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Difficulties in Determining the Future of China's Commodity Trade: Policy Issues and Grain Production¹

Jim Hansen², Fred Gale², Mary Marchant³,
Francis Tuan⁴, Funing Zhong⁵, Chen Wei⁶, and Agapi Somwaru⁷

² USDA, Economic Research Service, jhansen@ers.usda.gov, fgale@ers.usda.gov

³ Virginia Tech, mary.marchant@vt.edu, ⁴ Renmin University of China ftuan@waees-llc.com

⁵ Nanjing Agricultural University, fnzhong@njau.edu.cn, ⁶ Shanghai University of Finance and Economics, chen.wei@mail.shufe.edu.cn, ⁷ Economic Consulting, agapi.somwaru@gmail.com

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Poster Outline

- Research Objective
- Background – China's Sorghum imports and Corn area
- Methodology, Scenarios, Model
- Results and Implications for China and World Markets
- Conclusion



Picture: China

Title

Picture: China

Background

Sorghum

Corn Area

Objective

Sorghum Base

Corn Area
Base

Price Results
Market Share

Method

Sorghum
Imports

Corn Imports
Production

Results and
Conclusion

China Model

Scenario's
Explained

Sorghum
Table Results

Corn
Table Results



Research Objective

- Motivation:
Demonstrate the difficulty in developing long-term commodity projections for global markets based on current assumptions about China's agriculture trade policies and production potential.
- China's government currently imposes no import restrictions on sorghum for feed grains. Continues expansion of China's corn area has greatly limited import demand. Both are assumed in many long-term commodity projections for China. Relaxing these two assumptions may have very large impacts on global markets and alter the commodity projections for a number of countries.
- Research: Analyze two independent issues affecting China's long-term projections, which affect the global markets and other country projections.
- Analyze the impact of restricting sorghum imports by China. What are the effects of these restrictions on global market trade, international and domestic prices, producers and consumers?
- Analyze impact of limiting the continuous expansion in area planted to corn in China and lowering restrictions on corn imports. What will be the effect on global markets, international prices and trade as China increases corn imports for domestic feed demand?



Background: China Sorghum Imports

China began importing larger amounts of sorghum as a lower cost feed substitute for high priced domestic corn. China's sorghum imports jumped from 84 thousand metric tons in 2011/12 to 4.2 million mt in 2013/14, making it the world's largest sorghum importer. At this time Sorghum does not have any trade barriers for China's importers.

China's high corn prices are the result of domestic and agricultural trade policies that have created large gaps between domestic and international grain prices. These policies include domestic support to corn producers and import restrictions including its tariff rate quota system and complicated system for allocation of tariff quotas. China has intermittently restricted corn imports and feed substitutes. This has been through nontariff barriers such as rejection of genetically modified corn and restrictions on imports of dried distiller grains, a corn feed substitute.

China may in the near future begin to restrict sorghum feed grain imports to help maintain high domestic prices for corn and other feed grains.



Background: China Corn Area

China's area planted to corn has continued to increase from 24 million hectares in 2003 through 2014 and projected to increase again in 2015 to 37.7 million hectares. Since 2003 corn area increased by 13.7 million hectares, which is an annual growth rate of 3.8 percent, and a 56.4 percent in area.

This increased area is driven by profitability through high domestic prices and subsidies maintained by government support policies and restrictions on corn imports and feed substitutes. This continued increase in planted area has led to considerable lower corn imports. Many long term commodity projections of China's corn sector have failed to correctly incorporate this continued expansion of corn area, which has led to larger projections of corn imports than realized.



Two independent scenarios are developed which demonstrate the difficulty in developing long-term commodity projections for China, which has large global trade impacts for other country projections.

Sorghum Import Scenario: China imposes a restriction on sorghum imports.

Baseline: maintain current policy – no restrictions on sorghum imports, which increase from 4.77 mmt in 2015/16 to 5.57 mmt by 2024/25

Scenario: sorghum imports are restricted beginning in 2016/17 to 80,000 to 90,000 mt and throughout the projection period to 2024/25.

Corn Area Scenario: China's is limited in its capacity and ability to expand area planted to corn.

Baseline: corn area increases from 37.3 million hectares in 2015/16 to 39.5 million hectares by 2024/25

Scenario: corn area is maintained near current 2015/16 levels at 37.3 million hectares throughout the projection period to 2024/25.



Methodology and Modeling System

- The modeling system is large scale multi-country and multi-commodity partial equilibrium dynamic simulation model. Solves for global prices and trade and individual country models. Policy instruments are applied to the China model and solves globally.

China Model

- The model solves for domestic production, consumption, ending stocks, trade and prices. Domestic price are solved for to obtain equilibrium. Corn, wheat, and rice are protected from international markets. The model covers 28 commodities. Area harvested decision is based on expected net revenue or gross revenue. Livestock activities are modeled as backyard, specialized and commercial. Feed demand is based on type of livestock operation. Trade is modeled as import and export equations. China Policies include tariffs, quotas, TRQ's, state, non-state trading, VAT rebate, export tax, direct payments, input subsidies, and procurement prices.



Global and Country Model Description

Global Model: Linked Country Models (“Linker System”)

Annual model - dynamic partial equilibrium, 40 countries/regions,

Linked with U.S. model, 24 traded commodity markets

Solves for prices & trade that clear world and country commodity markets

Equilibrates: (Supply = Demand) and (Imports = Exports)

Policy (domestic and international) incorporated in individual countries

Bioenergy (ethanol & biodiesel) demand developed in individual countries

Data is PS&D and China data, November 2014.



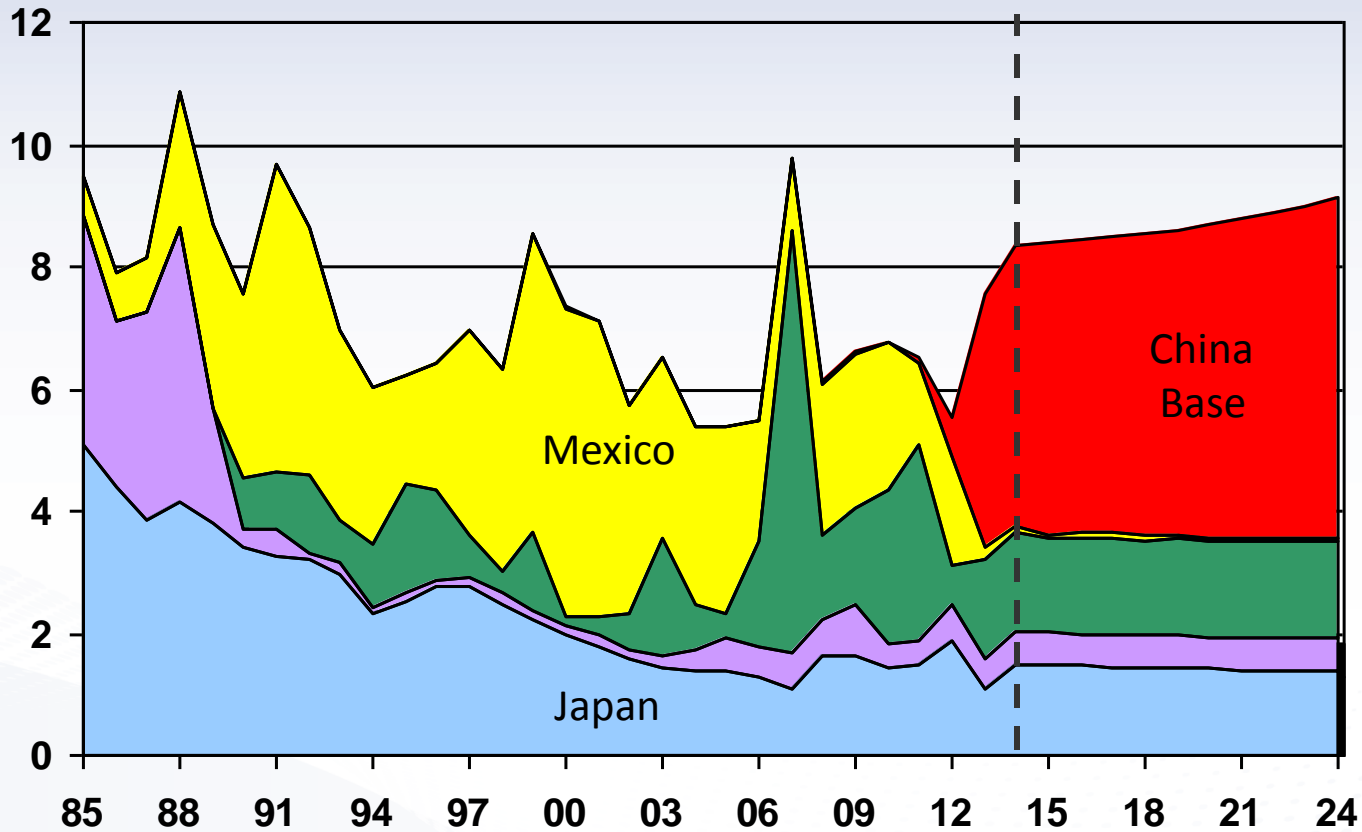
Results and Implications for China and World Markets



China's Sorghum Imports: Baseline Current Policies

No Import Restrictions

Million metric tons

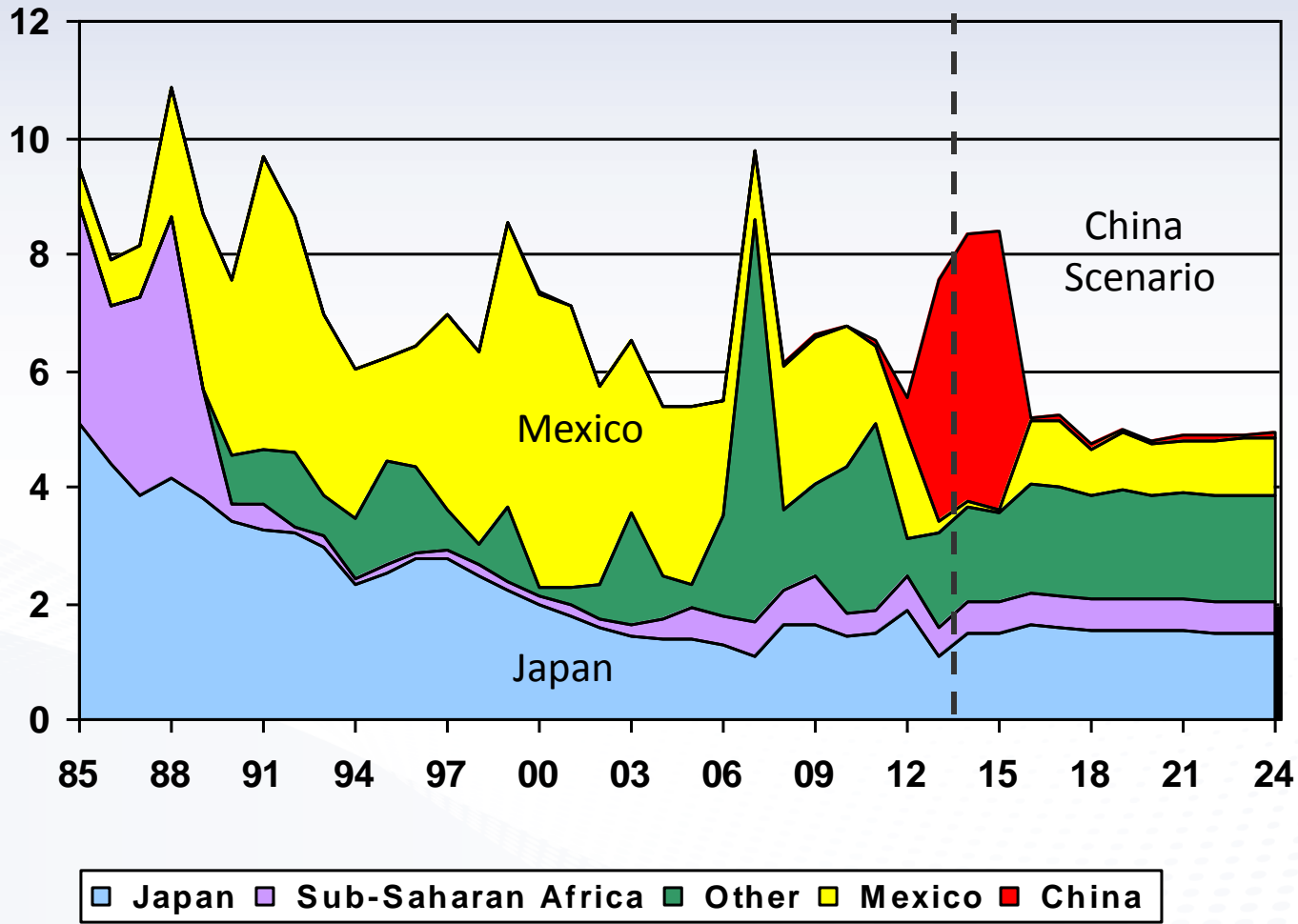


Japan Sub-Saharan Africa Other Mexico China



China's Sorghum Imports: Imports are Restricted to 85 thousand metric tons from a high of 5.57 million metric tons

Million metric tons



Results from China restricting sorghum imports

- If China banned sorghum imports, global price would fall 35%.
- China's global import share fall from 61% to 2%, Sorghum is thinly traded.
- Mexico benefits the most by increasing lower priced imports. Mexico is most price sensitive to sorghum prices and substitutes for feed grains.
- U.S., Argentina, and Australia - decrease production and export less sorghum. Exports decrease by about 41% to 50% for the U.S.
- Global sorghum production and trade decrease by 6% and 46%, respectively. Most sorghum production is consumed domestically with only 12% to 13% of production being traded.

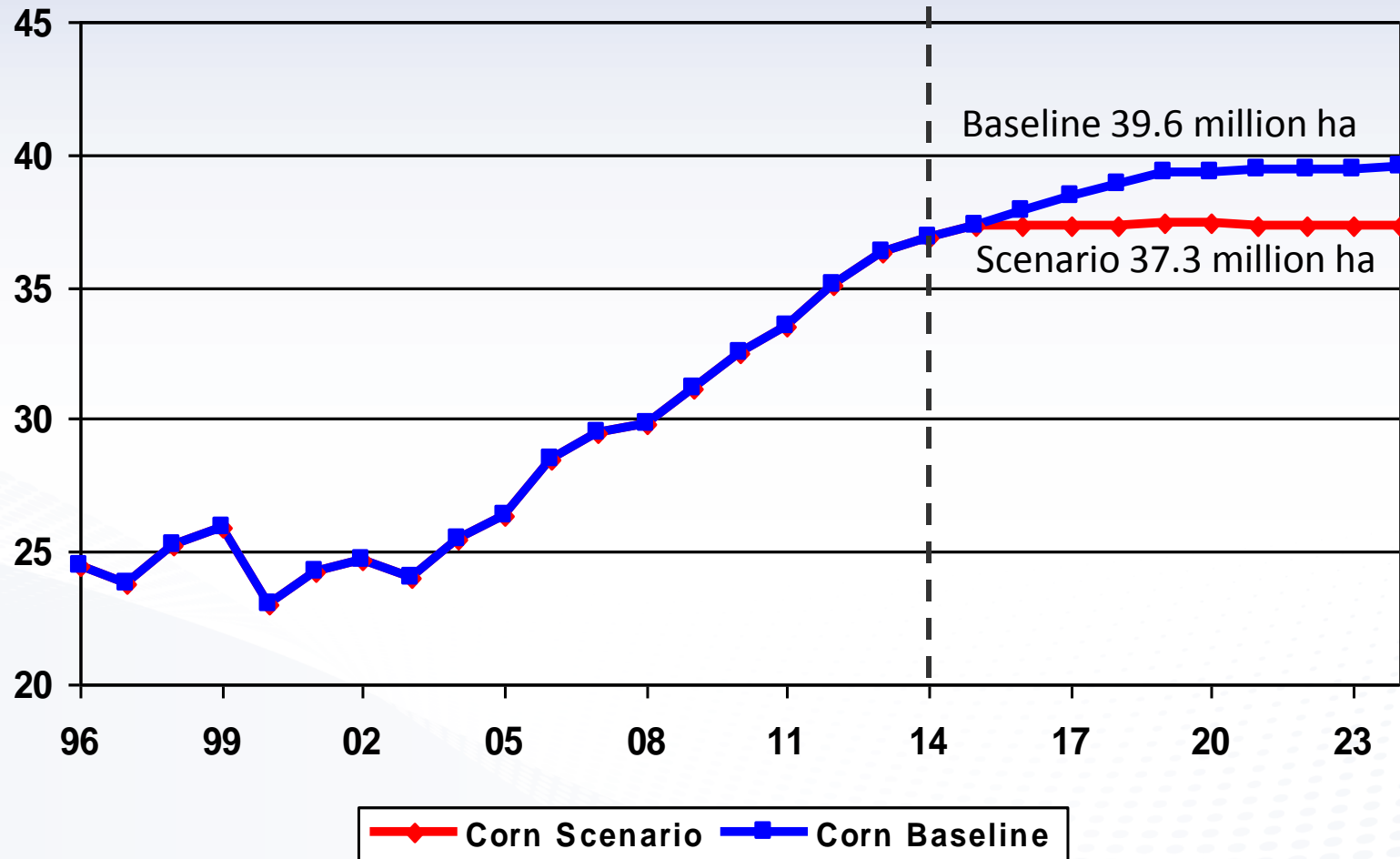


Commodity /Countries	Scenario with China Sorghum Imports Restricted			
	Difference from the baseline projection in percent and 1,000 metric tons			
Sorghum	2016/17	2019/20	2022/23	2024/25
World price	- 35.41%	- 28.81%	- 26.43%	- 26.84%
Importers (%)				
China	- 98.36%	- 98.57%	- 98.24%	- 98.38%
Mexico	846.00%	1067.00%	1725.00%	1820.00%
Japan	10.35%	8.48%	8.10%	8.35%
Exporters (%)				
United States	- 41.13%	- 44.13%	- 49.92%	- 51.54%
Argentina	- 40.28%	- 49.95%	- 46.75%	- 47.29%
Australia	- 35.29%	- 34.50%	- 33.60%	- 33.64%
Importers (1,000 mt)				
China	- 4713	- 4924	- 5243	- 5479
Mexico	962	914	868	908
Japan	152	121	112	114
Exporters (1,000 mt)				
United States	-2403	-2578	-2917	-3011
Argentina	-288	-293	-310	-325
Australia	-506	-684	-718	-793

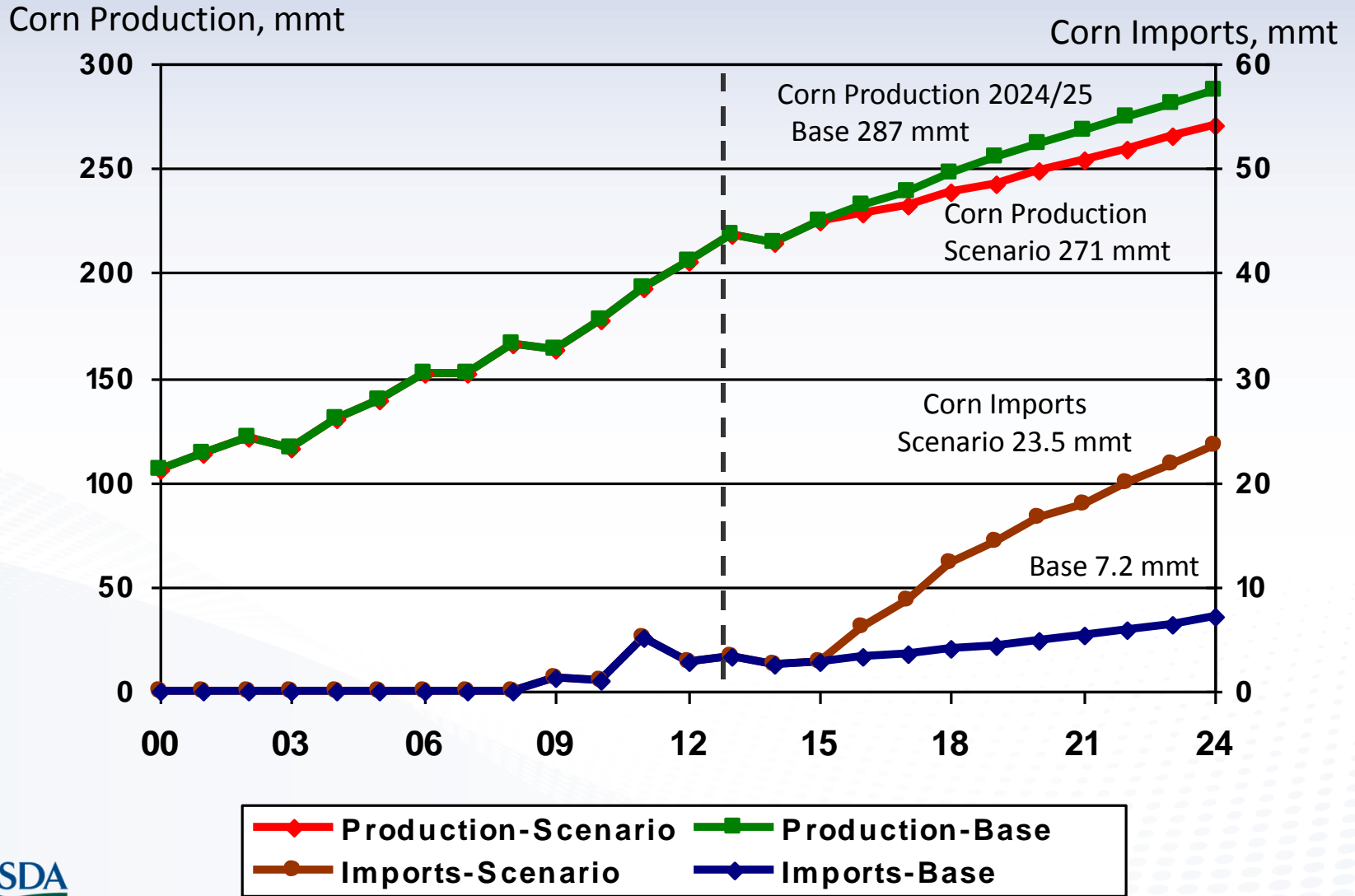


China's Corn Area Harvested Baseline and Scenario Limiting Corn Area Expansion (million ha)

Million hectares



China's Corn Production and Imports: Baseline and Scenario (million metric tons)



Results for limited expansion in China's area planted to corn

- China corn production decrease by 16 million mt by 2024/25
- To maintain feed demand - corn imports need to more than triple and increase by 16.2 million mt by 2024/25.
- China's global markets share of corn imports increase from 5% to 15%.
- Global corn prices increase by 5%
- The global corn market is large and most countries respond to even small changes in global prices, resulting in a damping global effect.
- Major producing countries expand production by 2 to 4% and exports increase. U.S. increase corn exports by 15%
- Importing countries reduce imports and slightly expand production.



	Scenario with China Corn Area Expansion is Limited			
Commodity/ Countries	Change in world price and trade Difference from the baseline projection in percent			
Corn	2016/17	2019/20	2022/23	2024/25
World price	1.73%	3.57%	4.22%	5.12%
Exporters				
United States	2.87%	10.02%	13.26%	15.03%
Argentina	0.74%	2.22%	2.91%	3.24%
Brazil	0.86%	4.70%	6.69%	7.74%
Ukraine	1.64%	2.62%	3.41%	3.75%
Russia	1.41%	4.72%	5.98%	6.78%
South Africa	4.24%	14.45%	18.84%	22.20%
Importers	2016/17	2019/20	2022/23	2024/25
China	86.30%	223.90%	238.90%	228.01%
Mexico	-0.13%	-0.36%	-0.40%	-0.40%
Japan	-0.07%	-0.22%	-0.31%	-0.35%
South Korea	-0.10%	-0.18%	-0.23%	-0.25%
EU	-3.08%	-10.66%	-15.98%	-20.53%
Canada	-7.26%	-18.50%	-21.11%	-25.99%
Egypt	-0.38%	-1.15%	-1.51%	-1.71%
Indonesia	-0.65%	-2.20%	-2.86%	-3.25%
Thailand	-4.42%	-9.34%	-9.35%	-9.31%
Philippines	-1.78%	-10.79%	-14.67%	-16.67%

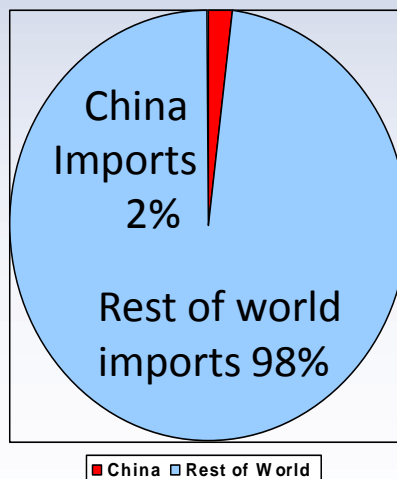
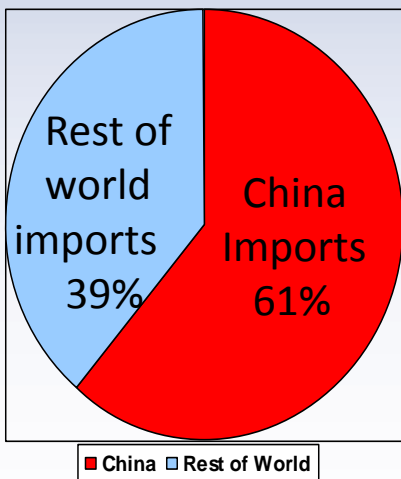


Percentage of China's World Market Share: Sorghum and Corn Imports

No restrictions on sorghum imports

Restrictions on sorghum imports

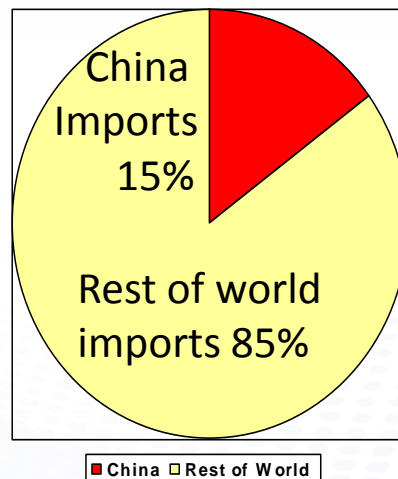
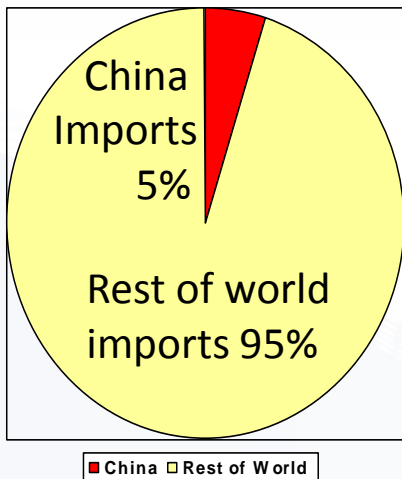
Sorghum



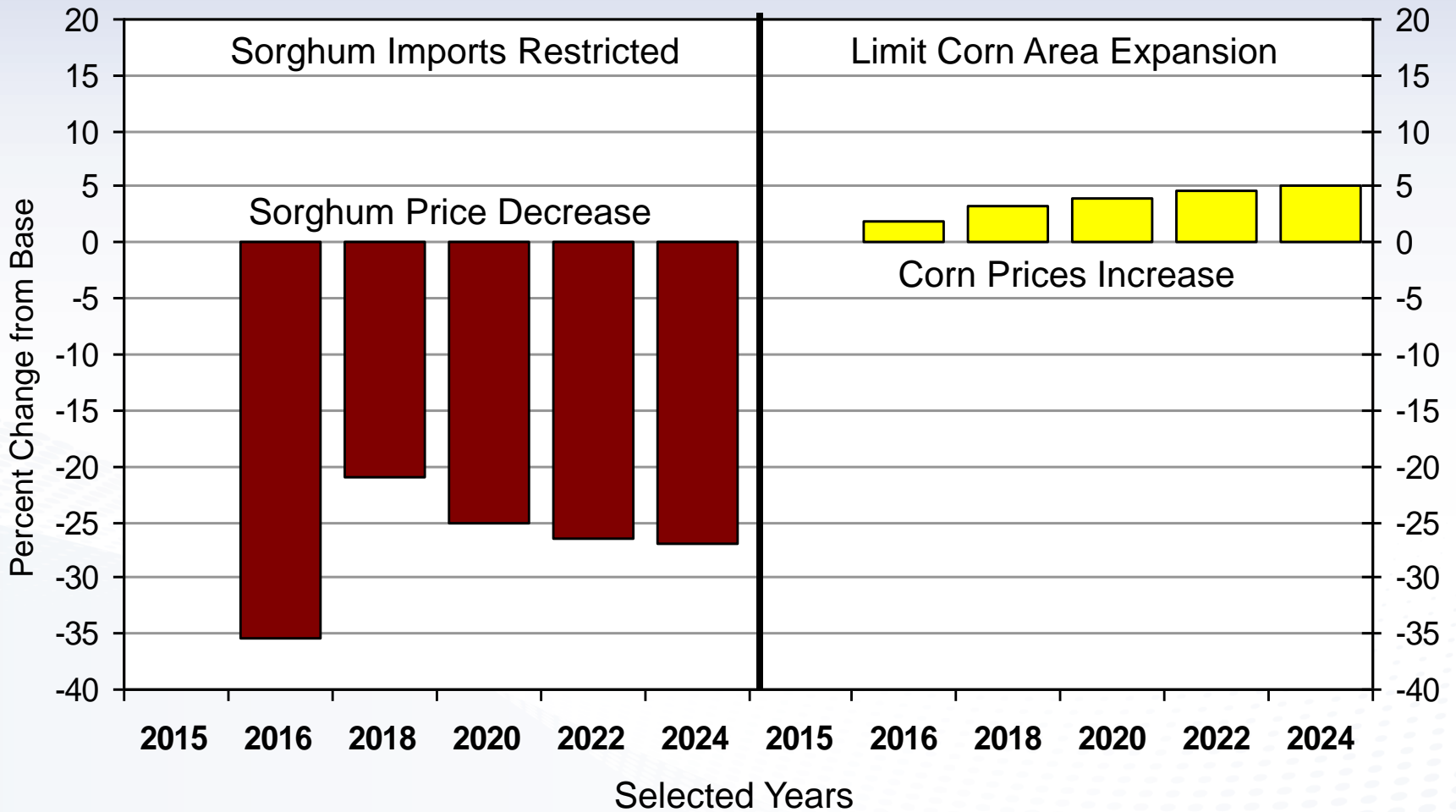
Corn area continues to expand

Corn area is limited

Corn



Change in Global Prices for Sorghum and Corn under Two Scenarios (percent change from base)



Conclusion

This research analyzes the impacts that specific assumption made on China's agricultural market will have on long-term commodity projections for the global markets and individual countries trade, production and consumption.

If China restricted sorghum imports - global prices decrease by 35 percent. Lower profitability leads to decreased production and exports in the major producing countries. Lower global prices lead to significant increase in imports, especially by Mexico, which is the most price responsive country. China's market import share decrease from 61% to 2%.

As China's corn area is limited - corn imports are increased to satisfy growing feed demand for livestock production. China's corn imports increase by 16.3 mmt by 2024/25 and international prices increase by 5.5 percent. The global markets respond by increasing production and exports, while imports are slightly decreased by importing countries. China's market import share increases from 5% to 15%.

Assumptions about China's long-term commodity projections have large impacts on the global markets. This is especially true when the commodity is produced and traded by few countries, such as sorghum, which causes large changes in global prices. Assumptions on China's agriculture market and policies have large effects on other country commodity projections.

