Trade Facilitation and Simulated Impacts of U.S.–China Tariffs on Soybeans, Beef, and Sorghum

ALLEN FEATHERSTONE & DELIDE JOSEPH

AgManager.info

KANSAS STATE UNIVERSITY | Agricultural Economics

Outline

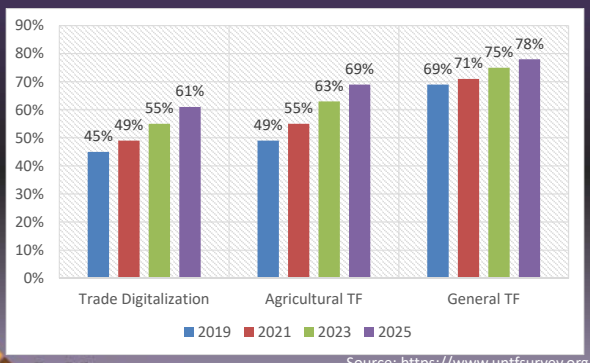
- Trade Facilitation and Digitalization
- Trade Facilitation and Policy Implications
- Timeline of U.S.–China Tariff Measures
- Import Sources and Export Destinations of China and the US
- TINA Trade: Tariff simulations
  - Trade Diversion in the Soybean Sector
  - Trade Diversion in the Sorghum Sector
  - Trade Diversion in the Beef Sector
- Summary

AgManager.info

KANSAS STATE UNIVERSITY | Agricultural Economics

Trade Facilitation and Digitalization

Trade Facilitation (TF): Simplification of import/export and border crossing procedures
Trade Digitalization (TD): Digitalization of trade data and documents to facilitate trade



Source: https://www.untfsurvey.org

Literature points to complex trade procedures as a more important barrier to trade than tariffs, on average.

Implementation of trade digitalization and agricultural trade facilitation measures lag implementation of general (paper-based and not sector specific) measures

AgManager.info

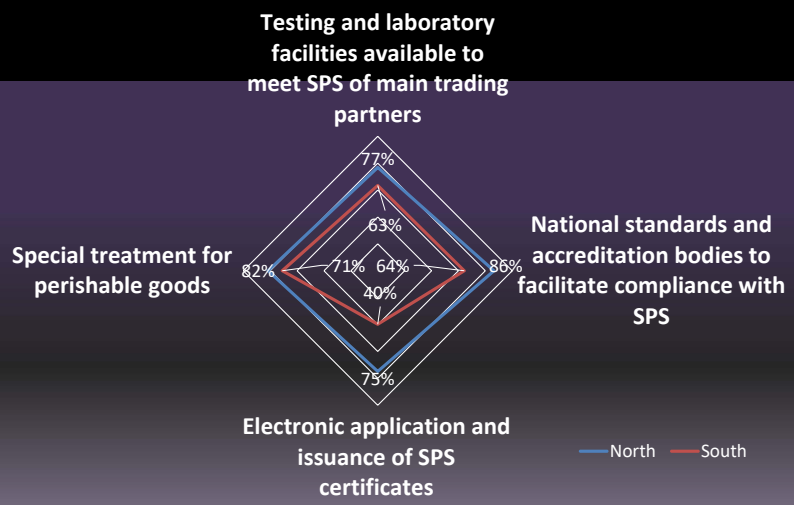
Kansas State University | Agricultural Economics

1. Background

ESCAP

Agricultural Trade Facilitation: Measures specific to agricultural and food trade, including sanitary and phytosanitary (SPS) procedures

North (high-income countries) exhibit higher Agri TF implementation rates compared to South (lower-income countries).



AgManager.info

Source: https://www.untfsurvey.org

Kansas State University | Agricultural Economics

Background

Time-series trade facilitation implementation data available for 160+ countries

The study uses a unique dataset from the UN Global Survey on Digital and Sustainable Trade Facilitation (https://www.untfsurvey.org) to assess the impact of:

- **General trade facilitation**
- **Trade digitalization**
- **Agriculture-specific measures**

2025 data available

Research Question

How do various trade facilitation measures, particularly those tailored to agriculture, impact bilateral agricultural trade flows on a global scale?

- Few studies focus on agricultural trade
- Limited analysis of digital & agricultural specific measures.
- Most use aggregate trade data and generic cost indicators (e.g., time to trade)
- Lacks insights for agriculture's unique needs.

Examining the effects of digital and sector-specific trade facilitation measures on bilateral agricultural trade

The main findings

- **Digitalization** boosts agricultural trade **globally**, especially in high-income high-income trade flows
- **Agricultural trade facilitation** significantly benefits high income lower income trade
- **Uneven gains across income group**: Facilitation impact is **3x higher in North-South/South-North vs. North-North**
- **Relative impact of agri-TF measures (ranking from highest to lowest):**
  - Sanitary – phytosanitary testing and labs
  - Special treatment for perishables
  - National sanitary – phytosanitary standards and accreditation
  - E- Sanitary – phytosanitary certification

Conclusion and way forward

- Strong, positive relationships between all TF measures and agricultural trade.
- **Trade digitalization** has the largest effect (up to a **4%** trade increase from 10% TF improvement); agri-TF measures also significant, though smaller impact (approx. **0.2%**)
- Effects of TF measures are **heterogeneous across income groups:**
  - **North-South/South-North** trade benefiting most from agri-specific facilitation
- Among individual agri-TF measures, improving **testing and laboratory facilities for SPS compliance** are most impactful.
- Policy implication:
  - combining **broad trade digitalization** efforts with **agri TF specific measures/strategy may** be most effective in enhancing trade.
  - The importance of **inclusive and targeted policy design for different income groups.**

Detailed Timeline of U.S.–China tariff measures (2018 – 2025)

2018

- **Feb:** US imposes **Section 201** tariffs on solar panels & washing machines
- **Mar: Section 232** tariffs on steel/aluminum (+ temporary exemptions for key partners)
- **Apr:** China retaliates on U.S. pork, fruits, nuts
- **Jul:** First **Section 301** tariffs ($34B, List 1); China retaliates
- **Aug:** Second round ($16B, List 2); China matches
- **Sep:** Third round ($200B, List 3 at 10%); China responds with $60B

2019

- **Jan:** China suspends auto-related tariffs and lowers MFN rates.
- **Jun**: U.S. raises List 3 tariffs from 10% to 25%; China responds with modified retaliation.
- **Sep**: *List 4A* tariffs (15% on $120B of goods) start; China retaliates on $75B of U.S. goods.
- **Oct**: U.S. imposes *Section 301* tariffs on EU over Airbus dispute.

2020

- **Feb**: Phase One Agreement leads to halved *List 4A* tariffs (7.5%); China reciprocates.
- **Jul**: China cuts MFN tariffs on ITA goods.
- **Aug – Sep** : U.S. briefly reimposes and then removes *Section 232* tariffs on Canadian aluminum

AgManager.info

Kansas State University | Agricultural Economics

Detailed Timeline of U.S.–China tariff measures (2018 – 2025)

2021

- **January:** China adjusts MFN tariff rates for 2021, and US reduces tariffs on imports from Japan under US-Japan Trade Agreement. -US adjusts Section 301 tariffs on selected imports from EU related to Airbus dispute
- **February:** US Section 201 tariffs reduced on solar panels and washing machines in fourth year of policy (washing machines had received an extension)
- **March :**US suspends Section 301 tariffs on selected imports from EU (March 11) and UK (March 4) related to Airbus dispute
- **May:** China's MFN tariffs cut on some steel products
- **July:** China's MFN tariffs cut on ITA products

2022

- **January:** China adjusts MFN tariff rates for 2022; US Section 232 tariffs on imports of steel and aluminum from the EU converted to a tariff-rate quota
- **February:** US Section 201 tariffs reduced on solar panels and washing machines in fifth year of policy (solar panels had received an extension)
- **April:** US Section 232 tariffs on imports of steel from Japan converted to a tariff-rate quota
- **May:** China's MFN tariffs cut to zero on coal
- **June:** US Section 232 tariffs on imports of steel and aluminum from the UK converted to a tariff-rate quota
- **July:** China's MFN tariffs cut on ITA products

2023

- **January:** China's MFN tariffs cut on selected products, effective MFN tariff increased on frozen chicken under conversion from special to ad valorem rate
- **February:** US Section 201 tariffs reduced on solar panels in sixth year of policy; Section 201 tariffs on washing machines expire
- **July:** China's MFN tariff cut on ITA products
- **December:** China's MFN tariffs on coal revert back to higher, binding rate

2024

- **January:** China adjusts MFN tariff rates for 2024
- **June:** US Section 201 tariffs reduced on solar panels in seventh year of policy
- **September:** US Section 301 tariffs adjusted on selected Chinese products, including electric vehicles

AgManager.info

Kansas State University | Agricultural Economics

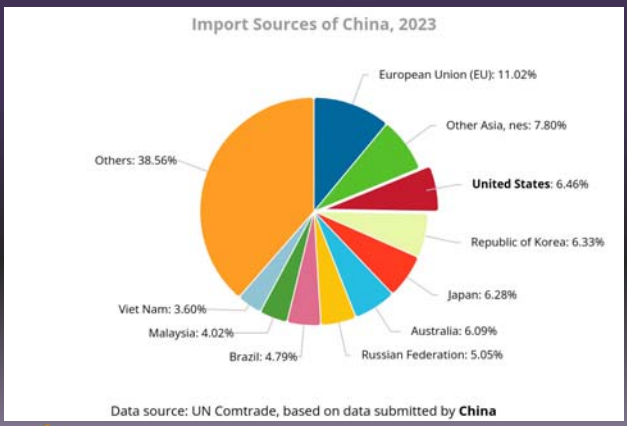
Detailed Timeline of U.S.–China tariff measures (2025)

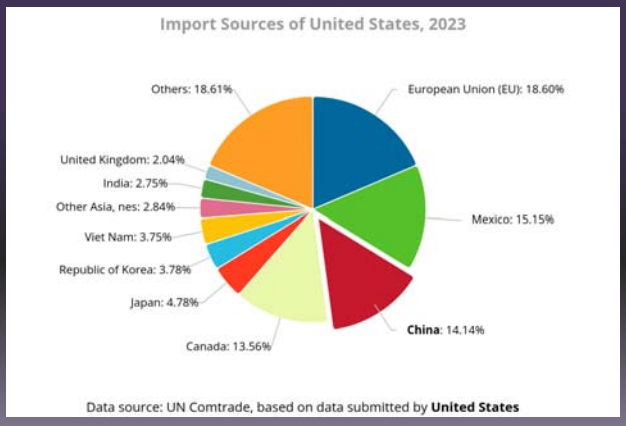
January - February	March	April	May
•China adjusts MFN tariff rates for 2025; US Section 301 tariffs imposed adjusted on selected Chinese products, including tungsten, wafers, and polysilicon. •US tariffs of 10 percent imposed on all imports from China under International Emergency Economic Powers Act (IEEPA) •US Section 201 tariffs reduced on solar panels in eighth year of policy •China retaliates against US tariffs under IEEPA imposed February 4	• US tariffs of 10 percent on all imports from China under IEEPA; US tariffs imposed on imports from Canada and Mexico that are not compliant with USMCA [not shown] •China retaliates against US tariffs under IEEPA imposed March 4 •US Section 232 tariffs imposed on steel, aluminum, and derivative products	•U.S. imposes 25% Section 232 tariff on autos. •U.S. imposes 10% IEEPA tariff on most countries (including China), with sector carveouts. •U.S. imposes 1–74% IEEPA tariffs on surplus countries; China faces 74%, plus 50% counter-retaliation (total 124%). •China retaliates with 84% tariffs. U.S. removes April 9 IEEPA tariffs for all except China, which faces an added 41% (total 125%), with carveouts. •U.S. removes some IEEPA tariffs (April 5–10) for certain semiconductor-related products. •China matches U.S. April 10 IEEPA tariffs, reaching 125%.	• US Section 232 tariffs of 25 percent imposed on automobile parts •US reduces to 10 percent from 125 percent the cumulative tariffs under IEEPA imposed on certain imports from China on April 5, 9 and 10; China reduces to 10 percent from 125 percent the cumulative retaliation to the IEEPA tariffs China had imposed on April 10 and 12

AgManager.info

KANSAS STATE UNIVERSITY | Agricultural Economics

Import Sources of China and the US

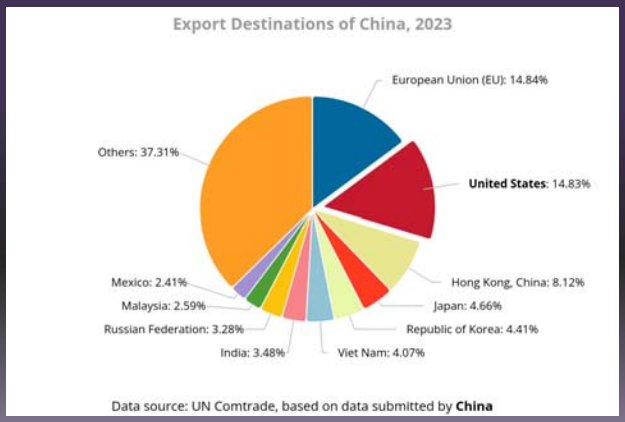




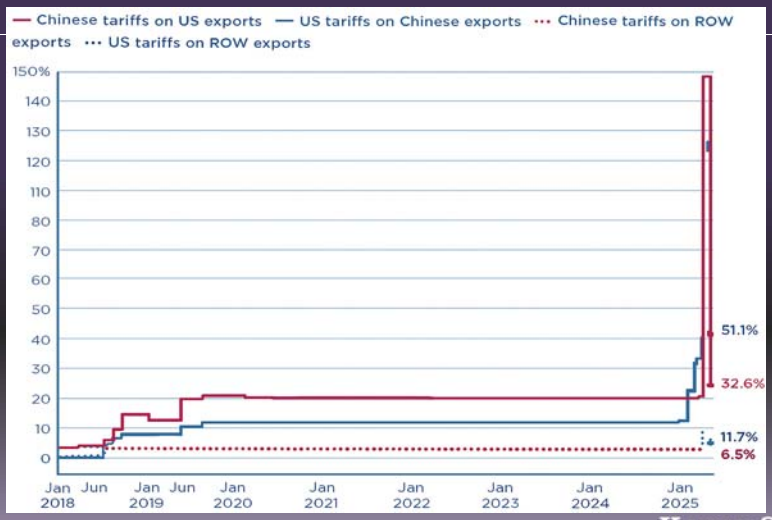
AgManager.info

KANSAS STATE UNIVERSITY | Agricultural Economics

Export Destinations of China and the US

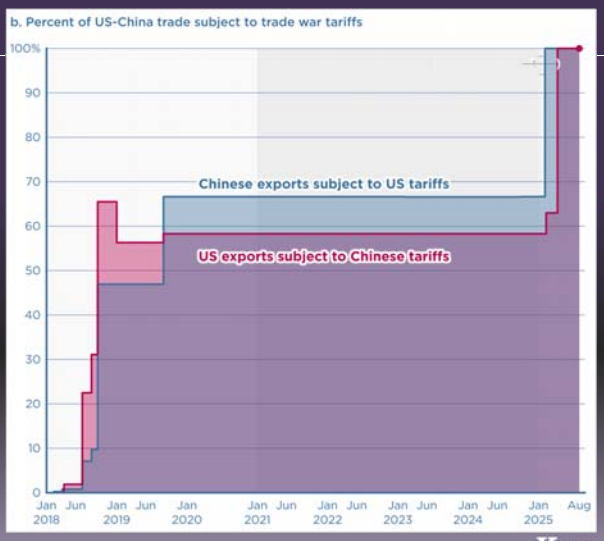


US-China Tariffs: An up-to-date Chart



Source: PIIE, https://www.piie.com/research/piie-charts/2019/us-china-trade-war-tariffs-date-chart

Percent of US-China Trade Subject to Tariffs



AgManager.info

KANSAS STATE UNIVERSITY | Agricultural Economics

Source: PIIE, https://www.piie.com/research/piie-charts/2019/us-china-trade-war-tariffs-date-chart

TINA Trade Tariff Simulations: the Case of Soybean, Beef, and Sorghum

AgManager.info

KANSAS STATE UNIVERSITY | Agricultural Economics

TINA:

TINA (Trade Intelligence and Negotiation Adviser) is an online platform designed to support trade policy analysis and negotiations. It was developed by the UN ESCAP's Trade, Investment and Innovation Division.

Key Functions:

Data-Driven Support: Integrates trade data, tariffs, and **simulation** tools to guide decision-making.

Scenario Modeling: Helps countries assess impacts of trade agreements

Custom Reports: Provides tailored economic impact assessments for trade negotiations.

Accessible Online: Available at www.TINA.trade.

How TINA's Tariff Simulation Works

Purpose:
Simulate how changes in a partner country's tariffs affect trade flows (creation + diversion).

Steps in TINA Tariff Simulation:

Select Importer & Exporter:
Define the partner country changing tariffs and the country being affected.

Enter Proposed Tariffs:

Interpret Trade Effects:
Simulates both trade diversion and creation. Negative creation is capped to avoid illogical outcomes.

Historical US–China Trade of Soybeans

Commodity Description: Soybeans, other than seed, whether or not broken

Represents **9.26%** of the total imports of China from the United States in 2023

Represents **2.32%** of the total imports of China from the world in 2023

Represents **1.38%** of total exports from the United States to the world in 2023

AgManager.info

Kansas State University | Agricultural Economics

Soybean Trade With China

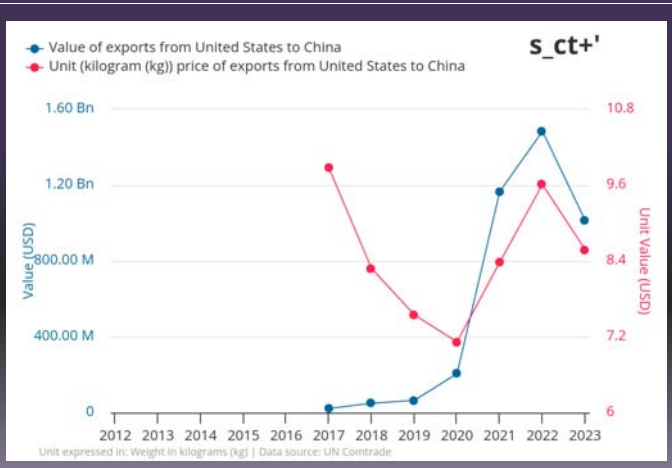
- July 2018: China imposes 25% retaliatory tariff on U.S. soybeans
- U.S. soybean exports to China fell 74% in 2018
- Price fell $0.74/bu at Gulf, Brazil price rose $0.97/bu
- U.S. issued $8.5B in MFP aid (estimated damage $3.1B)
- Market adjusted after 5 months, but exports didn't recover until late 2019

AgManager.info

Kansas State University | Agricultural Economics

Kuang & Xiang, 2021; Adjemian et al., 2023; Thayer et al., 2021; Liu et al., 2021; Bown (2021)

Historical US-China Trade of Beef



Commodity Description: Meat; of bovine animals, boneless cuts, frozen

Represent **0.60%** of total imports of China from United States in 2023

Represent **0.47%** of total imports of China from the world in 2023)

Represent **0.17%** of total exports from United States to the world in 2023

Tariff Rates
MFN Tariff: 12% (MFN applied AV duty)
Bound Tariff: 12% (Upper bound AV duty)

AgManager.info

KANSAS STATE UNIVERSITY | Agricultural Economics

Beef Trade with China

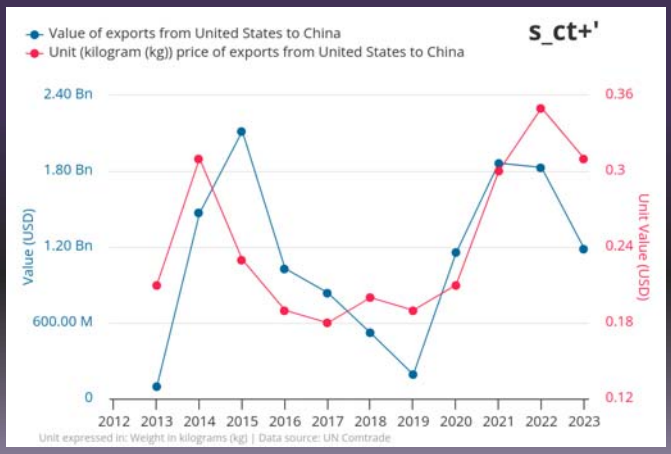
- China banned U.S. beef until July 2017; imports remain limited
- China applies strict bans on high-risk countries; trade agreements selectively reduce tariffs
- U.S. beef faces competition from Brazil, Australia, and Argentina
- Tariff/trade policy changes post-2020 improved access, but volumes are still low

AgManager.info

Beckman et al., 2022

KANSAS STATE UNIVERSITY | Agricultural Economics

Historical US-China Trade of Sorghum



Represent **0.53%** of total imports of China from United States in 2023

Represent **0.07%** of total imports of China from the world in 2023)

Represent **0.07%** of total exports from United States to the world in 2023

Tariff Rates
MFN Tariff: 2% (MFN applied AV duty)

AgManager.info

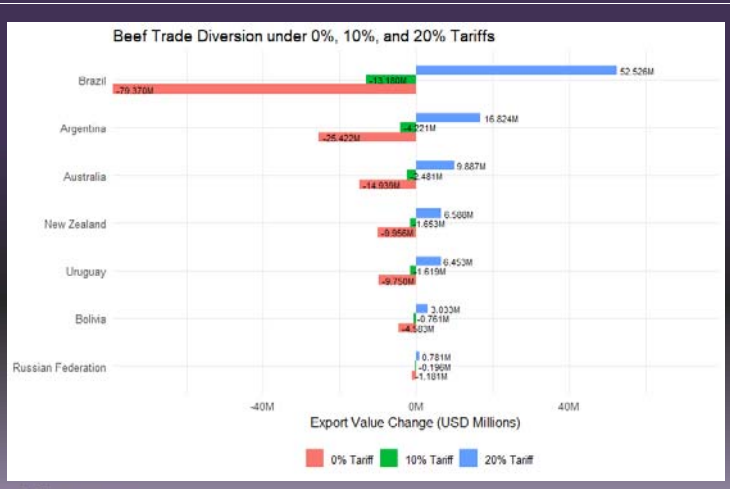
KANSAS STATE UNIVERSITY | Agricultural Economics

Simulated tariff on Soybean, Beef, and Sorghum

AgManager.info

KANSAS STATE UNIVERSITY | Agricultural Economics

Current Tariff on Beef: 12%
Simulated tariff: 0% to 20%



At a 0% and 10% tariff—lower than the current rate—the U.S. faces reduced barriers on beef exports to China. As a result, China may import more from the U.S. and less from other economies, decreasing beef exports from those economies.

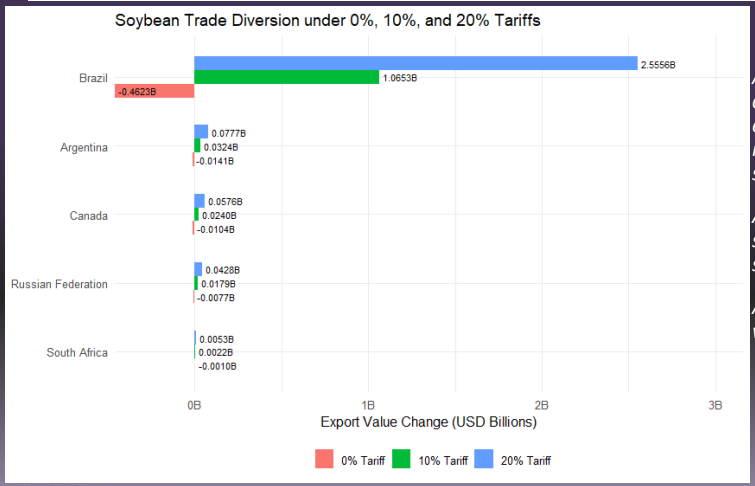
In contrast, a 20% tariff—higher than the current rate—could lead China to shift its imports away from the U.S., resulting in increased beef exports from alternative economies.

AgManager.info

Data Source: Tina Trade https://tina.trade/app/tariff-simulation-generator

Kansas State University | Agricultural Economics

Current Tariff on Soybeans: 2%
Simulated tariff: 0% to 20%



As a result of the 10% tariff—higher than the current rate—the U.S. faces steeper barriers to exporting soybeans to China. In response, China may shift its imports to other suppliers, increasing soybean exports from those economies.

At a 20% tariff, this diversion effect becomes even stronger, leading to a substantial increase in soybean exports from alternative suppliers

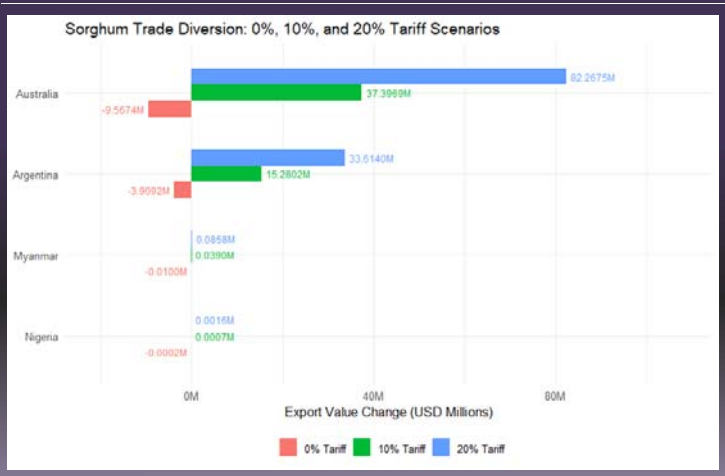
At a 0% tariff, the shift to U.S. soybeans from Brazil would be large.

AgManager.info

Data Source: Tina Trade https://tina.trade/app/tariff-simulation-generator

Kansas State University | Agricultural Economics

Current Tariff on Sorghum: 2%
Simulated tariff: 0% to 20%



As a result of free trade, China may import more from the United States and less from other economies, leading to a decrease in export of sorghum to China from these economies.

A 10% or 20% tariff means China would import from other economies, leading to an increase in exports for those economies.

AgManager.info

Data Source: Tina Trade https://tina.trade/app/tariff-simulation-generator

Kansas State University | Agricultural Economics

Tariff Simulation: 0% to 20%

Commodity	Current Tariff	Current Trade Value (US$)	Simulated Tariff	Simulated Trade Value (US$)	Change in Trade Value(US$)	Change in Trade Value(%)
Sorghum	2%	$ 867,273,166	0%	$ 925,414,558	$ 58,141,392	7%
			10%	$ 635,937,529	$ (231,335,637)	-27%
			20%	$ 349,411,958	$ (517,861,208)	-60%
Soybeans	3%	$ 15,299,669,751	0%	$ 16,532,598,453	$ 1,232,928,702	8%
			10%	$ 12,437,238,605	$ (2,862,431,146)	-19%
			20%	$ 8,382,172,812	$ (6,917,496,939)	-45%
Beef	12%	$ 998,139,458	0%	$ 1,706,336,359	$ 708,196,901	71%
			10%	$ 1,116,081,619	$ 117,942,161	12%
			20%	$ 526,730,777	$ (471,408,681)	-47%

AgManager.info

Kansas State University | Agricultural Economics

Data Source: Tina Trade https://tina.trade/app/tariff-simulation-generator

Summary

- Tariffs are an important discussion item with much uncertainty
- Digitalization and other trade facilitation mechanisms have historical had a larger effect on trade than tariffs
- Improving the ability to easily move goods across international borders is key to increasing trade
- Trade Simulations with China
  - Changing tariffs from 2023 levels to 20% would decrease trade into China by
    - 60% for Sorghum
    - 47% for Beef
    - 45% for Soybeans
  - Reducing tariffs to zero would increase trade into China by
    - 7% for Sorghum
    - 71% for Beef
    - 8% for Soybeans