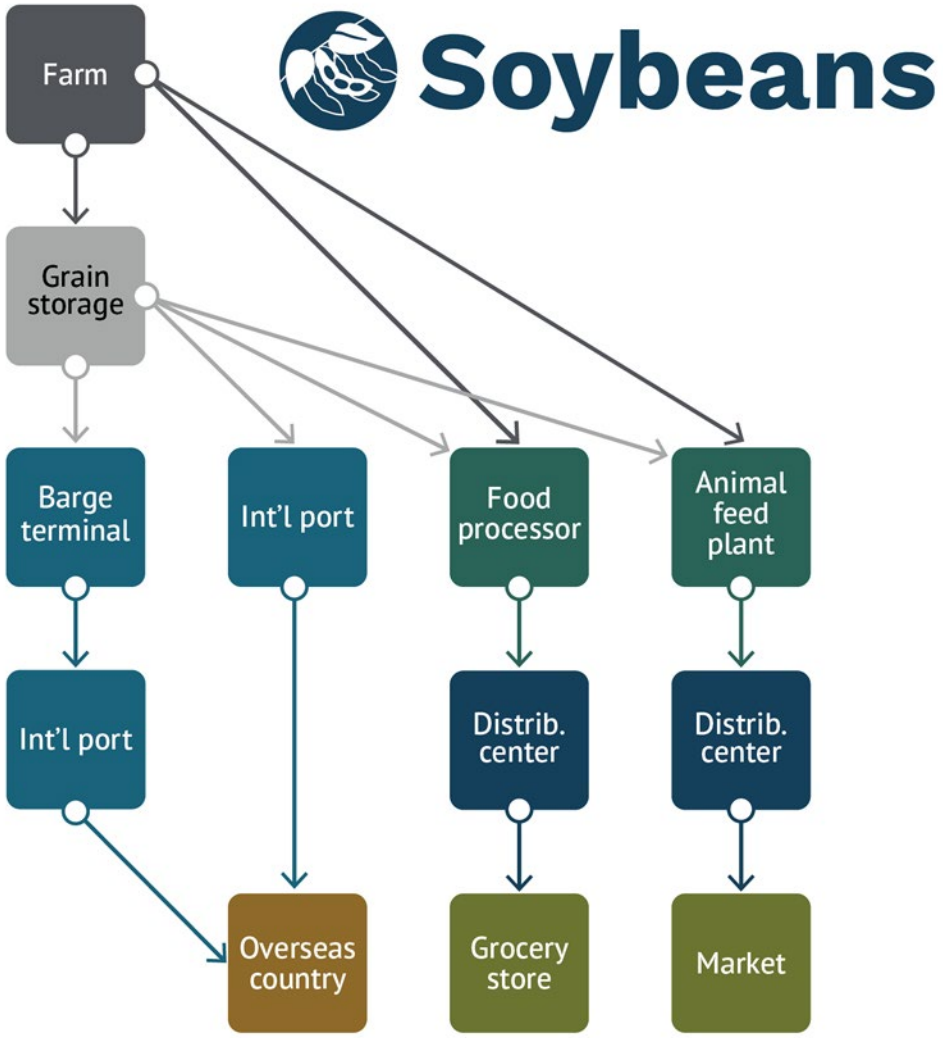


Figure 3.16: Soybean acres harvested, 2022



Source: U.S. Department of Agriculture via BRAG.Utah.Gov

Figure 3.17: Soybean supply chain



Source: Iowa DOT

Pork

Iowa is the nation's leading pork producing state in numerous USDA categories, including all hogs and pigs inventory, all hogs and pigs value, pig crop, and pork export value. The state raises nearly one-third of the nation's hogs with over 5,200 operations and a total inventory of 23.8 million animals as of the USDA 2022 Agriculture census. Figure 3.18 shows the total inventory of hogs and pigs by U.S. County in 2022.

With a concentration of corn, soybeans, and packing plant capacity, Iowa is an ideal location for pork production. The abundance of materials and capacity within the state lowers the cost of transportation and feed for Iowa farmers.

Many hog byproducts are used in pharmaceuticals and medical products such as insulin, hormones, and heart valves for transplants, as well as chemicals used in manufacturing to make glue, upholstery, pet food, lubricants, and cement. Additionally, a major byproduct from hogs is a necessity for Iowa's corn and soybean farmers: manure to be used as fertilizer for cropland. According to the Iowa Pork Producers Association, ten pigs from weaning to market provide the nutrient needs of an acre of cropland on a semiannual basis. This helps to enrich the soil for strong corn and soybean yields.

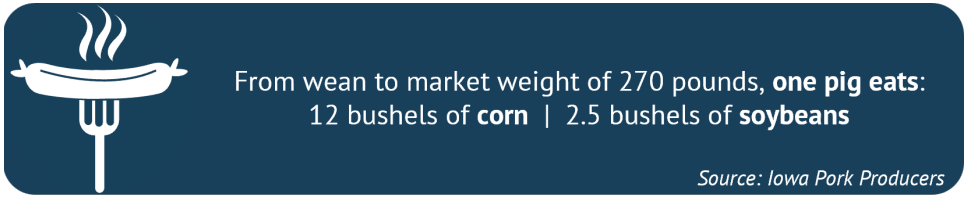
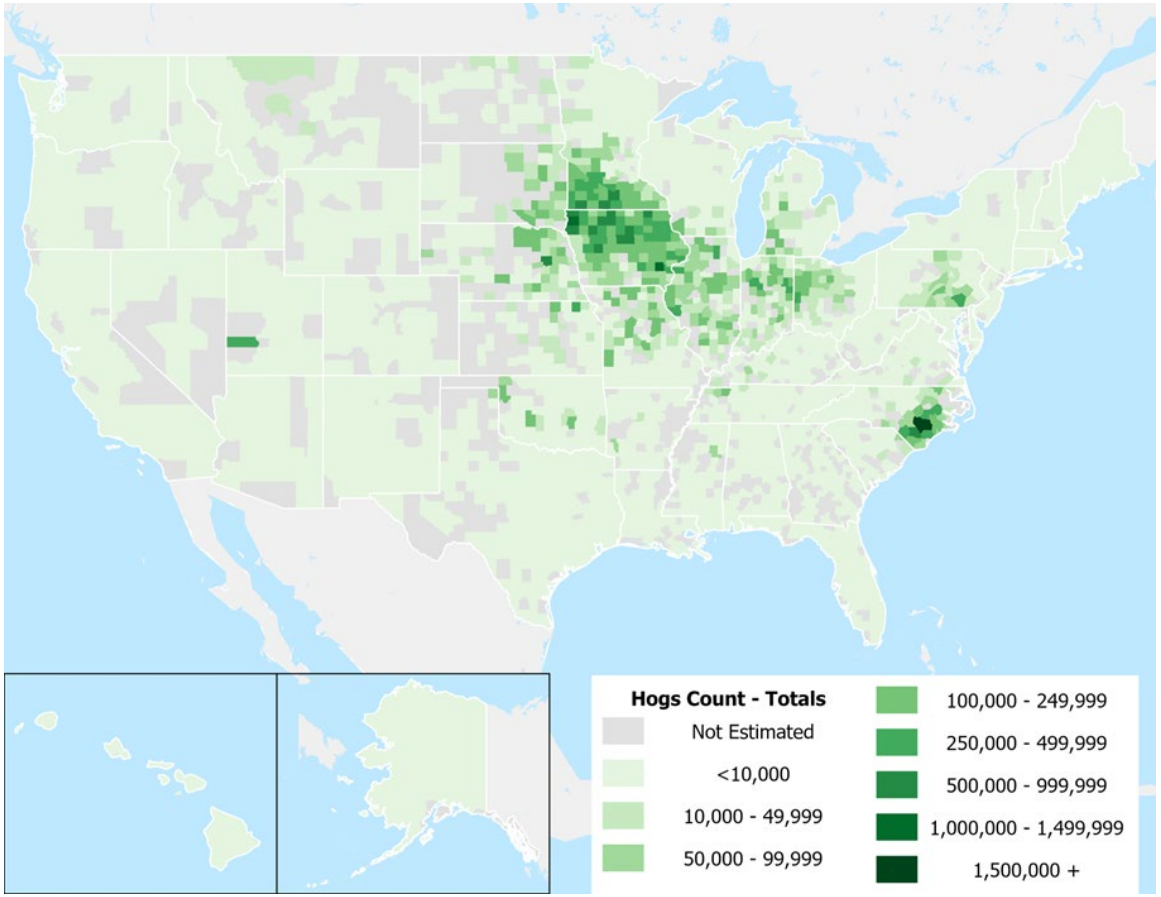
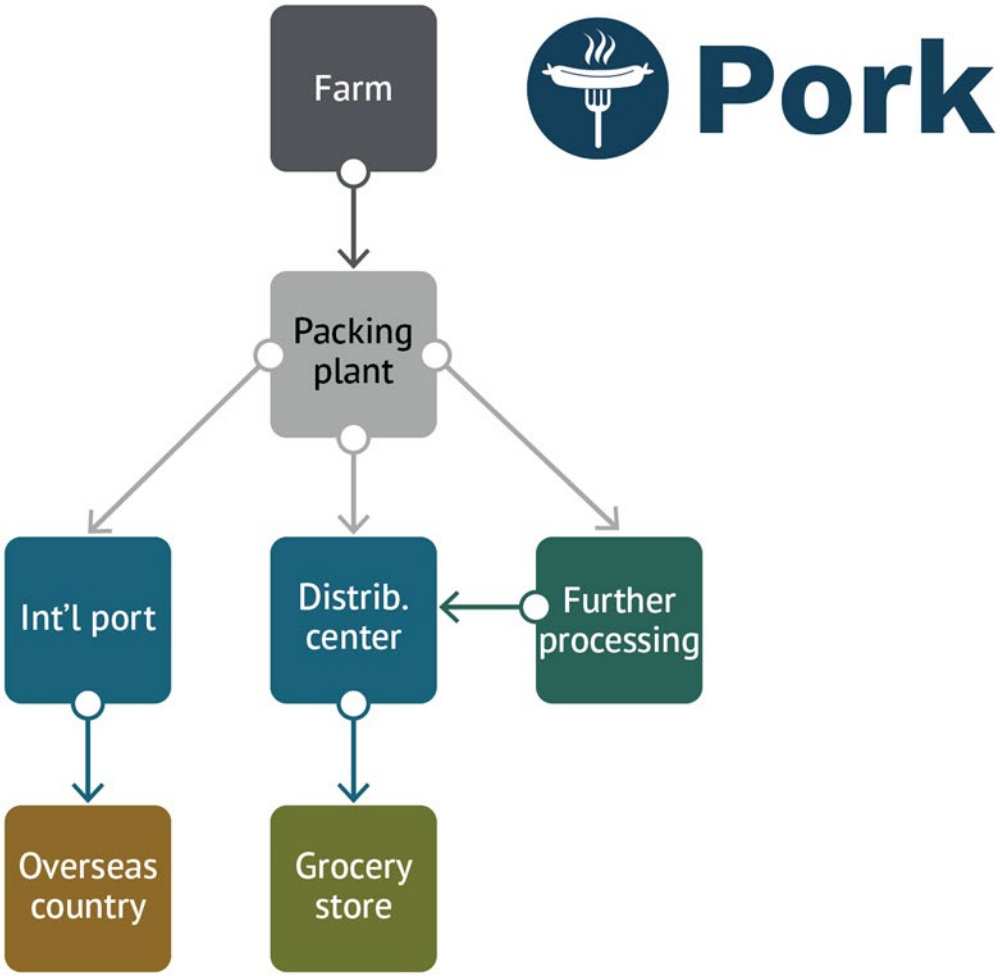


Figure 3.18: Inventory of hogs and pigs per county, 2022



Source: U.S. Department of Agriculture via BRAG.Utah.Gov

Figure 3.19: Pork supply chain



Source: Iowa DOT

Eggs

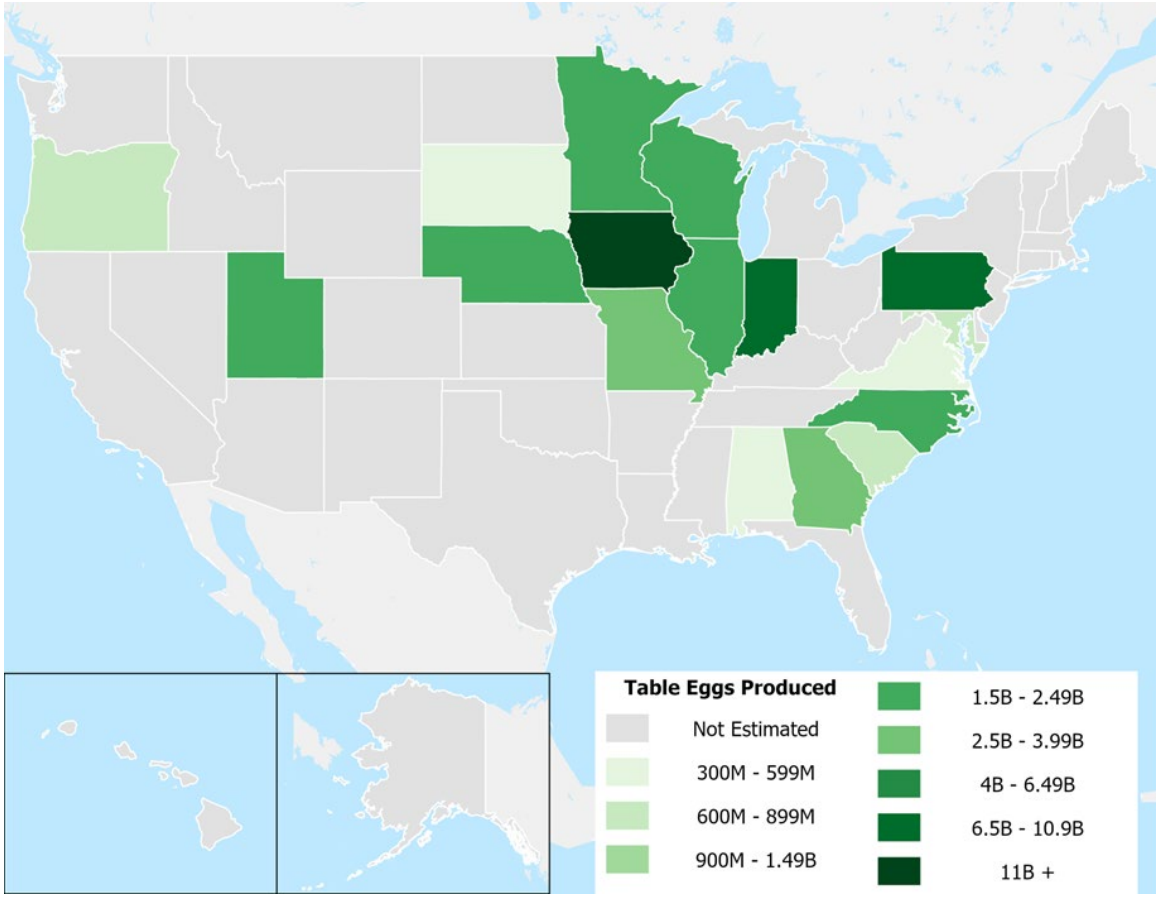
Iowa led the nation in egg production in 2022, continuing a trend that has lasted over a decade. The state increased egg output significantly between 1997 and 2006, taking advantage of a growing population and rising egg product consumption in the country. Production in Iowa has steadied since then, resulting in just over 13 billion table eggs being produced in 2022. Figure 3.20 shows U.S. egg production by state.

A significant reason for Iowa leading the nation in egg production is the competitive advantage the state has with affordable and abundant feed, which makes up a substantial percent of egg production costs. Laying hens alone consume more than 50 million bushels of corn and more than 450,000 tons of soybean meal each year. Iowa egg producers do not have the large additional cost of transporting feed like many other states. Iowa also has a feed price advantage due to its extensive feed-grain production and will likely maintain that advantage for the foreseeable future.

Iowa is home to around **45 million laying hens** producing close to **15 billion eggs per year**

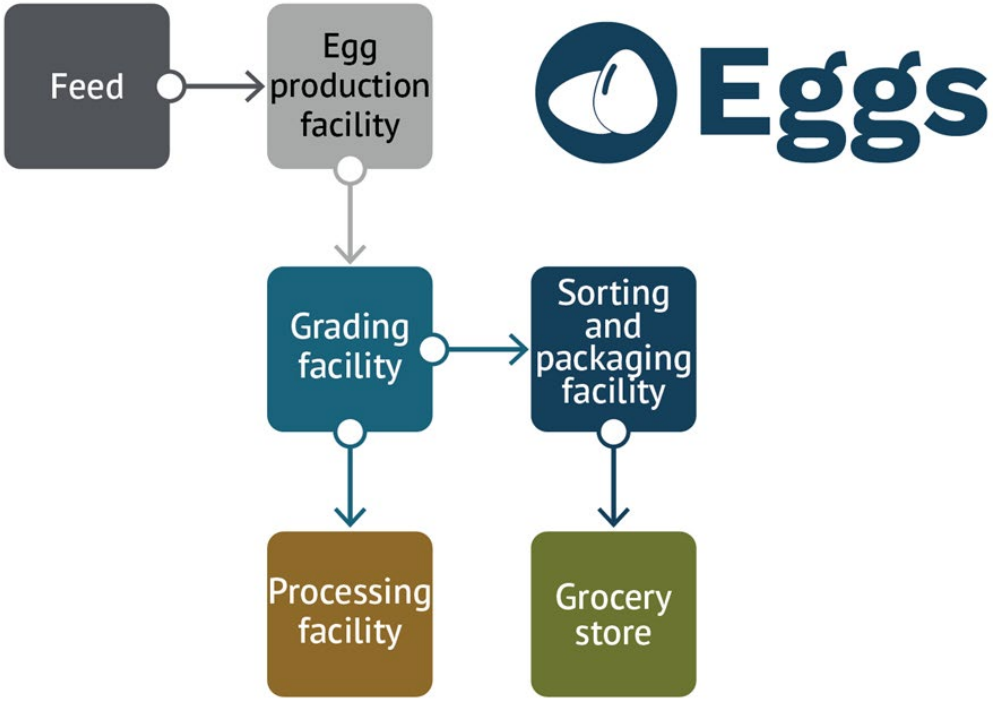
Source: Iowa Egg Council

Figure 3.20: Table egg production by State, 2022



Source: U.S. Department of Agriculture

Figure 3.21: Egg supply chain



Source: Iowa DOT

Tractors and Machinery Manufacturing

To produce record numbers of corn and soybeans, Iowa farmers need the appropriate equipment. The manufacturing of tractors, agricultural, and construction machinery is a natural fit for a major agricultural production area like Iowa.

The state is a major manufacturing center for agricultural machinery giants John Deere, Caterpillar Inc., Kinze Manufacturing, Vermeer, Danfoss, CNH Industrial (CASE, New Holland), Bridgestone/Firestone Agricultural Tire, and Hagie Manufacturing. There are approximately 6,300 manufacturers in and around Iowa. Iowa alone employs around 23,000 in agriculture and construction equipment manufacturing with sales near $15 billion per year. Figure 3.22 shows regional tractor and machinery manufacturing locations.

Agricultural and construction equipment manufacturing has continually developed over the years. These products are now the state's leading manufactured commodities in terms of value with tractors being Iowa's top manufactured export.

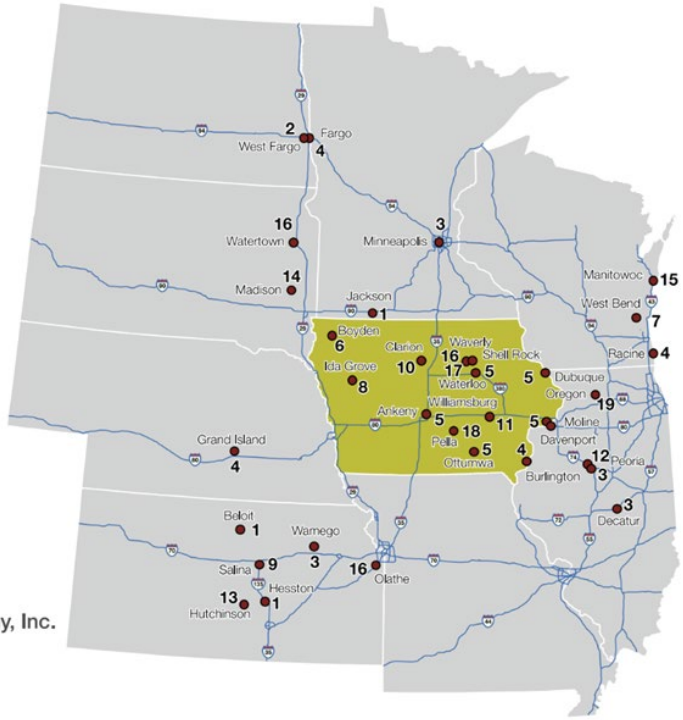


Iowa has the **3rd-highest concentration of manufacturing employees** in the United States

Source: Bureau of Labor Statistics, 2022

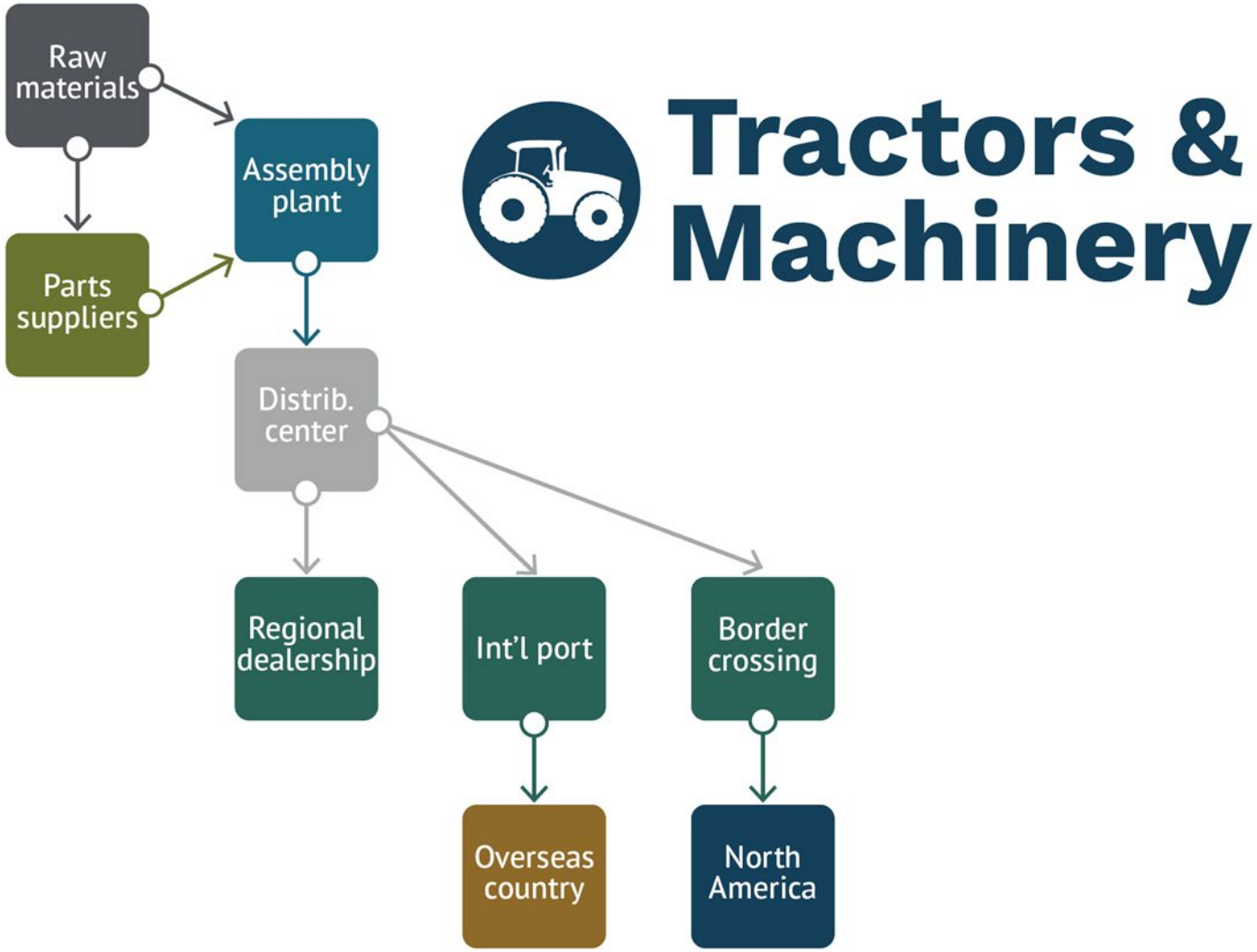
Figure 3.22: Regional agricultural and construction equipment manufacturers

1 AGCO Corporation
2 Bobcat Company
3 Caterpillar, Inc.
4 CNH Industrial
5 Deere & Company
6 DEMCO
7 Gehl Company
8 GOMACO Corporation
9 Great Plains Manufacturing, Inc.
10 Hagie Manufacturing Company
11 Kinze Manufacturing, Inc.
12 Komatsu America Corporation
13 Krause Corporation
14 Manitou Americas, Inc.
15 Manitowoc Company, Inc.
16 Terex Corporation
17 Unverferth Manufacturing Company, Inc.
18 Vermeer Manufacturing Company
19 Woods Equipment Company



Source: Iowa Economic Development Authority

Figure 3.23: Tractors and machinery supply chain



Source: Iowa DOT