Emerging Nutritionist Sorghum Experience Beaver Creek Colorado

U.S. Sorghum Market Overview

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Today's Discussion Topics,

- Overview
- Production
- Logistics
- Exports
- Crop Quality
- Sorghum PS&D
- Sorghum World View
- Corn PS&D
- Corn World View
- Why Sorghum
- Branding
- Information Sources
- USGC Quality Report
- Q and A

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Sorghum Overview,

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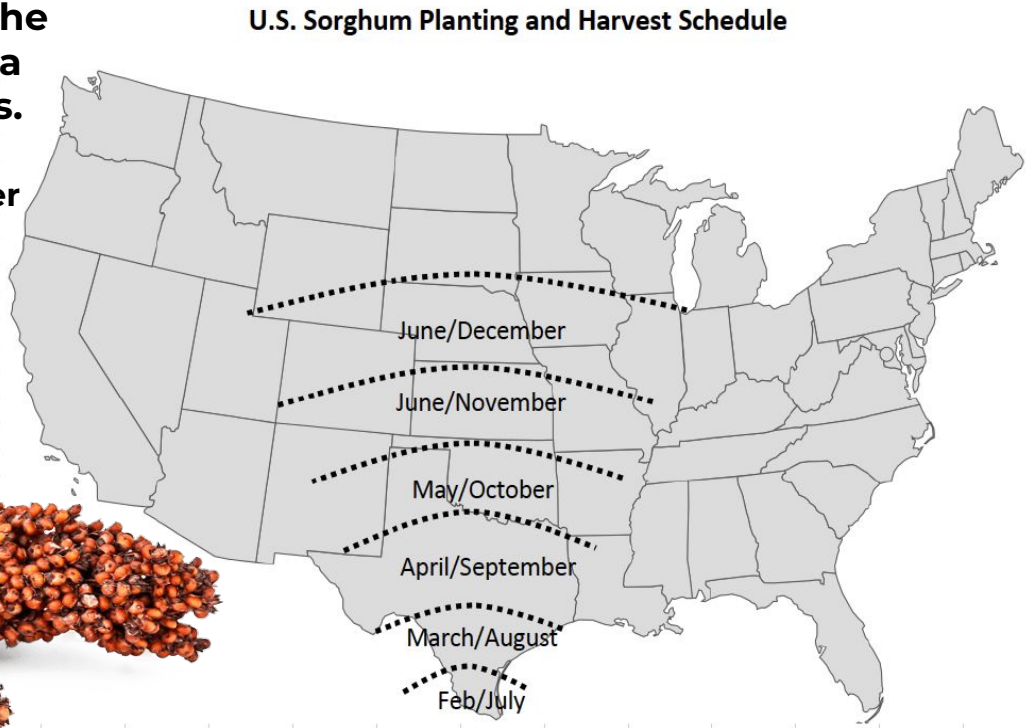
Sorghum in the U.S.,

Sorghum is traditionally grown throughout the Sorghum Belt, which runs from South Dakota to Southern Texas, primarily on dryland acres.

- The United States is the **world's largest producer** of grain sorghum.
- The top five sorghum producing states include: **Kansas, Texas**, Colorado, Oklahoma and South Dakota



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The Resource Conserving Crop®,

The Sorghum Checkoff trademarked "The Resource Conserving Crop®" and is a high residue crop that conserves soil moisture and reduces water needs.

Environmental benefits include:

- **Saving Water:** Climate resilient, water-efficient, and requires 30% less water than other grains.
- Nationally, 91% of sorghum acres are fed by rain alone.
- **Building Soil Health:** Sorghum helps regenerate soil with increased organic matter, enabling it to retain more important soil nutrients and moisture.
- **Restoring Our Environment:** Sorghum removes harmful carbon from the atmosphere and stores it safely in the soil, cleaning our air and helping to fight climate change.
- **Supporting Robust Ecosystems:** Sorghum helps wildlife populations thrive as a preferred food choice for quail, pheasants and many other species of birds and deer.

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THE RESOURCE CONSERVING CROP™

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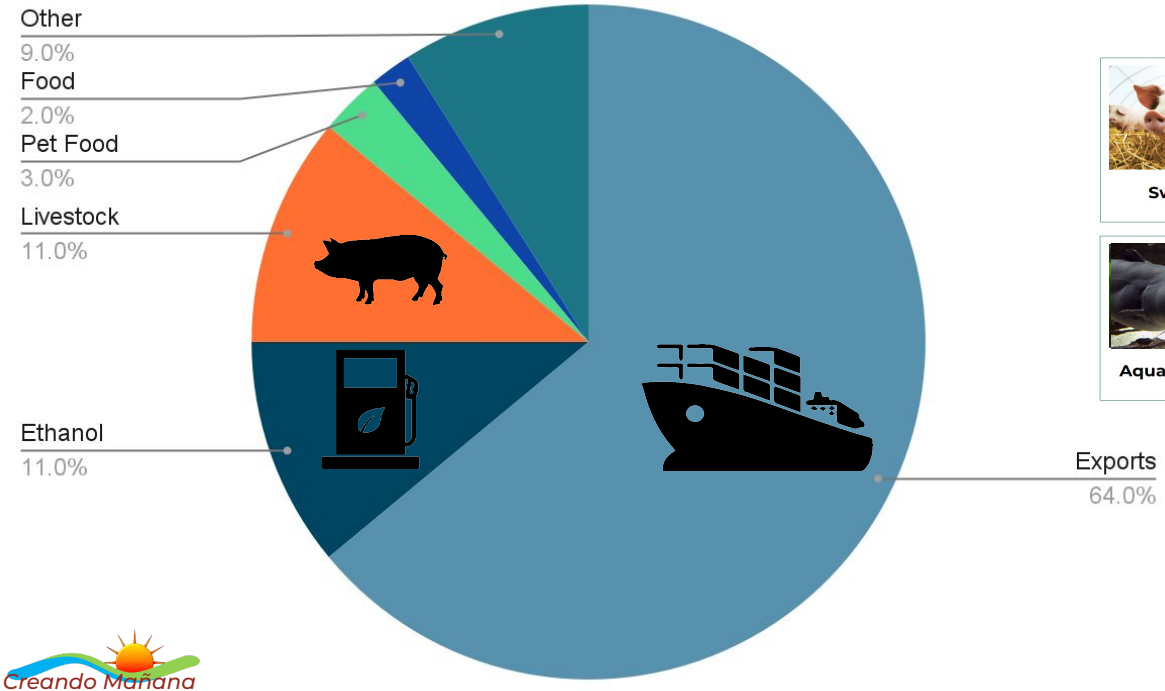
U.S Sorghum Markets,

Exports by far remain the primary consumer of U.S. sorghum. Exports are predominantly used in the livestock industry as an equal replacement for corn.




Swine


Pet Food


Beef/Dairy


Poultry


Aquaculture


Renewables


Alcohol


Consumer Food

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Sorghum Production,

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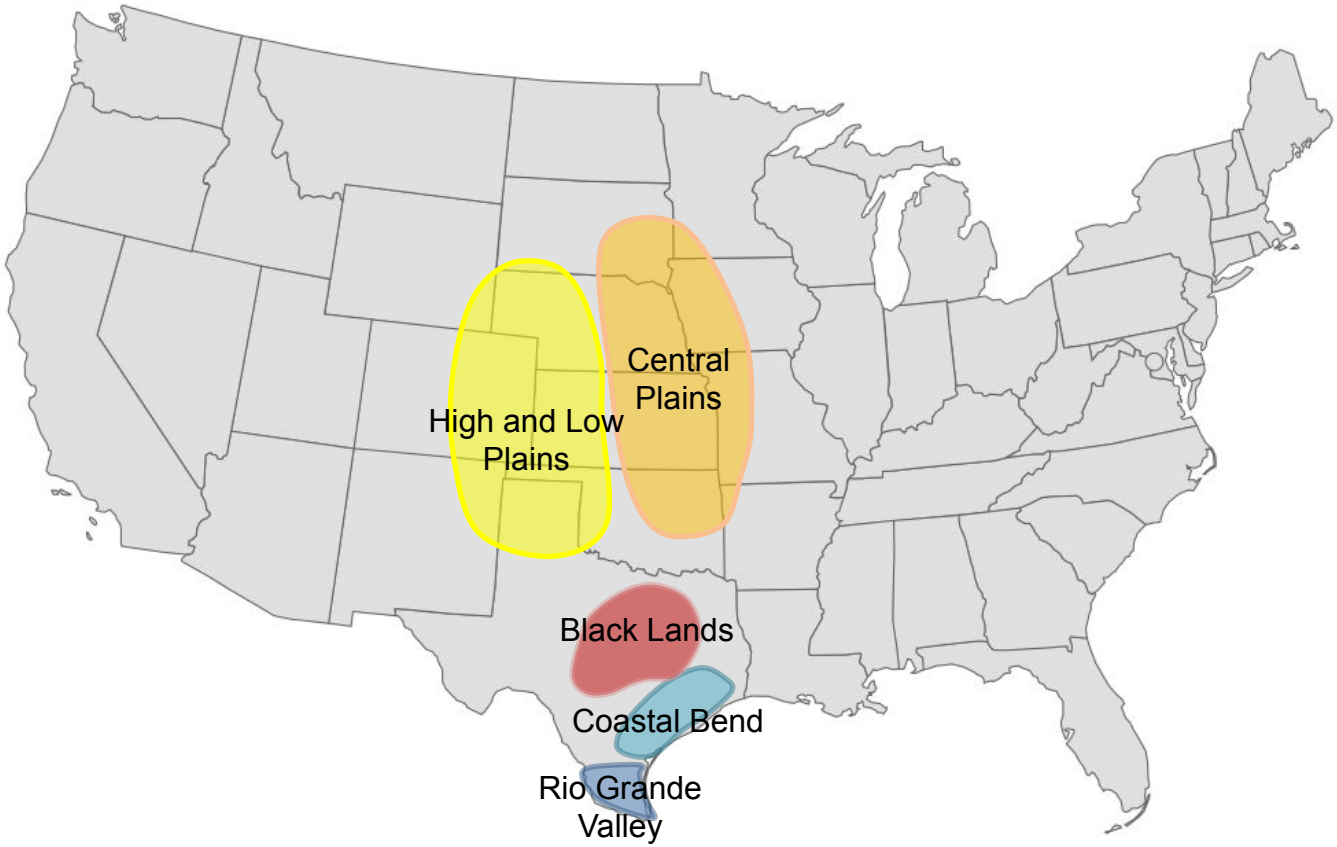
Sorghum Production Areas,



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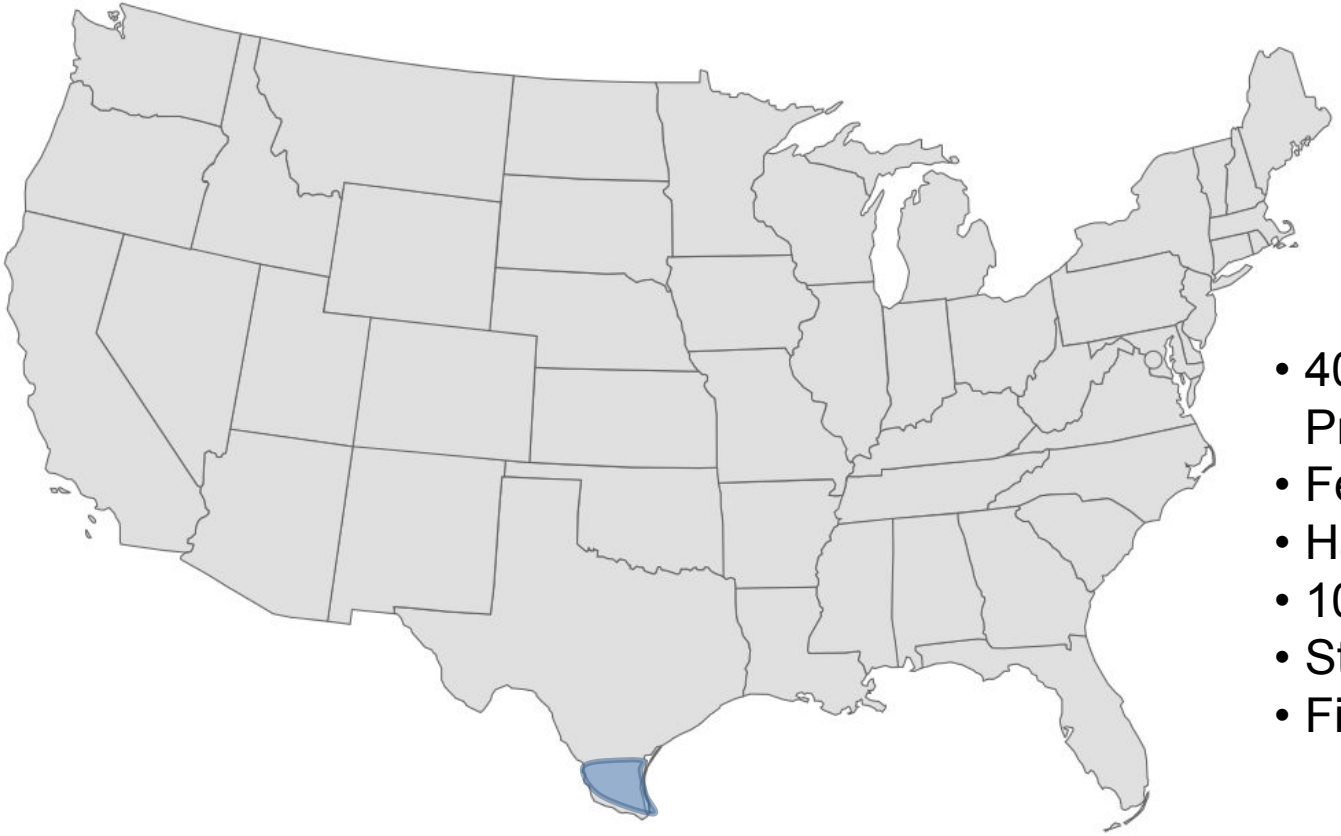
Rio Grande Valley Production,



- 400,000 MT Average Production
- February planting
- Harvest July
- 100% red sorghum
- Storage short
- Field dry, harvest aid

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Coastal Bend Production,

- 850,000 MT Average Production
- February planting
- Harvest July
- 100% red sorghum
- Storage short
- Field dry, harvest aid

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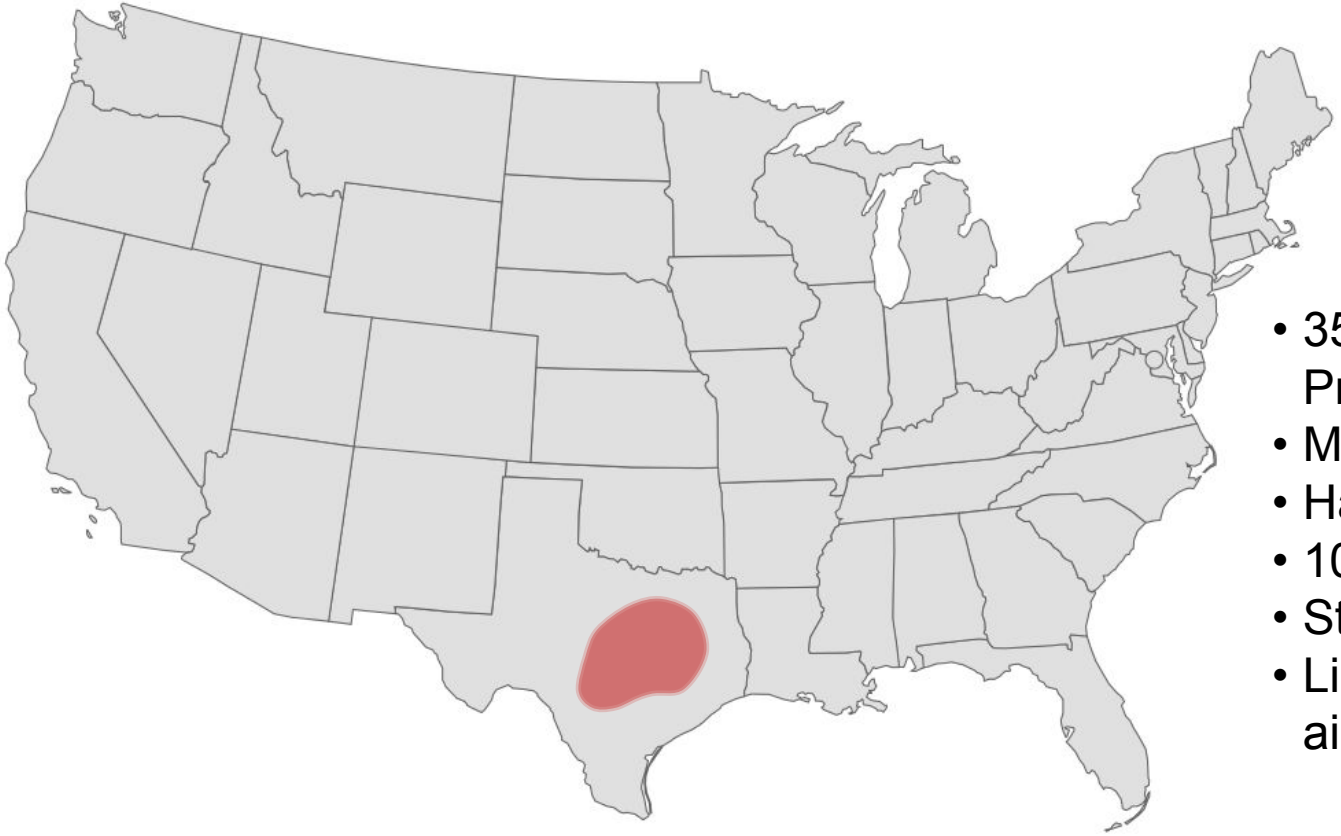
Black Lands Production,



- 350,000 MT Average Production
- March planting
- Harvest July/August
- 100% red sorghum
- Storage adequate
- Limited drying, harvest aid

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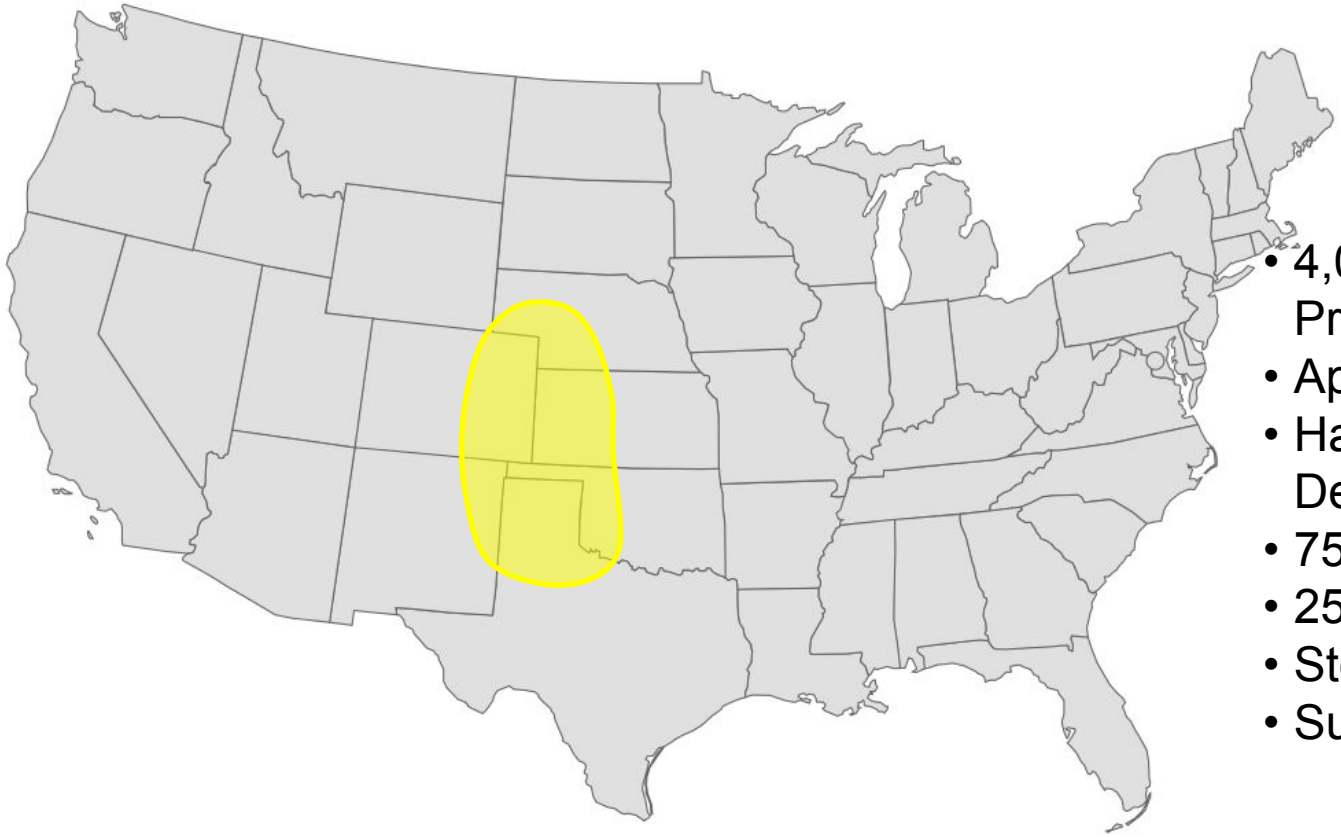
High and Low Plains Production,



- 4,000,000 MT Average Production
- April - July planting
- Harvest October - December
- 75% red sorghum
- 25% white sorghum
- Storage adequate
- Substantial drying

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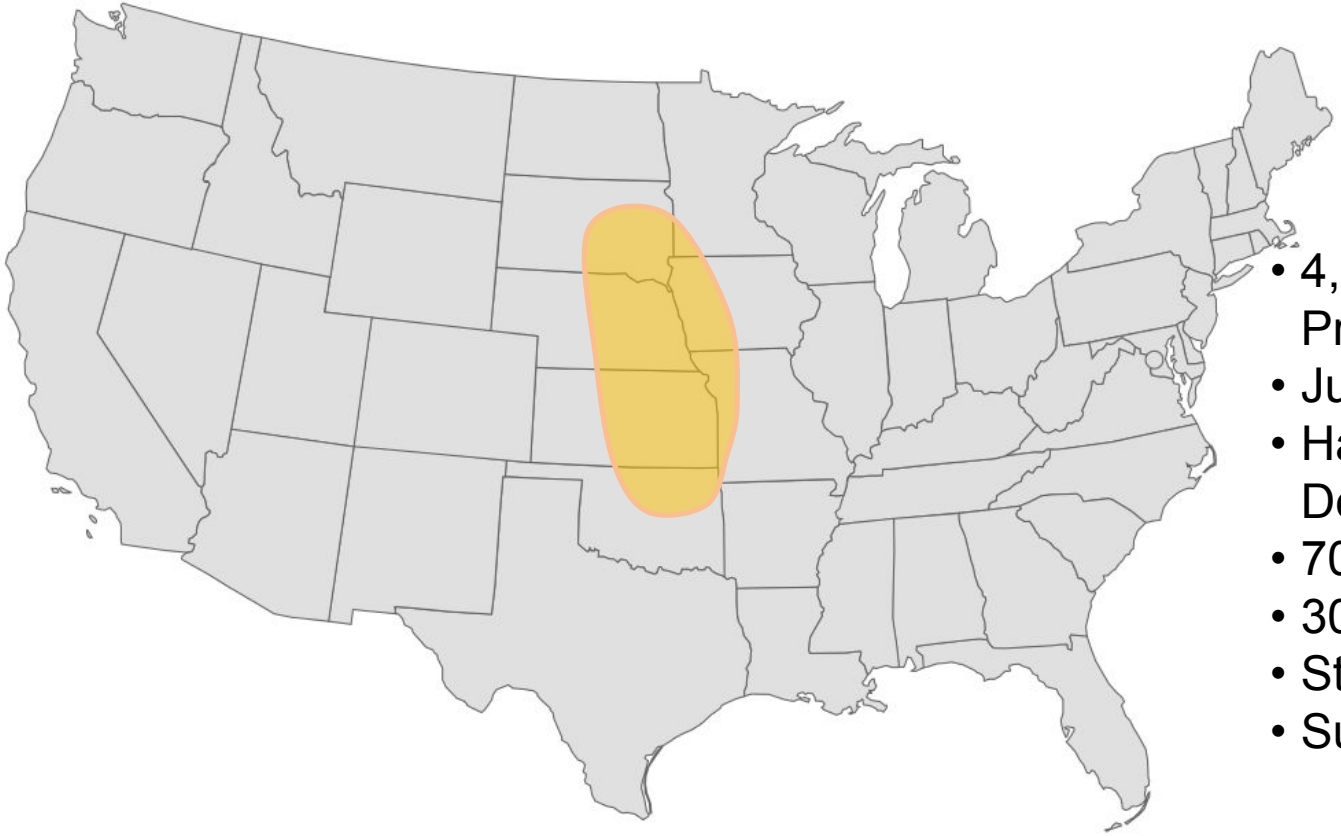
Central Plains Production,



- 4,000,000 MT Average Production
- June - August planting
- Harvest November - December
- 70% red sorghum
- 30% white sorghum
- Storage adequate
- Substantial drying

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Sorghum Logistics,

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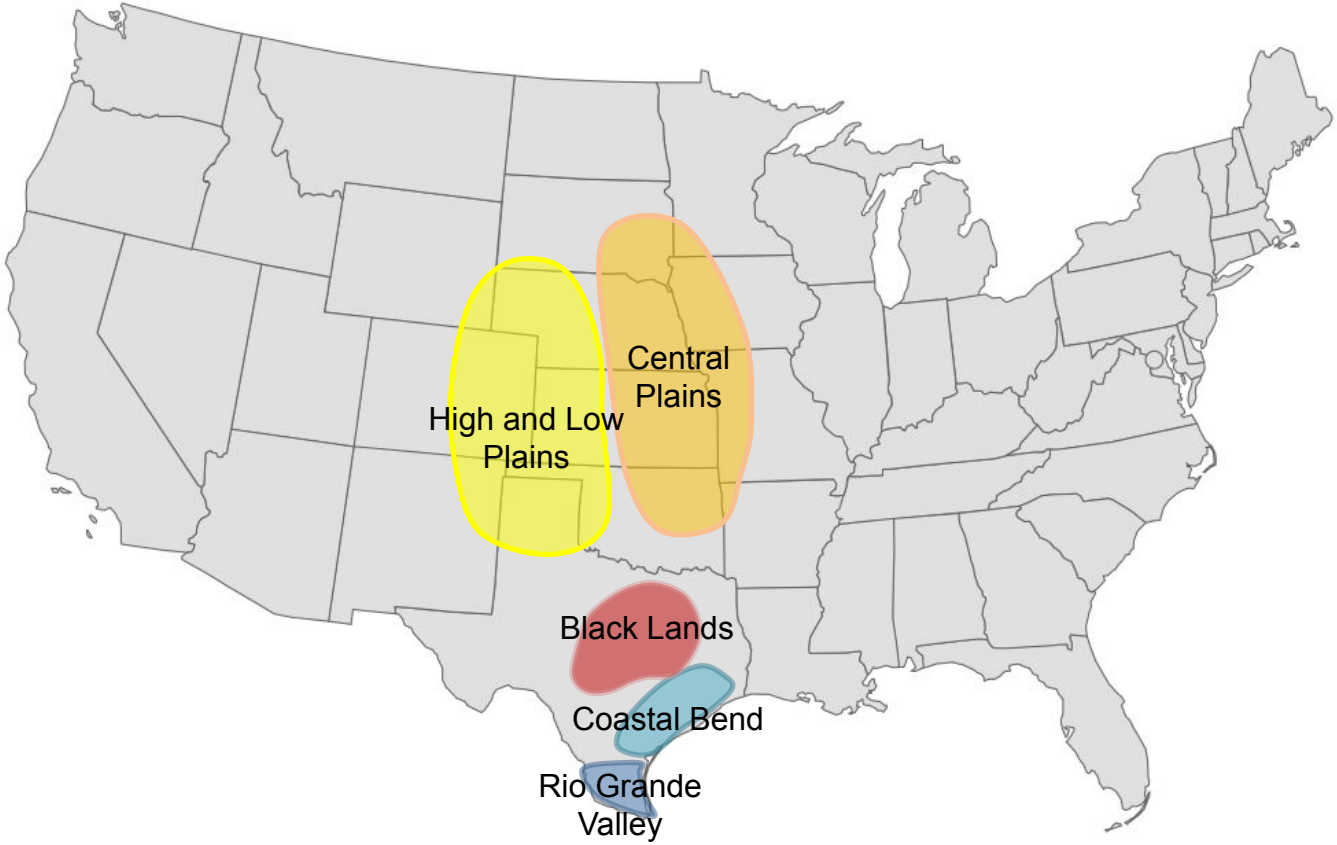
Sorghum Logistics by Area,



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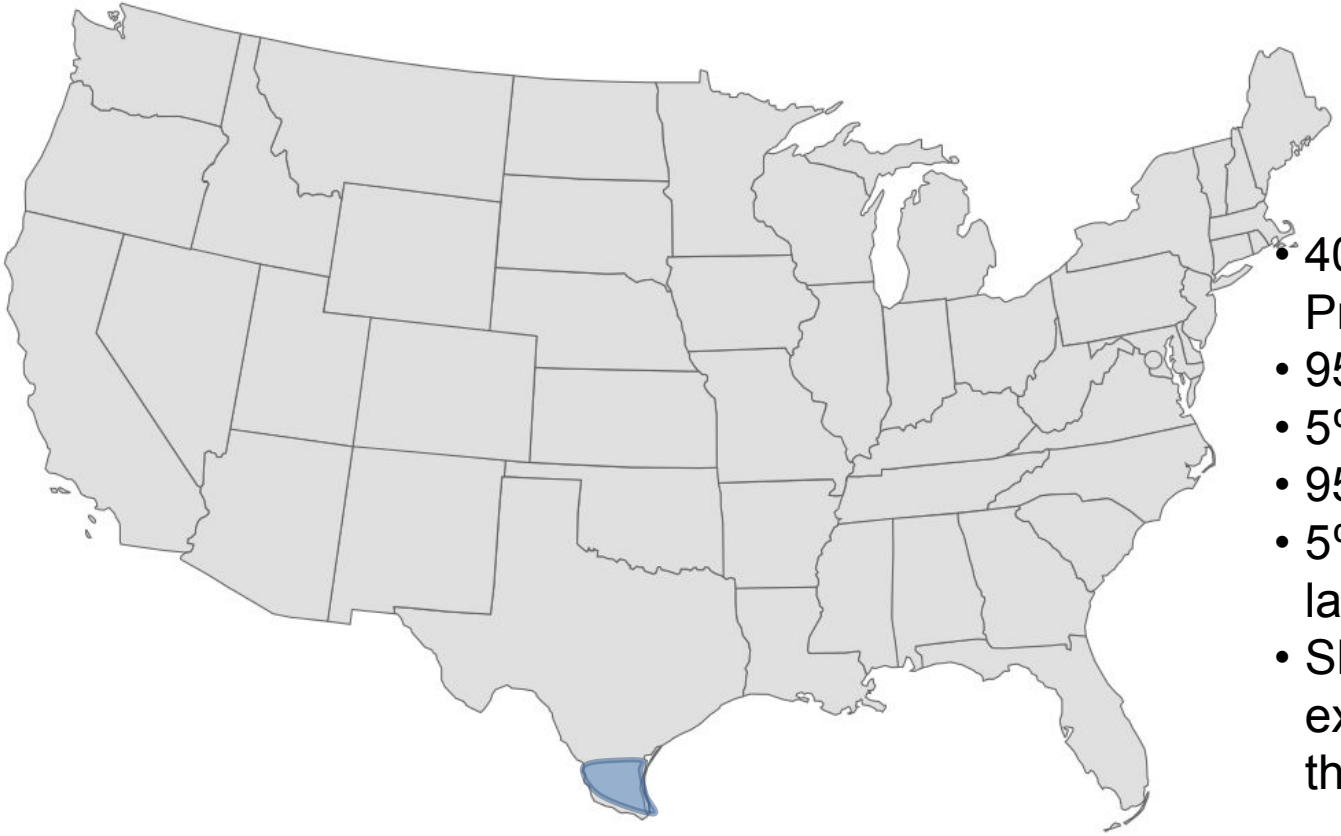
Rio Grande Valley Logistics,



- 400,000 MT Average Production
- 95% exported
- 5% local use
- 95% traded at harvest
- 5% farmer stored for later sale
- Short storage – exporting direct from the field

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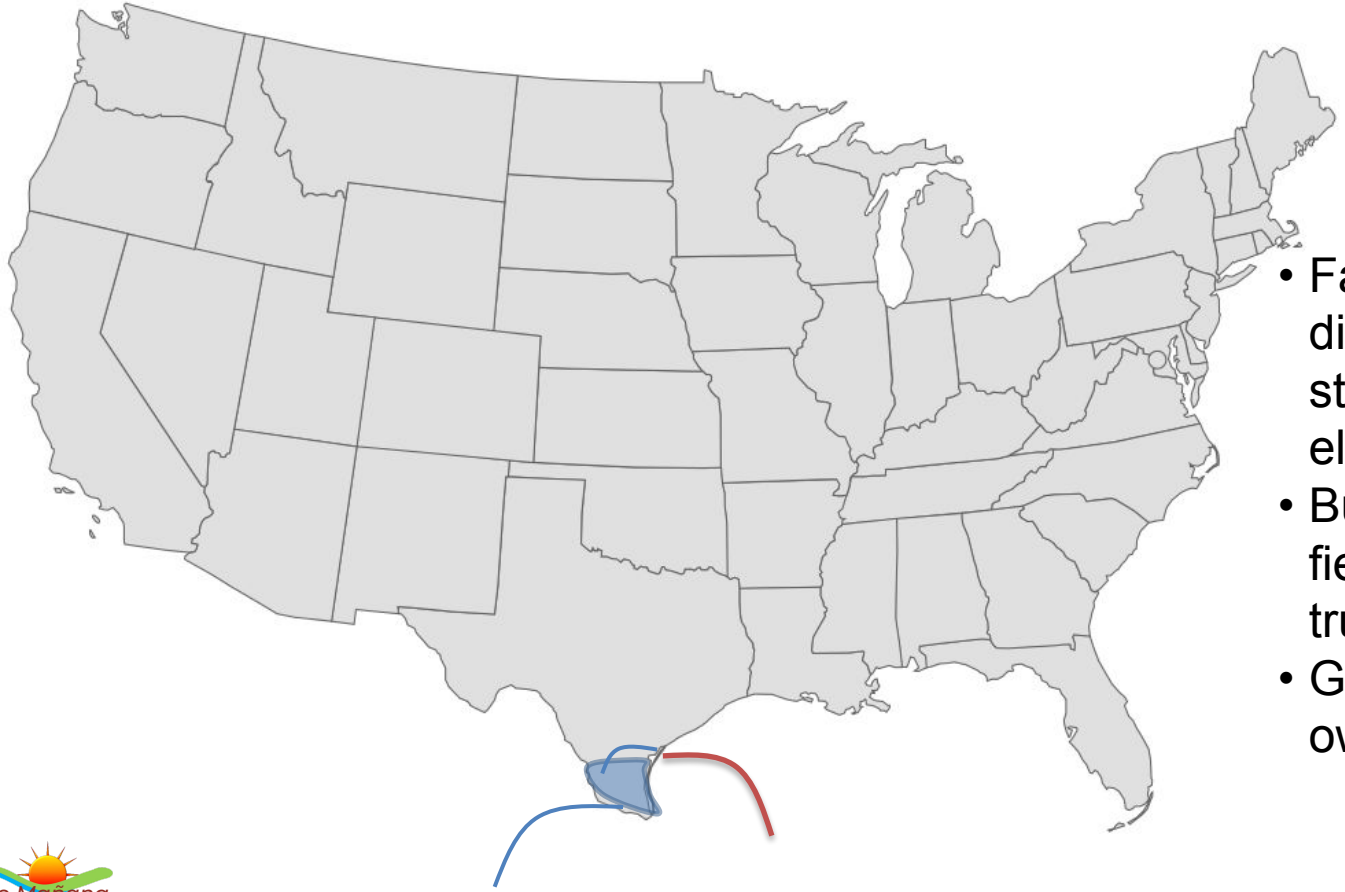
Rio Grande Valley Logistics,



- Farmer delivers directly to owned storage, port (CC), or elevator
- Buyer pickup in the field for the Mexico truck market
- Generally one or two ownership points

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Coastal Bend Logistics,

- 850,000 MT Average Production
- 95% exported
- 5% local use
- 95% traded at harvest
- 5% farmer stored for later sale
- Short storage – exporting direct from the field

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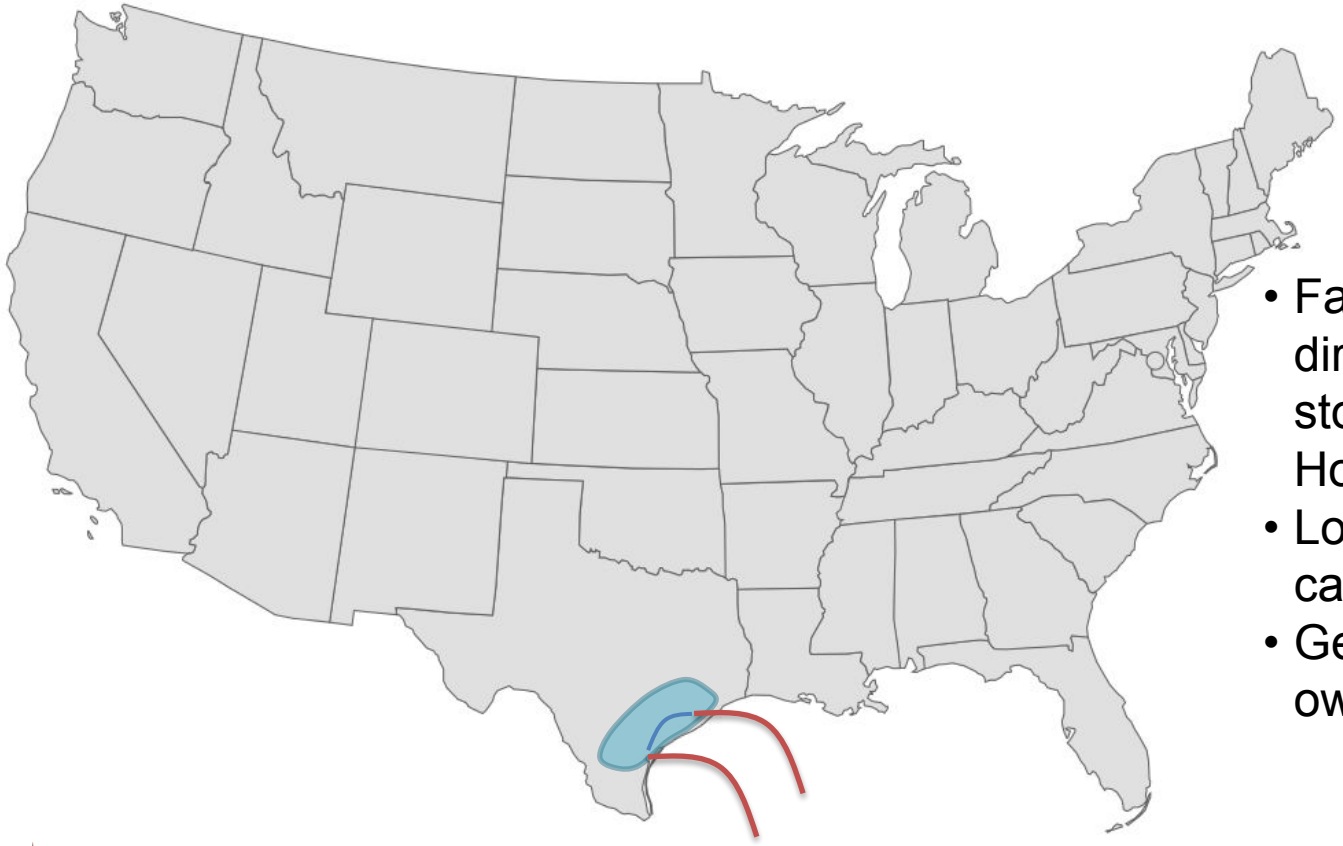
Coastal Bend Logistics,



- Farmer delivers directly to owned storage, port (CC or Houston), or elevator
- Local use into beef cattle
- Generally one or two ownership points

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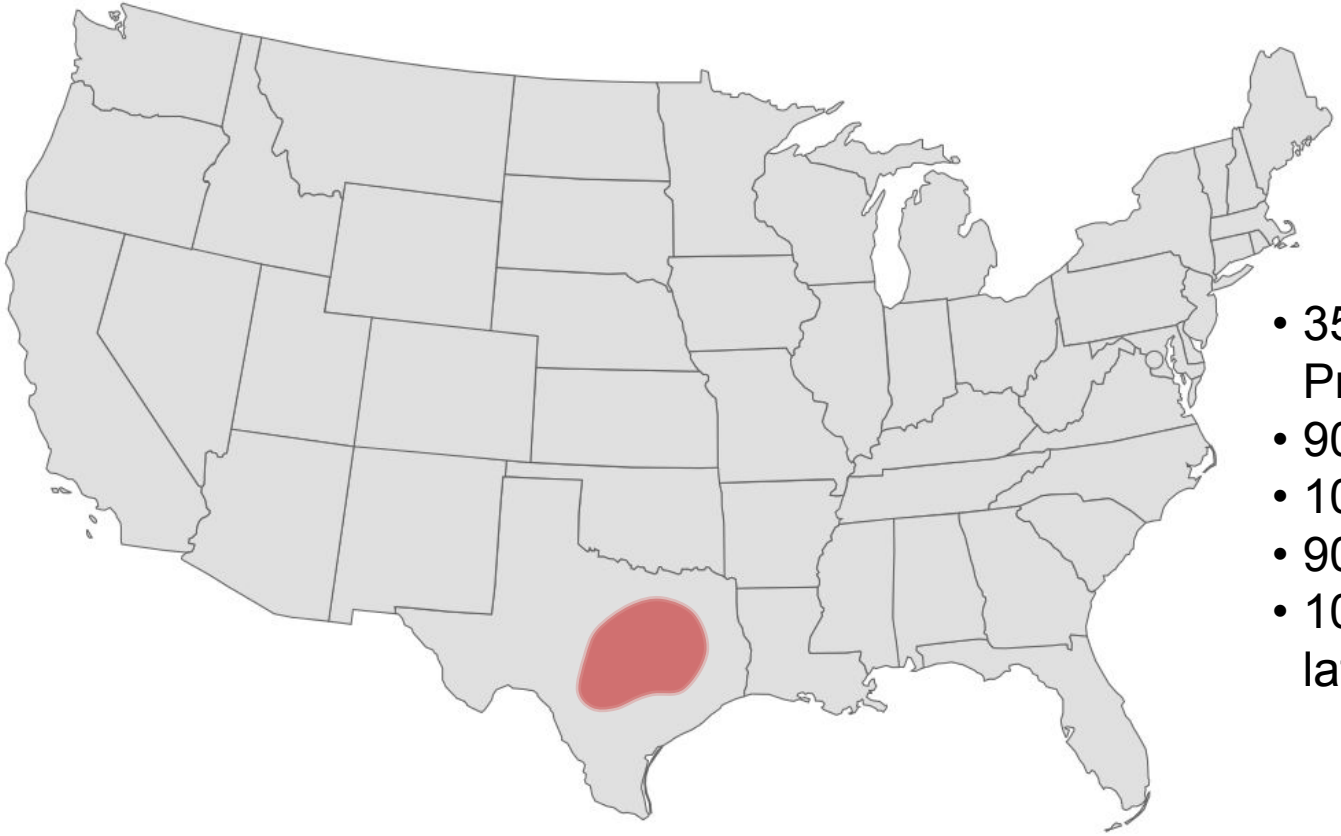
Black Lands Logistics,



- 350,000 MT Average Production
- 90% exported
- 10% local use
- 90% traded at harvest
- 10% farmer stored for later sale

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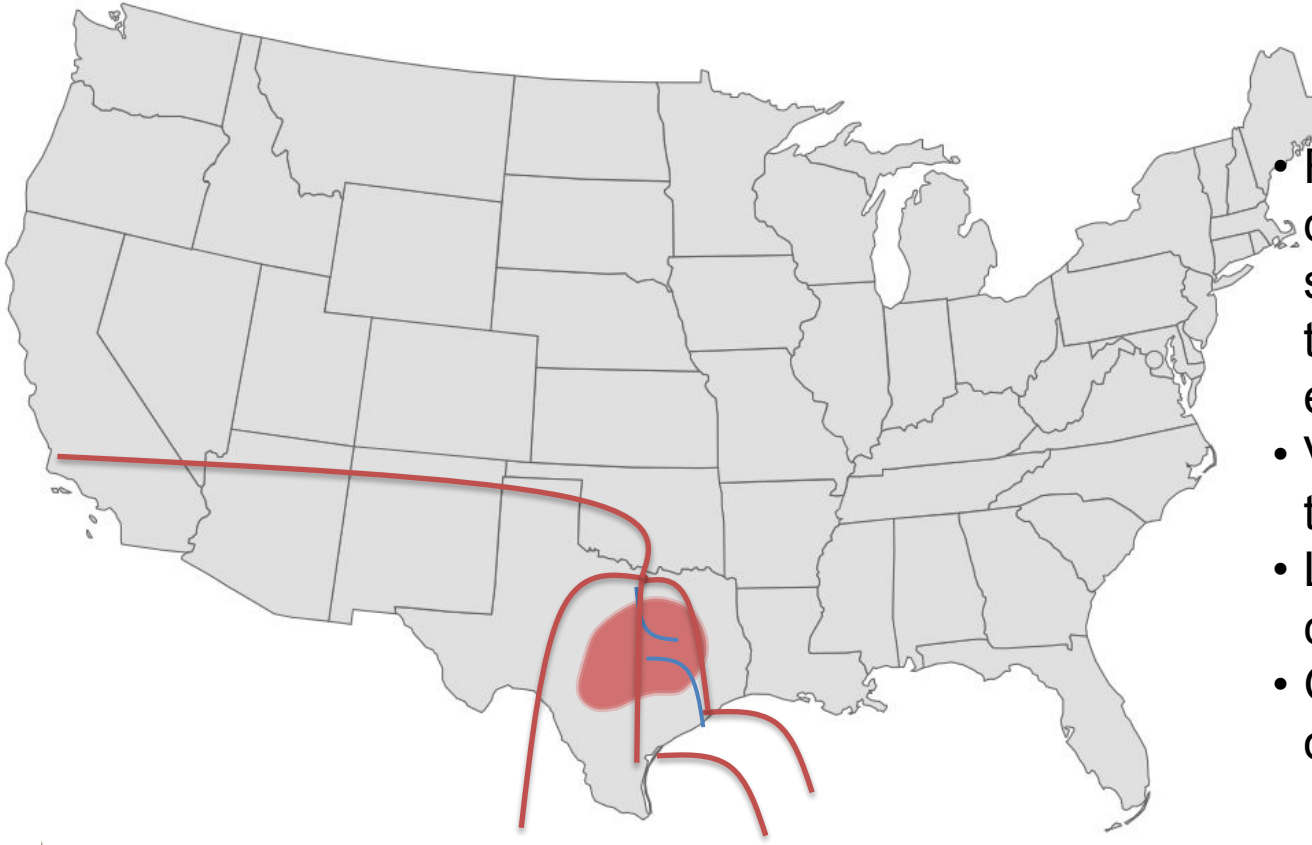
Black Lands Logistics,



- Farmer delivers directly to owned storage, regional terminal, end-user, or elevator
- Very limited containers to West Coast
- Local use into beef cattle, poultry, pet food
- Generally one or two ownership points

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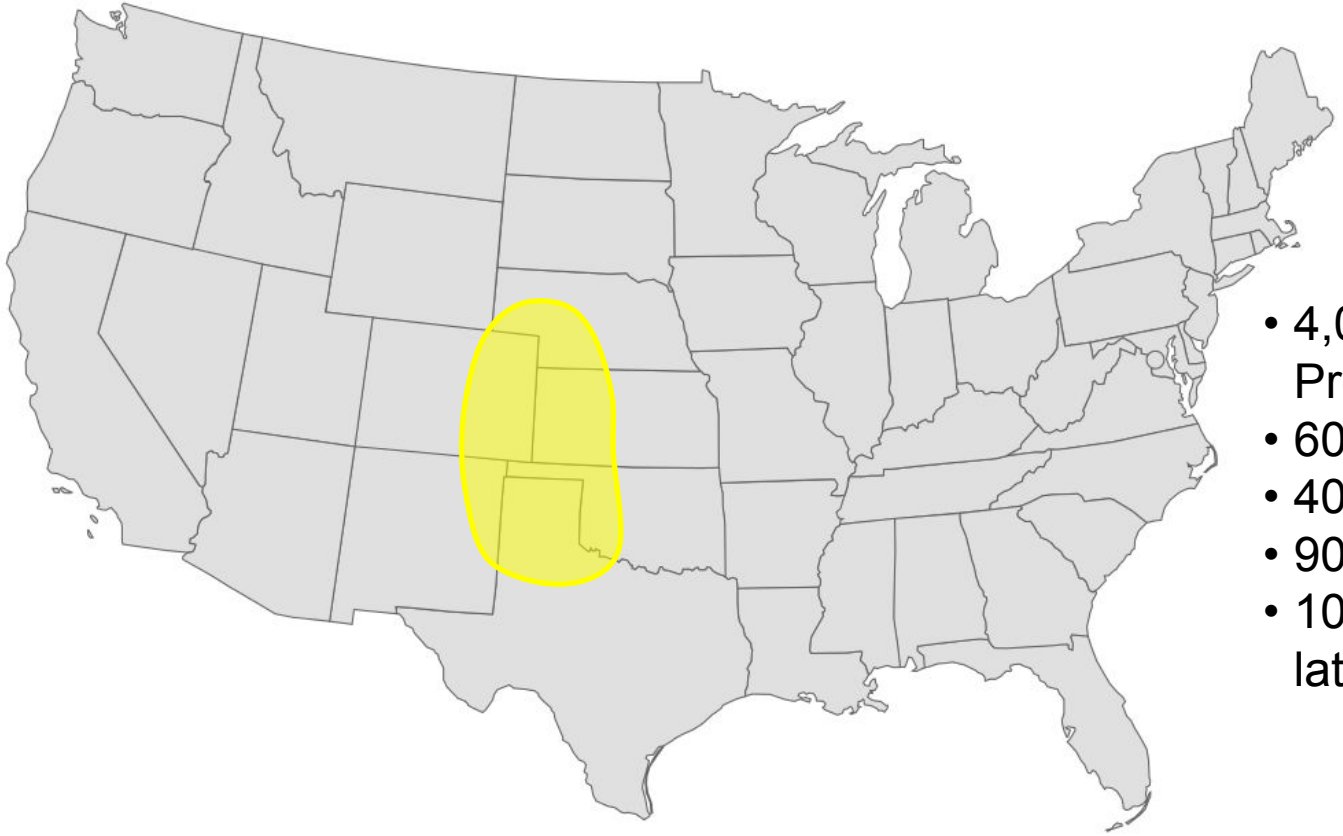
High and Low Plains Logistics,



- 4,000,000 MT Average Production
- 60% exported
- 40% local use
- 90% traded at harvest
- 10% farmer stored for later sale

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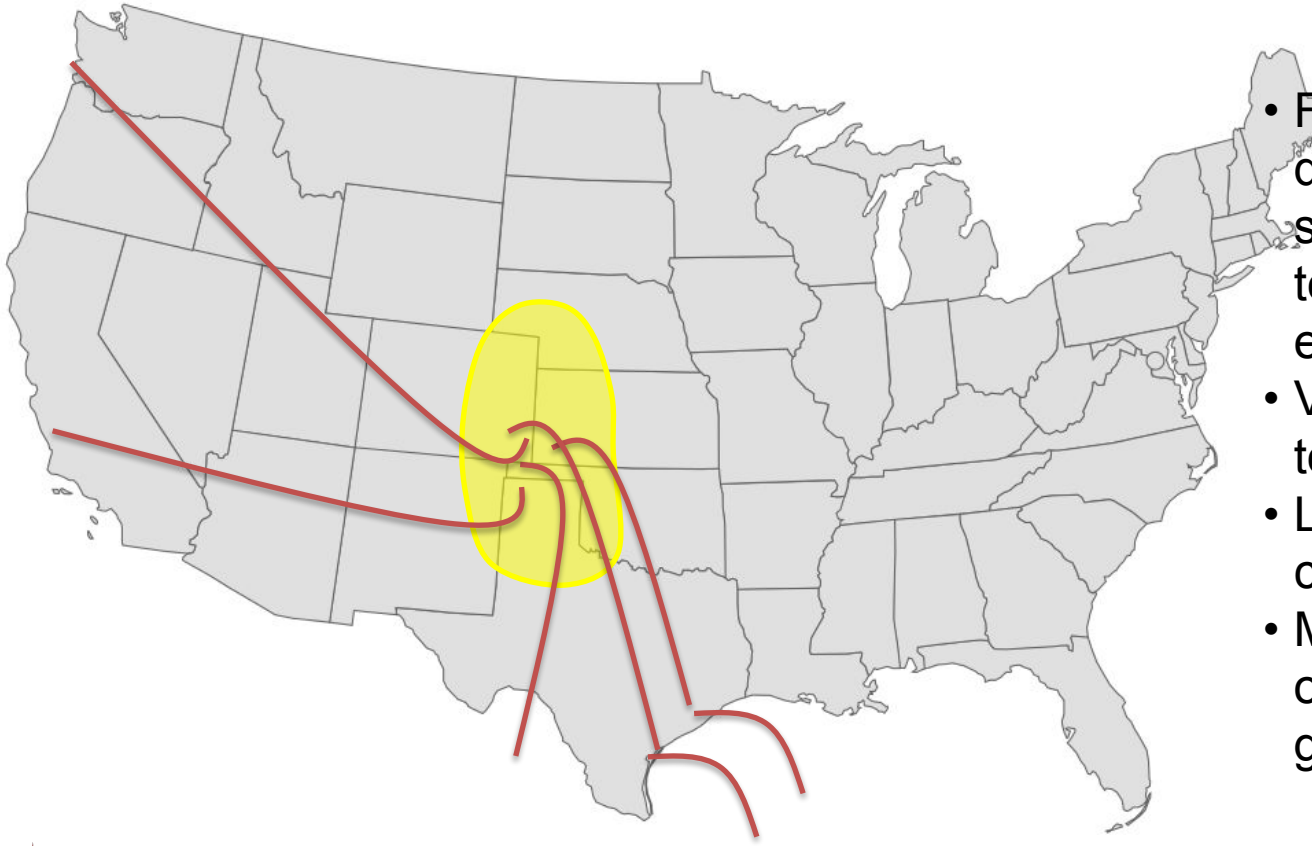
High and Low Plains Logistics,



- Farmer delivers directly to owned storage, regional terminal, end-user, or elevator
- Very limited containers to West Coast
- Local use into beef cattle, ethanol
- Multiple changes in ownership of most grain, up to 5 or 6

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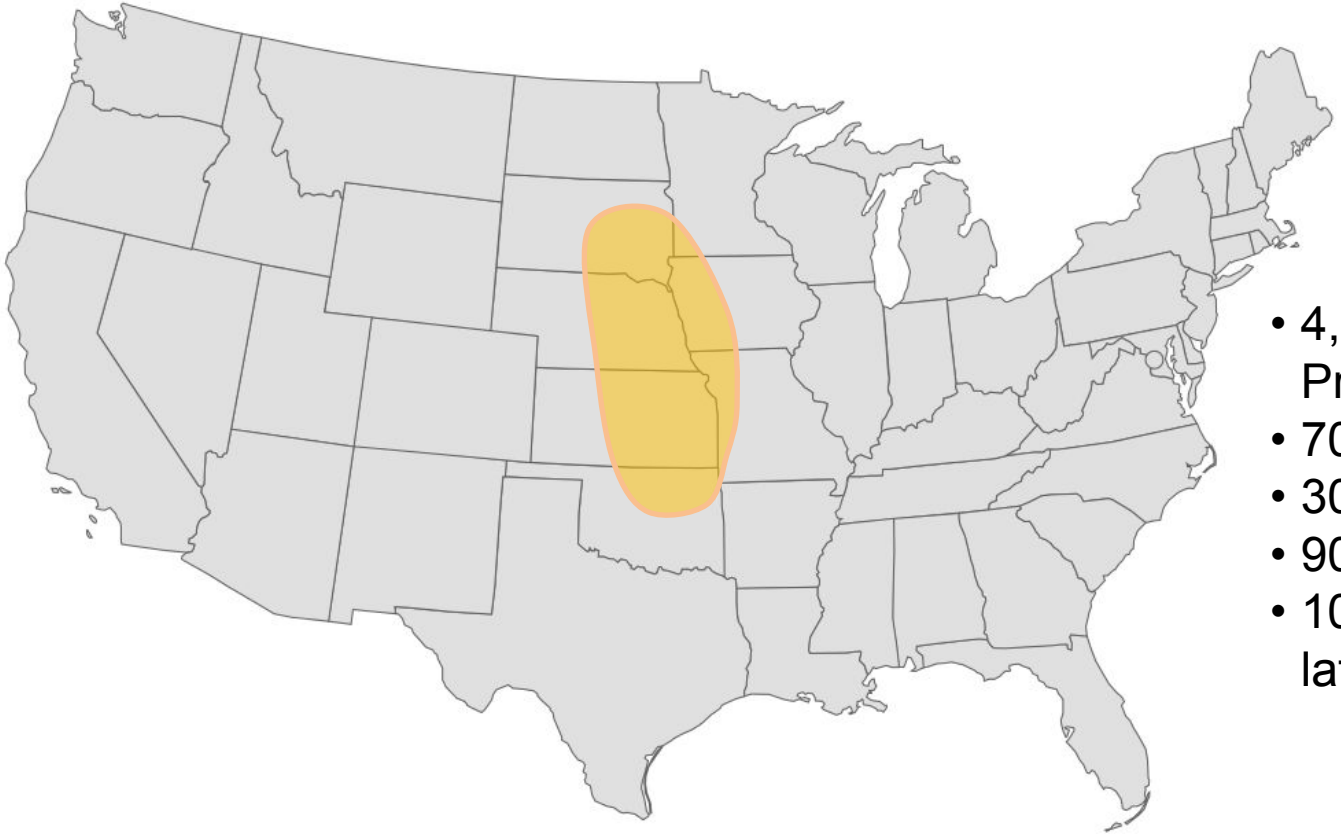
Central Plains Logistics,



- 4,000,000 MT Average Production
- 70% exported
- 30% local use
- 90% traded at harvest
- 10% farmer stored for later sale

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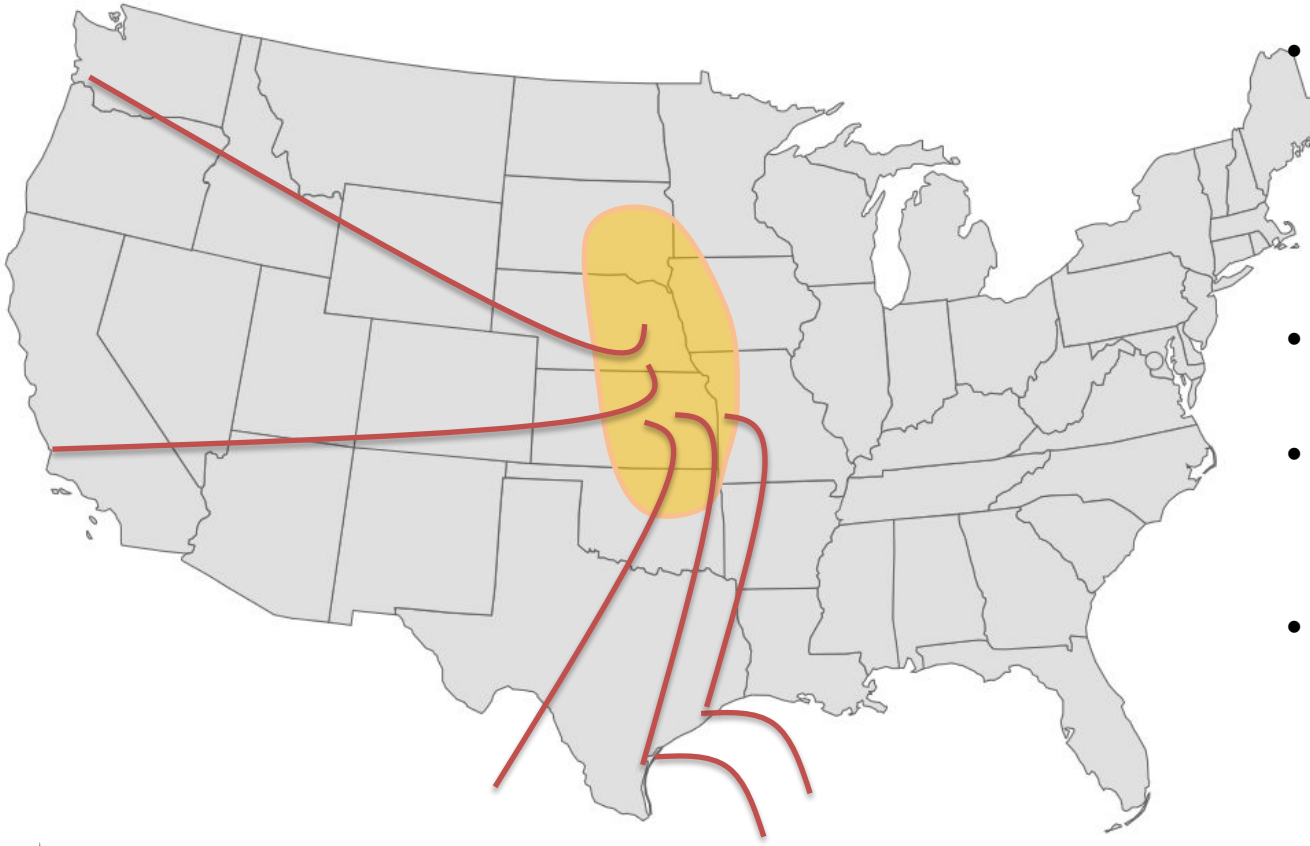
Central Plains Logistics,



- Farmer delivers directly to owned storage, regional terminal, end-user, or elevator
- Containers to West Coast
- Local use into beef cattle, ethanol, pet food
- Multiple changes in ownership of most grain, up to 5 or 6

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Exports,

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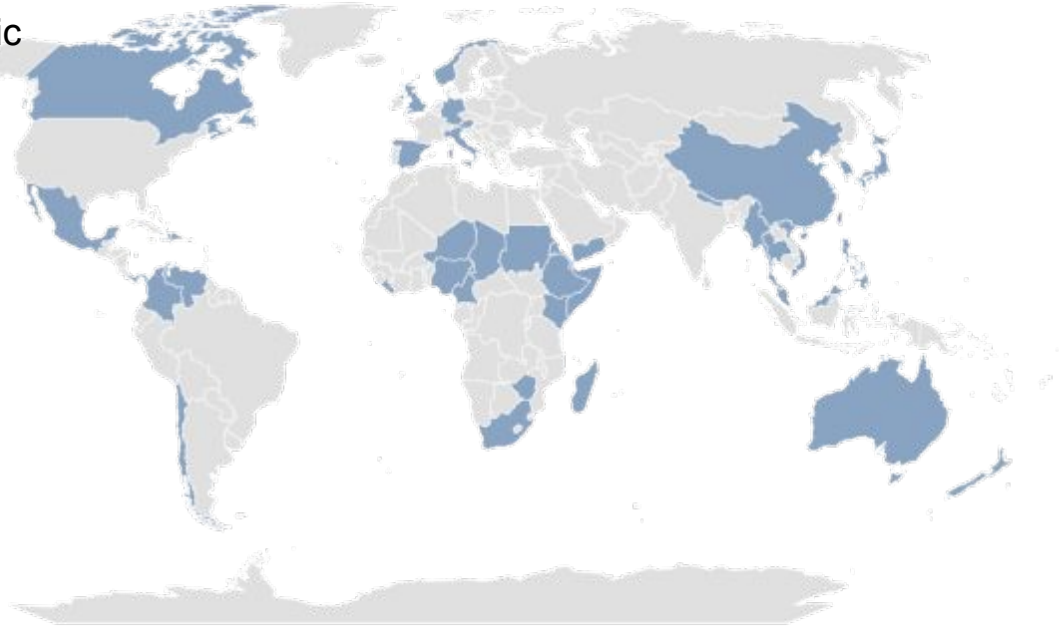
Sorghum Import Countries Including Food AID, 2017 - Current,

China
Mexico
Sudan
Japan
Spain
Eritrea
Djibouti
Somalia
South Africa
Kenya
Ethiopia
Cameroon
Zimbabwe
Madagascar
Yemen

Italy
New Zealand
Canada
Nigeria
Haiti
Chad
Nepal
Korea, South
Philippines
Niger
Malaysia
Thailand
Liberia
Hong Kong
United Kingdom

Dominican Republic
Chile
Panama
Austria
Norway
Venezuela
Barbados
Netherlands
Antilles
Taiwan
Germany
Colombia
Burma
Vietnam
Australia



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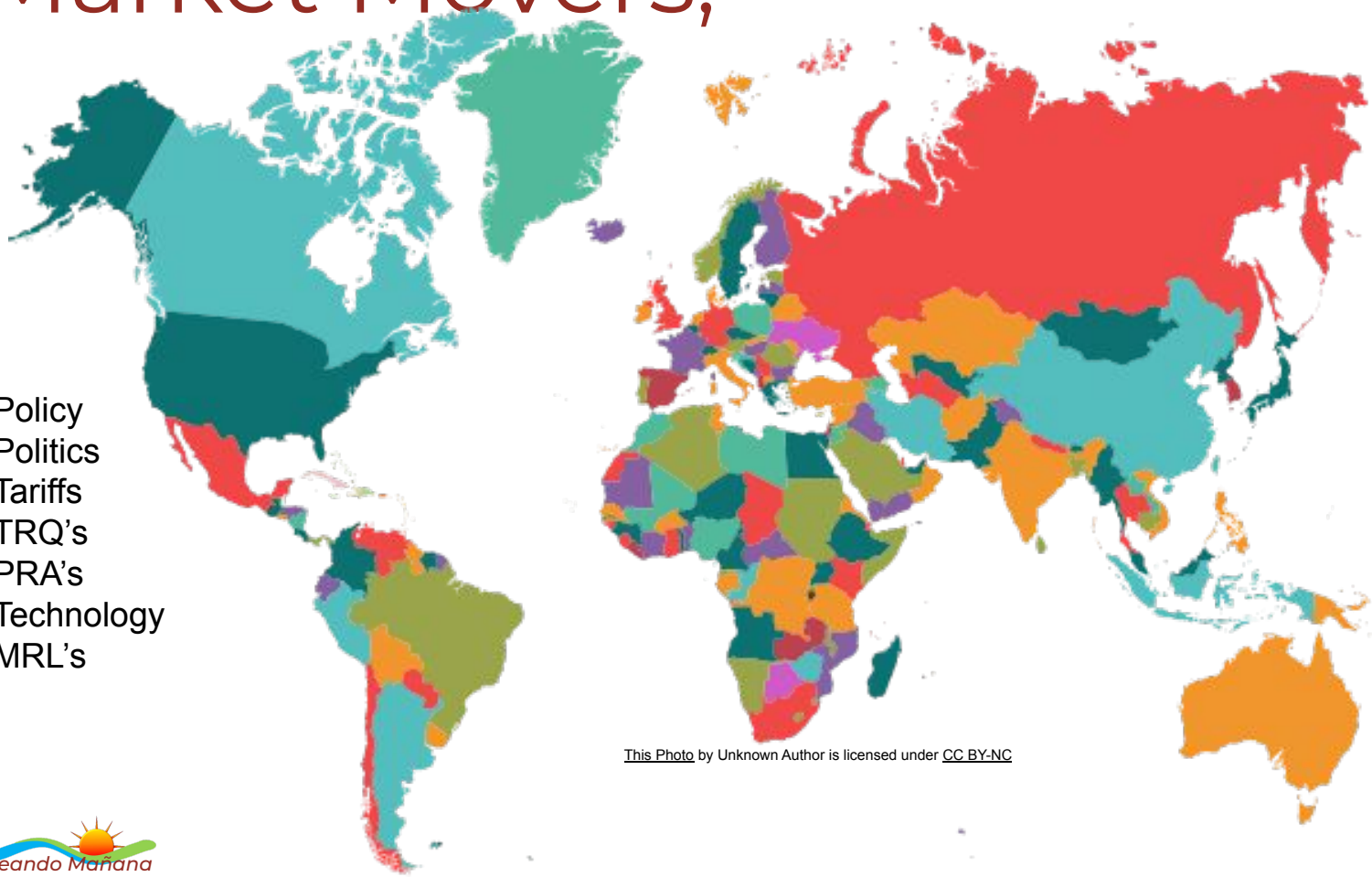
Market Movers,



Policy
Politics
Tariffs
TRQ's
PRA's
Technology
MRL's

Price
Buying Ease
Quality
PS&D
Stocks to Use
Ending Stocks
Storage
Terms
Contracts
Cultural Aspects
Social Aspects
Processing Factors
Downstream Factors
Service

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China Multiple Markets,

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Vietnam Pangasius Market,

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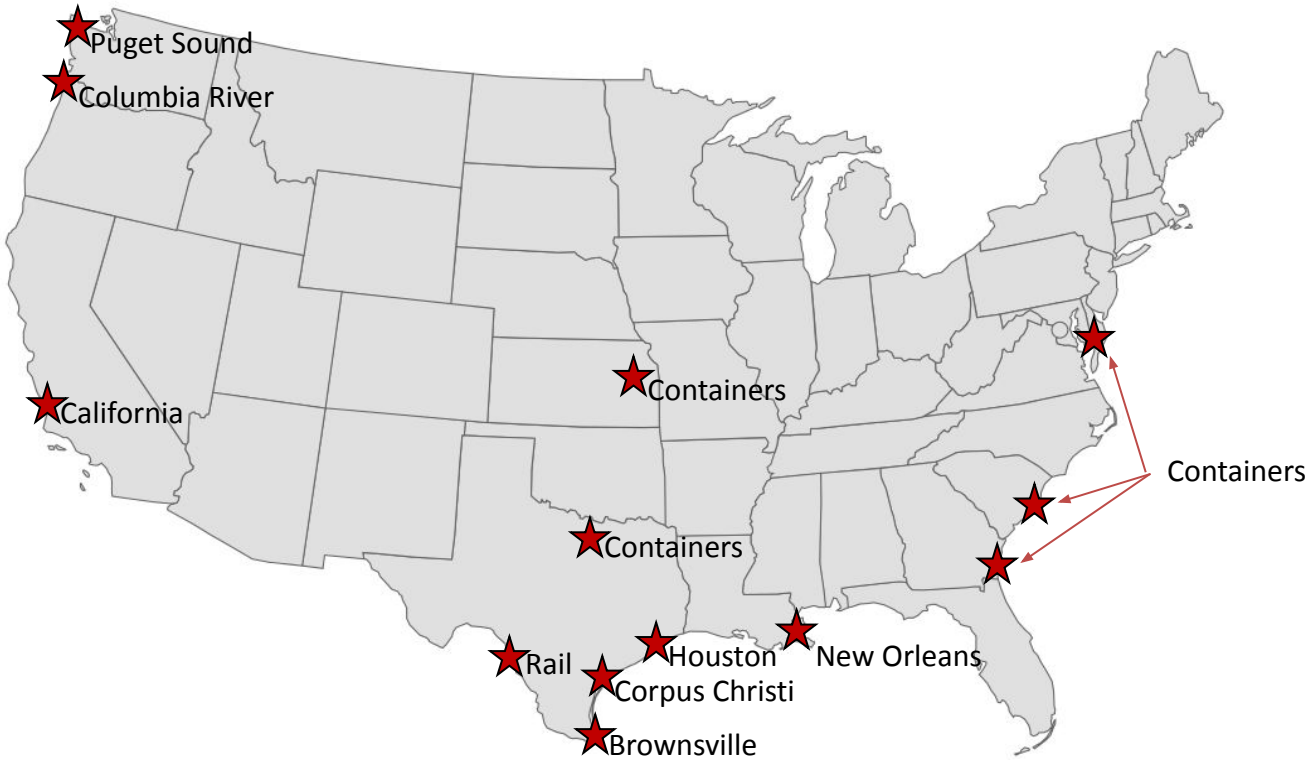
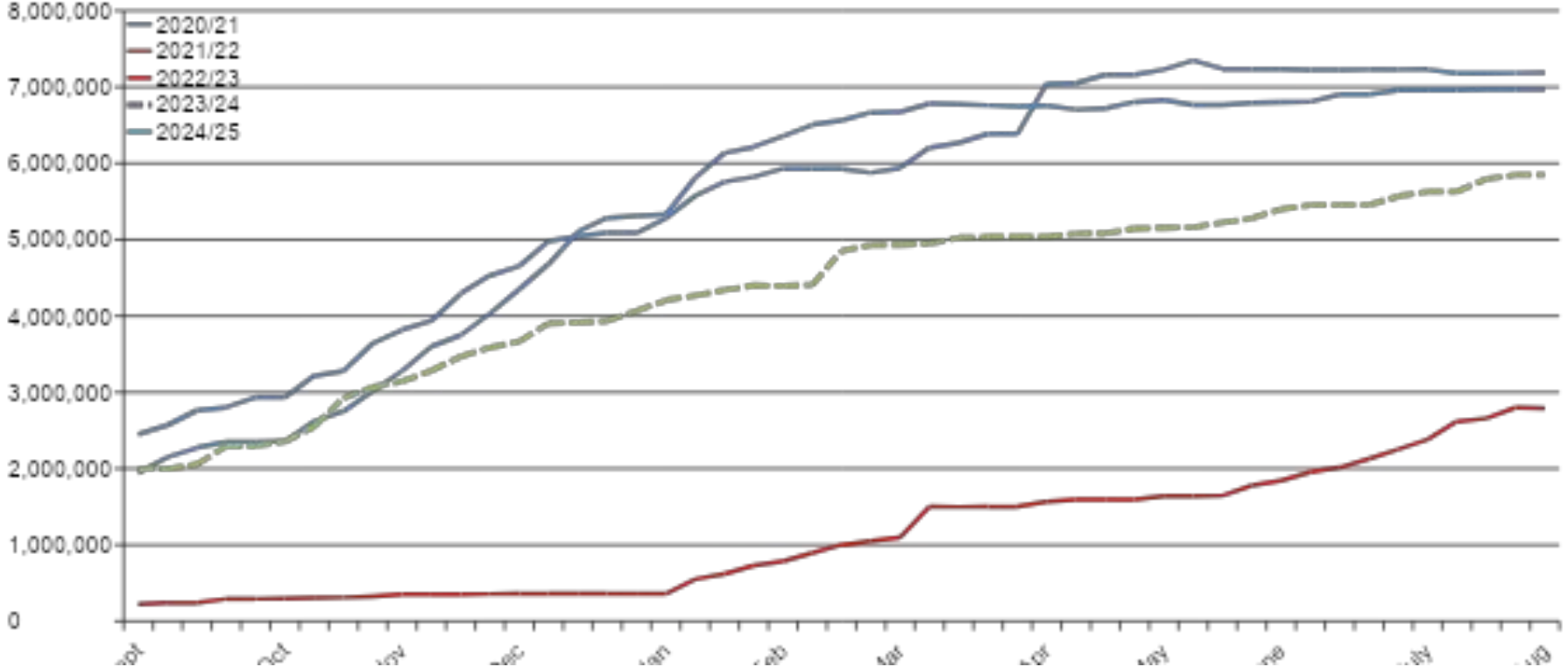
Sorghum Export Facilities,



U.S. Sorghum Commitments,



USDA Data
Metric
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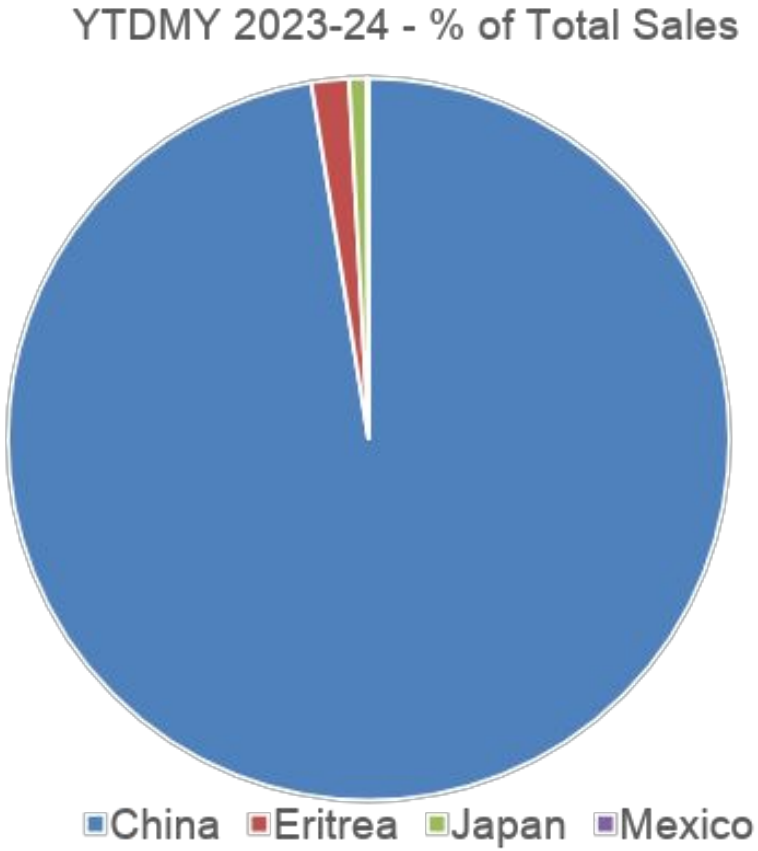
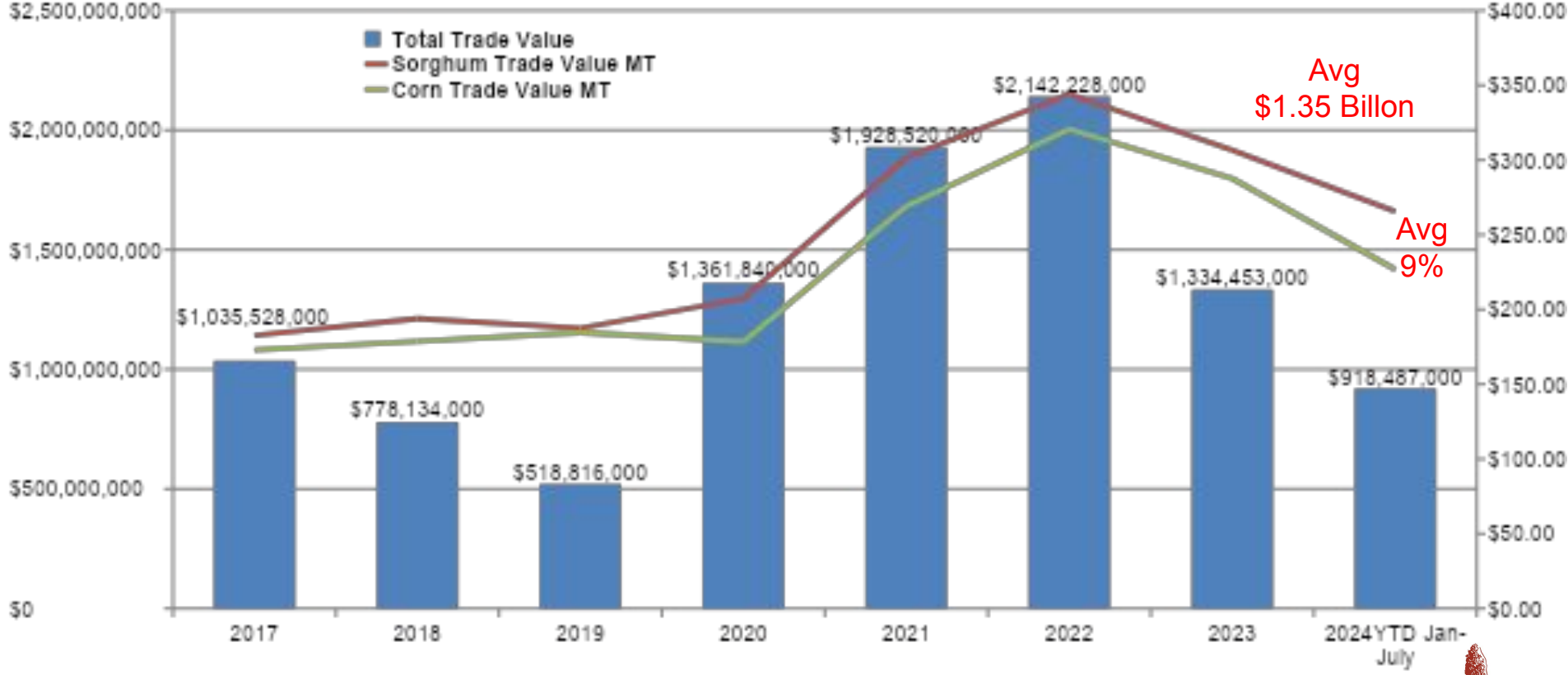
U.S. Sorghum Export Countries,



USDA Data
Metric
Tons

Sorghum Export Value,



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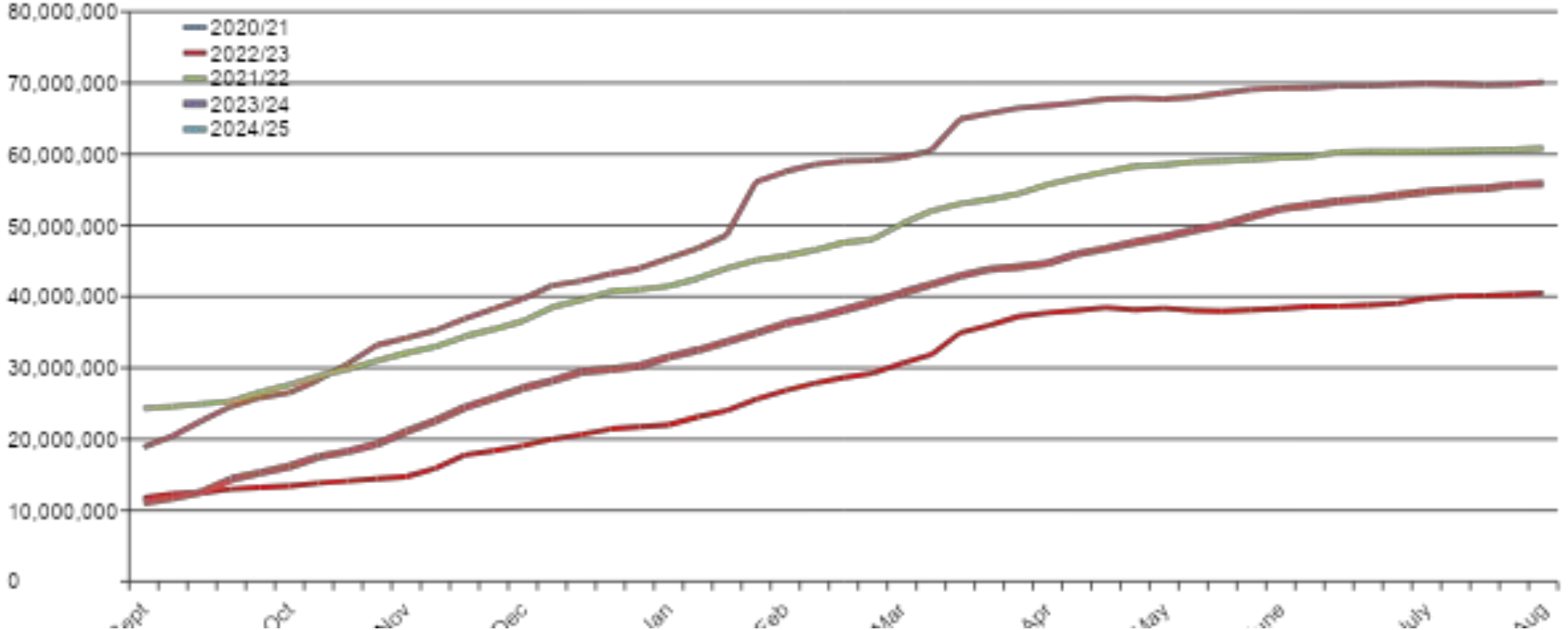
U.S. Corn Commitments,



USDA Data
Metric
Ton

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Current Crop Quality,

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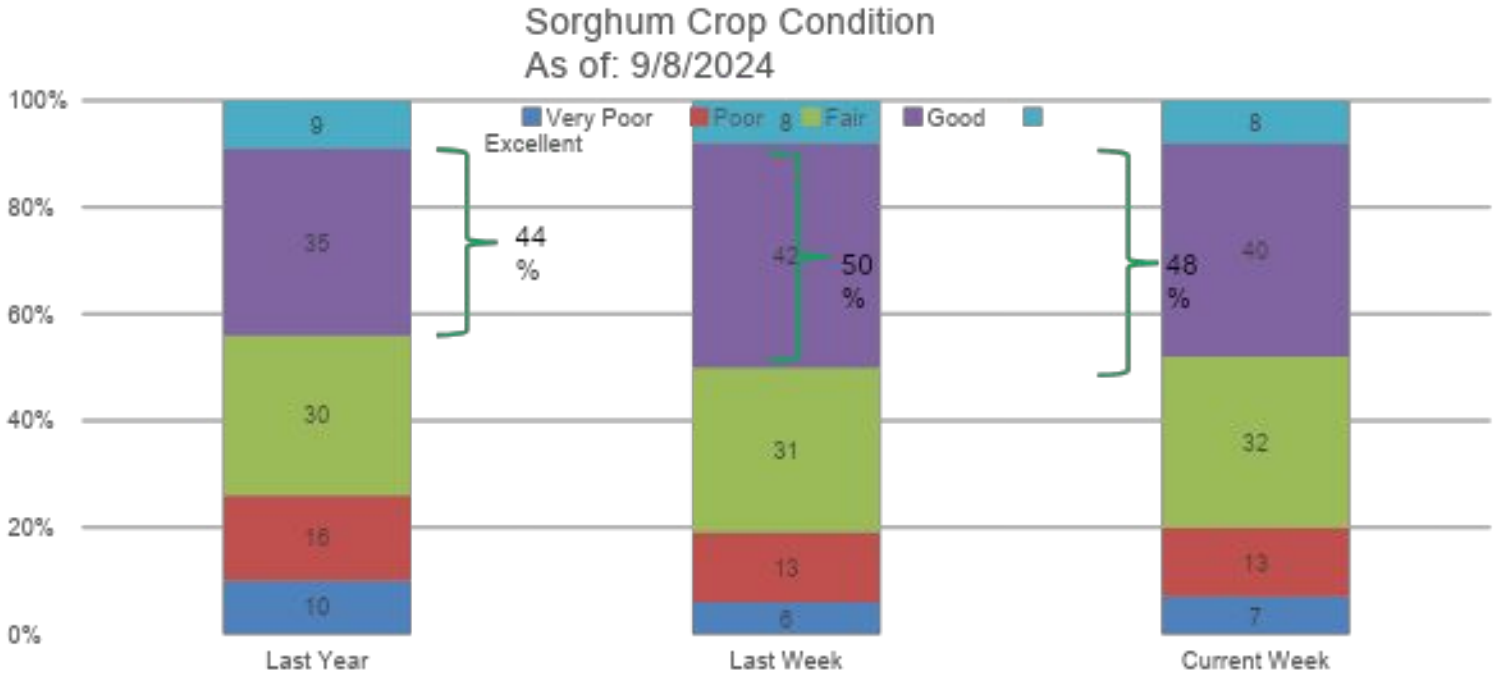
U.S. Current Sorghum Quality,



USDA Data

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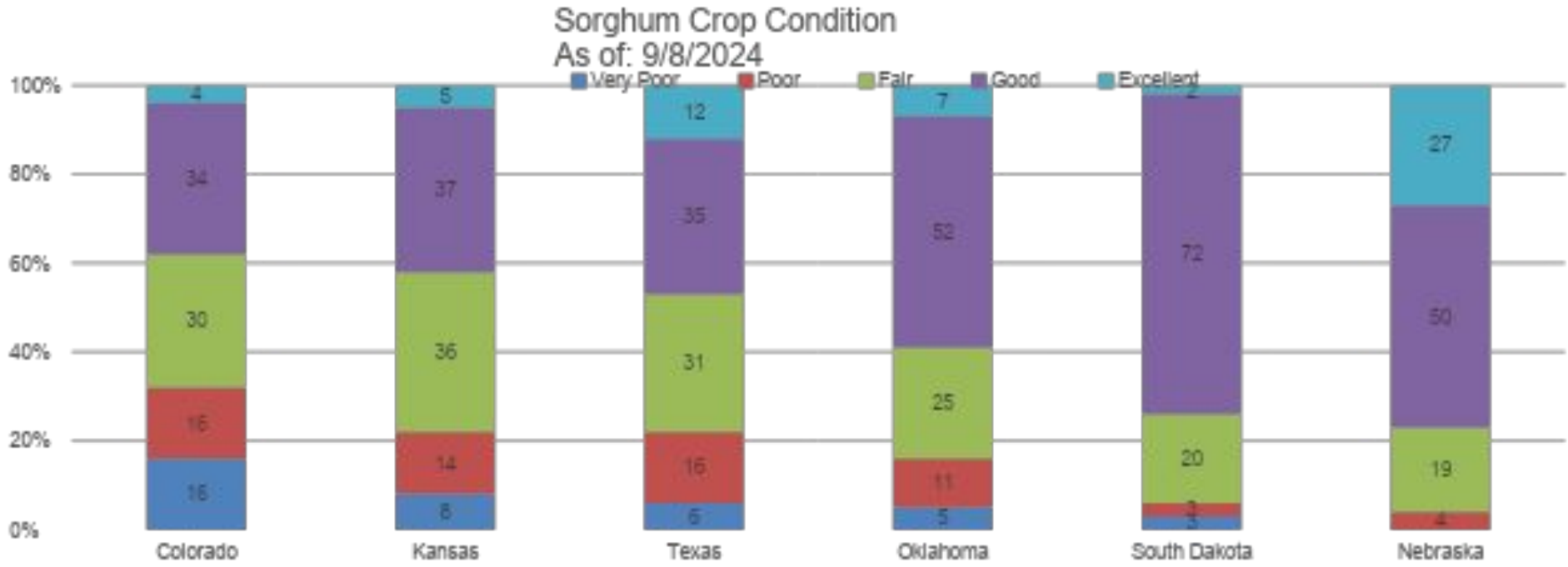
U.S. Current Sorghum Quality,



USDA Data

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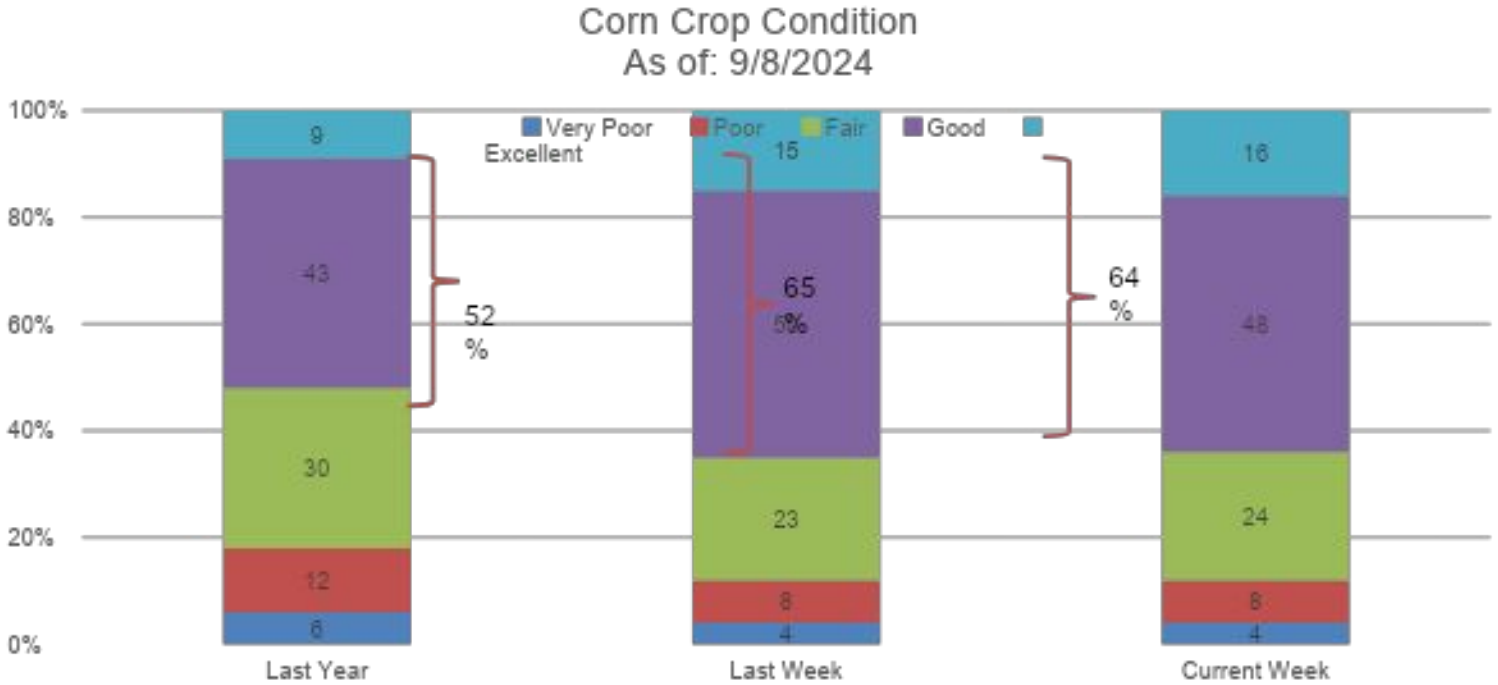
U.S. Current Corn Quality,



USDA Data

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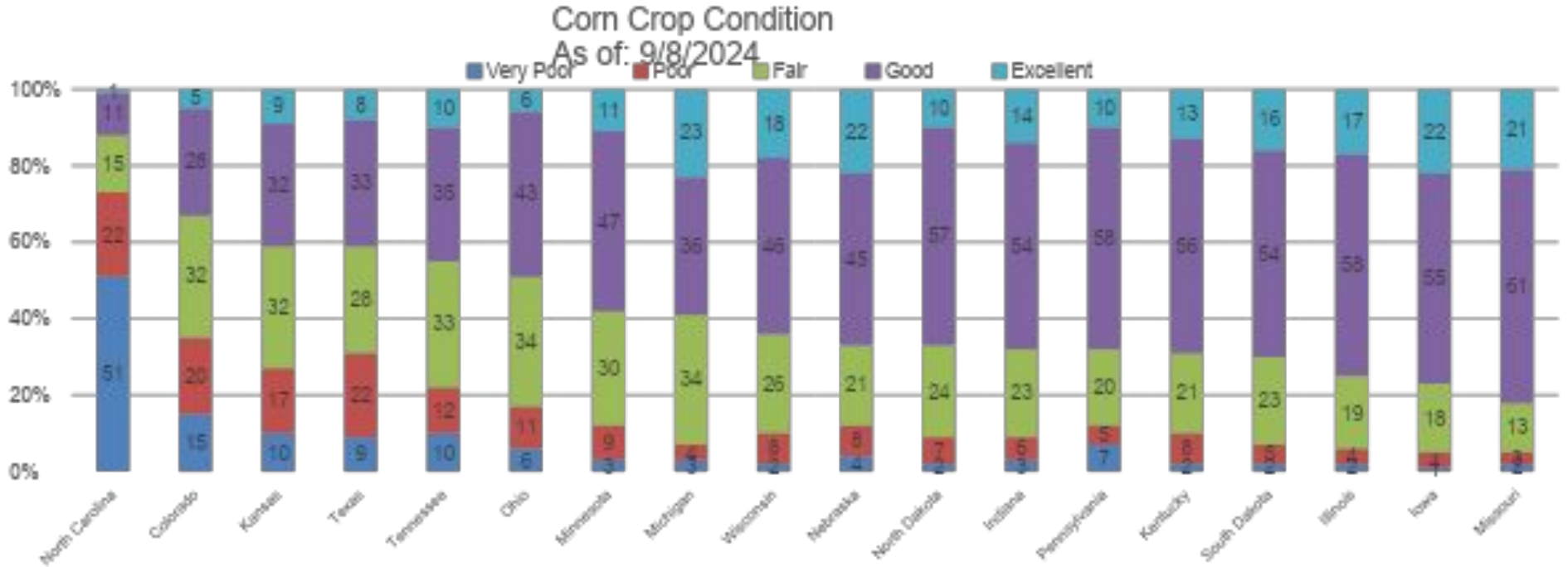
U.S. Current Corn Quality,



USDA Data

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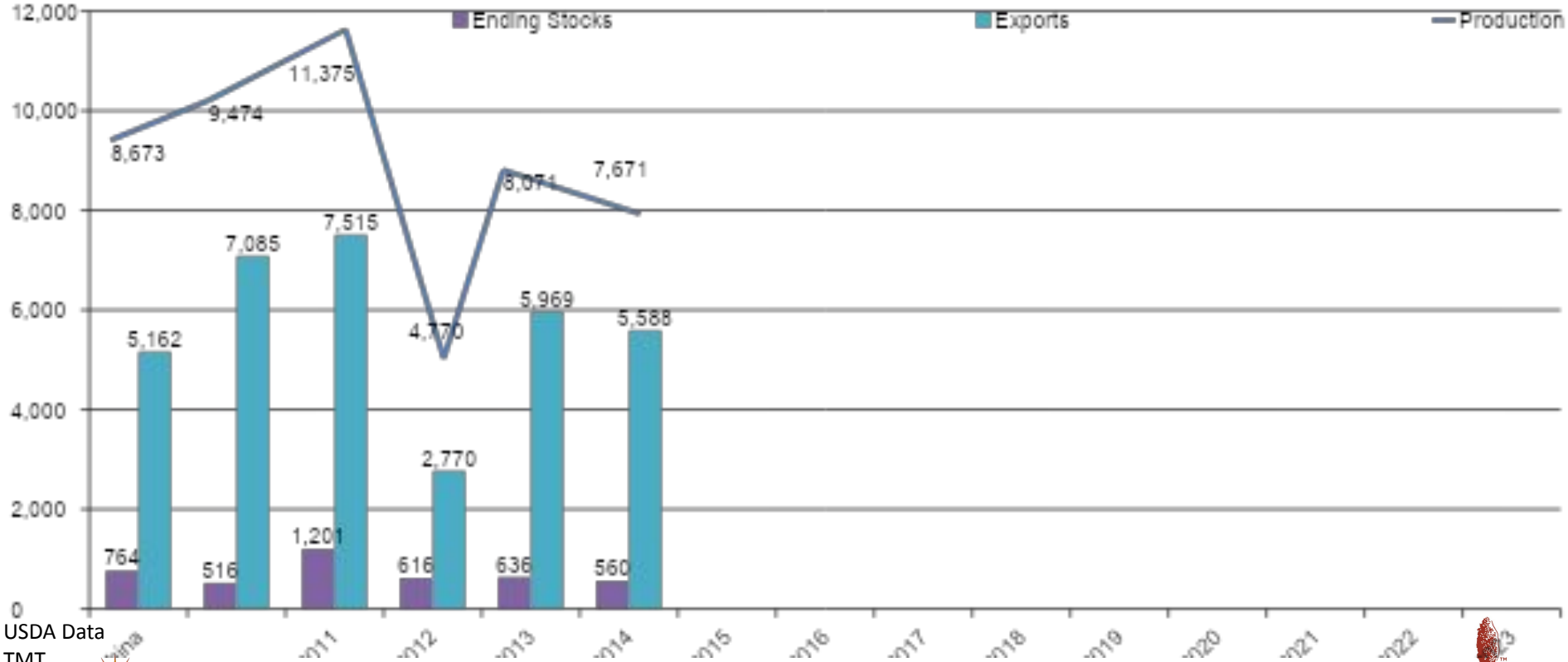
Sorghum PS&D,

United States Sorghum PS&D,



USDA Data
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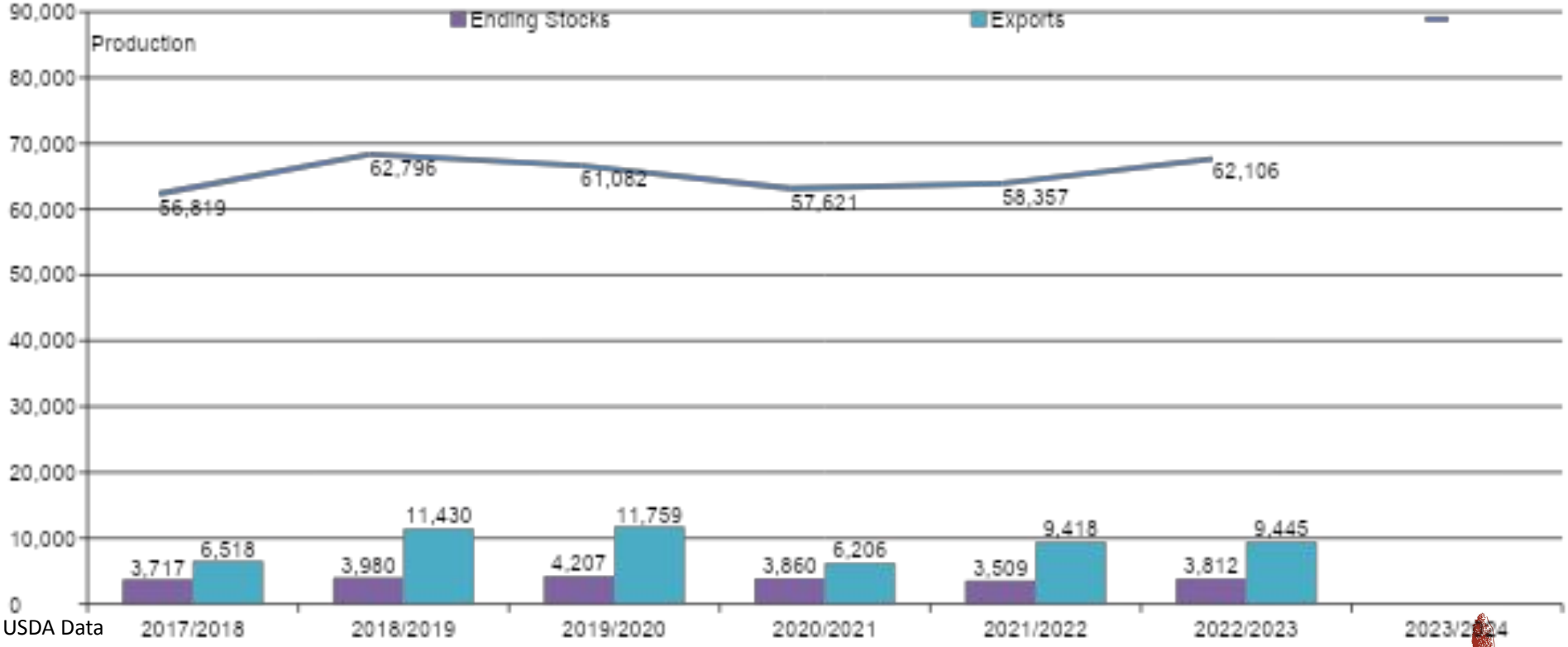
World Sorghum PS&D,



USDA Data

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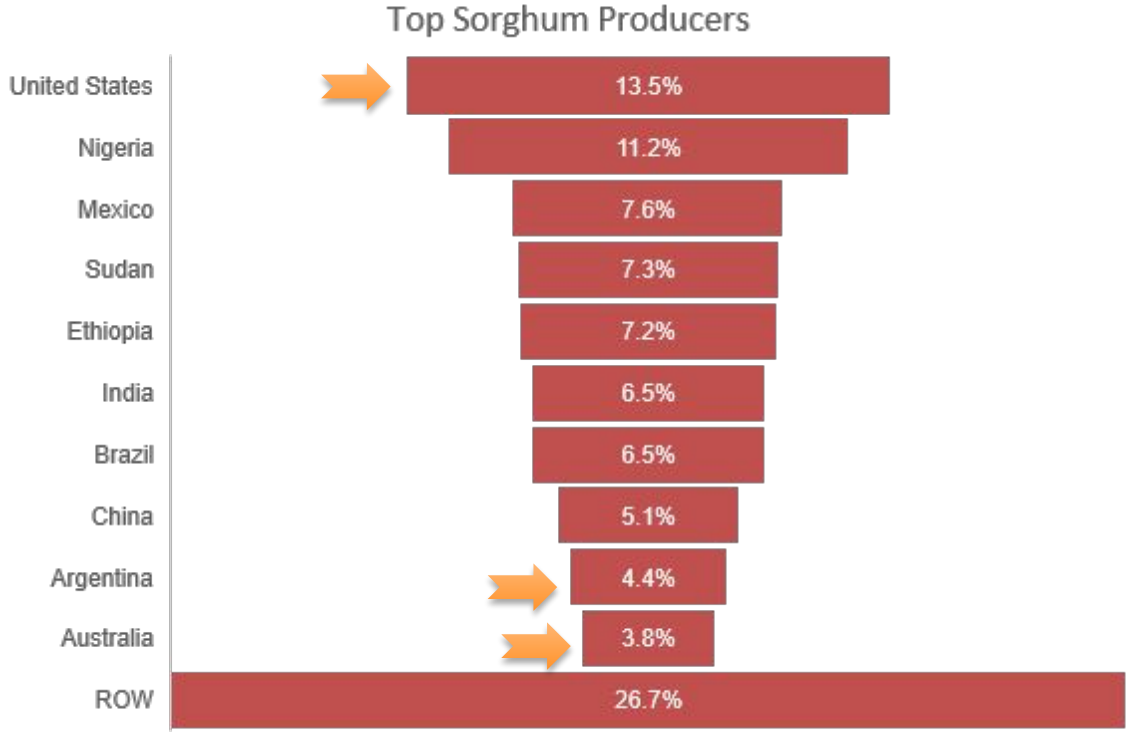
Sorghum - World View,

Sorghum Production - World View, 5 Yr



5 Year Avg - 1,000 MT

World Total	60,392
United States	8,272
Nigeria	6,744
Mexico	4,572
Sudan	4,396
Ethiopia	4,352
India	4,315
Brazil	3,929
China	3,088
Argentina	2,662
Australia	2,305
ROW	15,756

USDA-FAS-PS&D

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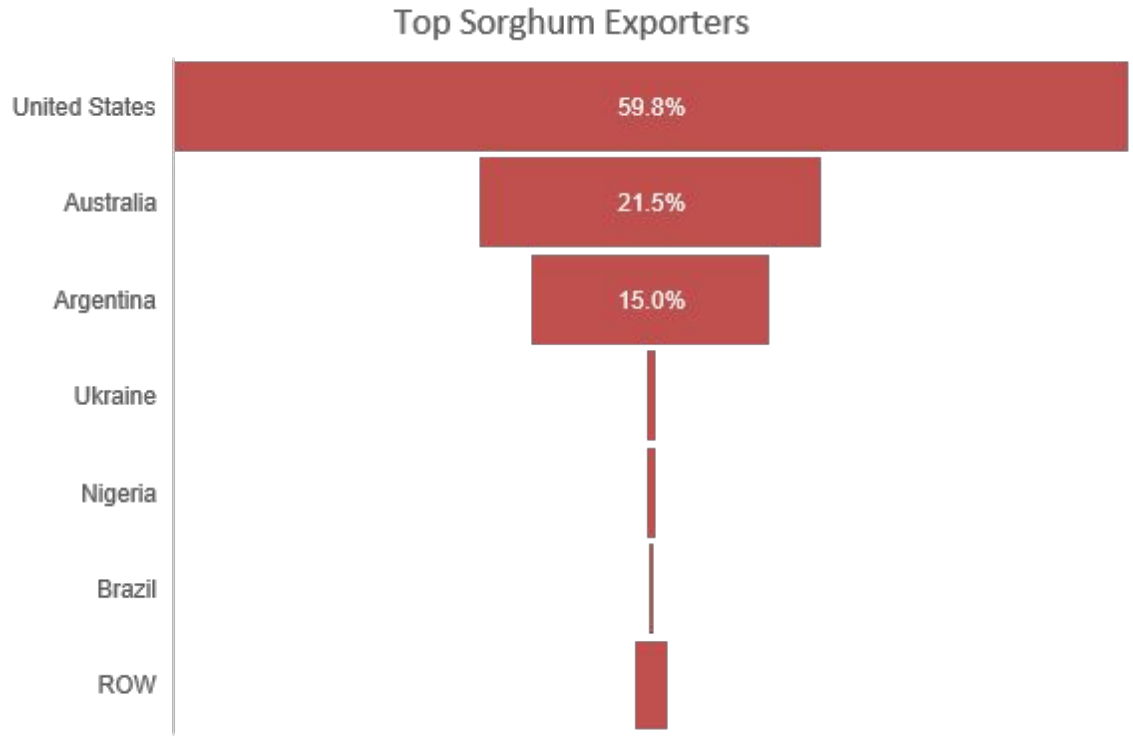
Sorghum Exporters - World View, 5 Yr



5 Year Avg - 1,000 MT

World Total	9,652
United States	5,785
Australia	2,093
Argentina	1,418
Ukraine	57
Nigeria	50
Brazil	39
ROW	209

USDA-FAS-PS&D

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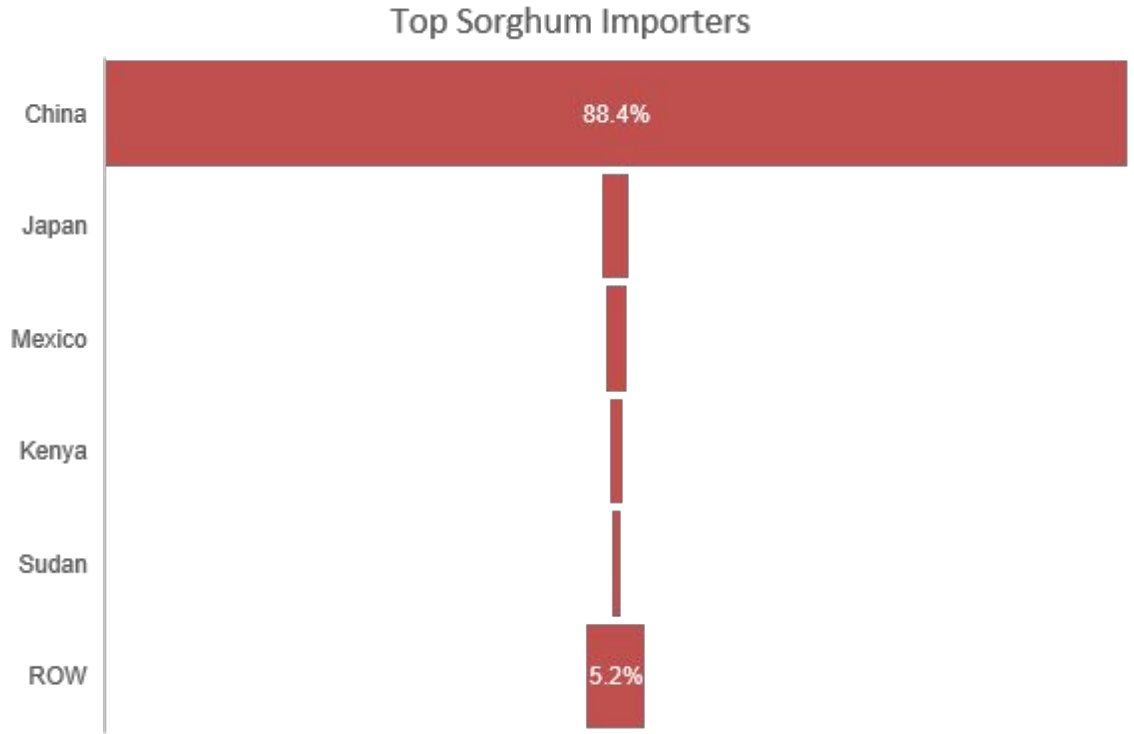
Sorghum Importers - World View, 5 Yr



5 Year Avg - 1,000 MT

World Total	8,923
China	7,885
Japan	216
Mexico	169
Kenya	106
Sudan	82
ROW	466

USDA-FAS-PS&D

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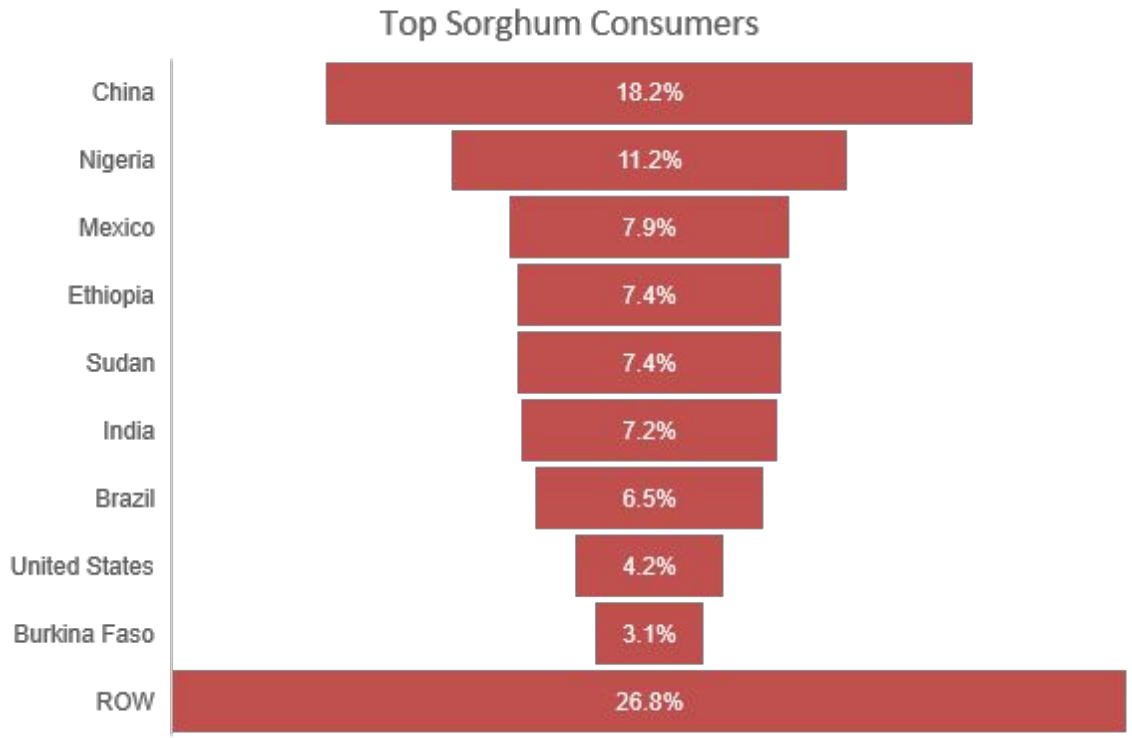
Sorghum Consumers - World View, 5 Yr



5 Year Avg - 1,000 MT	
World Total	59,825
China	10,900
Nigeria	6,690
Mexico	4,760
Ethiopia	4,450
Sudan	4,440
India	4,320
Brazil	3,860
United States	2,528
Burkina Faso	1,840
ROW	16,047

USDA-FAS-PS&D

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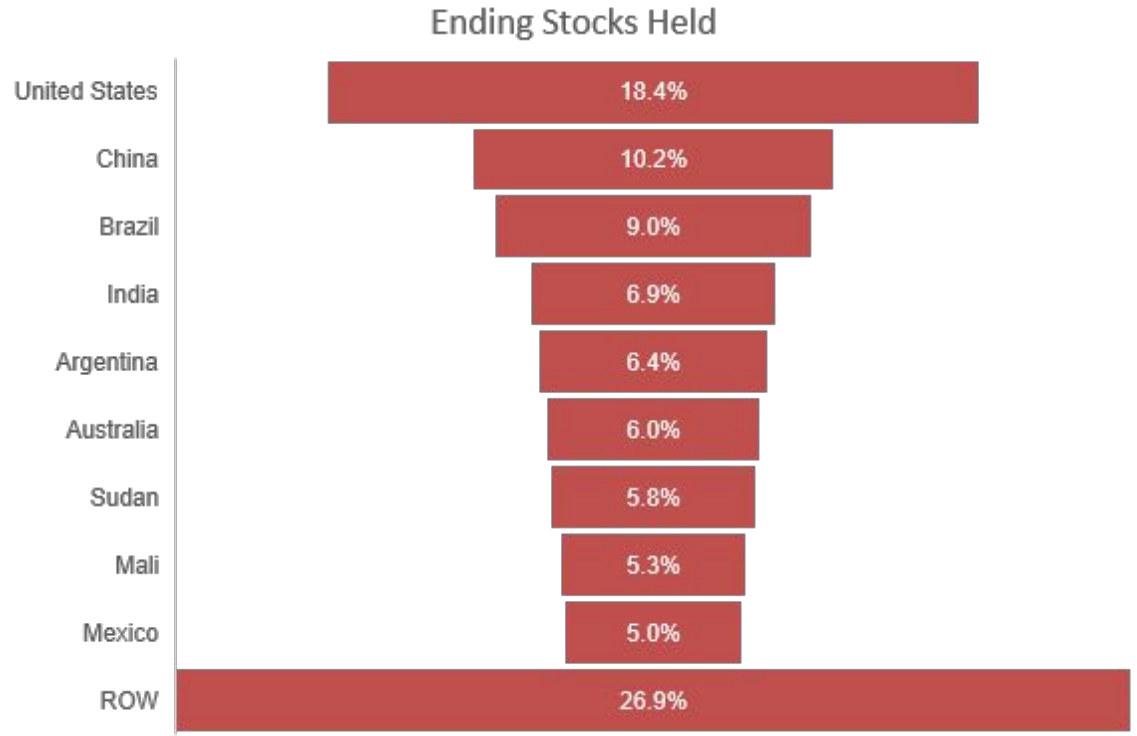
Sorghum Ending Stocks - World View



5 Year Avg - 1,000 MT	
World Total	3,890
United States	706
China	395
Brazil	352
India	270
Argentina	250
Australia	235
Sudan	225
Mali	205
Mexico	184
ROW	1,048

USDA-FAS-PS&D

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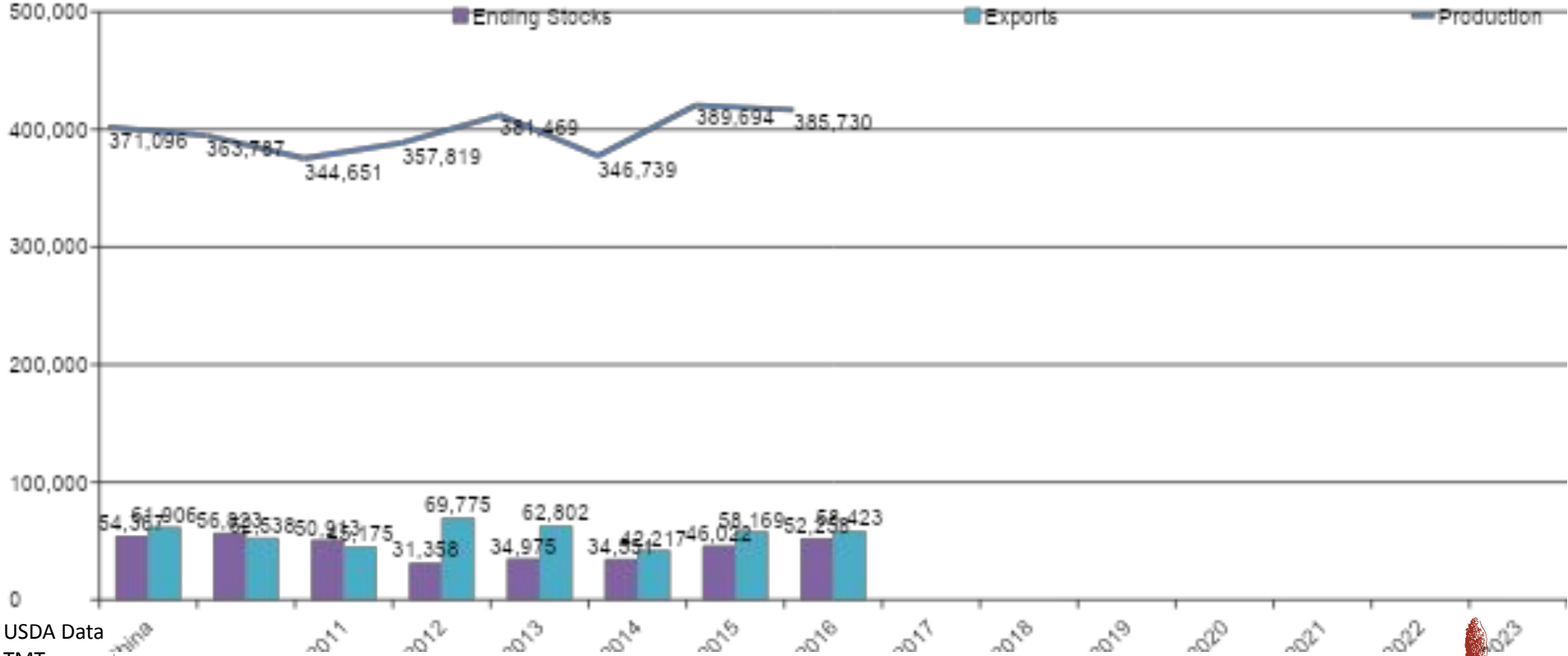
Corn PS&D,

United States Corn PS&D,



USDA Data
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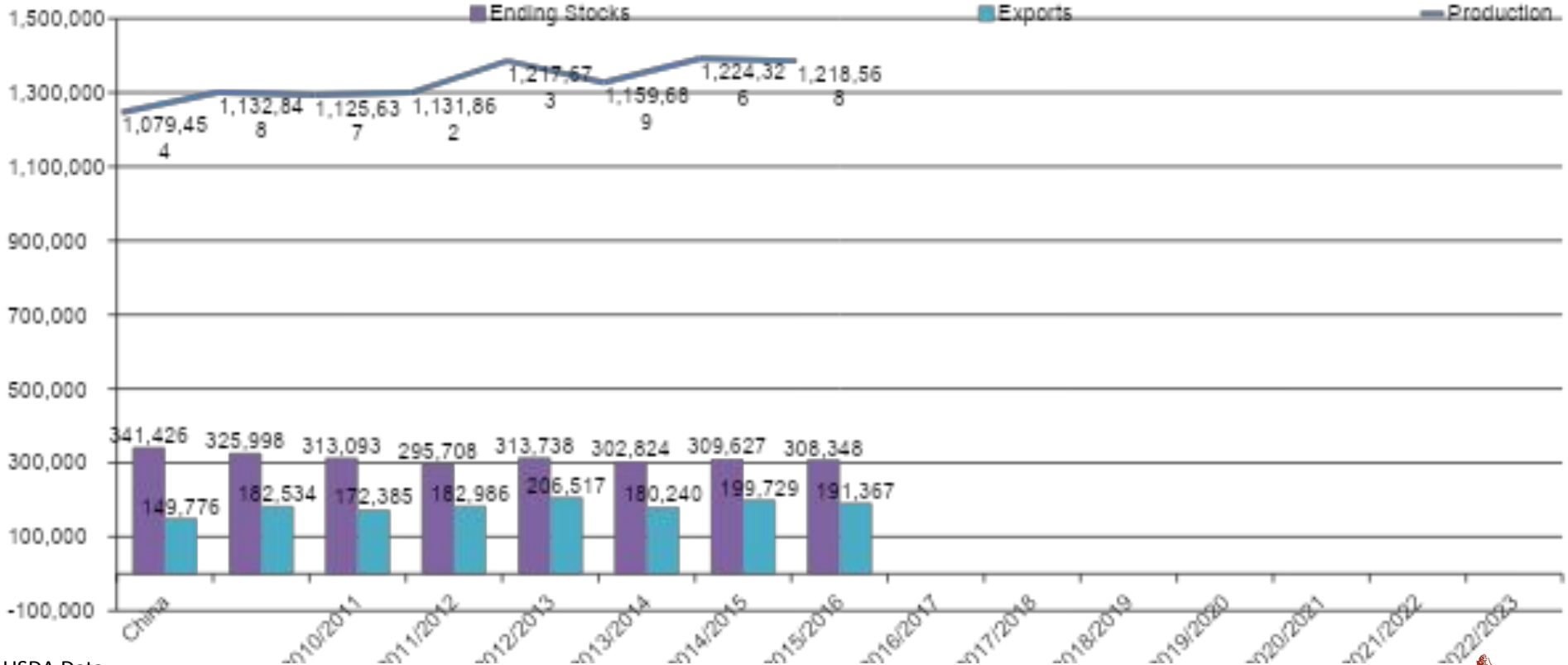
World Corn PS&D,



USDA Data

TMT

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SORGHUM THE SMART CHOICE

Corn - World View,

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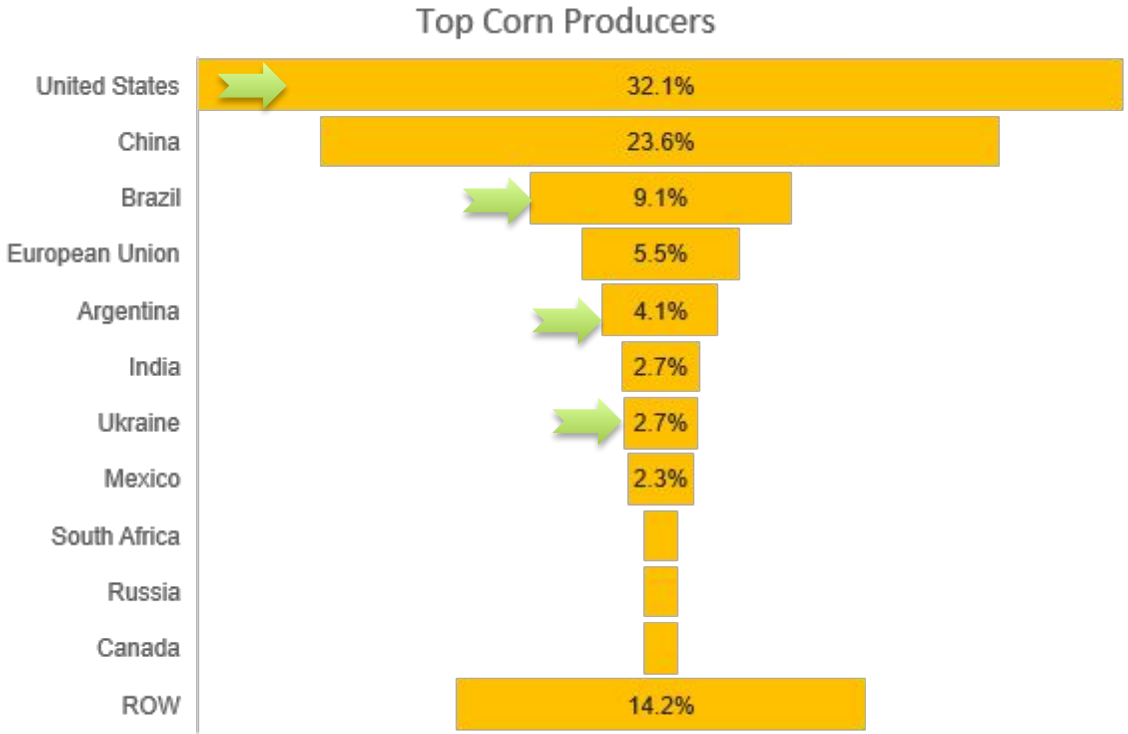
SORGHUM THE SMART CHOICE

Corn Production – World View, 5 Yr Avg



5 Year Avg - 1,000 MT	
United States	367,127
China	269,689
Brazil	103,950
European Union	62,567
Argentina	46,780
India	31,216
Ukraine	30,623
Mexico	26,533
South Africa	14,743
Russia	14,239
Canada	14,229
ROW	163,086

USDA-FAS-PS&D

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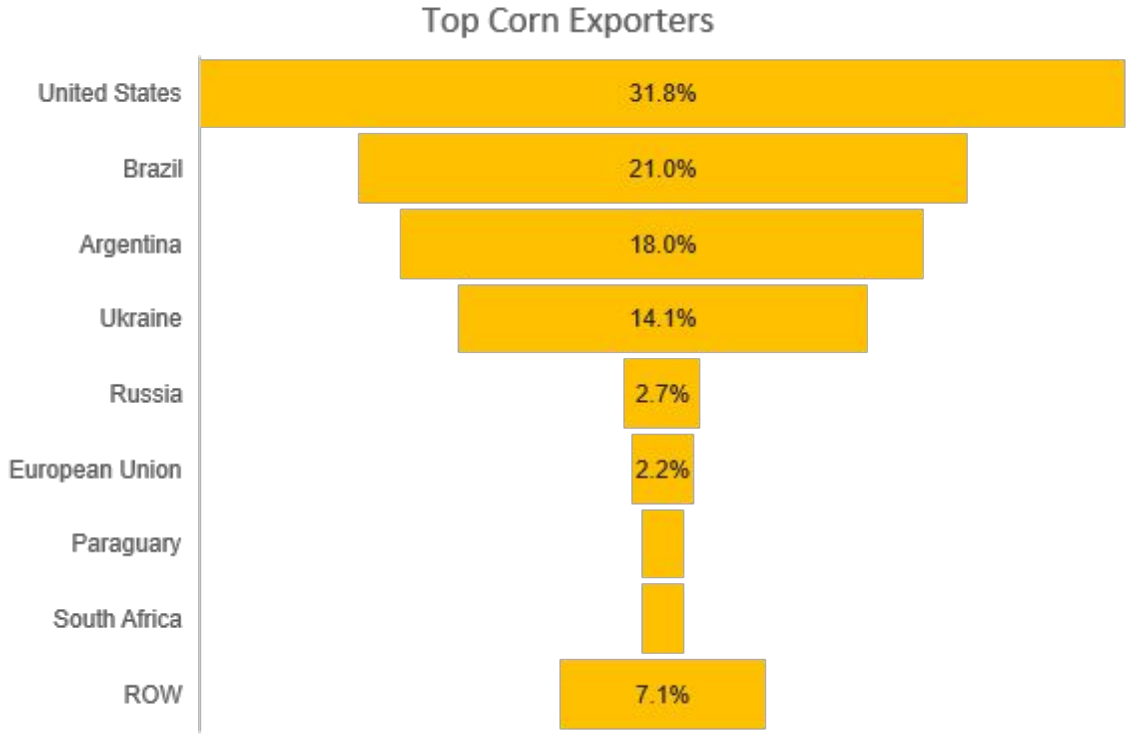
SORGHUM THE SMART CHOICE

Corn Exporters – World View, 5 Yr Avg



5 Year Avg - 1,000 MT	
United States	55,755
Brazil	36,509
Argentina	31,548
Ukraine	24,668
Russia	4,655
European Union	3,882
Paraguay	2,622
South Africa	2,552
ROW	12,582

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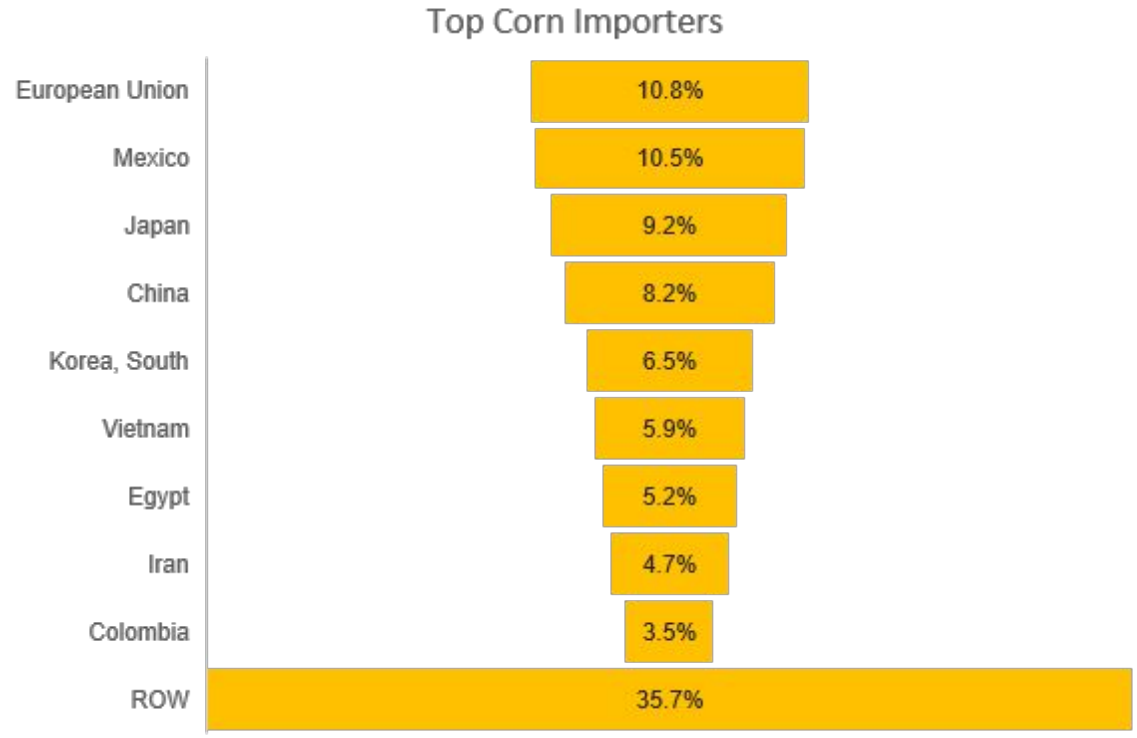
Corn Importers – World View, 5 Yr Avg



	5 Year Avg - 1,000 MT
European Union	18,281
Mexico	17,736
Japan	15,486
China	13,576
Korea, South	10,950
Vietnam	9,910
Egypt	8,767
Iran	7,790
Colombia	5,819
ROW	60,317

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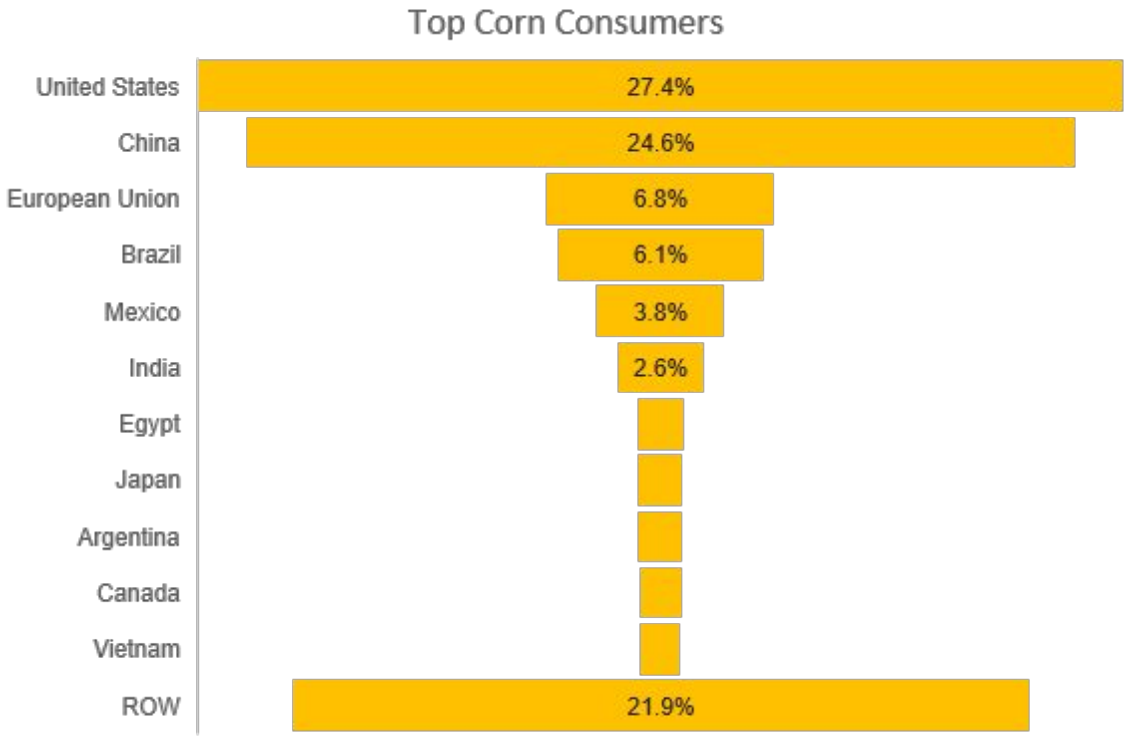
Corn Consumers – World View, 5 Yr Avg0



5 Year Avg - 1,000 MT	
United States	311,490
China	279,400
European Union	77,240
Brazil	69,750
Mexico	43,750
India	29,975
Egypt	15,625
Japan	15,449
Argentina	15,420
Canada	14,670
Vietnam	14,140
ROW	248,925

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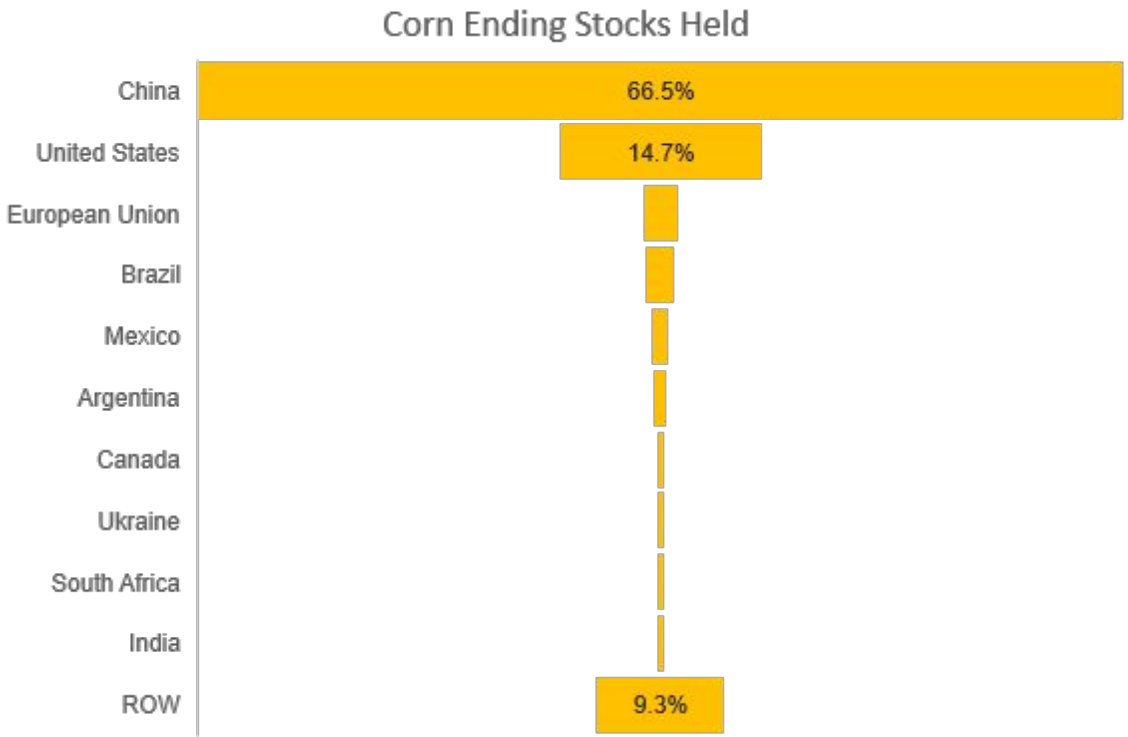
Corn Ending Stocks – World View, 5 Yr Avg



5 Year Avg - 1,000 MT	
China	211,189
United States	46,364
European Union	7,988
Brazil	6,859
Mexico	4,154
Argentina	3,235
Canada	2,174
Ukraine	2,068
South Africa	1,959
India	1,940
ROW	29,562

USDA-FAS-PS&D

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SORGHUM THE SMART CHOICE

Why sorghum,

Why sorghum,

- *Current market dynamics and consumer preferences identify with a story.*
    - *Healthy*
    - *Environmentally friendly*
    - *Safe*
    - *Cost competitive*
    - *Diverse application*

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SORGHUM THE SMART CHOICE

Value-added development,

- Pet Food
- Aquaculture
- Food products
- Spirits
- Attributes
- Sustainability platform
- Environmental platform
- Certificate methodology

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SORGHUM THE SMART CHOICE

Sorghum & Livestock,

Why sorghum?

- *In swine,*
  - 98-99 percent the energy content of corn.
  - Greater digestible phosphorus requiring less supplemental inorganic phosphorus.
  - More saturated fatty acids and less. polyunsaturated fatty acids.
  - More of the essential amino acids threonine, tryptophan, and valine allow for greater quantities of supplemental amino acids (lysine and methionine).

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SORGHUM THE SMART CHOICE

Sorghum & Livestock,

Why sorghum?

- *In broilers and layers,*

- Excellent source of protein and energy for broilers and egg layers.
- 95-97 percent amino acid digestibility content of corn.
- Contains reduced quantities of xanthophylls that create higher egg yolk pigmentation and skin coloration.
- Concerns about tannins are unwarranted as 99% of U.S. sorghum is tannin-free.

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SORGHUM THE SMART CHOICE

Sorghum & Livestock,

Why sorghum?

- *In ducks,*
  - Trails indicate meat and egg duck diets containing sorghum had no negative effects on production.
  - No concerns were noted on meat quality.
  - Sorghum does contain reduced quantities of xanthophylls that create higher pigmentation of egg yolk and skin coloration.
  - Concerns about tannins are unwarranted as 99% of U.S. sorghum is tannin free.

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SORGHUM THE SMART CHOICE

Sorghum & Livestock,

Why sorghum?

- *In cattle,*
  - Sorghum used in grain and DDG form.
  - Most beneficial in price-competitive scenarios.
  - Popped, and steam-flaked are typical use methods.
  - 90 to 95 percent relative value to corn.
  - Forage sorghum is heavily used due to the production advantages such as water use from irrigation.

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SORGHUM THE SMART CHOICE

Sorghum & Livestock,

Why sorghum?

- *In aquaculture,*
  - Trails indicate aquaculture diets containing sorghum had no negative effects on production.
  - No concerns were noted on fillet quality in pangasius.
  - No concerns have been noted on feed performance.
  - Protein and amino acids values have been noted.
  - More saturated fatty acids and less polyunsaturated fatty acids.

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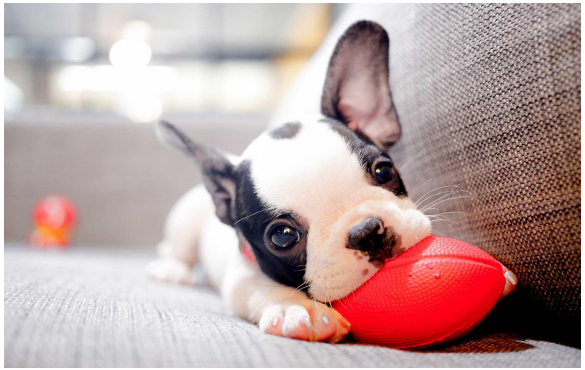
SORGHUM THE SMART CHOICE

Sorghum & Pets,

Why sorghum?

- *In companion animals,*
  - Maintains blood sugar balance.
  - Measurable dietary fiber.
  - Less fat at 3.46% compared to corn at
  - No need for special processing to achieve Good digestibility creating potential cost/energy savings.
  - Palatability studies show sorghum is favored or similar to rations formulated with other grains.



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Products around the world,

- *Beer*
- *Liquor – especially baijiu*
- *Pasta*
- *Snacks*
- *Breads*
- *Flour*
- *Whole grain or processed*
- *Desserts*
- *Cereals*
- *Syrups*
- *Condiments*
- *Water and energy drinks*
- *Porridges*
- *Popped*

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Branding,

- Adding future value

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SORGHUM THE SMART CHOICE

Branding,

- *Sorghum type – Identity preserved*
    - *Red*
    - *White*
    - *Waxy*
    - *High Protein*
    - *Specific varietal*

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SORGHUM THE SMART CHOICE

Branding,

- *Production – Identity preserved*
  - *Environmental attribute*
  - *Sustainable attribute*
  - *Area*
  - *Farmer*

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Branding,

- *Producer Verified Program*
  - *USDA driven*
  - *End-user driven*
  - *Certified*
  - *Audit verified*
  - *Consistent*

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Trending,

- *Consumer-driven, consumer-capture development*
    - *Unique*
    - *Elitist*
    - *Trend setter*
    - *Healthy*

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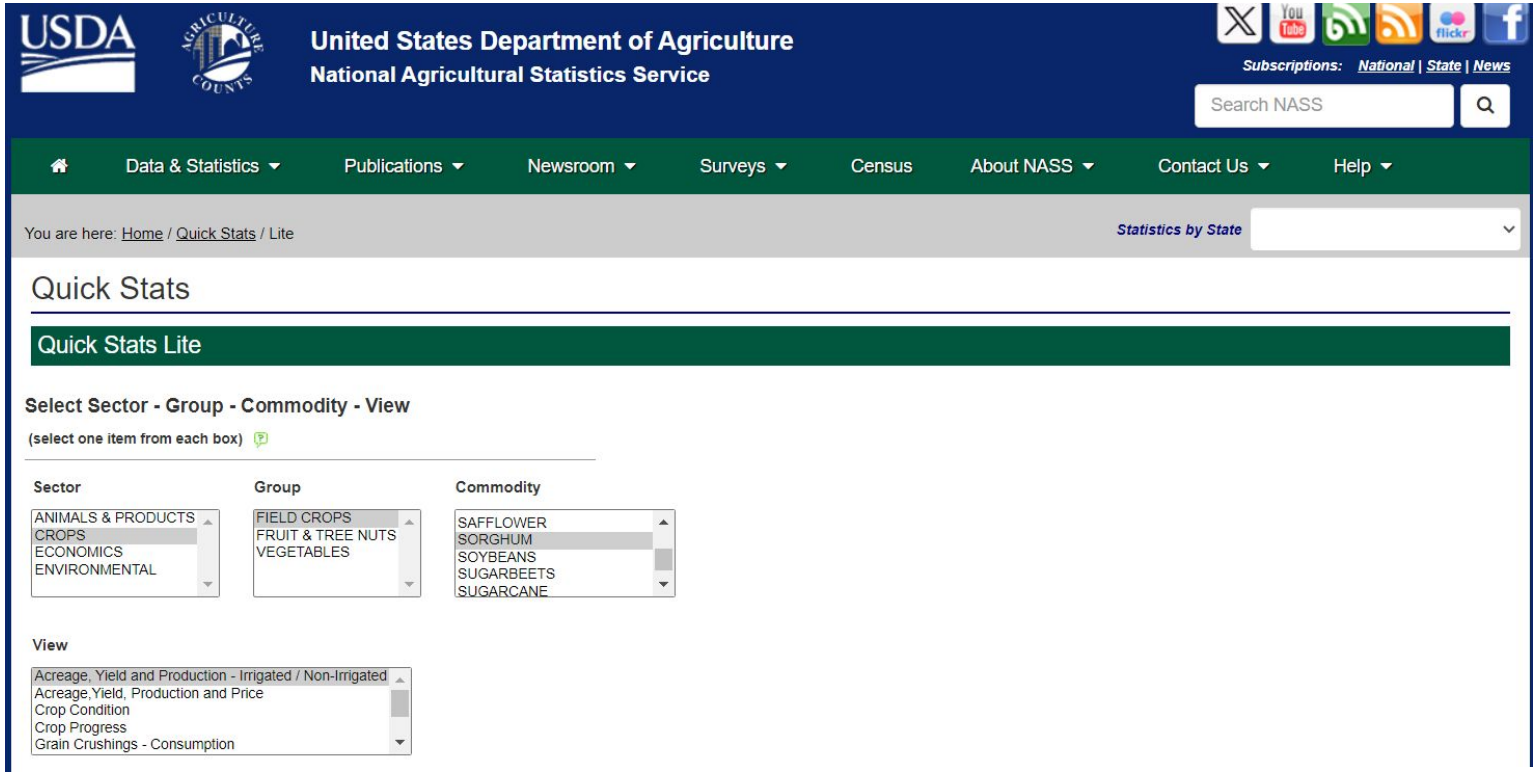
Information Sources,

https://www.nass.usda.gov/Quick_Stats/Lite/index.php



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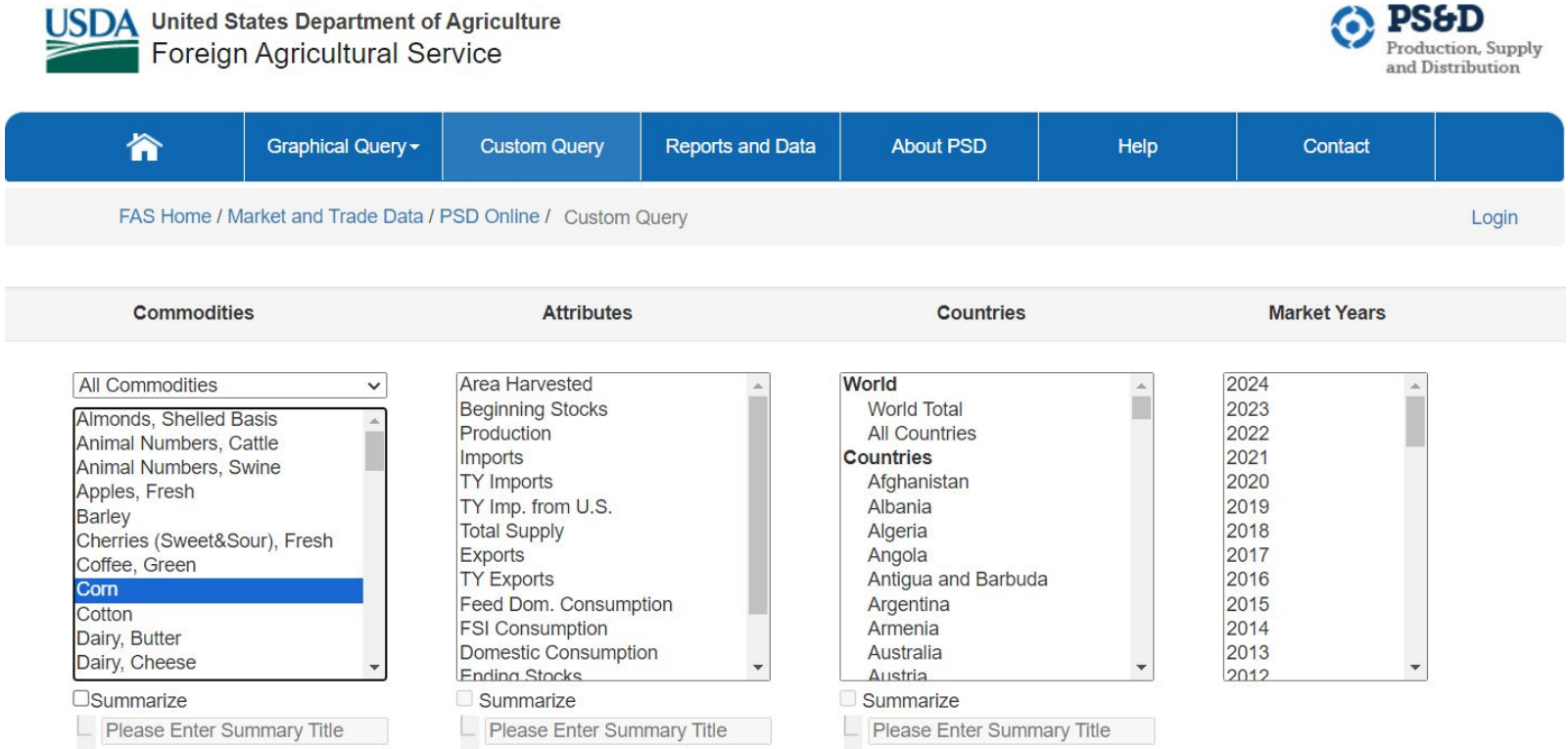
SORGHUM THE SMART CHOICE

https://apps.fas.usda.gov/psdonline/app/index.html#/app/advQuery



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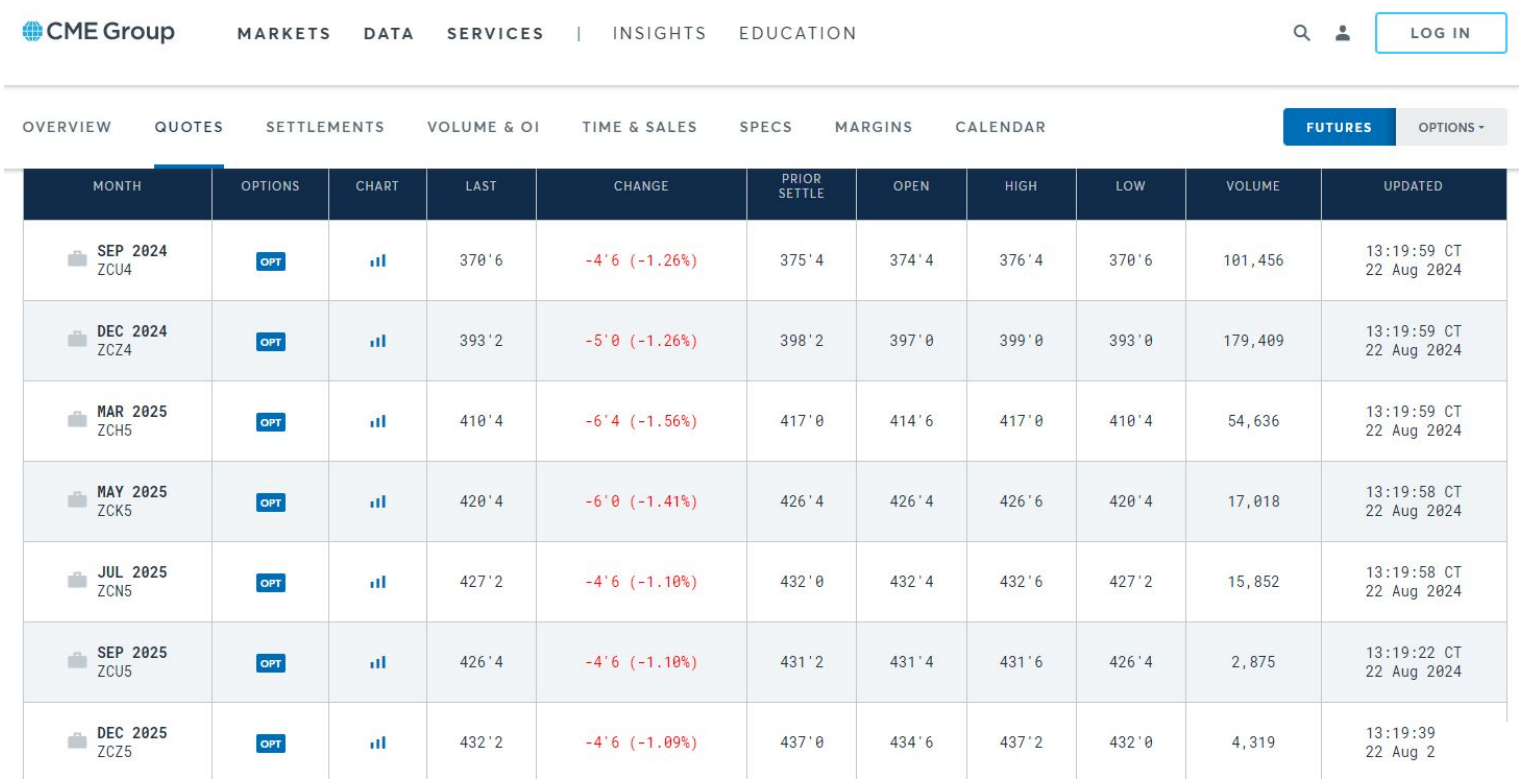
SORGHUM THE SMART CHOICE

https://www.cmegroup.com/markets/agriculture/grains/corn.quotes.html



CME Group MARKETS DATA SERVICES | INSIGHTS EDUCATION LOG IN

OVERVIEW QUOTES SETTLEMENTS VOLUME & OI TIME & SALES SPECS MARGINS CALENDAR FUTURES OPTIONS

MONTH	OPTIONS	CHART	LAST	CHANGE	PRIOR SETTLE	OPEN	HIGH	LOW	VOLUME	UPDATED
SEP 2024 ZCU4	OPT		370'6	-4'6 (-1.26%)	375'4	374'4	376'4	370'6	101,456	13:19:59 CT 22 Aug 2024
DEC 2024 ZCZ4	OPT		393'2	-5'0 (-1.26%)	398'2	397'0	399'0	393'0	179,409	13:19:59 CT 22 Aug 2024
MAR 2025 ZCH5	OPT		410'4	-6'4 (-1.56%)	417'0	414'6	417'0	410'4	54,636	13:19:59 CT 22 Aug 2024
MAY 2025 ZCK5	OPT		420'4	-6'0 (-1.41%)	426'4	426'4	426'6	420'4	17,018	13:19:58 CT 22 Aug 2024
JUL 2025 ZCN5	OPT		427'2	-4'6 (-1.10%)	432'0	432'4	432'6	427'2	15,852	13:19:58 CT 22 Aug 2024
SEP 2025 ZCU5	OPT		426'4	-4'6 (-1.10%)	431'2	431'4	431'6	426'4	2,875	13:19:22 CT 22 Aug 2024
DEC 2025 ZCZ5	OPT		432'2	-4'6 (-1.09%)	437'0	434'6	437'2	432'0	4,319	13:19:39 22 Aug 2

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SORGHUM THE SMART CHOICE

Additional Sources,

Aquaculture: https://www.sorghumcheckoff.com/industry/aquaculture/
Livestock: https://www.sorghumcheckoff.com/industry/livestock-feed/
Companion Animals: https://www.sorghumcheckoff.com/consumers/pet-food/
Sustainability: https://www.sorghumcheckoff.com/sustainability/
Suppliers: https://www.sorghumcheckoff.com/supplier-directory/
Consumers: https://www.sorghumcheckoff.com/consumers/
U.S. Grains Council: https://www.grains.org
USGC Market Data: https://grains.org/market_perspectives/
USGC Sorghum Harvest Report: https://grains.org/sorghum_report/

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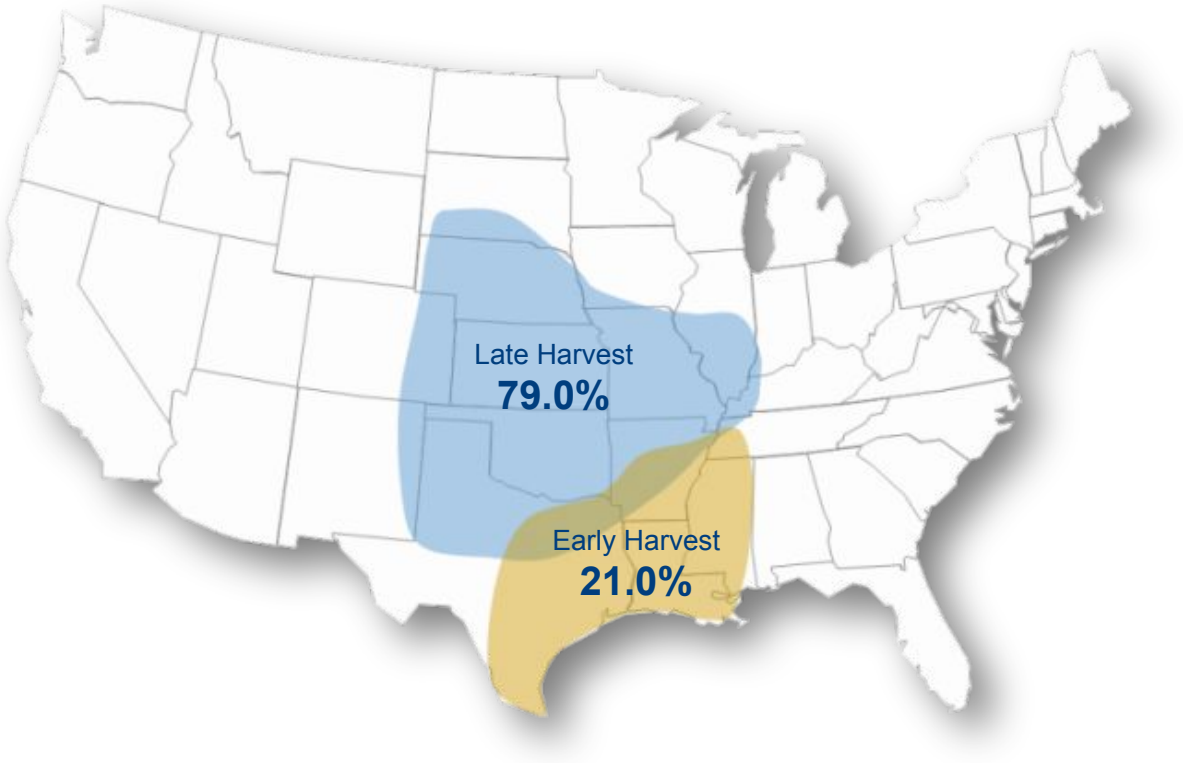
SORGHUM THE SMART CHOICE

2023/2024,Sorghum Quality Report

Sorghum Harvest Areas

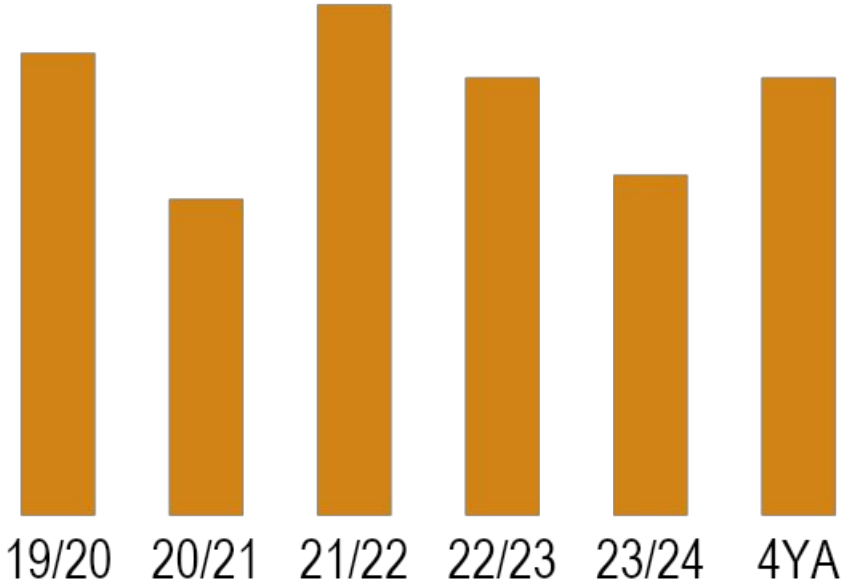
104 samples collected from Harvest Areas representing nearly 100% of U.S. Sorghum exports



Test Weight (lb/bu & kg/hl)

U.S. Aggregate: 58.4 lb/bu

- Average **lower** than the 4YA (58.8 lb/bu or 75.7 kg/hl)
- Average **higher** than minimum for U.S. No. 1 grade (57.0 lb/bu or 73.4 kg/hl)



Historical Aggregate by Marketing Year

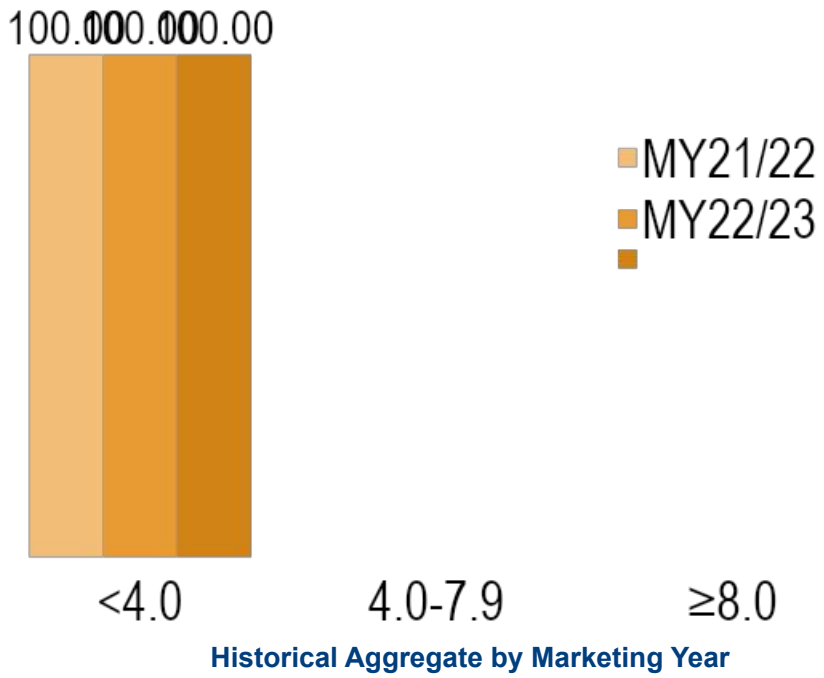
Tannins

U.S. GRAINS COUNCIL

Tannins (mg CE/g)

U.S. Aggregate: <4.0%

- Tannin levels in all samples were less than 4.0 mg CE/g, implying an absence of tannins, the **same** as in the previous three years.



Historical Aggregate by Marketing Year

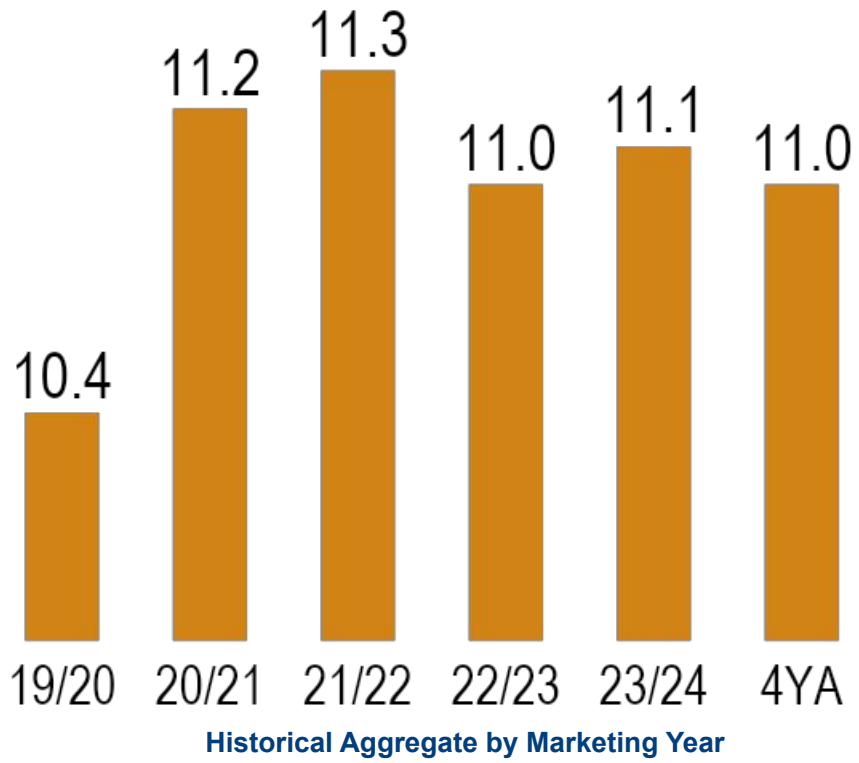
Chemical Composition

U.S. GRAINS COUNCIL

Protein (Dry Basis %)

U.S. Aggregate: 11.1%

- Average **similar** to 2022/2023 and the 4YA (both 11.0%)

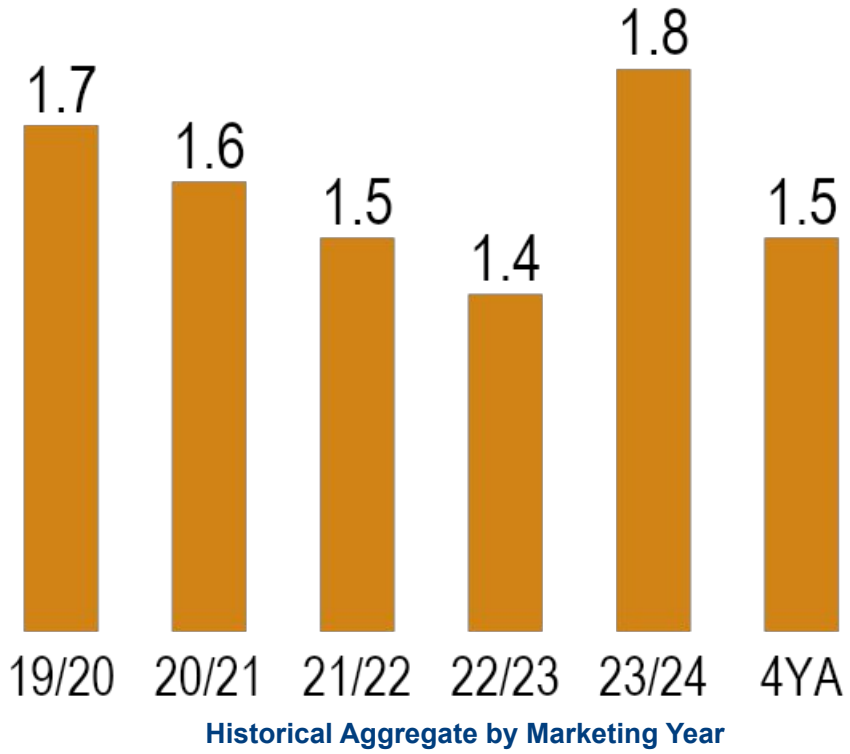


Historical Aggregate by Marketing Year

Broken Kernels & Foreign Material (%)

U.S. Aggregate: 1.8%

- Average **higher** than the 4YA (1.5%)
- Average **lower** than the maximum for U.S. No. 1 grade (3.0%)

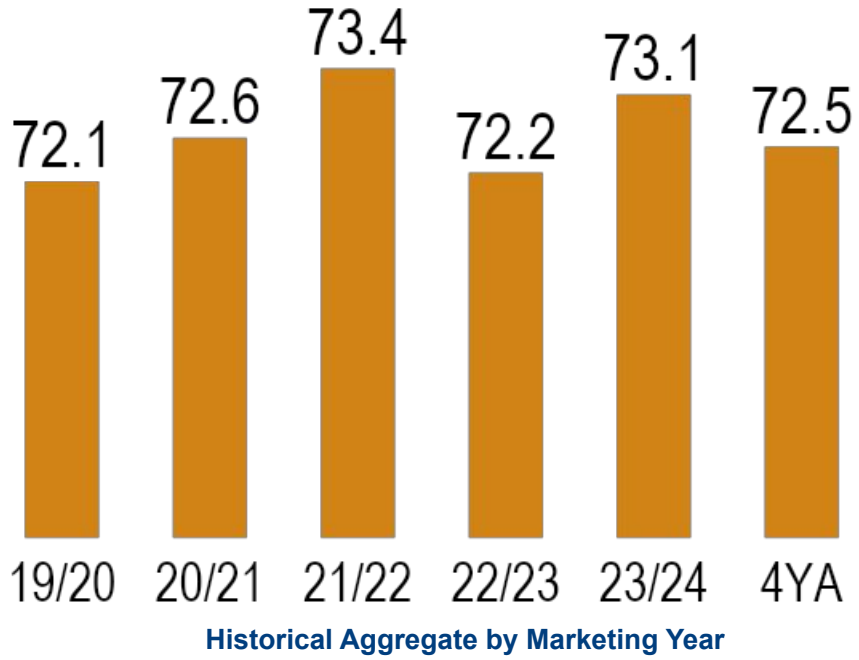


Historical Aggregate by Marketing Year

Starch (Dry Basis %)

U.S. Aggregate: 73.1%

- Average **higher** than 2022/2023 (72.2%) and the 4YA (72.5%)

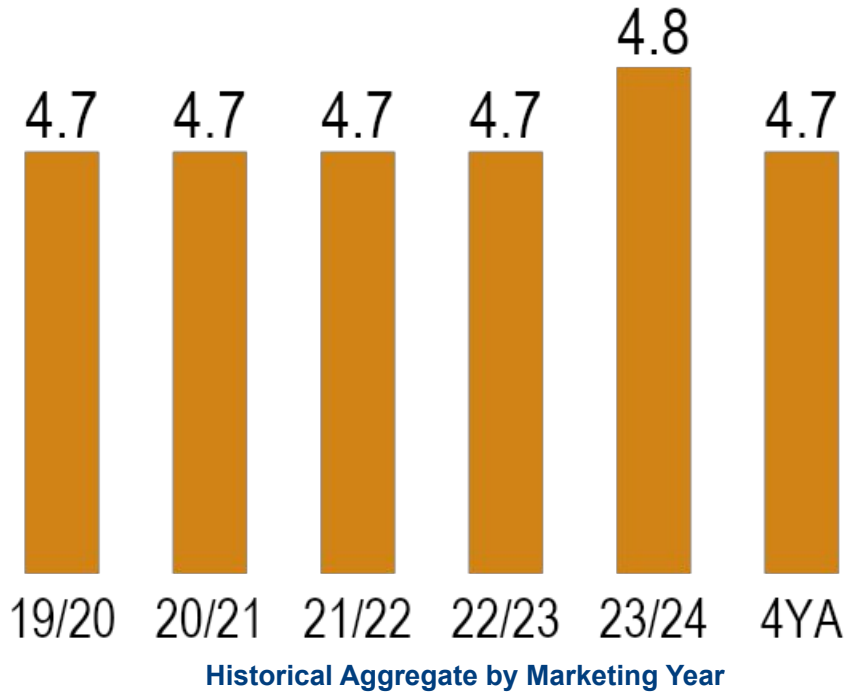


Historical Aggregate by Marketing Year

Oil (Dry Basis %)

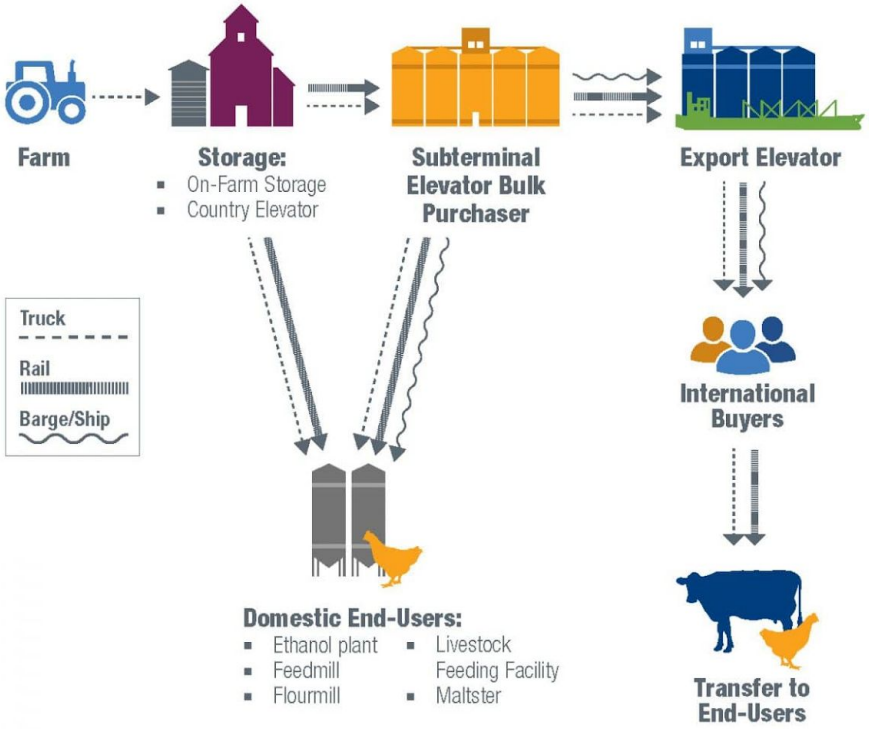
U.S. Aggregate: 4.8%

- Average **higher** than each of the previous four years



Historical Aggregate by Marketing Year

HOW DOES U.S. GRAIN MOVE?



THE UNITED STATES HAS:

164,000 miles (263,932 km) of highways, part of a 4-million mile public road network.

12,000 miles (19,312 km) of navigable waterways.

140,000 miles (225,308 km) of freight railways.

Grain movement to final domestic users:		Grain movement to international buyers:	
Truck	80%	Barge/Ship	48%
Rail	19%	Rail	39%
Barge/Ship	1%	Truck	13%

Sources: U.S. Department of Transportation, Waterways Council, Inc., Association of American Railroads, and the Transportation of U.S. Grains A Modal Share Analysis ams.usda.gov/sites/default/files/media/TransportationofUSGrainsModalShare1978_2016.pdf

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