

Delaware Department of Transportation Agriculture Supply Chain Study: Transportation Supply Chain Analysis

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Overview of Findings

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Summary Agricultural findings

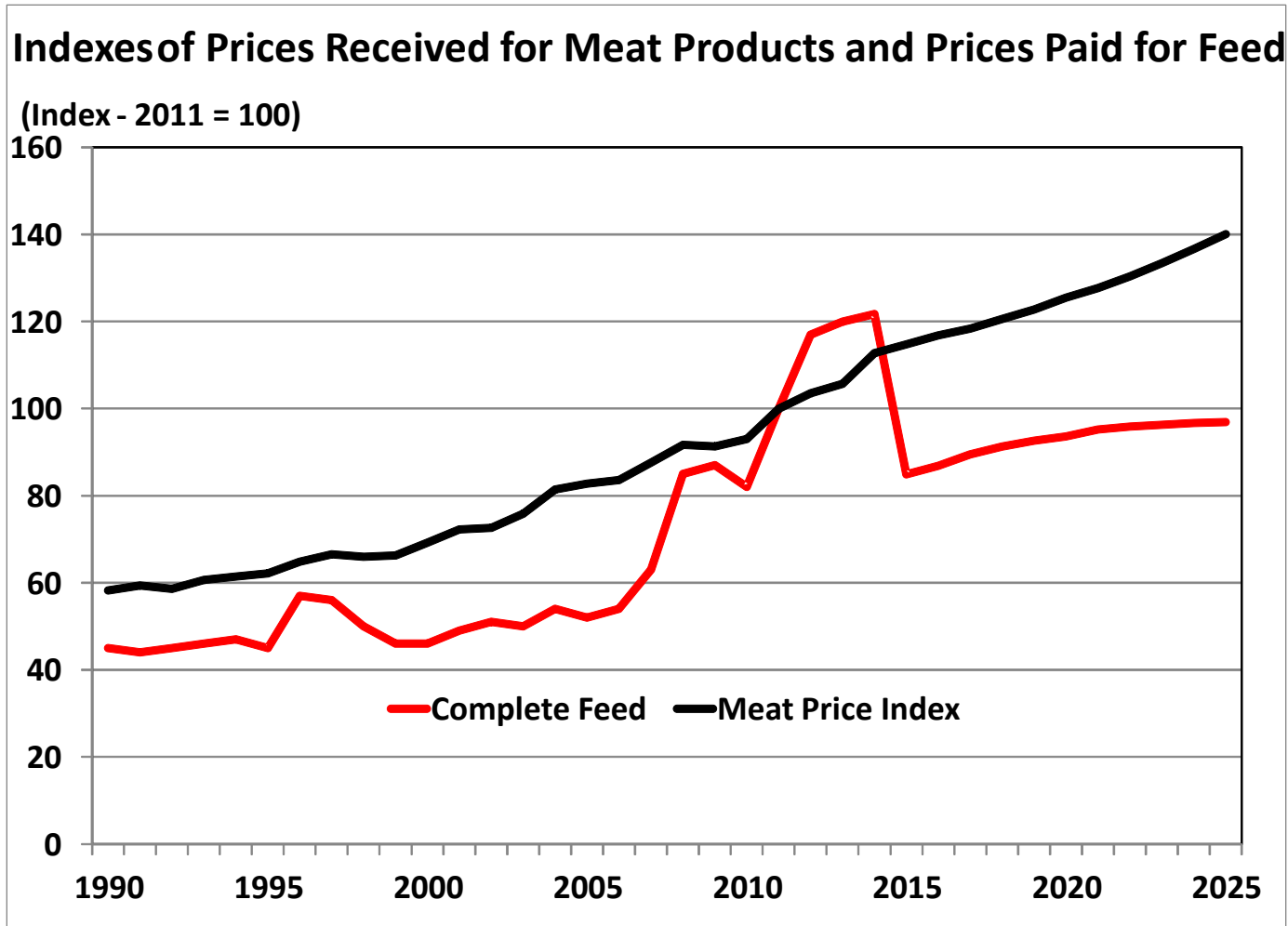
- **Delmarva Agriculture Market Analysis**

- US broiler demand will reach almost 90 lbs per capita by 2030, the fastest growth of all major meat sectors.
- Major increases in food consumption in China, including demand for livestock feed, will drive significant gains in grain exports from the US to Asia.
- The increasing prices for domestic meat compared to feed prices in the US should improve profits in the poultry sector.
- Delmarva broiler production will continue to increase in absolute terms, although significant additional share gains will be limited moving forward

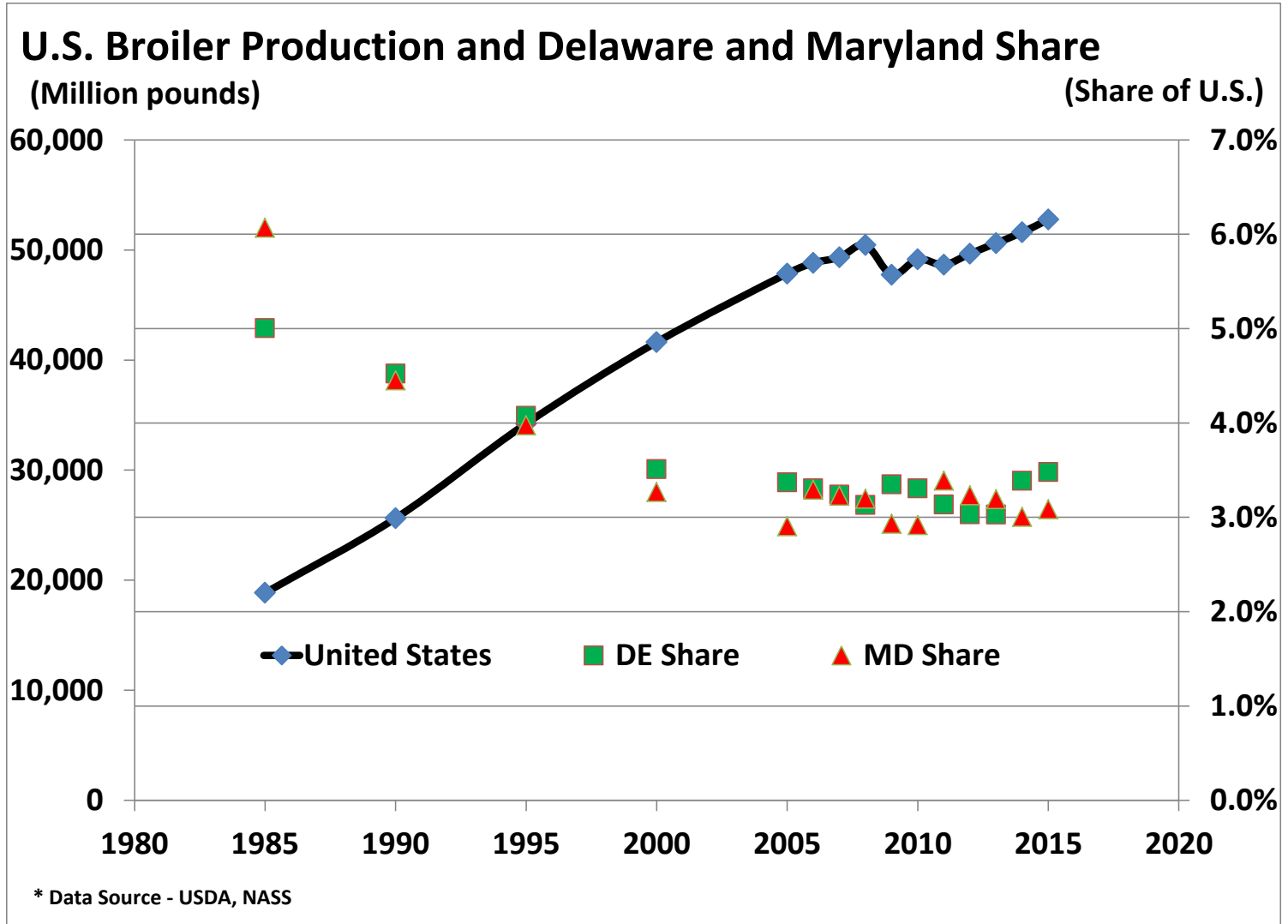
Some Factors that have and will shape U.S. and Delaware agriculture

- Growth in China's middle class
- Bio-fuel production levels
- Persistent high feed cost in recent years had a significant impact on the meat production sector – profits have returned in recent years.
- Environmental issues, including manure / nutrient management
- Irrigation and water availability

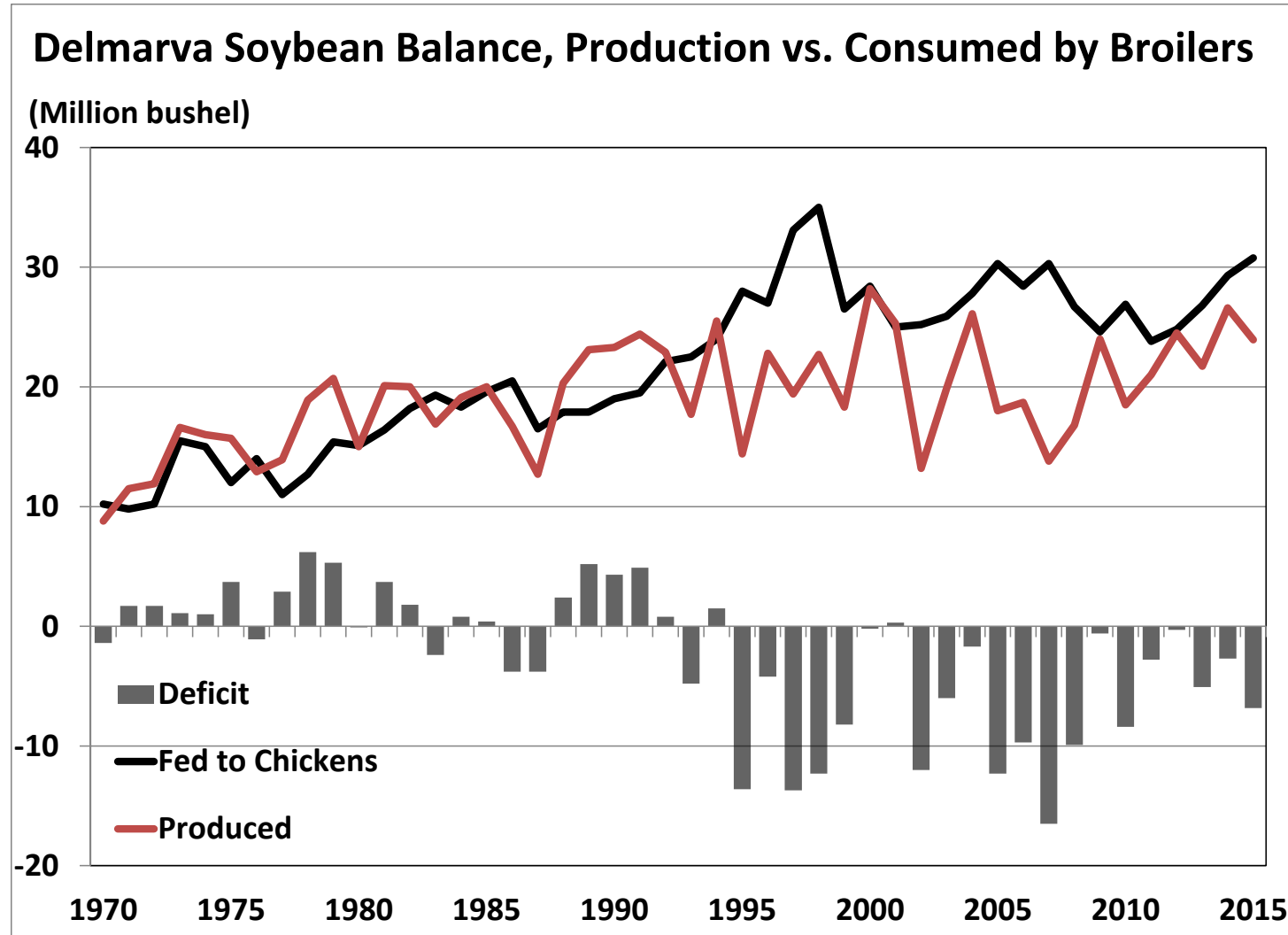
Meat price index increases compared to feed index providing the best opportunity for sustained profits in the poultry and other meat protein categories



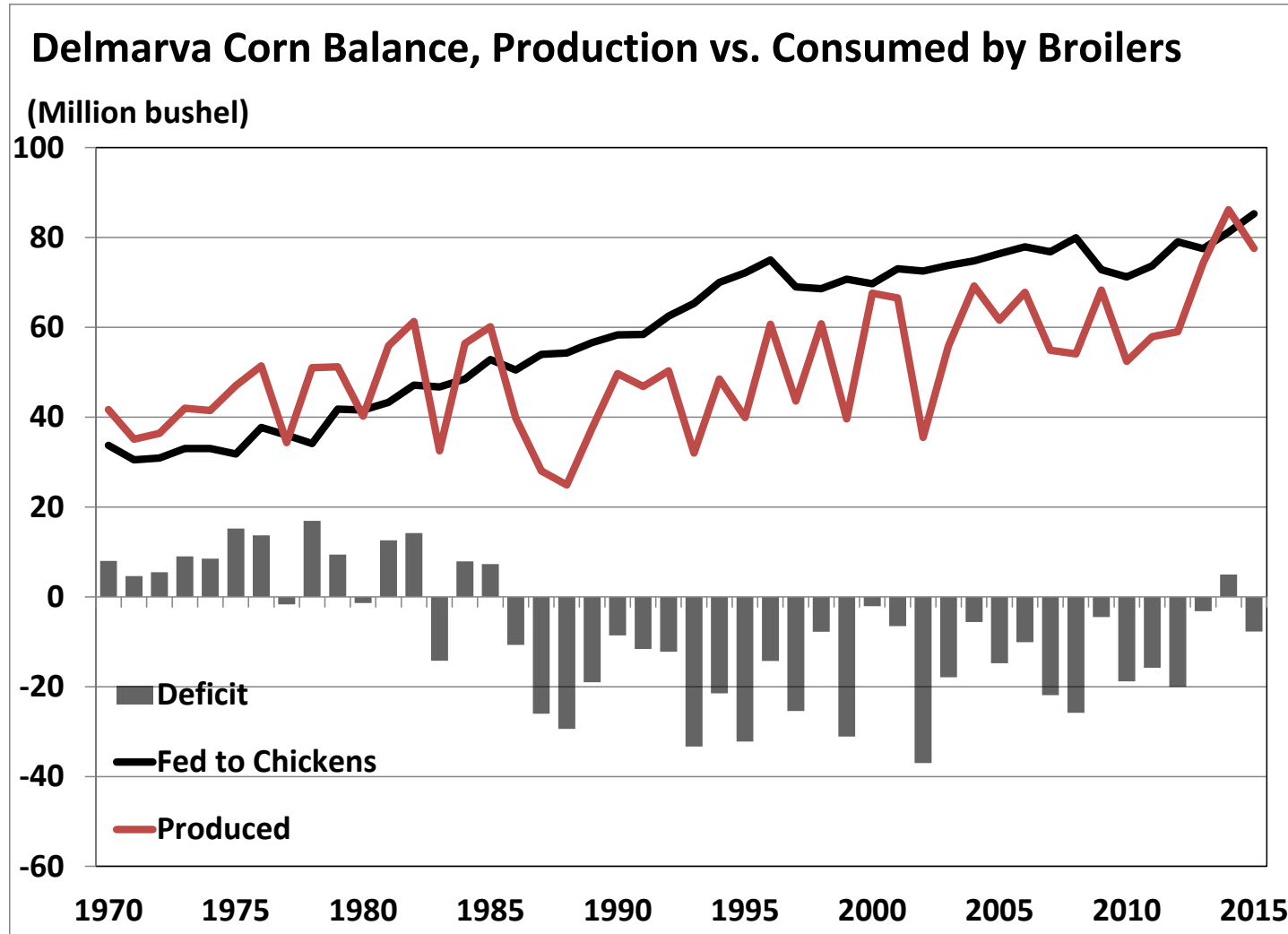
Delaware and Maryland's shares of broiler production had declined, but output and share are up in recent years



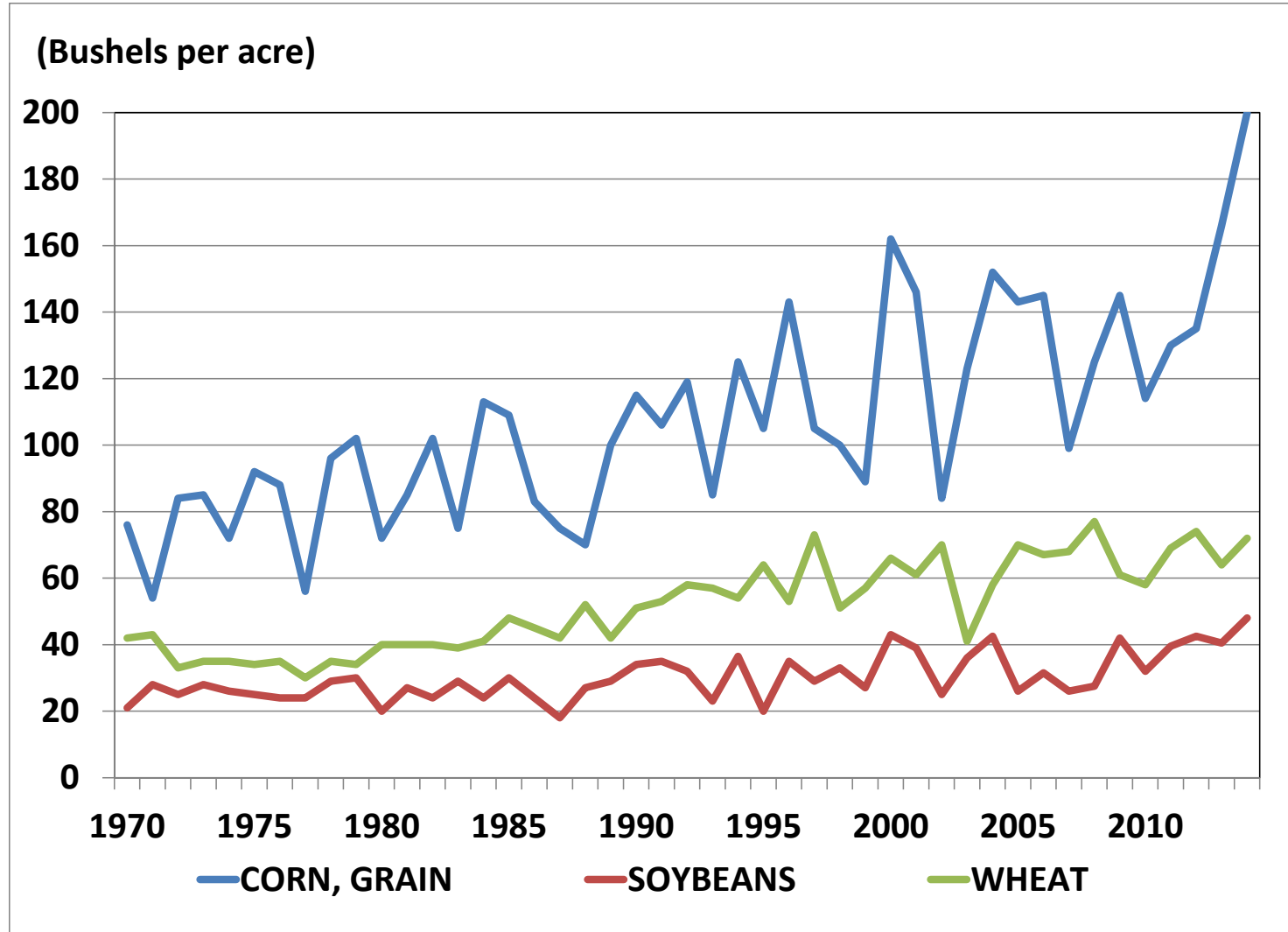
Delmarva produces less soybeans than required for local broiler feed, requiring external sourcing



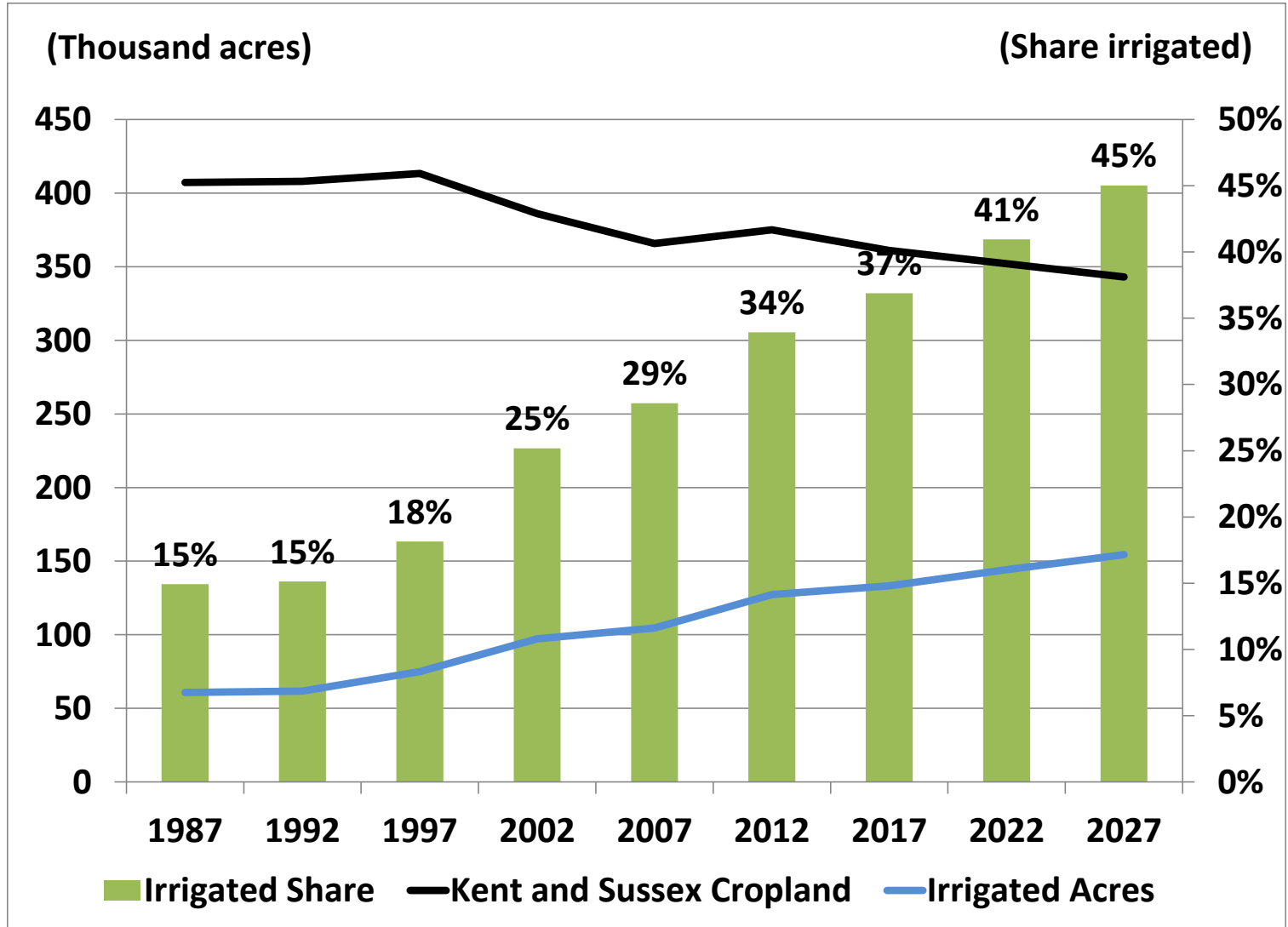
Delmarva currently produces less corn than consumed by broilers requiring imports from U.S. Midwest



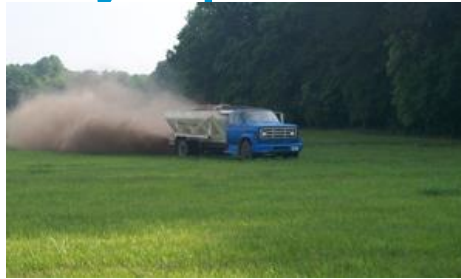
Corn yield in Delaware has been increasing exponentially since 2010, due in part to improvements in irrigation



Agricultural Land in Kent and Sussex Counties Delaware, Total Cropland, Irrigated Cropland, and Irrigated Share



Delaware's Poultry Industry Impacts Transportation in Many Ways



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Summary of key transportation elements of the Delmarva agriculture supply chain



- Grain
- Tropical fruit
- Fertilizer



- Grain
- Soybeans



- Grain
- Soybean meal
- DDGs



- Soybeans



- Chickens, Eggs
- Grain
- Vegetables, Field Crops
- Fertilizer
- Milk

- Grain
- Tropical fruit
- Poultry, Chickens, Eggs
- Soybeans
- Fertilizer

Overview of Agricultural Flows in the Study Region

Mode Tonnages, Tonnage Share and Projected Growth Rates, thousands of tons

Mode	2013 Share	2030 Share	CAGR 2013-2030
Truck	91.7%	90.8%	2.5%
Rail	4.0%	4.3%	3.1%
Water	4.3%	4.9%	3.4%
Air	0.0%	0.0%	1.9%
Total	100%	100%	2.6%

- Trucking is the dominant form of transportation, particularly by value.
- Poultry production is vital to Delmarva's agricultural sector and moves by truck.
- Grains, soybean meal, and DDGs forms the primary input to chicken feed.
 - Inbound grain moves primarily by truck, about 43% of tonnage*.
 - About 32% moves by rail and 26% by barge.
- Water transport moves through the ports of Philadelphia and Wilmington, with barge traffic moving through Salisbury and Seaford.

*This figure reflects the breakdown of inbound cargo. Grains farmed within Delmarva and used as feed in the poultry industry are overwhelmingly moved by truck, and industry sources suggest that overall about 70% of grains are delivered to feed plants by truck, 15% by rail, and 15% by barge.

Summary of industry outreach for primary research

Methodologies employed for industry feedback

	Date	Medium	Description
Industry Workshop	May 6 th	Conference Meeting	<ul style="list-style-type: none"> • Two-hour session at the Delaware Department of Agriculture building in Dover, DE • Focus on poultry industry supply chains • Industry participation*: Large regional grains and poultry companies, railroads, and equipment providers • Public-sector participants: DeIDOT, Wilmapco, and Dover/Kent County MPO
Interviews	April – June	Phone and in-Person	<ul style="list-style-type: none"> • Semi-structured phone and in-person interviews • Outreach to industries*: Transportation & Logistics**, Dairies, Fisheries, Forestry, Breweries, Food Processing & Packing, Suppliers, and Storage • 12 Interviews conducted
Survey	May 22 nd – June 5 th	Online Survey	<ul style="list-style-type: none"> • Conducted by the Delaware Farm Bureau through its weekly on-line news publication to Delaware farmers • Structured and open-ended questions concerning top concerns and priorities for Delmarva policymakers • Participation rate: 7 out of about 100

* Participants identified by Delaware Department of Agriculture, Delaware Department of Transportation, and IHS Agriculture Consulting

** Includes public-sector entities not present at the Industry Workshop, and regional trucking and logistics companies

Summary of priorities: All primary research methods by industry sector

Priorities by sector (at least one mention)

Sector	Poultry	Farmers	Transport/ Logistics	Fisheries/ Dairy	Suppliers
Improve rail throughput across Amtrak NEC	X	X	X		X
Maintain safe, reliable Delmarva Secondary service	X	X	X		X
Improvements to reduce travel times on the I-95/295/495 corridor, tolls & interchanges and the Bay Bridge	X	X	X	X	
Enhance capacity of N-S Delmarva highways (Routes 1, 13, 113)	X	X	X	X	
Reduce congestion on east-west highways, interchanges, and at-grade crossings in southern Delaware (Routes 8, 15, 24, 26, 404)	X	X	X	X	
Permit truck weights up to 90,000 lbs.	X	X	X		
Maintain Nanticoke and Wicomico river channels		X			
Make improvements to secondary roads to permit safe co-existence of trucks and passenger modes	X	X			
Consolidated grain elevator/shuttle terminal	X	X			
Passenger vehicle driver education		X			X
Reduce regulatory burdens (e.g., electronic permitting)		X	X	X	X
Improve truck safety amenities (e.g., rest stop parking)		X			

Regional transportation assets for the Delmarva agriculture industry

Transportation Assets by Mode with Role Description

Mode	Assets	Role in the Regional Supply Chain
Roadways	I-95 System	<ul style="list-style-type: none"> • Primary point of entry and exit to the region by truck; includes I-295 and I-495 • Through route from South to Northeast of US and also to and around Wilmington • Fresh, northbound poultry transits I-95 to major out-of-state markets like Pennsylvania and New York • Grain and other chicken feed and vitamins coming from Pennsylvania, New York, and elsewhere in the Atlantic states also transit I-95
	State Highway System	<ul style="list-style-type: none"> • Primary north-south route is Delaware Route 1; US13 and US113 are vital spurs • I-50 across the Chesapeake Bay is a critical corridor to/from Baltimore & Washington • Limited access in the more urbanized northern parts of the State
Seaports	Philadelphia	<ul style="list-style-type: none"> • Has an FDA foreign imports screening facility for food imports • Major foreign imports-exports site for agriculture products
	Norfolk	<ul style="list-style-type: none"> • Major site for containerized exports of frozen poultry • Grains consolidation and distribution to Delmarva
	Baltimore	<ul style="list-style-type: none"> • Some agriculture industry use for the Delmarva Peninsula
	Wilmington	<ul style="list-style-type: none"> • Inbound fresh fruit products (bananas and juices)
Freight Rail	Norfolk Southern	<ul style="list-style-type: none"> • The only Class I rail serving the Peninsula south of Wilmington via its Delmarva Secondary line, which runs north-south through Delaware and Maryland • Limited to 8 trains ingress or egress per day due to bottleneck at Amtrak NEC
	Shortlines	<ul style="list-style-type: none"> • Connect the Delmarva Secondary to the Atlantic coast (DCLR and MDDE), Maryland (MDDE) and Virginia (BCRR)
Airports	PHL and BWI	<ul style="list-style-type: none"> • Limited use for inbound farm products and vegetables plus outbound hatched fish
Inland Waterways	Seaford	<ul style="list-style-type: none"> • Primarily handles inbound grain for chicken feed but also some outbound grain
	Salisbury	<ul style="list-style-type: none"> • Primarily handles inbound grain for chicken feed but also some outbound grain

Delmarva Grain and Soybean Supply Chain by Mode

Inbound Feed-Stocks by Mode, thousands of tons

	Grain	Soybeans	Total	Share
Truck	564	195	759	43%
Rail	310	254	564	32%
Barge	451	12	463	26%
Total	1,325	462	1,786	

- Delmarva relies more upon trucking transportation for its feed-stocks than the nation as a whole.
 - This is largely a function of supply chains under 500 miles.
- Inbound movements are disproportionately weighted toward barge and rail traffic, compared to the nation.
 - This is largely a function of significant demand, geography and the transportation network available.
- Limited storage and less production than total demand necessitates significant inbound traffic most of the year.
 - Feed-stocks flow out from Delmarva for a few months after harvest.
- Despite the relatively modest market share of rail, feed-stock prices are impacted by the availability of rail.
- “Soybeans” includes soybean meal. “Grain” includes distillers dried grains (DDG).

Comparison of Regional Agricultural Supply Chains

- A price premium is associated with shipping grain and soybeans to Delmarva.
 - This is evident when comparing the per bushel price of corn in Delmarva with nearby states – Pennsylvania, Maryland, North Carolina and Virginia.
 - Other states are advantaged in their price spread due to their geography and transportation network.
- Due to rail capacity constraints, Delmarva can move a limited quantity of feed stocks into the region. Other states do not suffer from the same rail constraints, and this is reflected in their price spread.

Comparison of Corn Spreads across States

State	Price Spread	Quantity Shipped
Delaware	\$0.50	-
Maryland	\$0.36	119 thousand tons
North Carolina	\$0.35	77 thousand tons
Virginia	\$0.24	640 thousand tons
Pennsylvania	\$0.34	265 thousand tons

Delmarva Grain and Soybean Supply Chain by Region

