



Changing Landscape of the Grain Trade



JFV Solutions, Inc.

Solving Today's and Tomorrow's Opportunities!



GEAPS

Presented by

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President – JFV Solutions Inc.

April 17, 2024

Segments of Grain Trade

- **Inputs**
 - Seed, fertilizer, chemicals, machinery, fuel, capital
- **Producer/Farmer**
 - Production
- **Grain Handling and Storage**
 - Inputs - labor, energy, equipment and machinery, capital
- Grain Trading/Marketing
 - Domestic and Export
- **Processors**
 - Inputs - labor, energy, equipment and machinery, capital
 - Marketing and sales
- **Logistics**
 - Trucking, rail, barge, vessel, container
 - Infrastructure
- **Consumer**
- **Government**
 - Regulatory
 - Policy
 - Trade

Factors Impacting the Grain Trade

Economics – cost and availability of working capital

Inflation – cost of inputs

Global Geo-Political conflicts – disruption of trade/exports

Social /Economic Factors – population growth and shifts, disposable income

Cultural shifts - food safety and security, healthy diet

Domestic Political Polarization - farm bill, trade

Weather Events - drought, heat, storm intensity

Supply Chain Challenges - input and machinery/availability

Labor Availability/Participation rates – help wanted signs

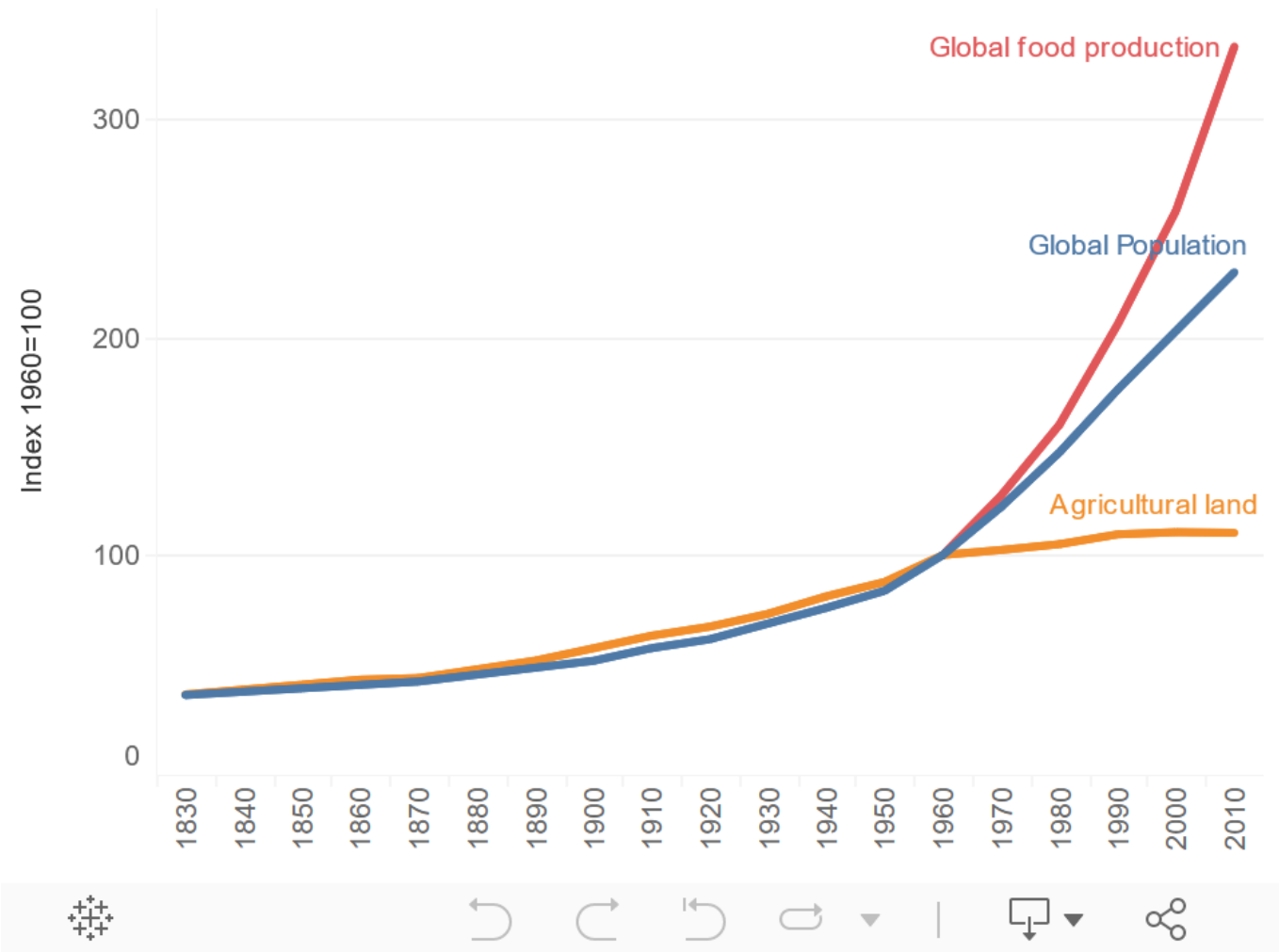
Availability/Cost of Credit – cost of doing business/sustainability

Logistics - cost, reliability

A.I. – it's here: Impact?

Food Production Trends

Global food production, population and agricultural land use

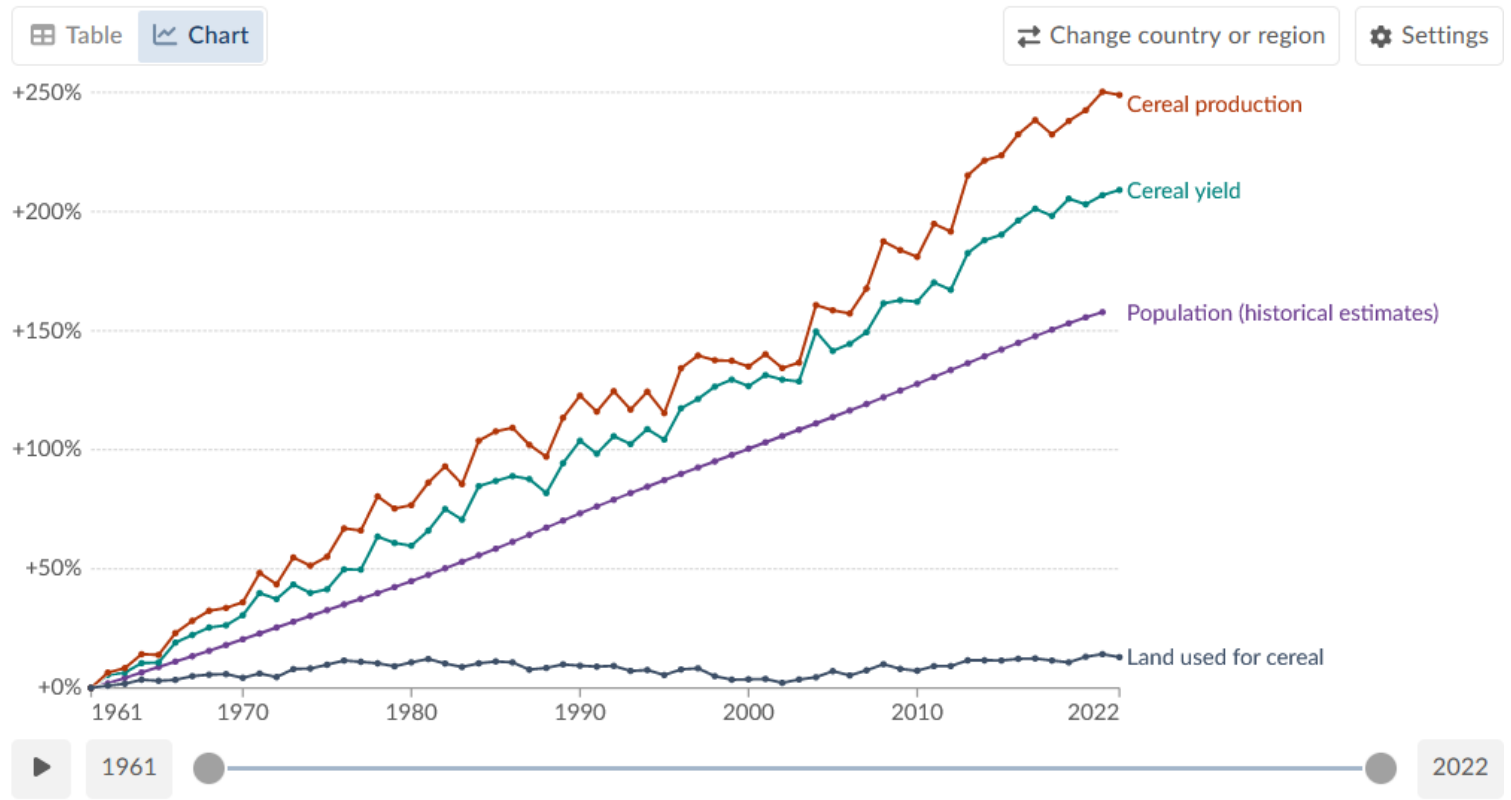


Cereal Grain Production

Change in cereal production, yield, land use and population, World



All figures are indexed to the start year of the timeline. This means the first year of the time-series is given the value zero.



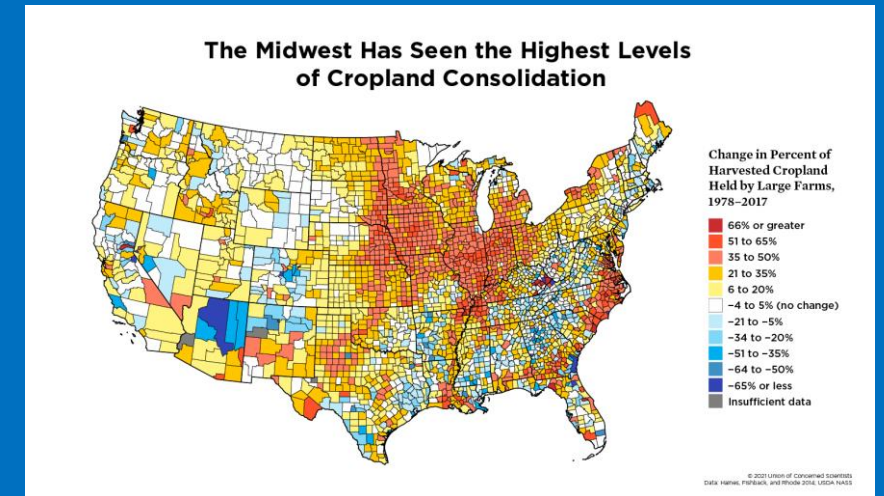
Data source: Food and Agriculture Organization of the United Nations (2023) and other sources - [Learn more about this data](#)
OurWorldInData.org/crop-yields | CC BY



Trends in the Grain Trade

• **Producer/Farmer**

- Consolidation
 - Fewer and larger farms
- Improved information sourcing and management
 - Internet, social networking , satellites
- Improved tillage practices
 - No-till, improved water management (irrigation)
- Higher capacity equipment
 - Planting, , application, harvesting, storage, drying, trucking
- Increased application of Precision Agriculture
- Greater usage of biotechnology
- Greater use of technology
- Greater usage of automation
- Increased interest in certified non-GMO and/or certified organic
- Marketing – more direct to end user or processor
- Inadequate succession planning
- Carbon neutrality



Trends in the Grain Trade

- **Grain Handling and Storage**
 - Consolidation of commercial elevators
 - Regional , domestic , globally
 - Co-operatives
 - Higher capacity equipment
 - Increase in rail shipment vs decline in barge
 - Higher levels of testing
 - Greater use of temporary storage
 - Shrinking labor pool
 - Inadequate succession planning
 - Consolidation in the equipment and bin manufacturing sector
 - Introduction of FSMA into the supply chain
- **Grain Trading/Marketing**
 - Greater and instant access to global data and events
 - Pressure to show value of country elevator system
 - Change back to carry markets
 - Increase activity in overnight trading
 - Increased usage of algorithmic trading
 - Greater influence of China and Brazil on the markets
 - Shrinking knowledge pool
 - Increase barriers from tariffs, trade barriers and geopolitical events

Trends in the Grain Trade

- **Processors**

- Consolidation
- Globalization
- Expansion
- Technology
- Food Safety/Security
- Consumer preference changes
 - Diet and Health
- Societal evolution
 - Age and values

- **Logistics**

- Consolidation
- Globalization
- Carbon Neutral
- Food Security and Safety
- Technology
- Infrastructure issues
- Climate related events
- Political related events
- Carbon Neutral movement

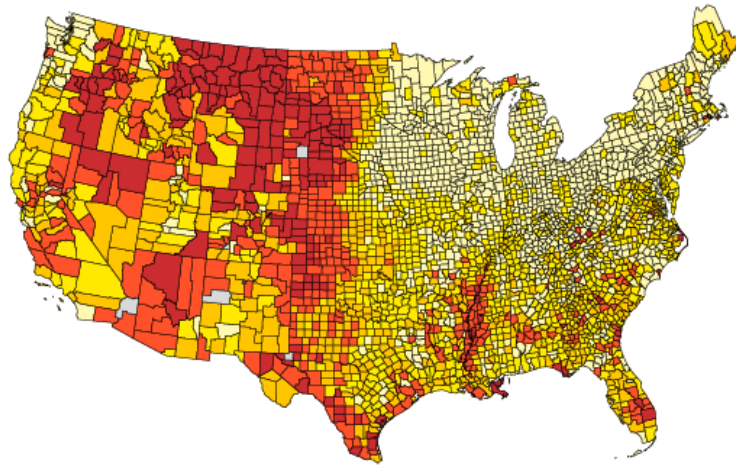
Consolidation in U.S. Agriculture Continues



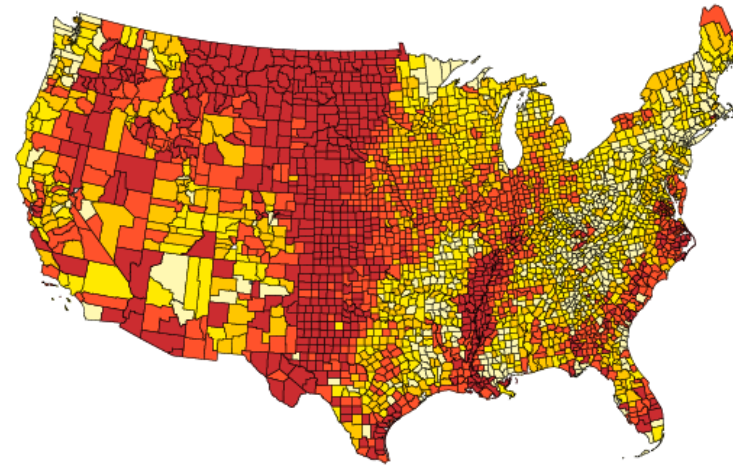
Farm Consolidation

Large Farms Are Consolidating Cropland Across the Country

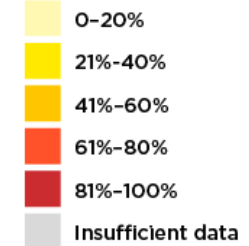
1978



2017



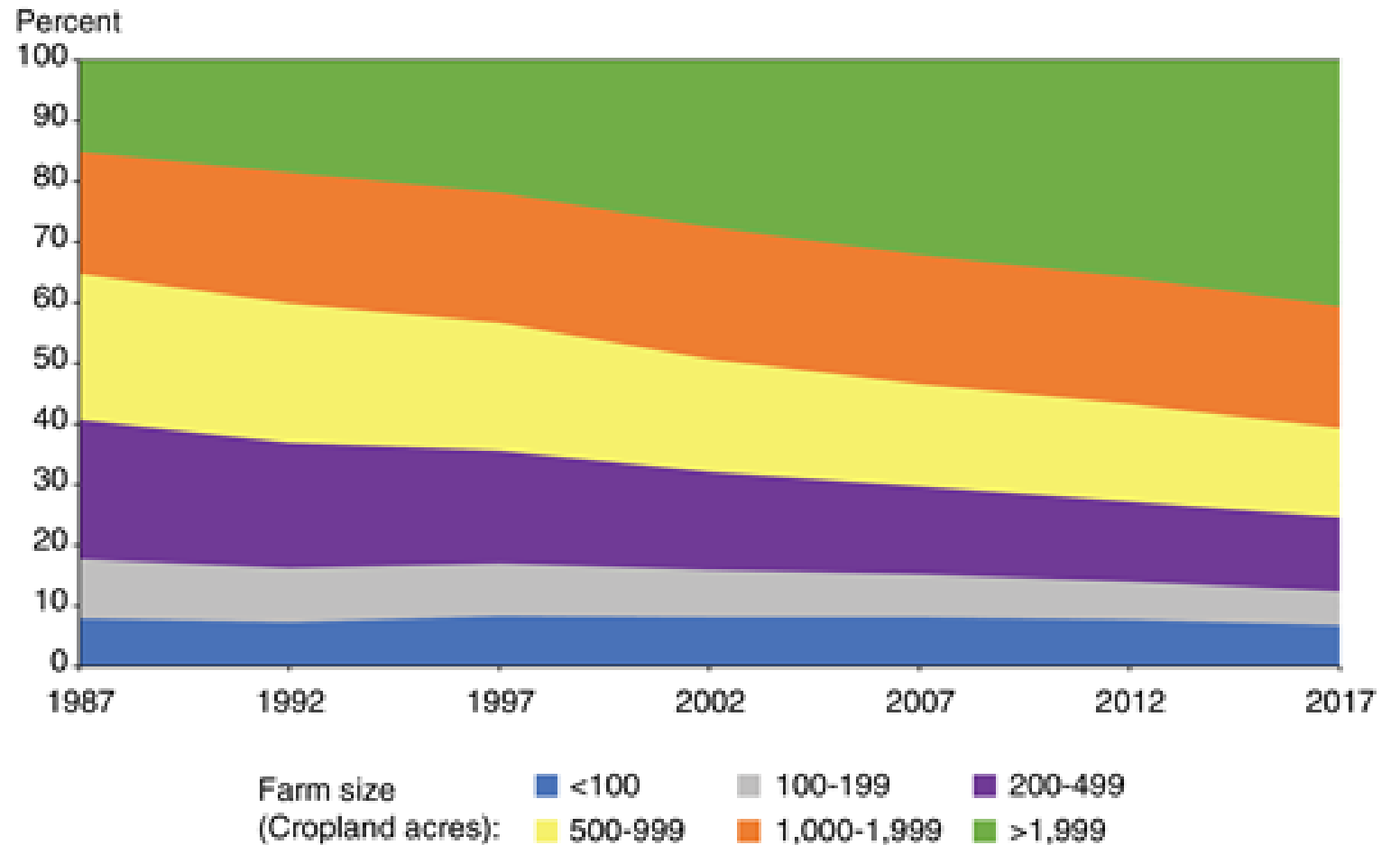
Percent of Harvested
Cropland Held by
Large Farms



© 2021 Union of Concerned Scientists
Data: Haines, Fishback, and Rhode 2014; USDA NASS

Farm Consolidation

Cropland kept moving to larger farms over 30 years



Source: USDA, Economic Research Service using data compiled from USDA, National Agricultural Statistics Service, Census of Agriculture, 1987, 1992, 1997, 2002, 2007, 2012, and 2017.

Consolidation of Commercial Elevators

The major traders, Archer Daniels Midland (ADM), Bunge, Cargill and Louis Dreyfus, collectively known as the ABCD traders, share a significant presence in a range of basic commodities, controlling as much as 90 per cent of the global grain trade.



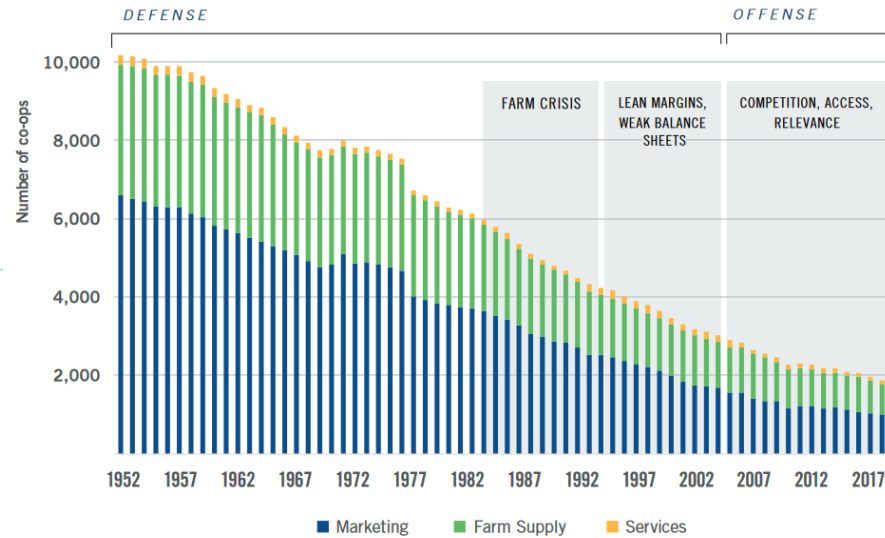
Off-Farm Grain Storage Facilities

Early 1990's – around 13,500	1999 – 10,000	Early 2000's – 9,800	Mid teens – 8,700	2021 – 8,197	2022 - 8,068 almost 12 Billion bushels
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Consolidation of Cooperatives

Number of Cooperatives Declining

EXHIBIT 1: Agricultural Co-op Consolidation by the Numbers

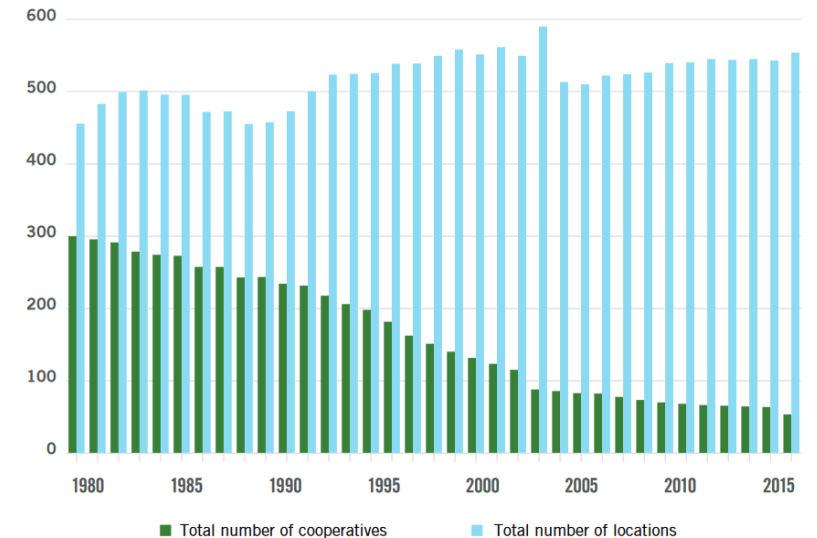


Consolidation has been happening for decades, but driving forces have shifted from defensive to offensive.

Source: USDA Rural Development, CoBank, Keri Jacobs

Number of Cooperative faculties remaining intact

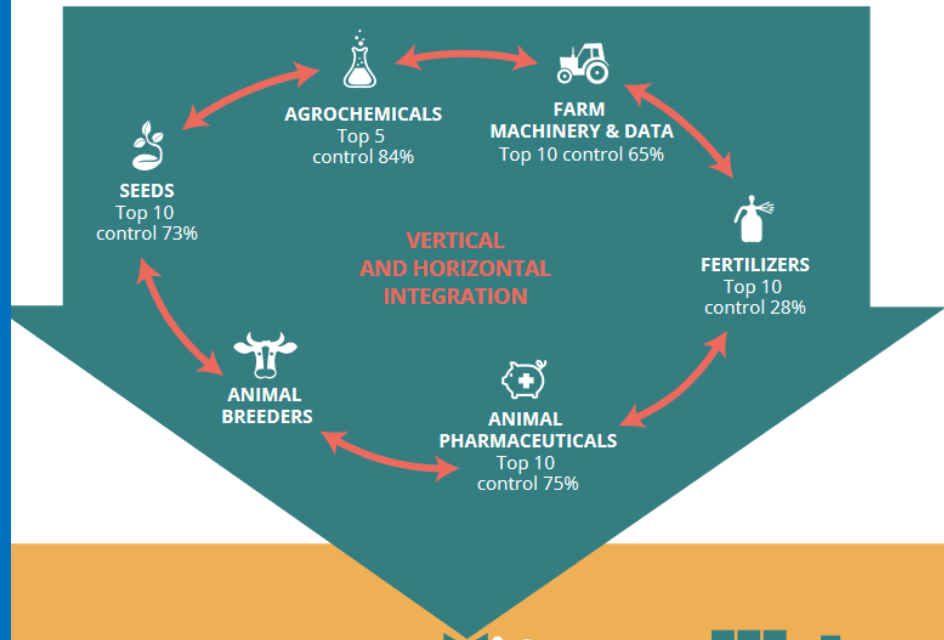
EXHIBIT 4: Iowa Cooperatives and Locations



Iowa is representative of other states. Co-op numbers have declined but facility numbers have not.

Source: Briggeman, Jacobs, Kenkel, McKee. "Current Trends in Cooperative Finance"

CONCENTRATION IN THE AGRI-FOOD SUPPLY CHAIN



Consolidation in Inputs



30%
LARGE SCALE
FARMS



70%
SMALLHOLDERS

1.5bn
PRODUCERS (570m. farms)



**AGRICULTURAL
COMMODITY TRADERS**
Top 10 control 90%



**FOOD AND
BEVERAGE
PROCESSORS** & **ANIMAL SLAUGHTER**
Top 10 control 90% | 4 firms control between
53 & 75% depending
on animal type



RETAILERS

ALTERNATIVE FOOD SYSTEM INITIATIVES

7.5bn
EATERS

Technological Changes in Production

- Mechanical
 - Tillage Practices
 - Irrigation
 - Equipment
 - Automation
 - AI
- Chemical
 - Fertilization
 - Pesticides
- Biological
 - Seed



Mechanical Advancements

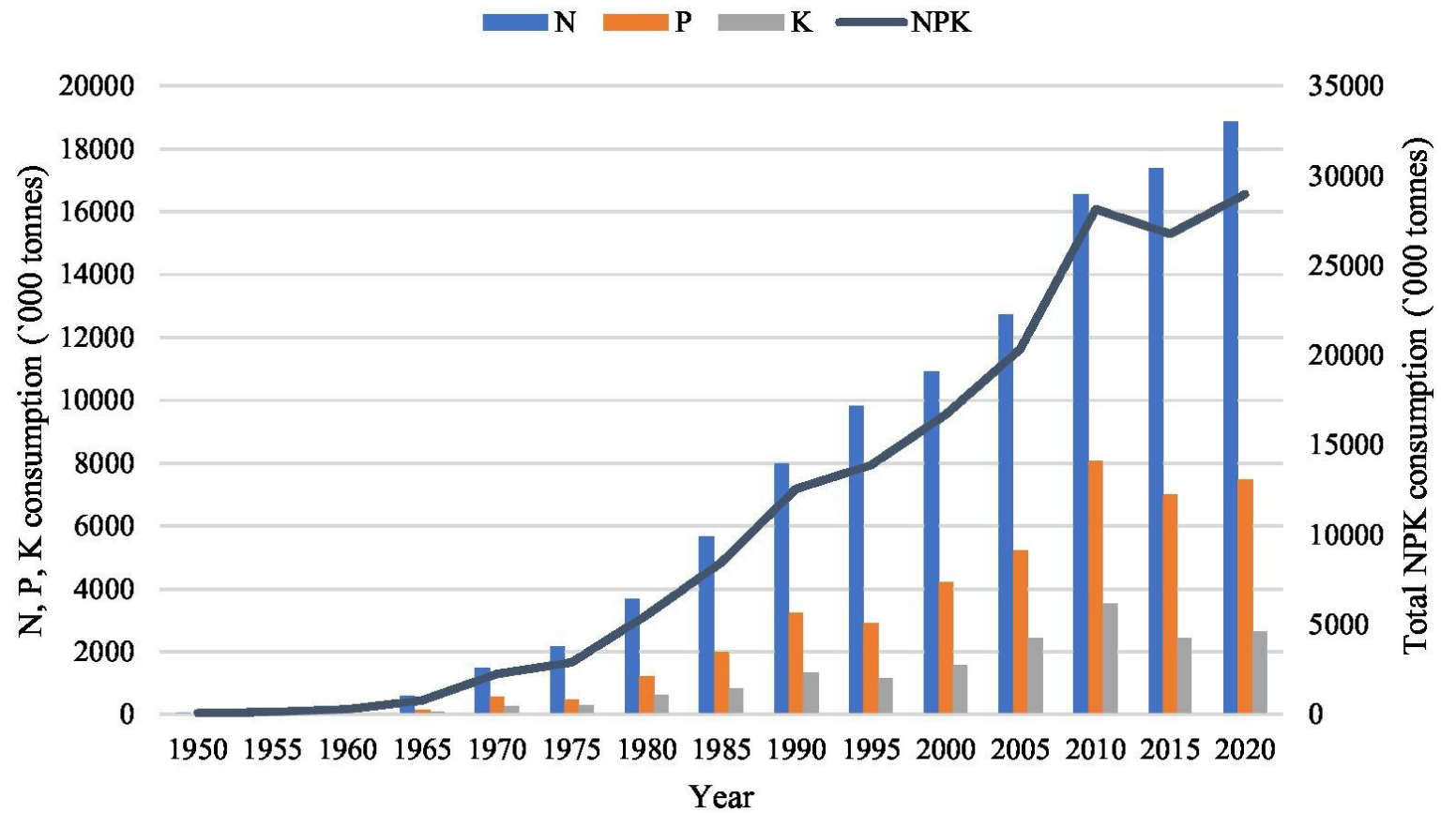
John Deere DB120 120' Tool Bar – 48 Rows



John Deere X9 1100 690Hp – 7,200 bph

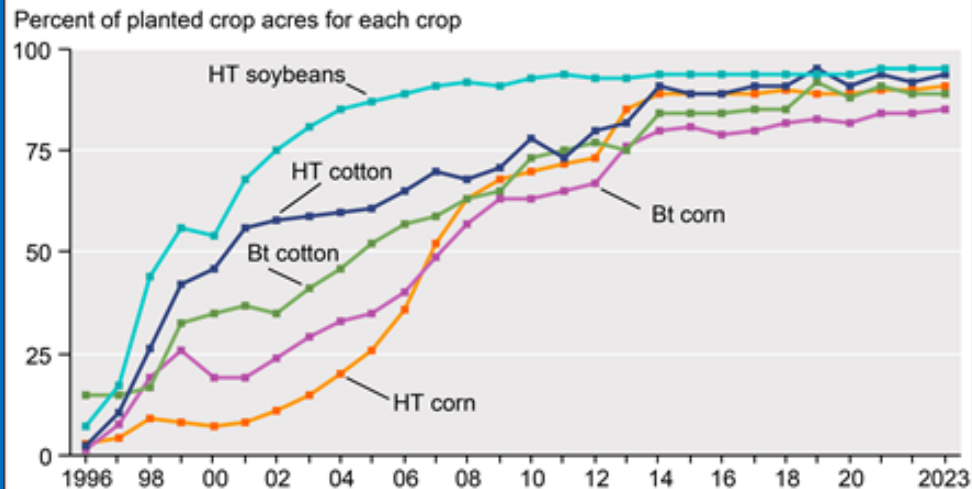


NPK Usage



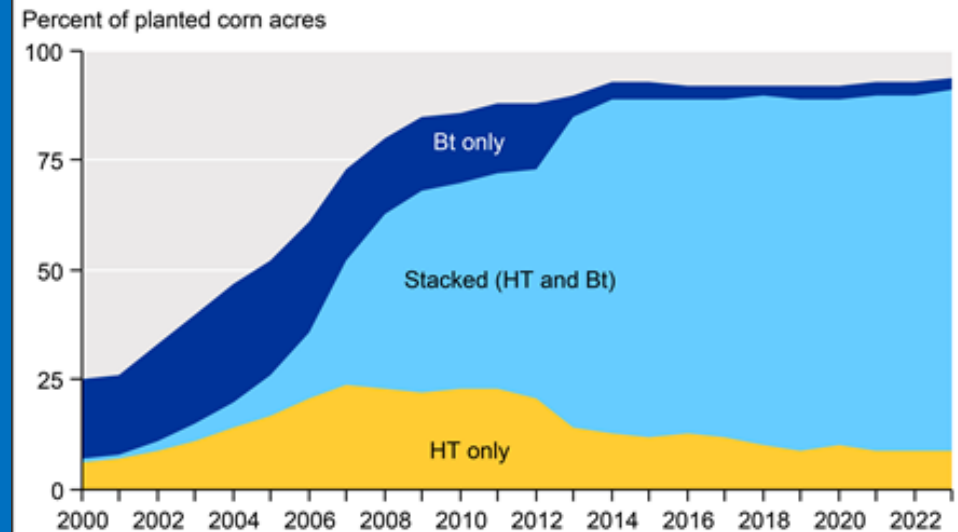
Biotechnology Acceptance

Adoption of genetically engineered crops in the United States, 1996–2023



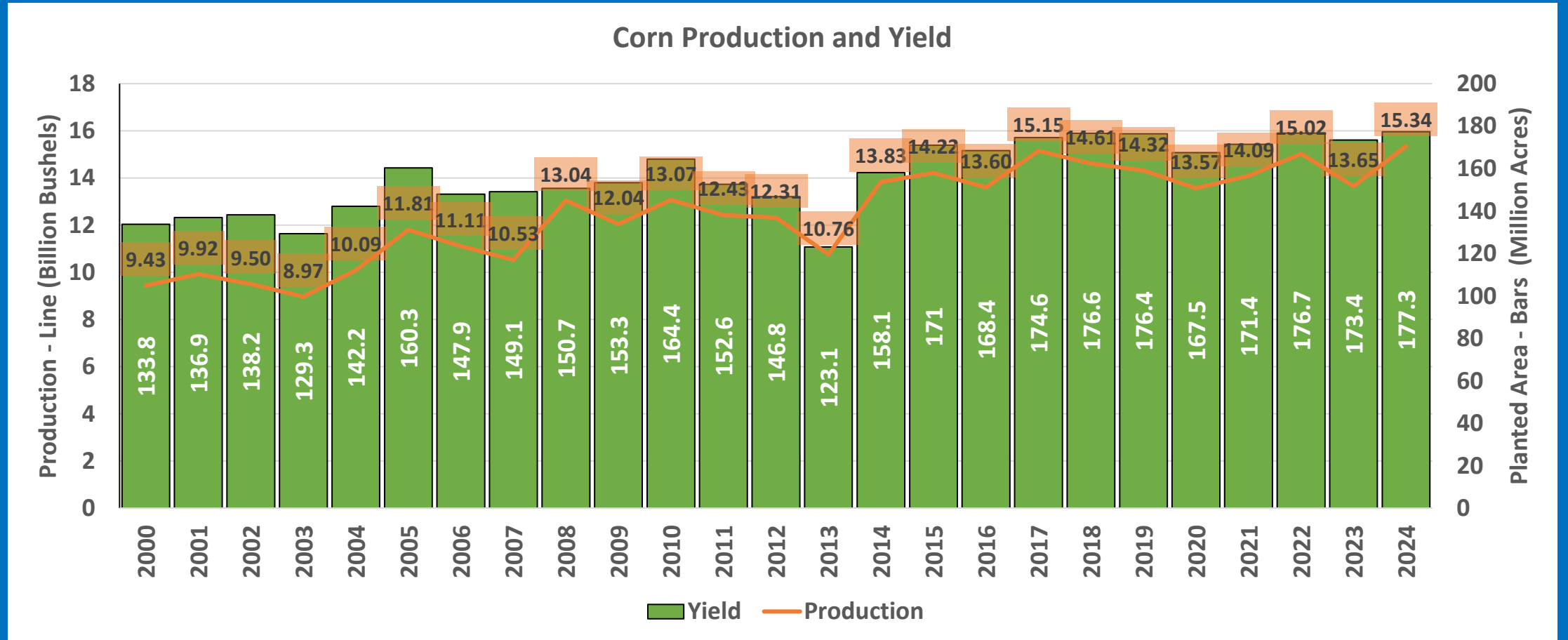
Note: HT indicates herbicide-tolerant varieties; Bt (*Bacillus thuringiensis*) indicates insect-resistant varieties (containing genes from the soil bacterium Bt). Data for HT/Bt corn and cotton are not mutually exclusive, as HT and Bt categories include those varieties with overlapping (stacked) HT and Bt traits.
 Source: USDA, Economic Research Service using data from the 2002 ERS report, Adoption of Bioengineered Crops (AER-810) for 1996–99 and National Agricultural Statistics Service, (annual) June Agricultural Survey for 2000–23.

Adoption of genetically engineered corn in the United States, by trait, 2000–23

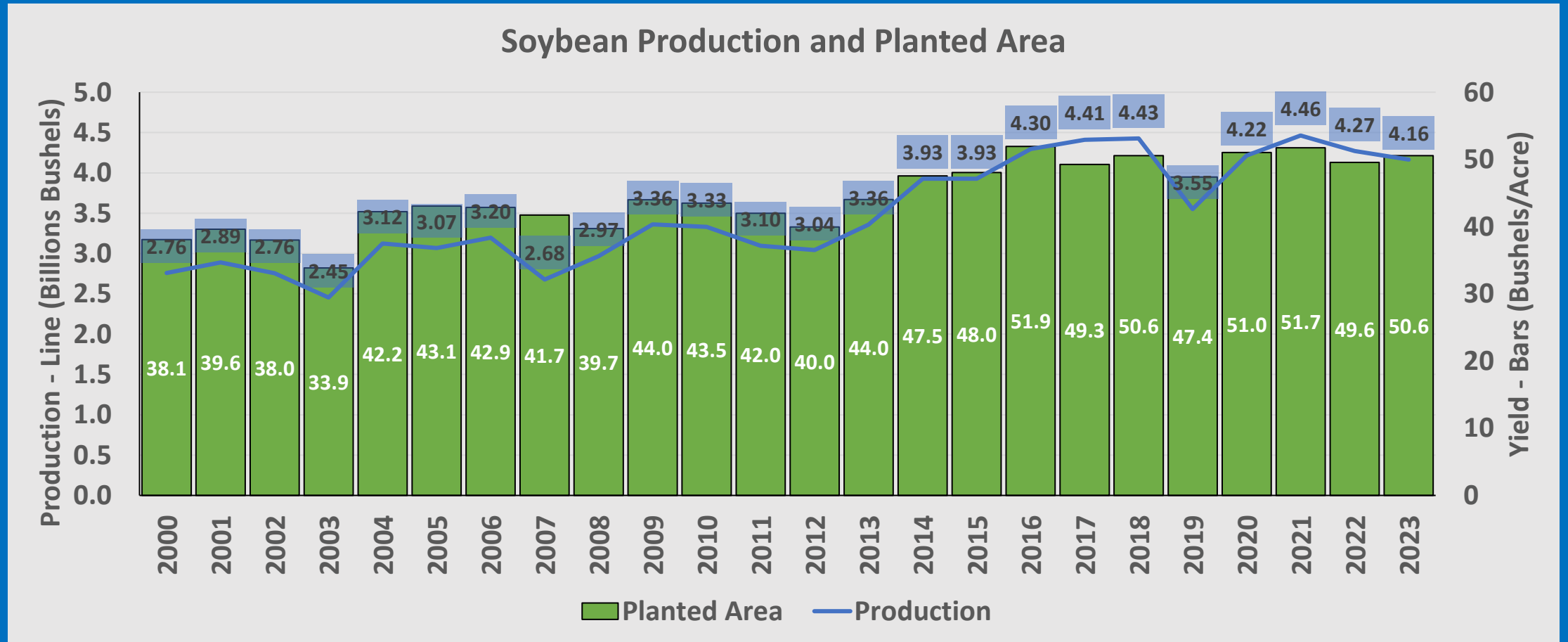


Note: HT indicates herbicide-tolerant varieties; Bt (*Bacillus thuringiensis*) indicates insect-resistant varieties (containing genes from the soil bacterium Bt). Stacked varieties include those with both HT and Bt traits.
 Source: USDA, Economic Research Service using data from USDA, National Agricultural Statistics Service, annual June Agricultural Survey, various years.

Corn Trends



Soybean Trends



Grain Storage and Handling

- Receiving upgrades
 - Capacity
- Storage Upgrades
 - Capacity
 - Size
 - Aeration
- Drying Upgrades
 - Capacity
 - Moisture Management
- Handling Upgrades
 - Capacity
 - Quality Integrity
- Loading Upgrades
 - Unit trains
- Automation

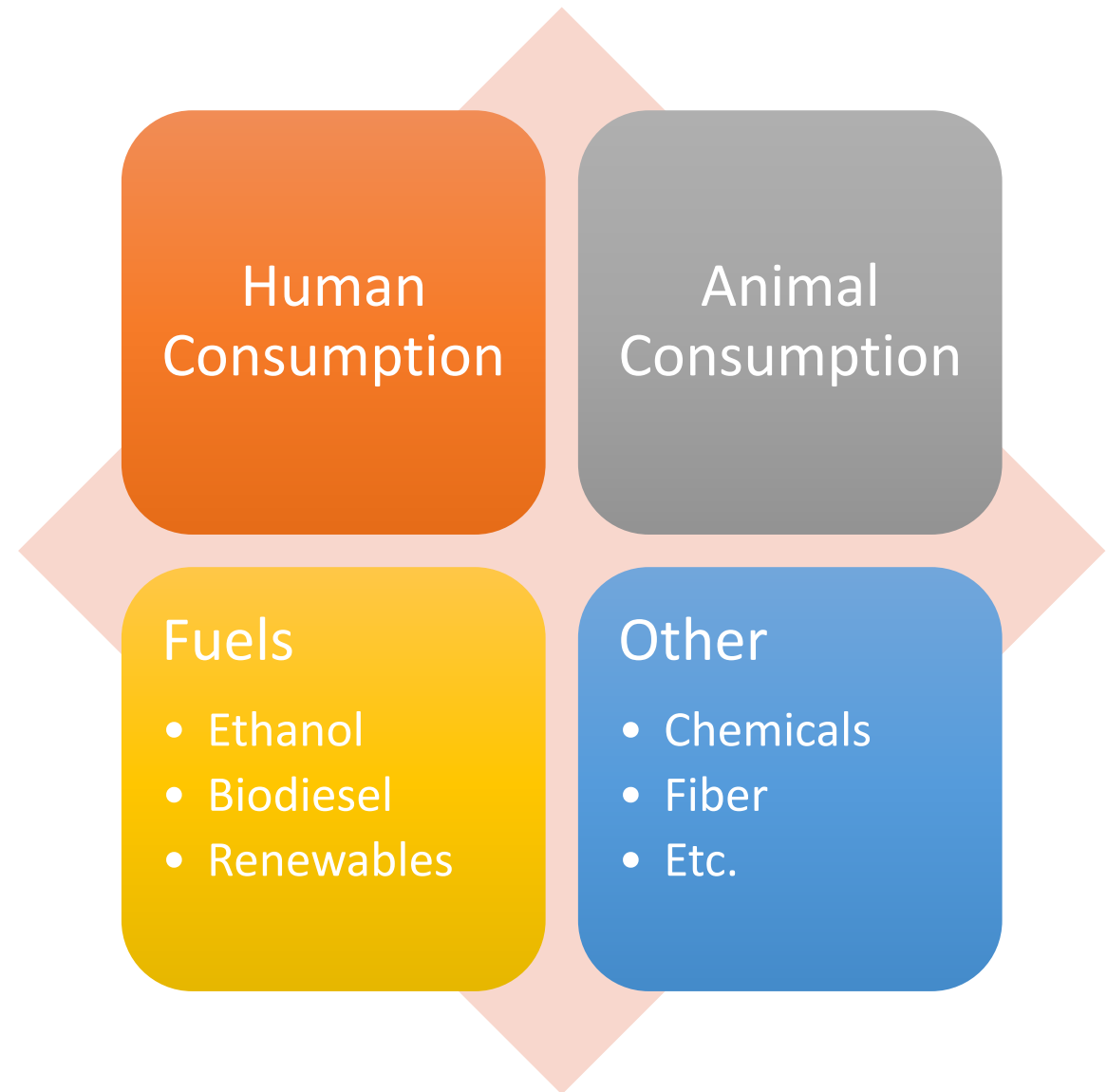


90' Diameter – 500,000 bushels

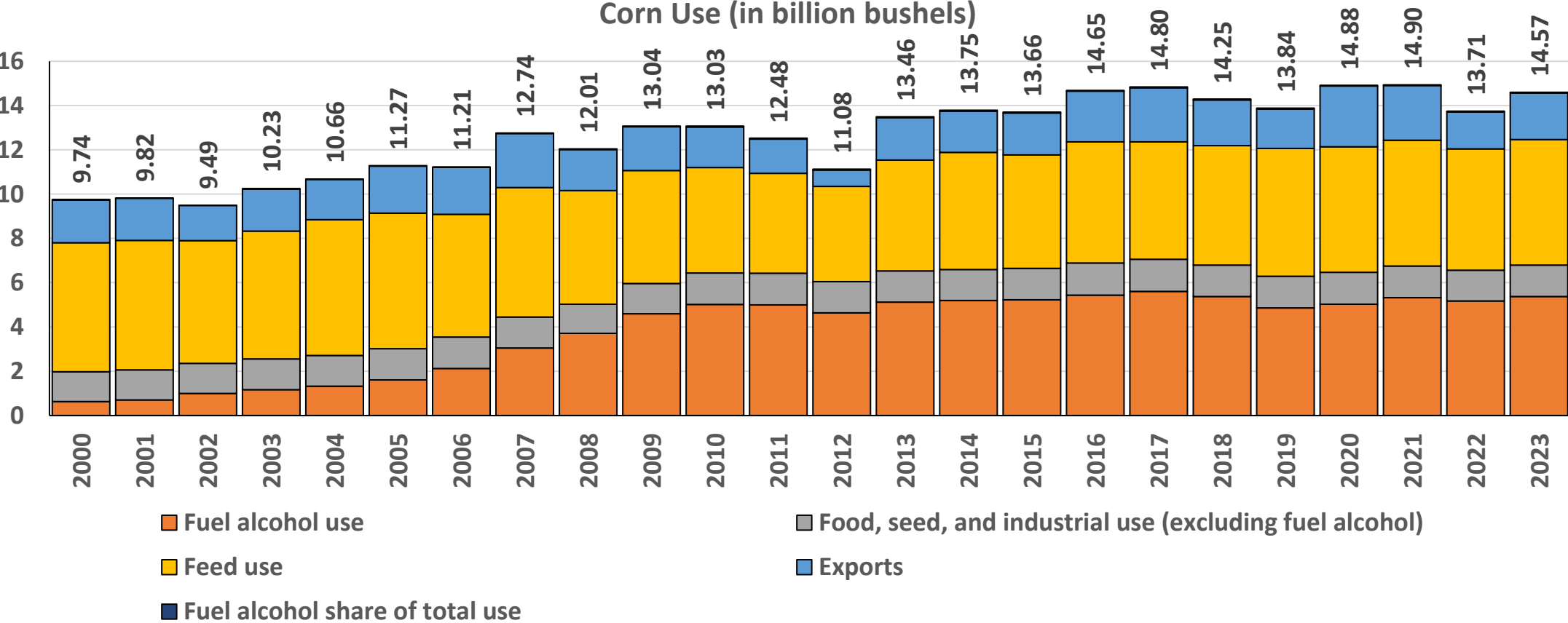
132' Diameter – 1.2 million bushels



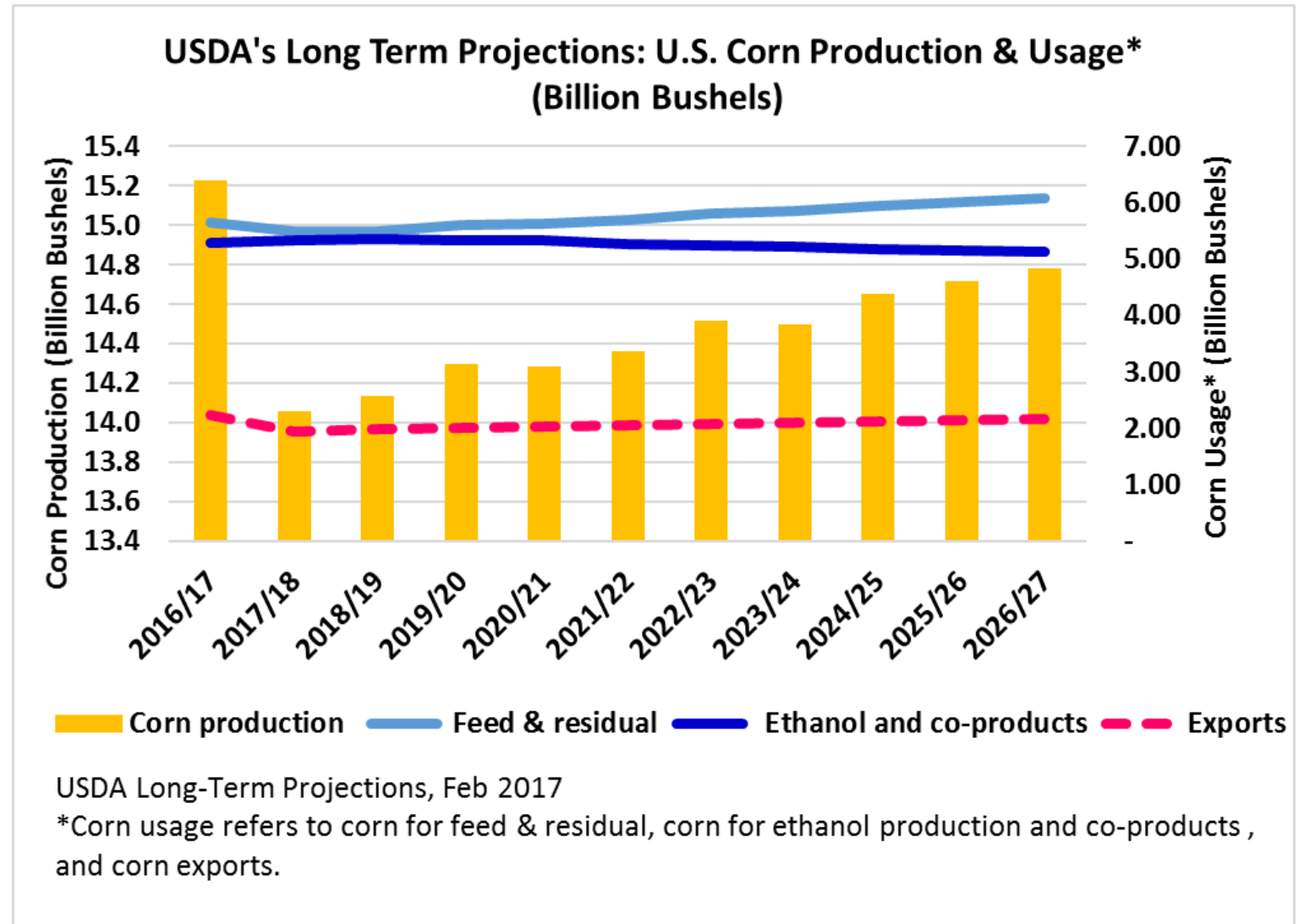
Processing



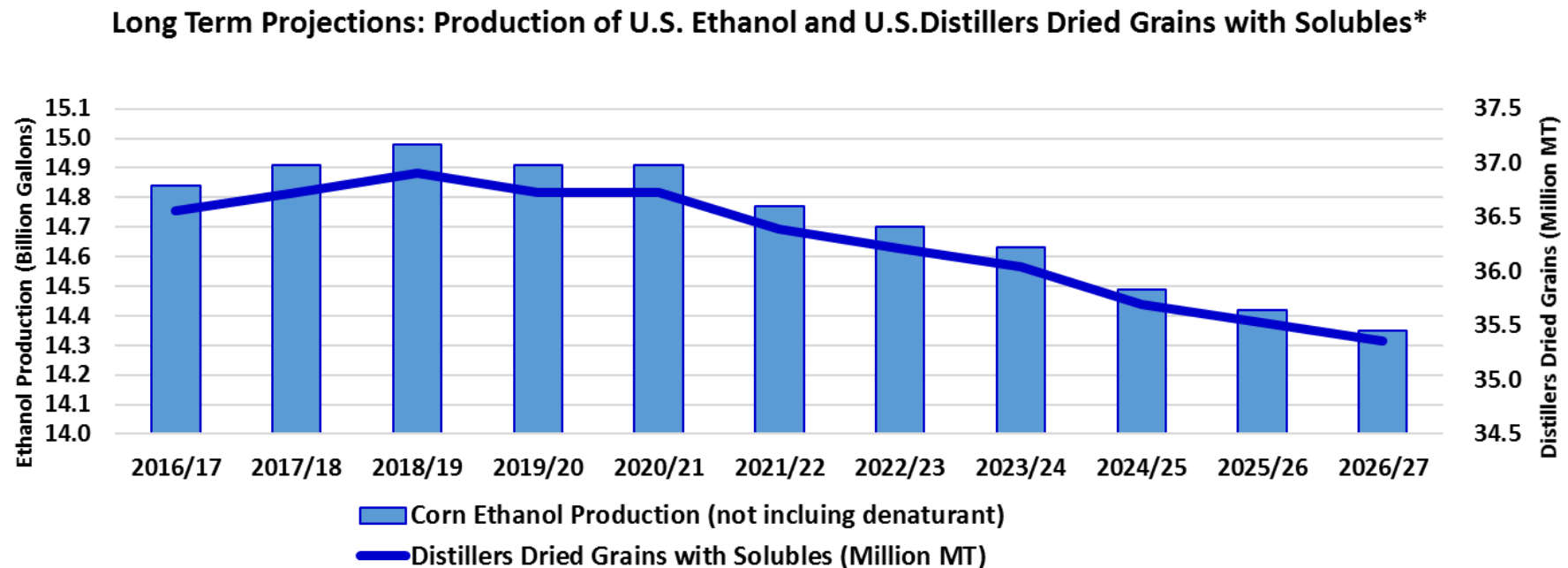
Domestic Corn Usage Trends



Corn Projections



Ethanol Projections



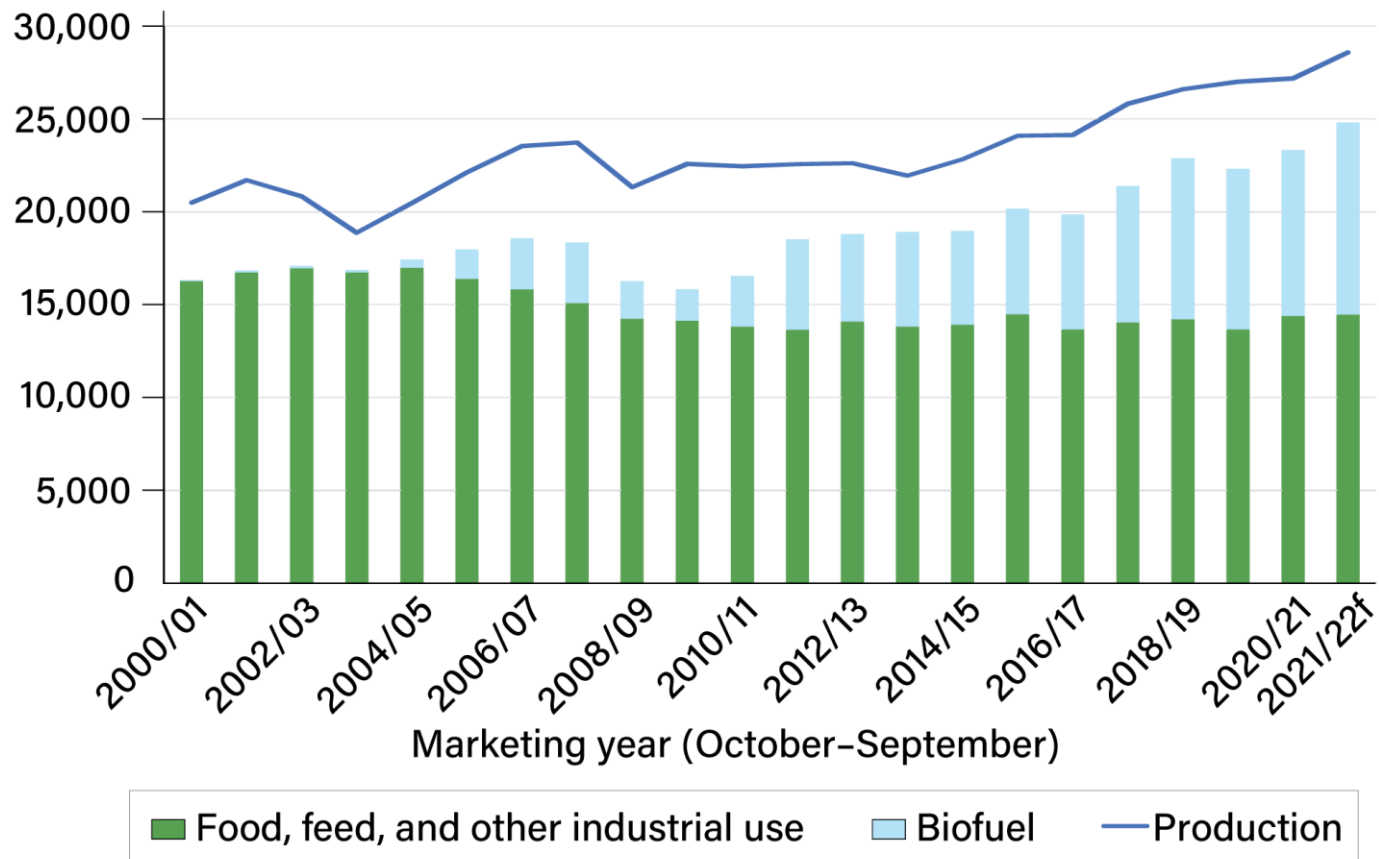
Source: USDA Long Term Projection (Feb 2017)

* Ethanol and distillers dried grains with solubles (DDGS) production were projected based on the USDA's long term projections for corn usage for ethanol production. DDGS is the main co-product of dry mill plants. Conversion factors: one bushel of corn yields 2.8 gallons of ethanol. One bushel of corn yields 17 pounds of DDGS. Assumption 89.5% of corn used to produce ethanol is processed in dry mill plants. Ethanol production does not include denaturant.

Soybean Oil Production Trends

U.S. soybean oil production rises to meet growing domestic demand

Soybean oil (millions of pounds)

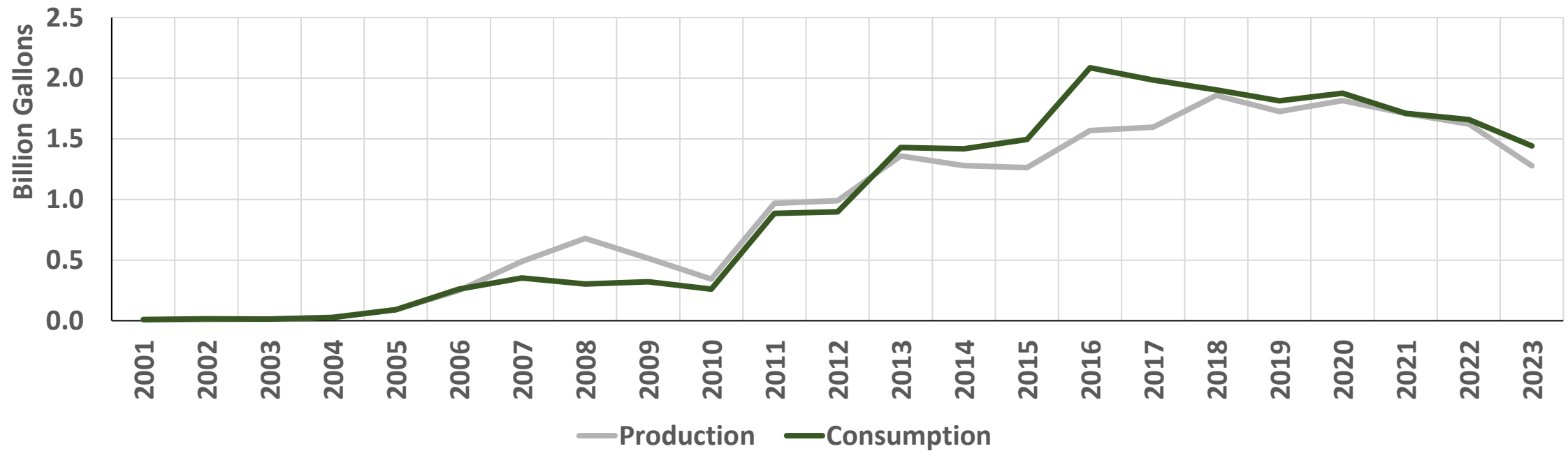


Notes: **f** = forecast. **Biofuel** includes biodiesel and renewable diesel.

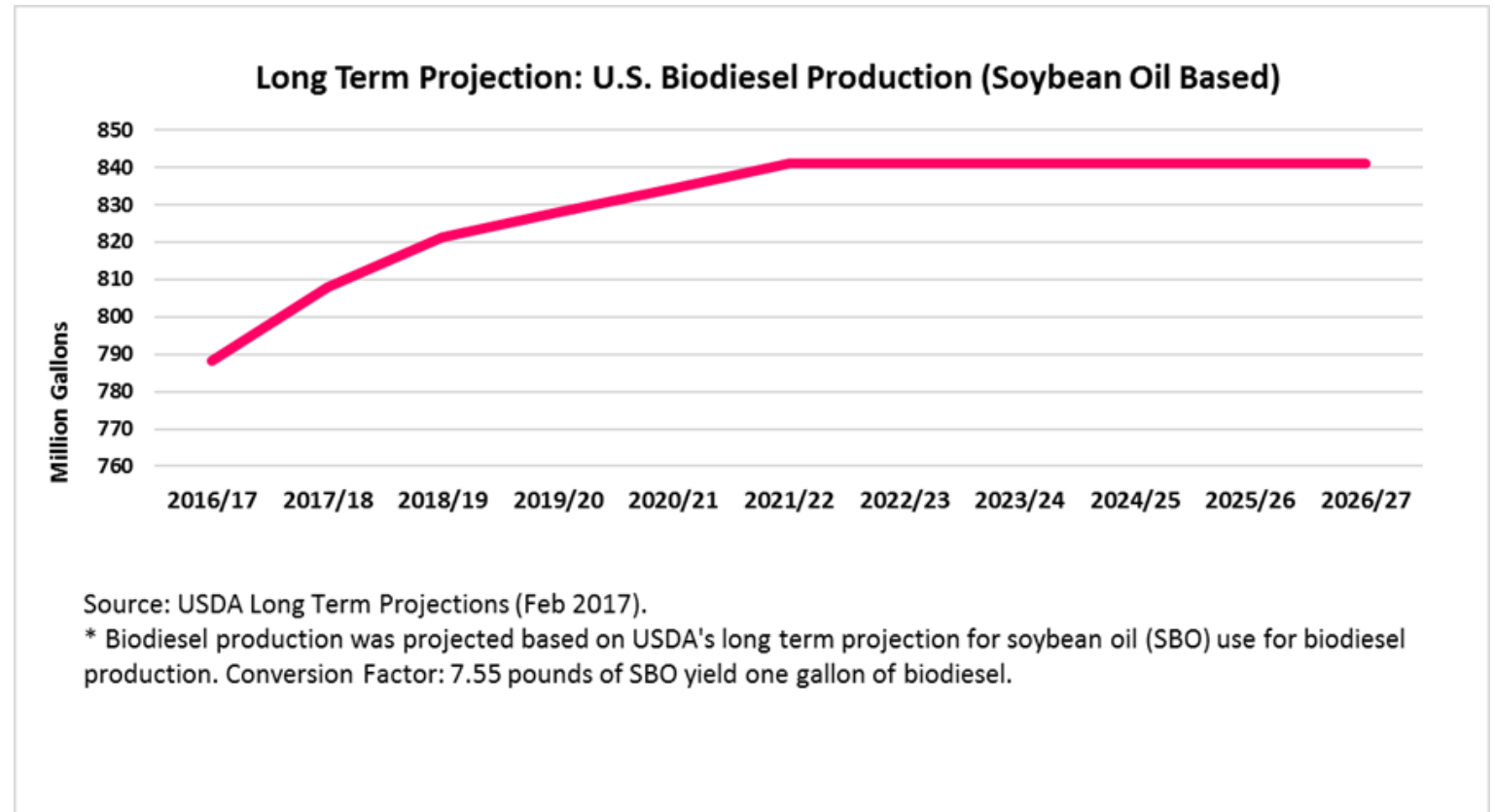
Source: USDA, Economic Research Service using data from World Agricultural Outlook Board, *World Agricultural Supply and Demand Estimates*, November 2022.

Biodiesel Trends

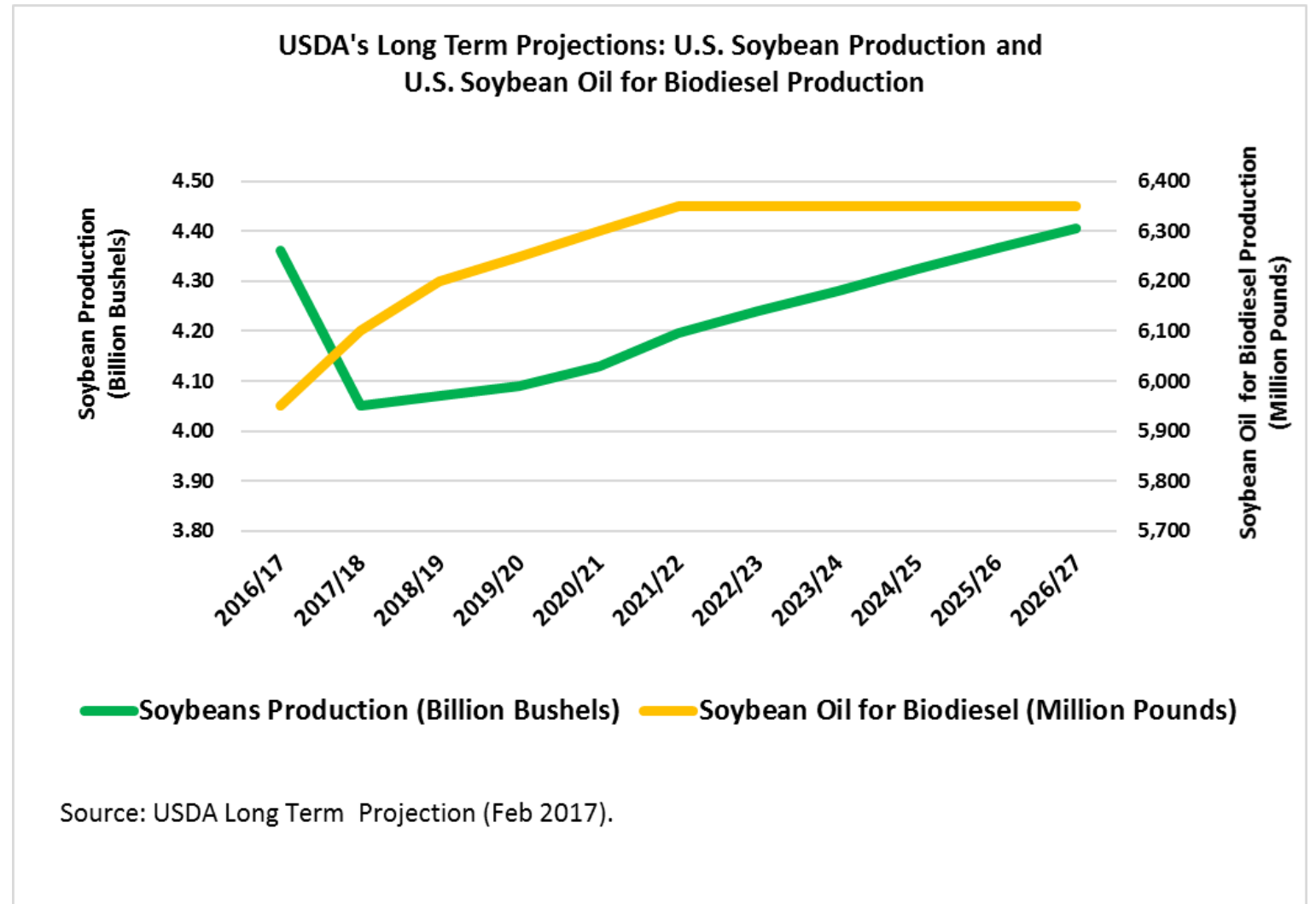
U.S. Biodiesel Production and Use, by Calendar Year



Biodiesel Production Projections

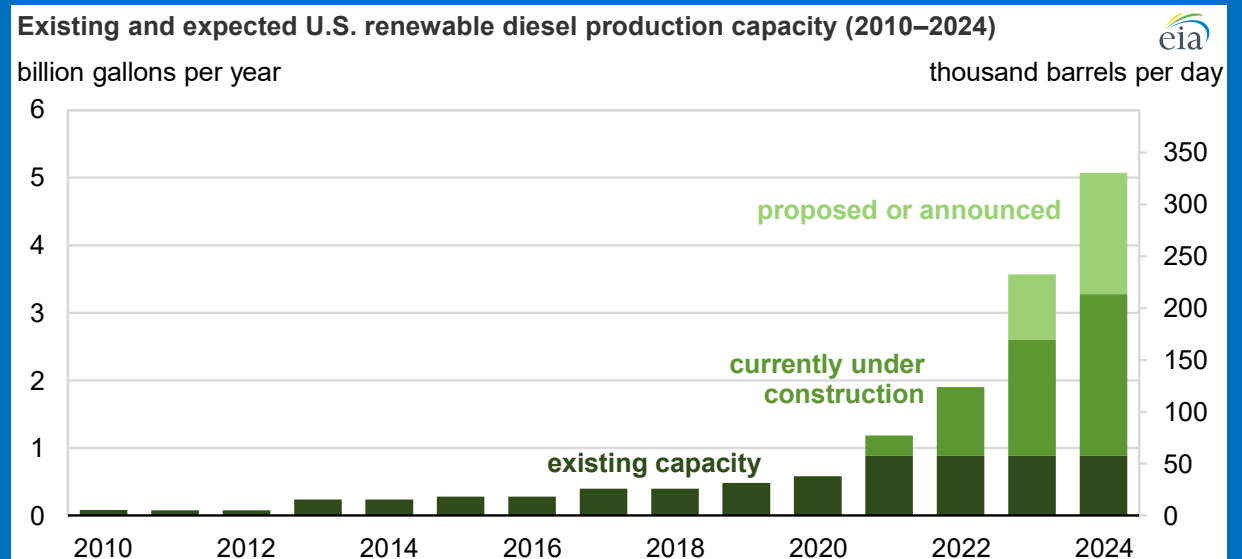
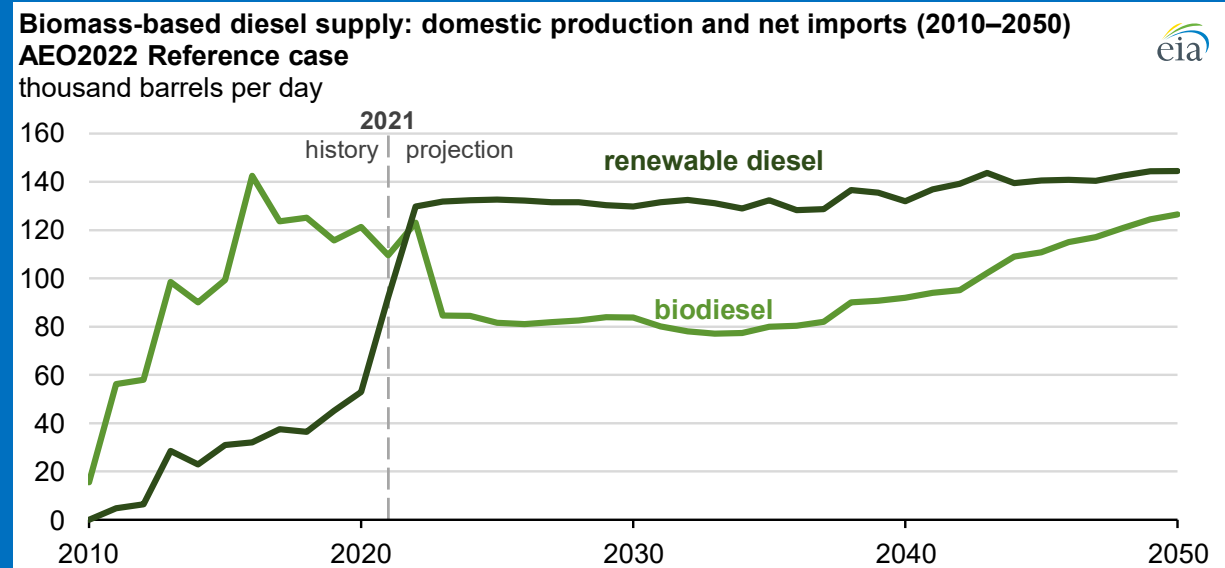


Biodiesel Production Projections

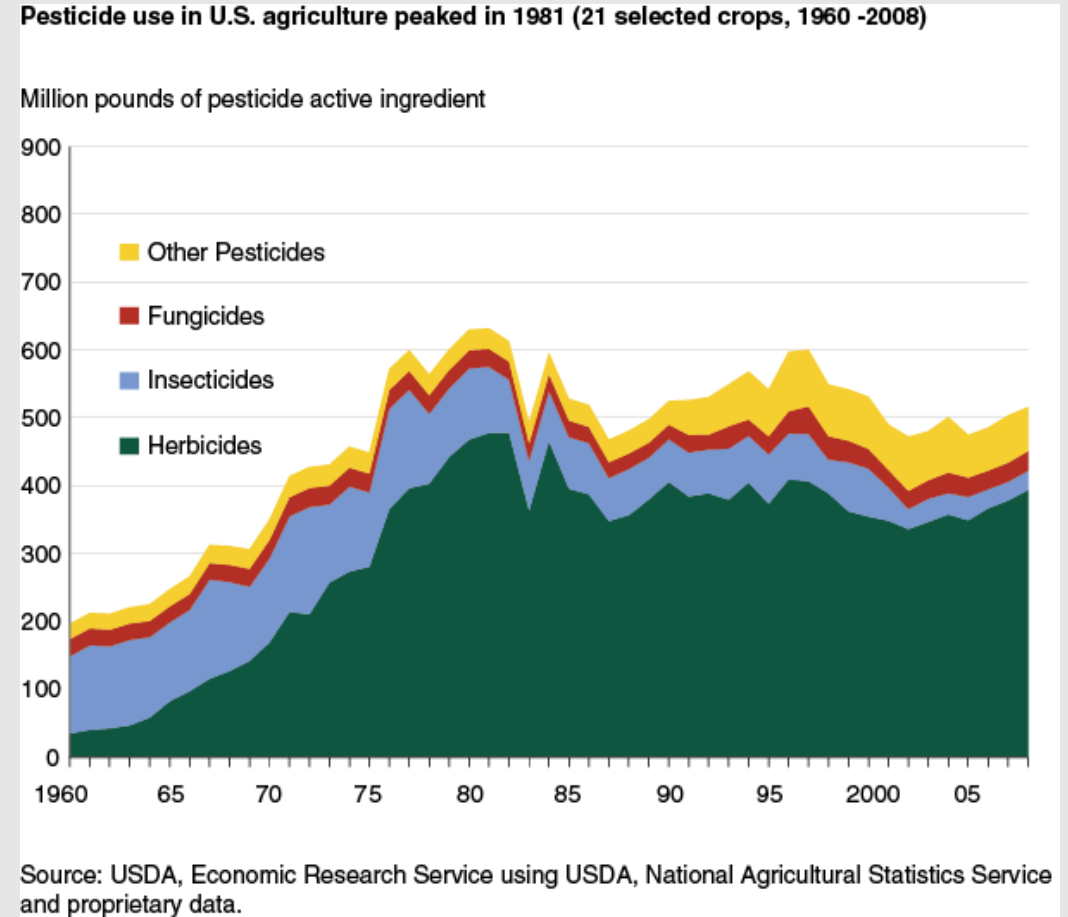
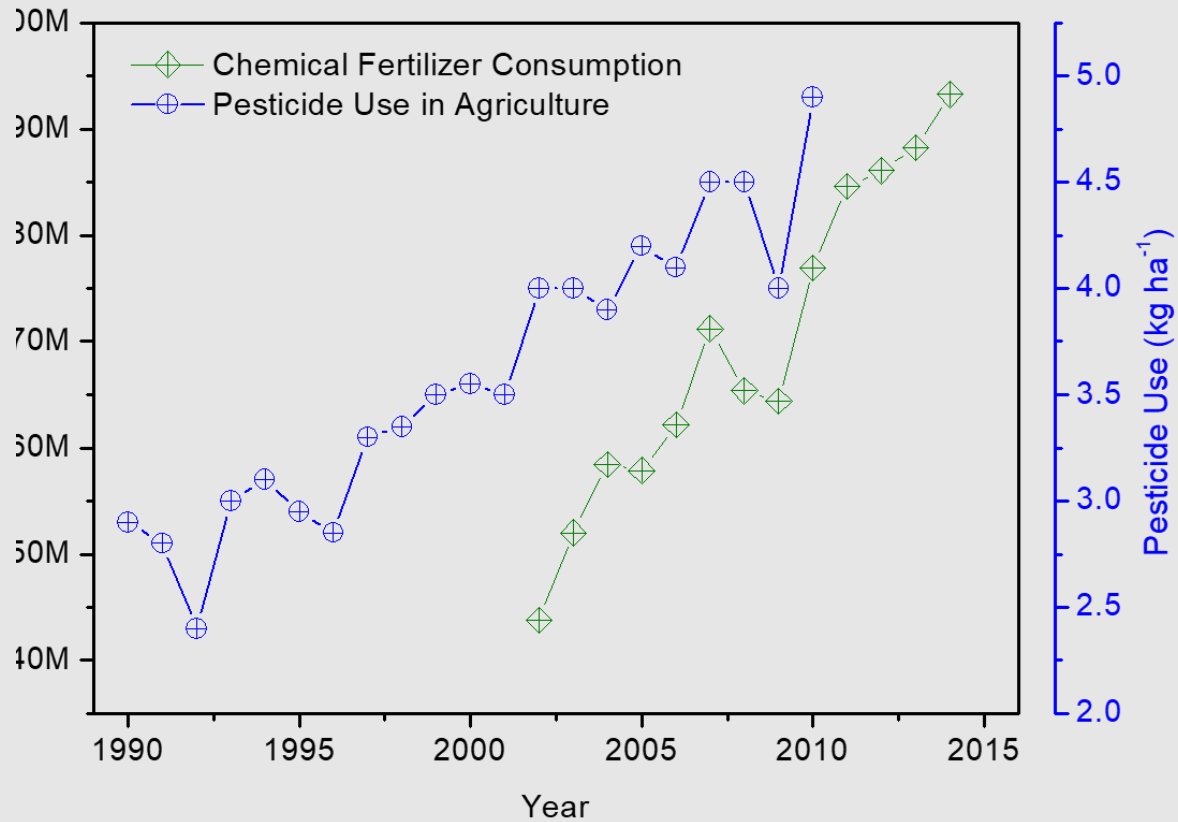


Serious oversupply looms for renewable diesel?

The boom in renewable diesel is driving U.S. production capacity far above the market for the fuel, said agricultural economist Scott Irwin of the University of Illinois on Thursday. “It’s going to be a very ugly 2024” for refiners, Irwin said during a webinar.

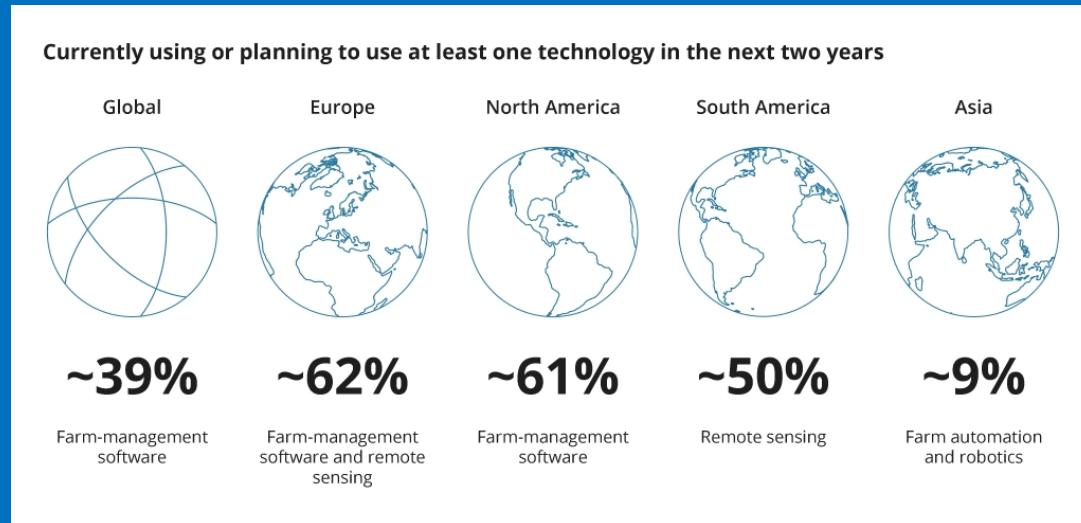


Chemical Acceptance Trends

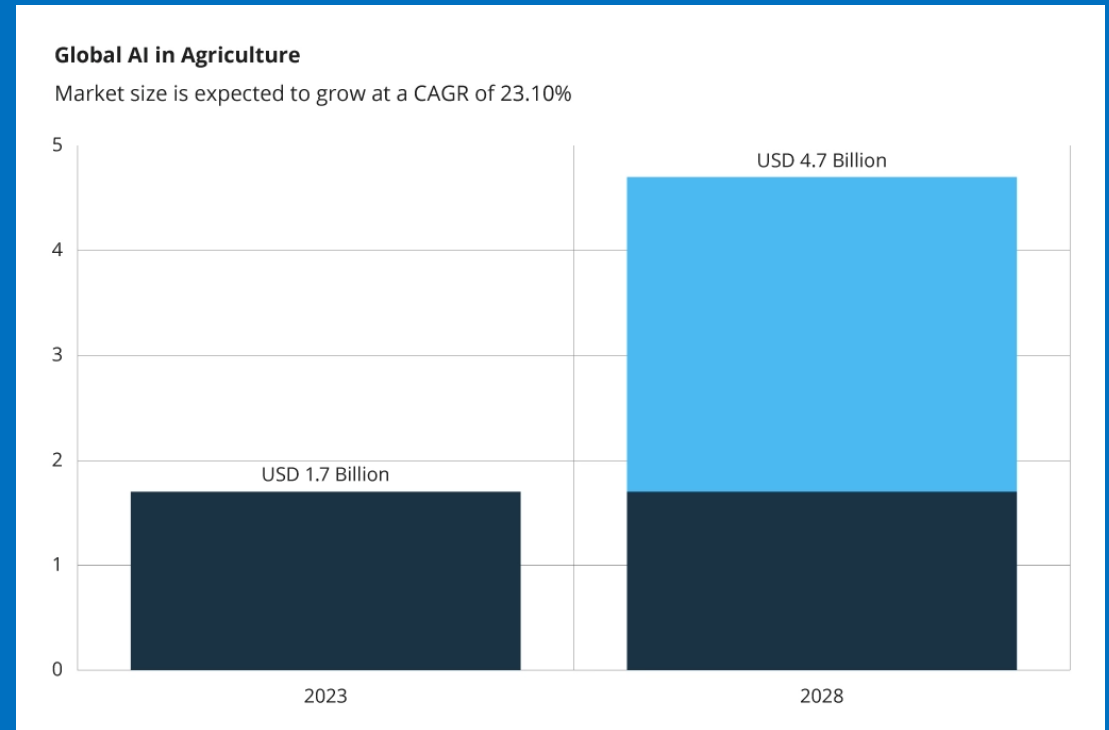


Technology Acceptance

Geographic Acceptance



\$ Value

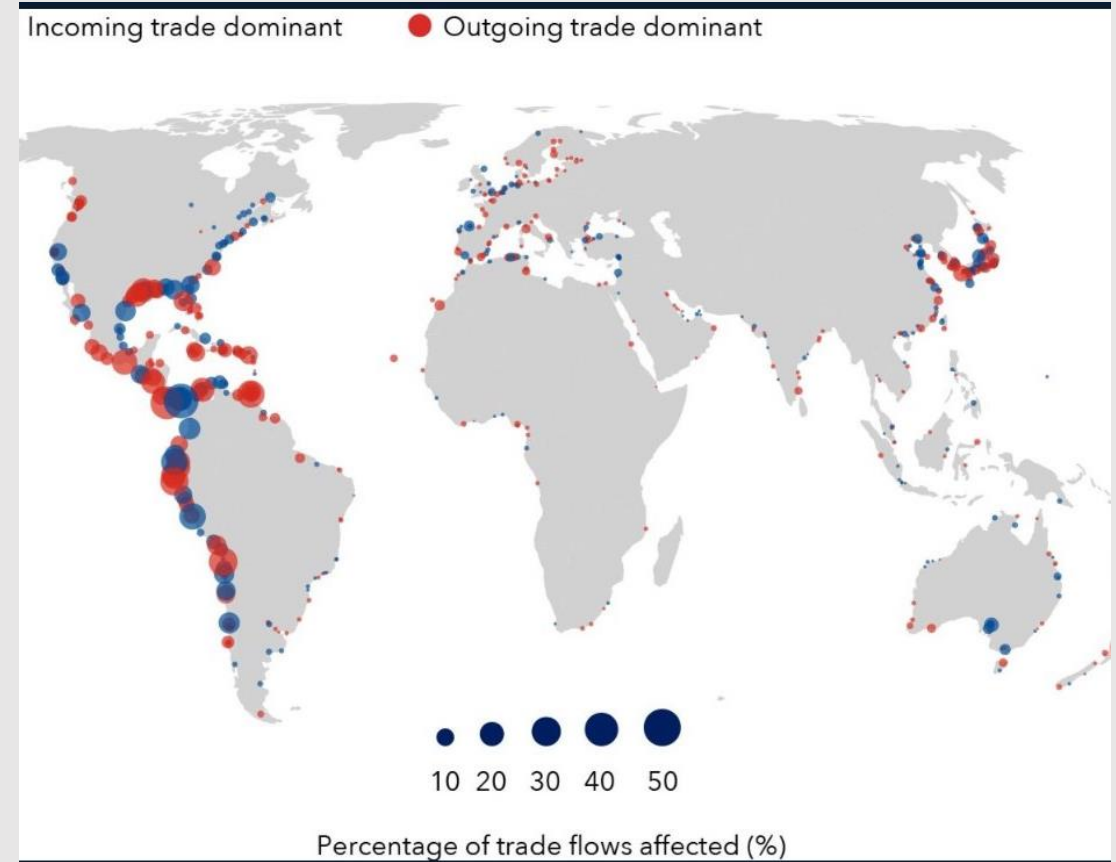




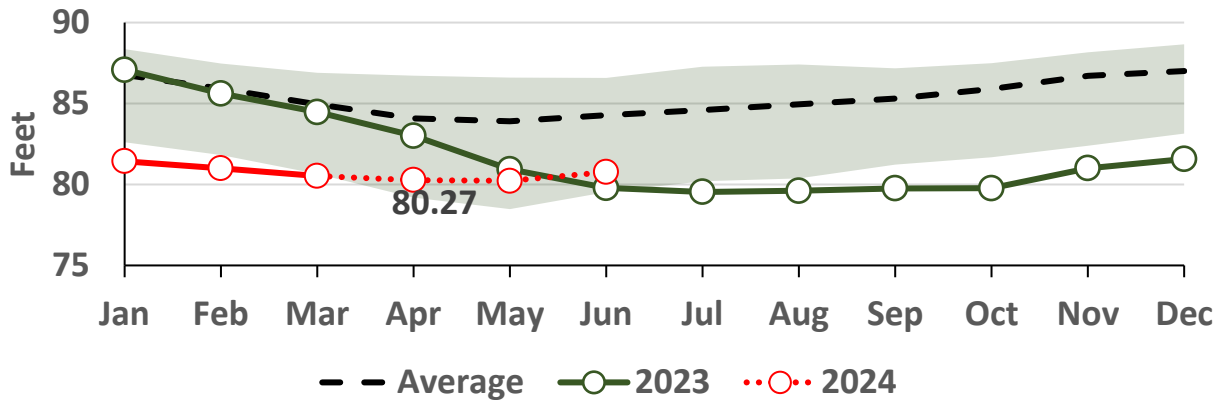
Logistics

- Farm to Elevator/Feeder/Processor
 - Truck
- Elevator to Feeder
 - Truck
 - Rail
- Elevator to Processor
 - Truck
 - Rail
 - Barge
 - Container
- Elevator to Export
 - Truck
 - Rail
 - Barge
 - Container

Map shows the volume of traffic flows at risk of being affected by the recent disruptions to shipping in the Panama Canal, assuming a 30-day disruption. Affected traffic flow is tracked for each port visited before entering the strait (outgoing traffic) and visited after transiting (incoming traffic). Total affected traffic flow is the sum of outgoing and incoming traffic, with color indicating dominant flow at port level. These estimates are based on a forthcoming paper by Verschuur and Hall (2024).



Panama Canal Water Levels (Gatun Lake): Monthly
Avg. 1965-2024
Mar-Apr/24 projections



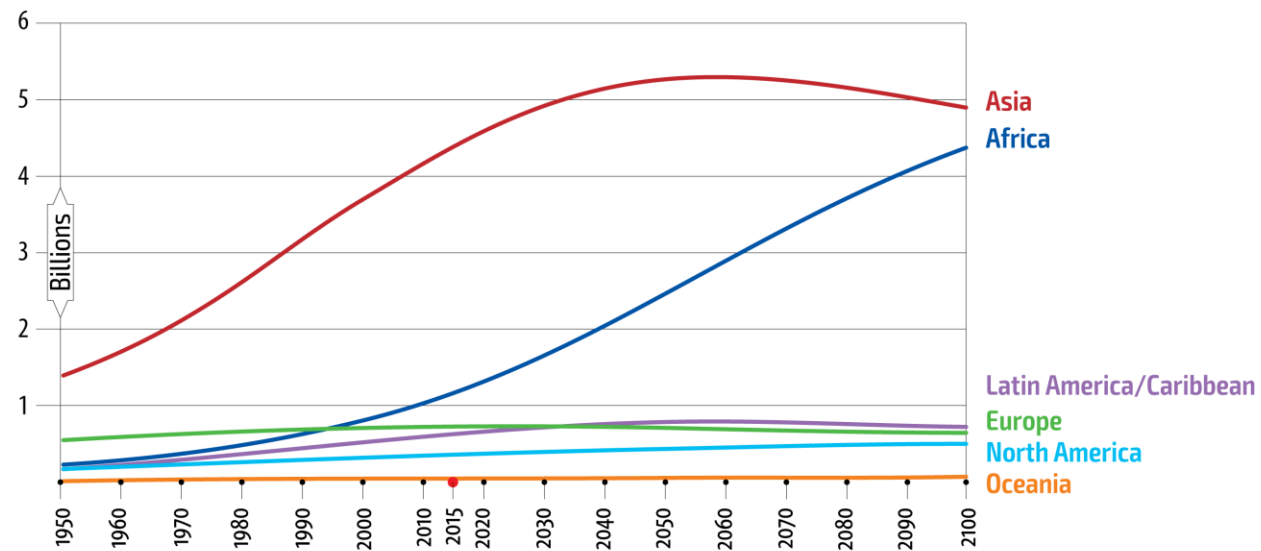
Monthly port-level traffic flows at risk from traffic restrictions in the Panama Canal (5% of global maritime trade)



Vessels transporting corn and soybeans – 1st week of Jan. 2024

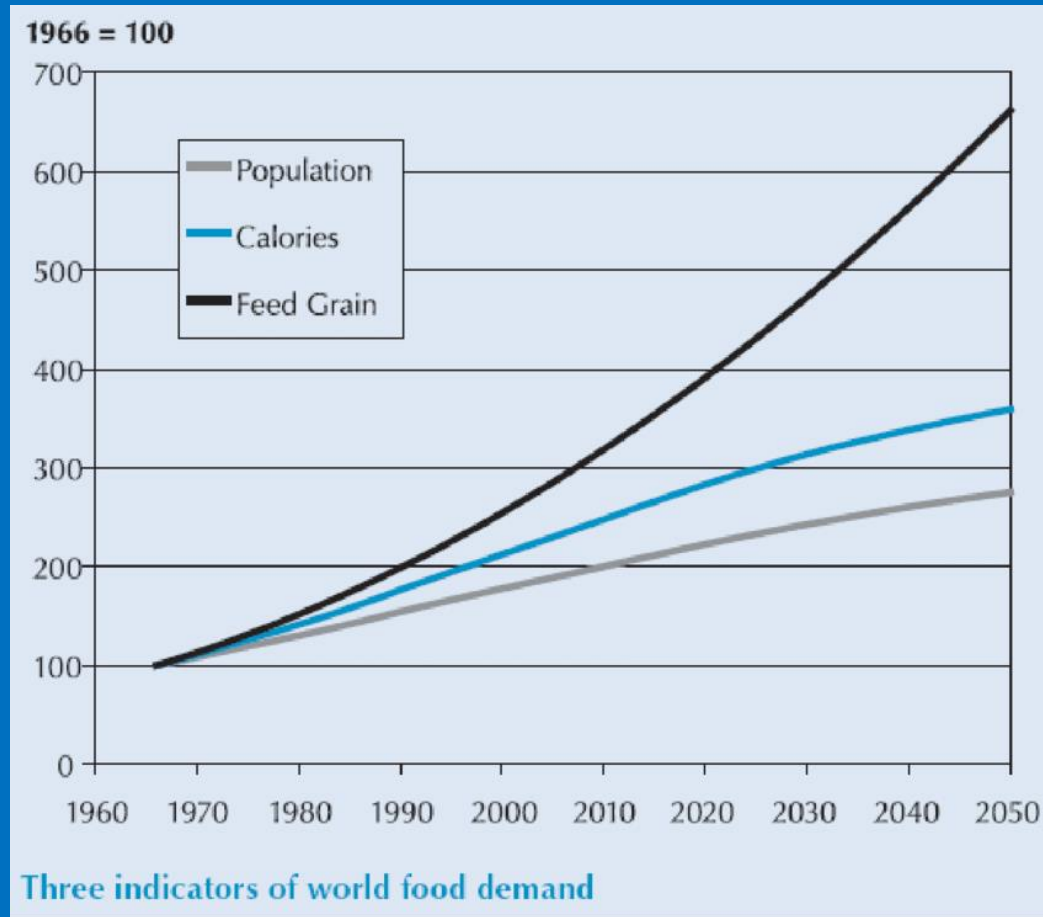
Looking Forward

Figure 1.2 Population growth to 2100, by region (medium variant)

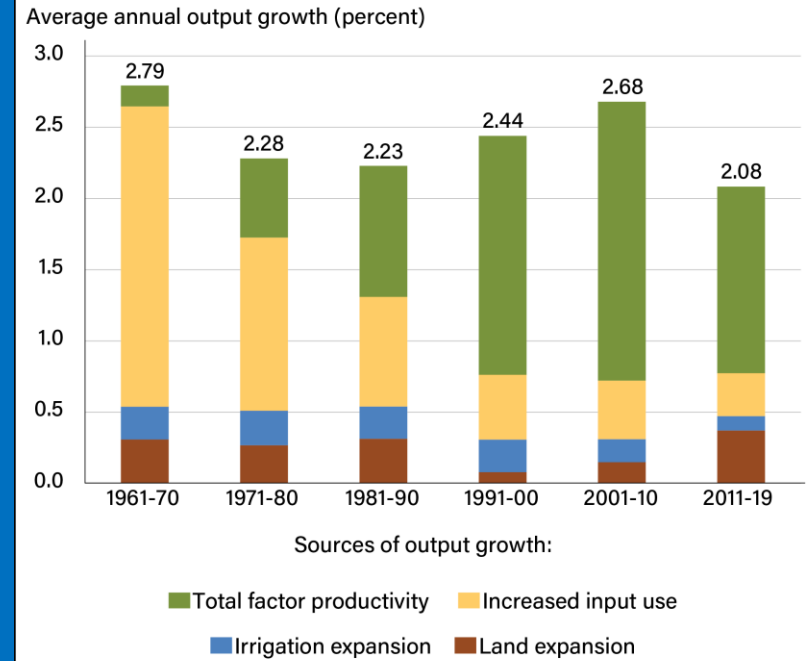


Source: UN, 2015.

Population to Feed Grain Trends



The growth rate in global agricultural output was lower over the past decade because the rate of productivity growth slowed



Notes: The colors of the bars distinguish sources of growth into components based on land expansion, extension of irrigation to cropland, to increase use of inputs per acre of agricultural land, and improvements in total factor productivity.
 Source: USDA, Economic Research Service (ERS) using the ERS International Agricultural Productivity data product.

Continued Technology Advancements

Automation

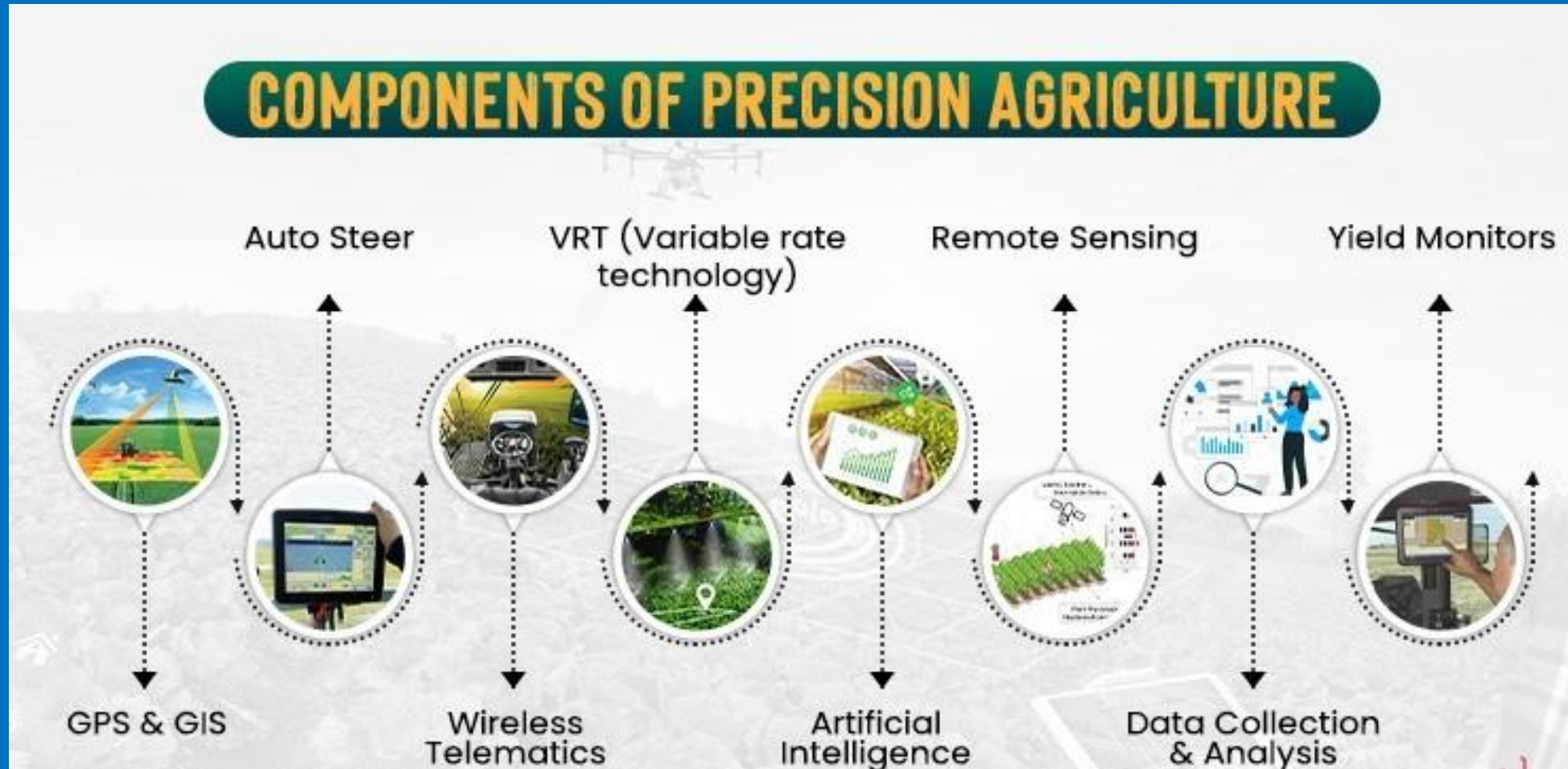


Biotech



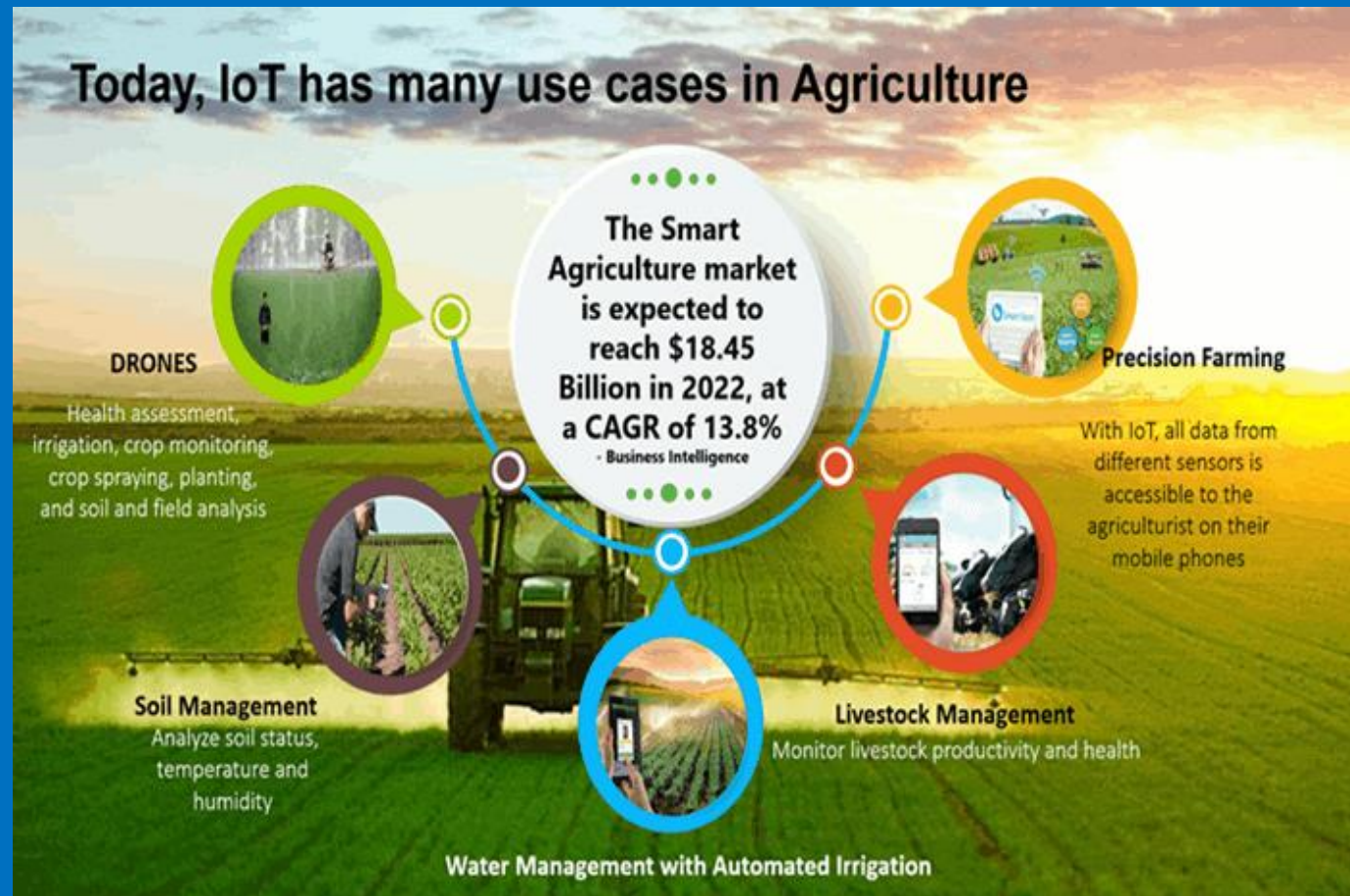
Drones

Precision Agriculture



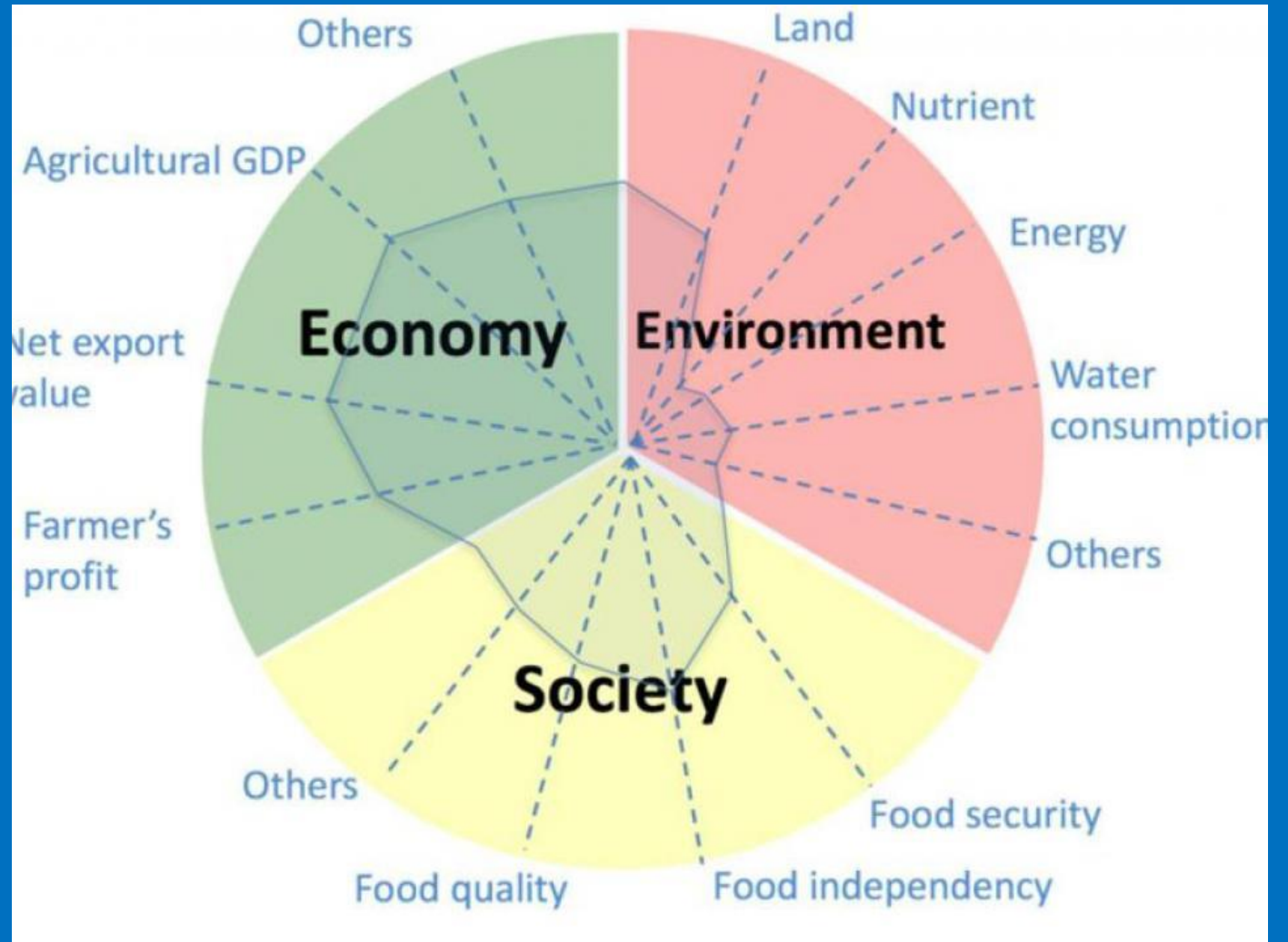
Smart Agriculture

The term IoT, or Internet of Things, refers to **the collective network of connected devices and the technology that facilitates communication between devices and the cloud, as well as between the devices themselves.**



Sustainable

The goal of sustainable agriculture is to meet society's food and textile needs in the present without compromising the ability of future generations to meet their own needs.

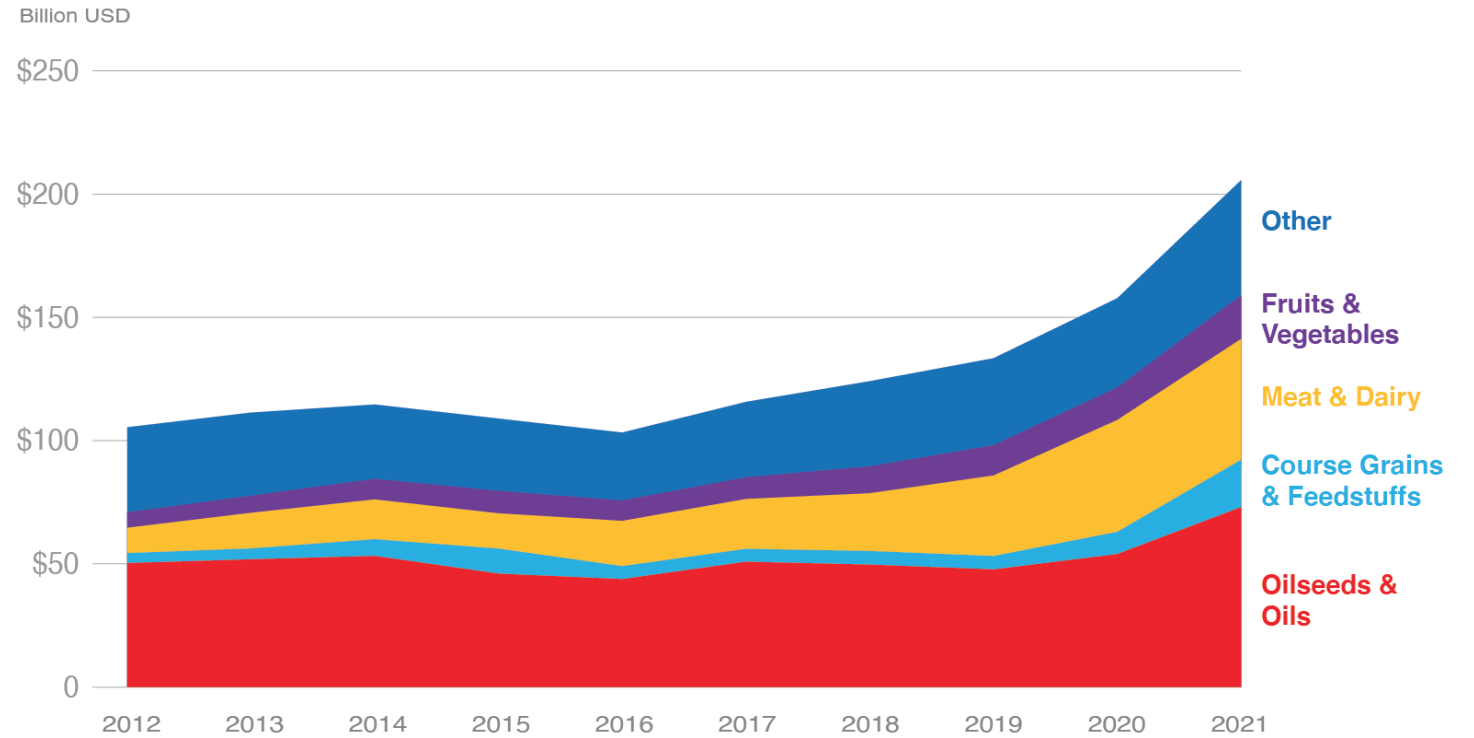


Challenges to the Industry

- Loss of knowledge
- Loss of political power
- Financing, carrying cost, working capital,
- Input cost
- Profitability
- Sustainability
- Carbon neutrality
- Food safety and security
- Geo-Political
- Competition
- Population growth
- Infrastructure
- Globalization/trade
- Product losses- especially post harvest
- Pressure to increase production, yields
- Conservation
- Labor issues
- Supply chain challenges
- Change in soy crush driver from meal to oil, what do you do with the meal

Impact of China

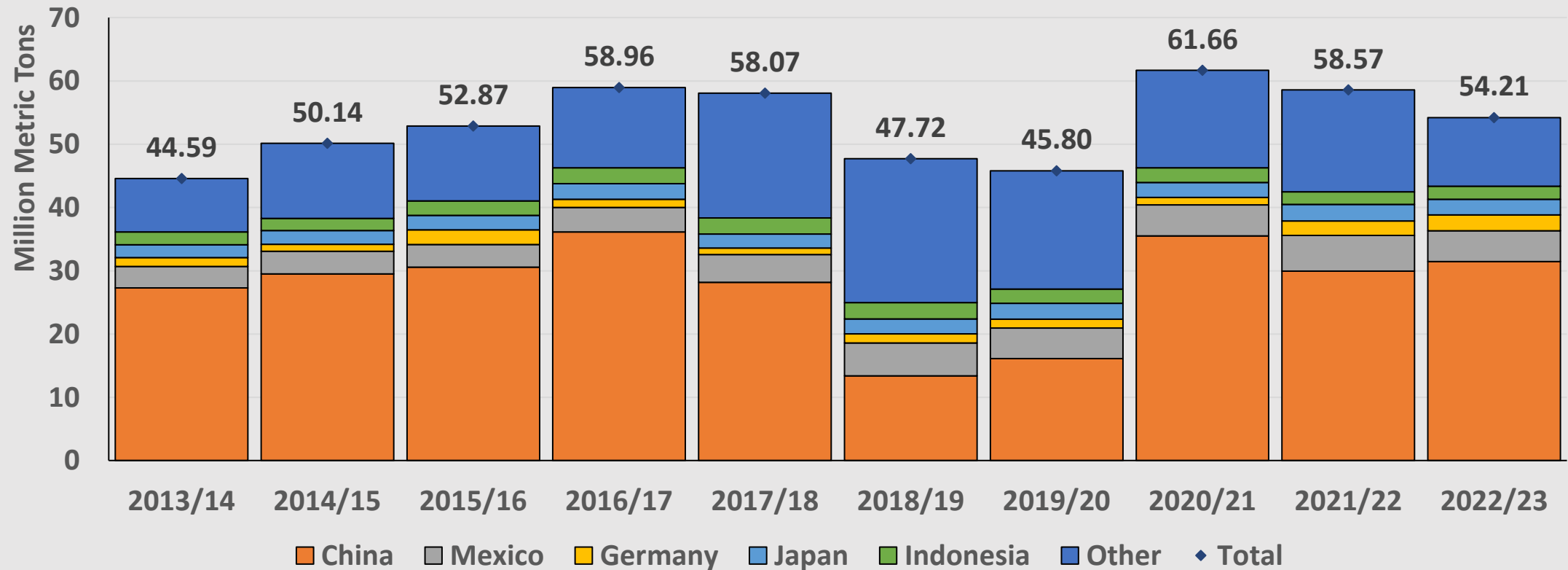
China's Agricultural Imports from the World

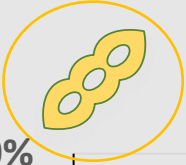


Source: Trade Data Monitor, Inc.

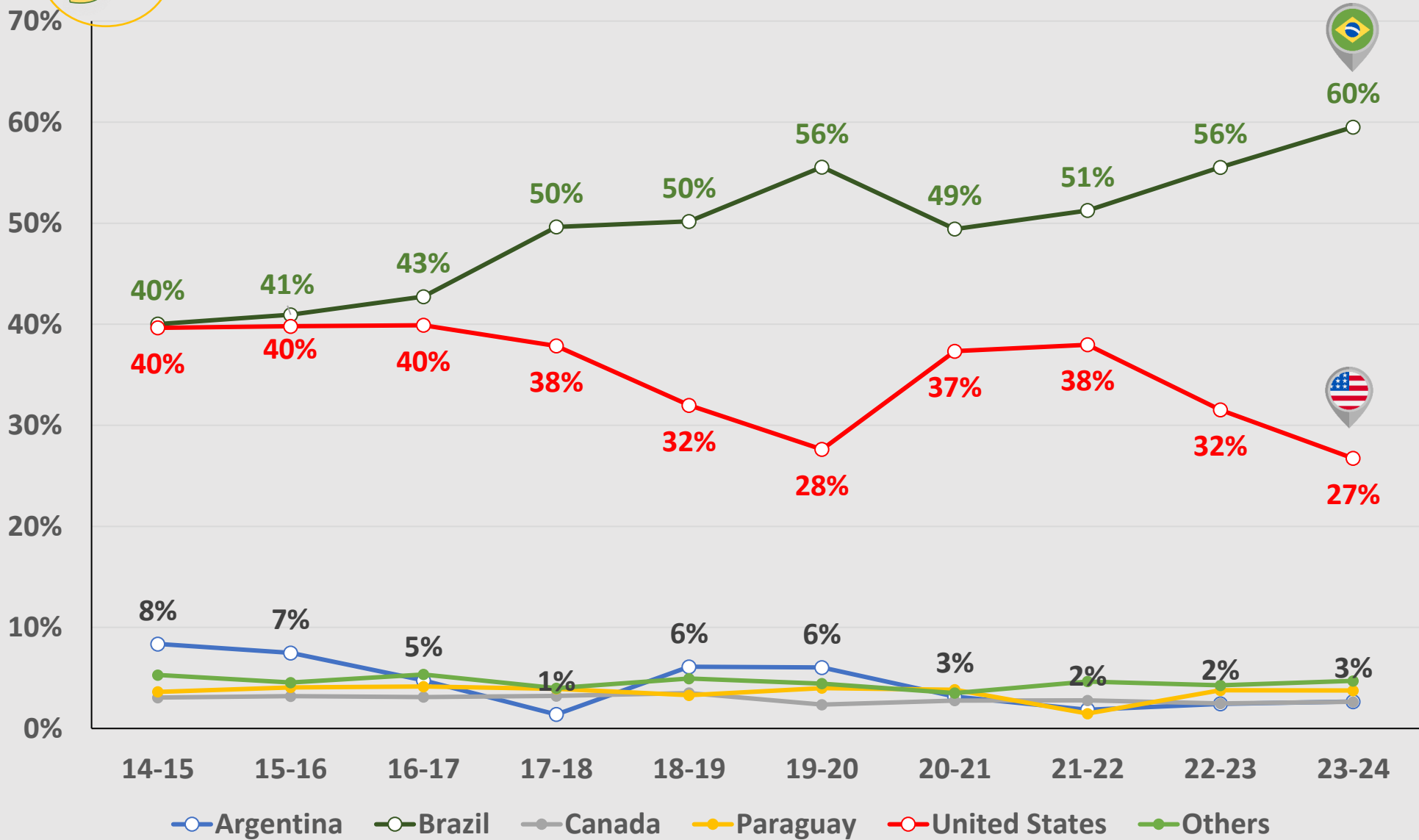
Soybean Exports

Soybean exports by selected destinations

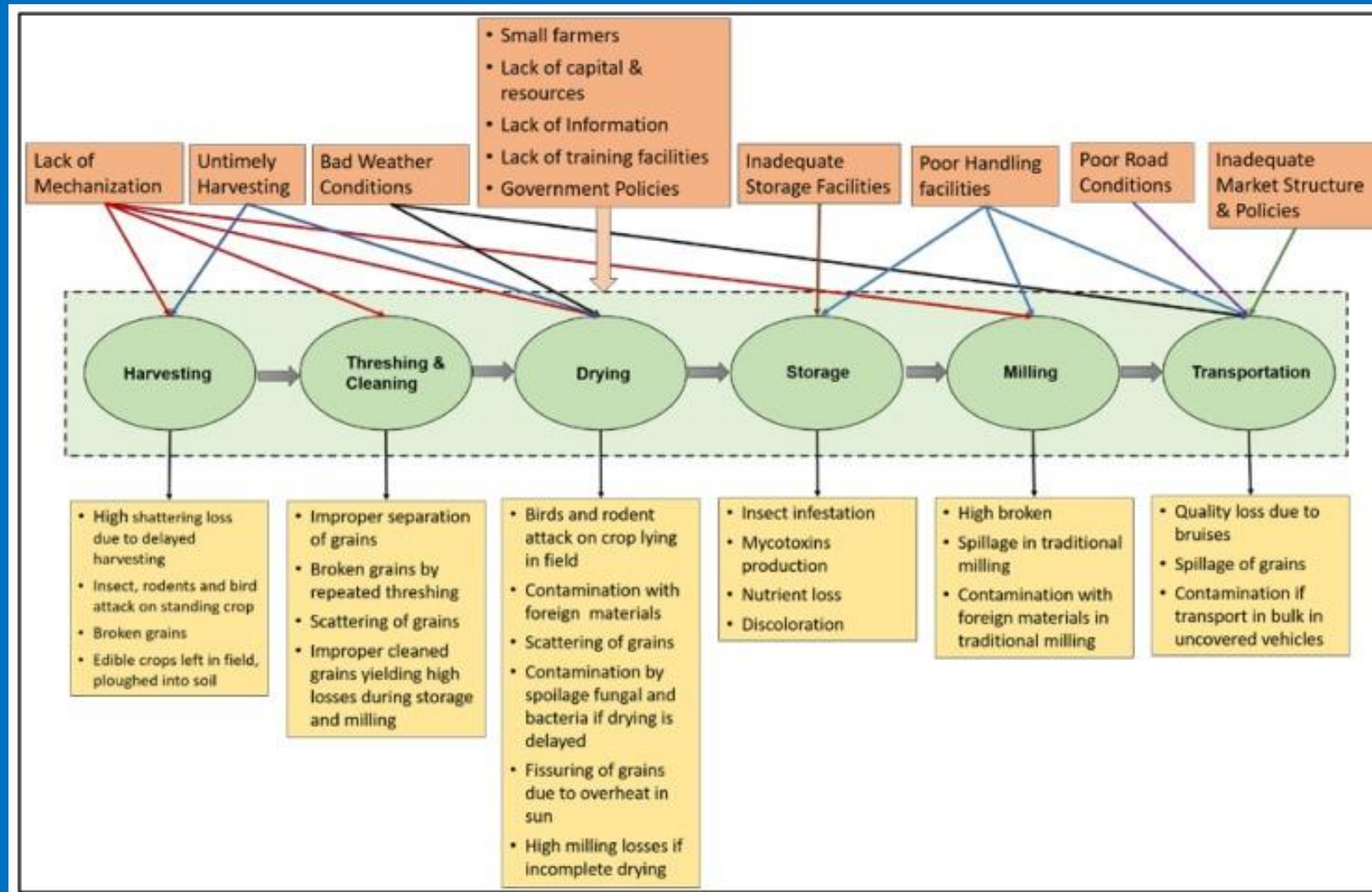




Soybean Exports Market Share



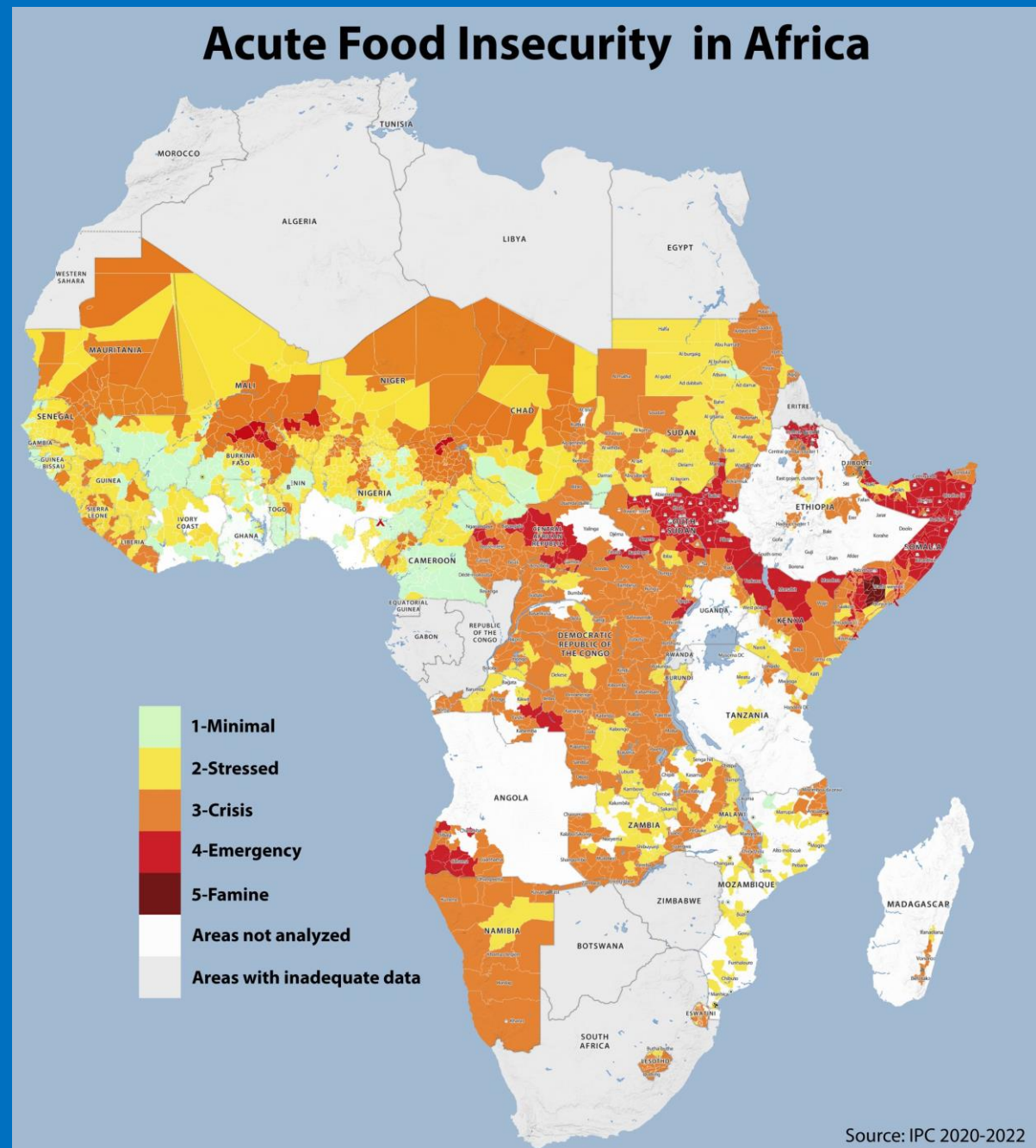
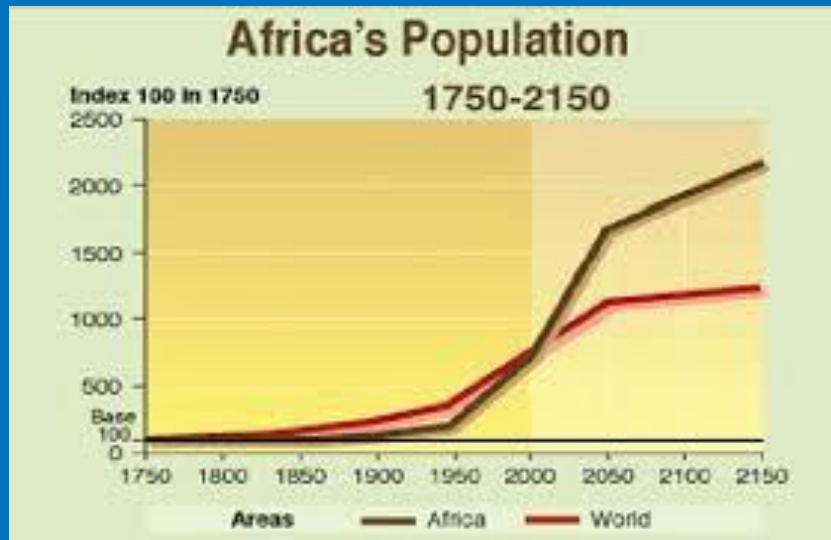
Losses in the Grain Supply Chain



Post Harvest
Losses

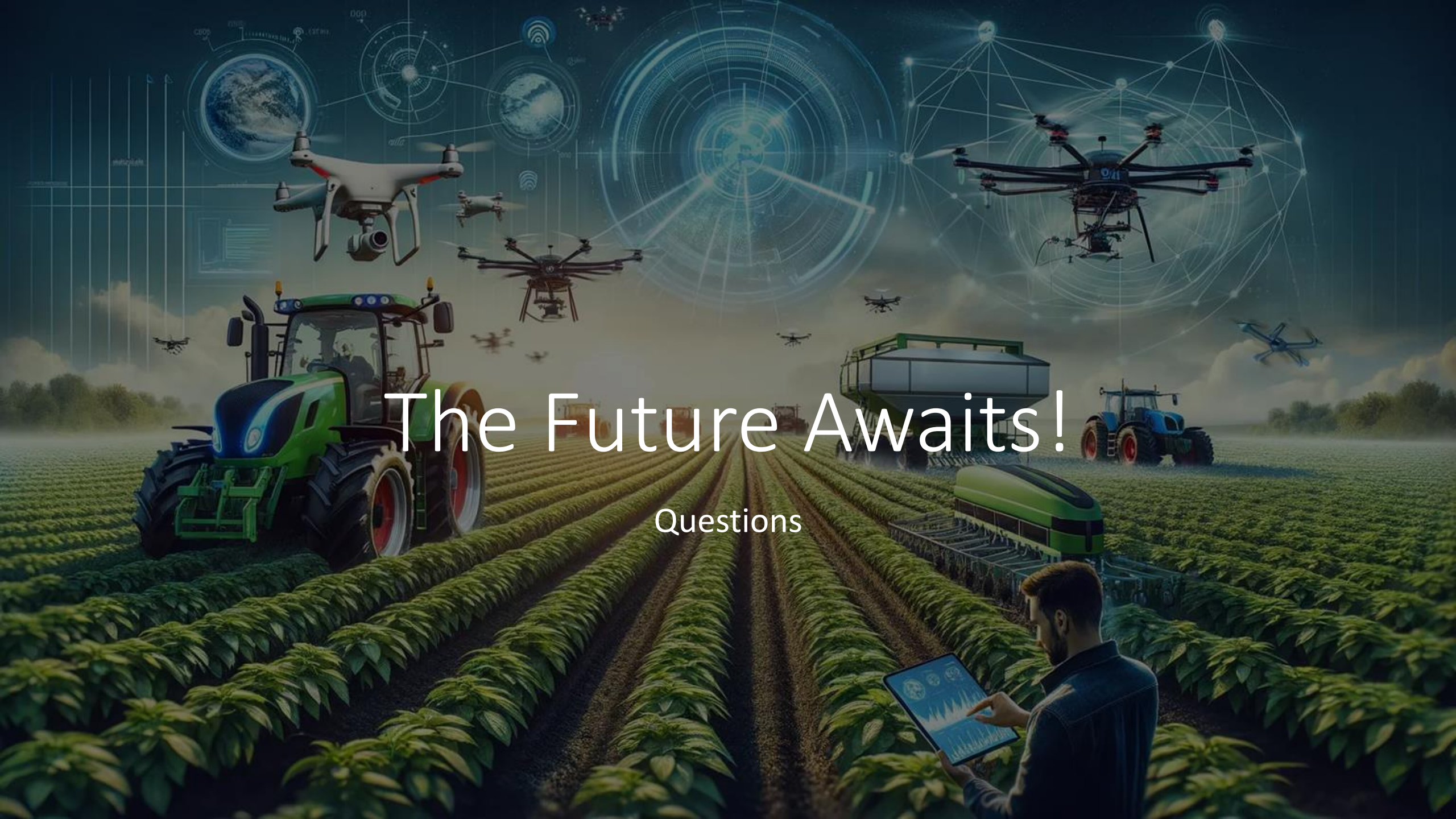
One in Three People Will Live in Sub-Saharan Africa in 2100, Says UN

Out of the 800 million people still suffering from hunger in the world, **over 204 million come from Sub-Saharan Africa**. The situation is currently getting worse in this region as it moved from 170.4 million hungry people in 1990 to 204 million in 2002



"This really is an innovative approach, but I'm afraid we can't consider it. You see, it's never been done before."





The Future Awaits!

Questions