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Importance of Tracking Rice for Feed Consumption

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Research Objective

- Understand the background behind the increasing use of rice in Japan, South Korea, and Thailand feed markets
- Explain the impacts on feed markets of governmental policies that release rice stocks at prices below market
- Use the USDA baseline model to measure the effect that a policy by China to release rice for feed has on the rice and corn markets

Background: Feed Rice

South Korea

- Before 2015, the Government of South Korea had not allowed the use of rice in feed markets. High stocks, increasing production and consistently decreasing consumption led the government to release rice at a discounted price for two years in a row
- Rice in the feed market can be of consequence to U.S. feed grain exports: South Korea is the sixth-largest market for U.S. agricultural exports. The U.S.-Korea Trade Agreement allows U.S. wheat, corn, soybeans, and whey for feed use to be imported duty-free

Japan

- An aging population and changing diets have decreased per capita consumption of rice. Policies have historically encouraged rice production. In 2016, farmers received incentives to shift production from table to feed rice (USDA-FAS, October 2016). The Government allows a maximum of 100,000 MT of imported rice for direct food use, selling rest as feed or re-exporting as aid
- Increasing use of rice in the feed market can impact U.S. feed grain exports: Japan is the largest importer of US corn, and accounting for 26% of U.S. corn exports in 2015/16 crop year

Thailand

- The Government of Thailand accrued large stockpiles due to the Paddy Pledging Program, a three-year program that purchased paddy from farmers at prices up to 50% above the world market price. The scheme cost the government over \$21 billion and accumulated 12.8 million MT (2012/13 ending stocks). The government reduced stocks to 5 million MT via auction sales. The USDA Thailand Post estimates the current stock distribution to be 44% feed quality, 22% unfit for human consumption, and 34% food quality (USDA-FAS, April 2017)
- Rice in the feed market can be of consequence to US feed grain exports: The U.S. exports feed wheat and soybeans to Thailand

Background: China

A key priority of the Chinese government is to support overall agricultural production and reach self-sufficiency

- The 2015 Number One Document declared self-sufficiency in rice to be an essential target (USDA-FAS, March 2015)
- Government support prices for rice increased yearly from 2008 to 2015. In 2016, the floor price dropped for long-grain rice but kept stable for mid- to late long-grain and medium-grain rice

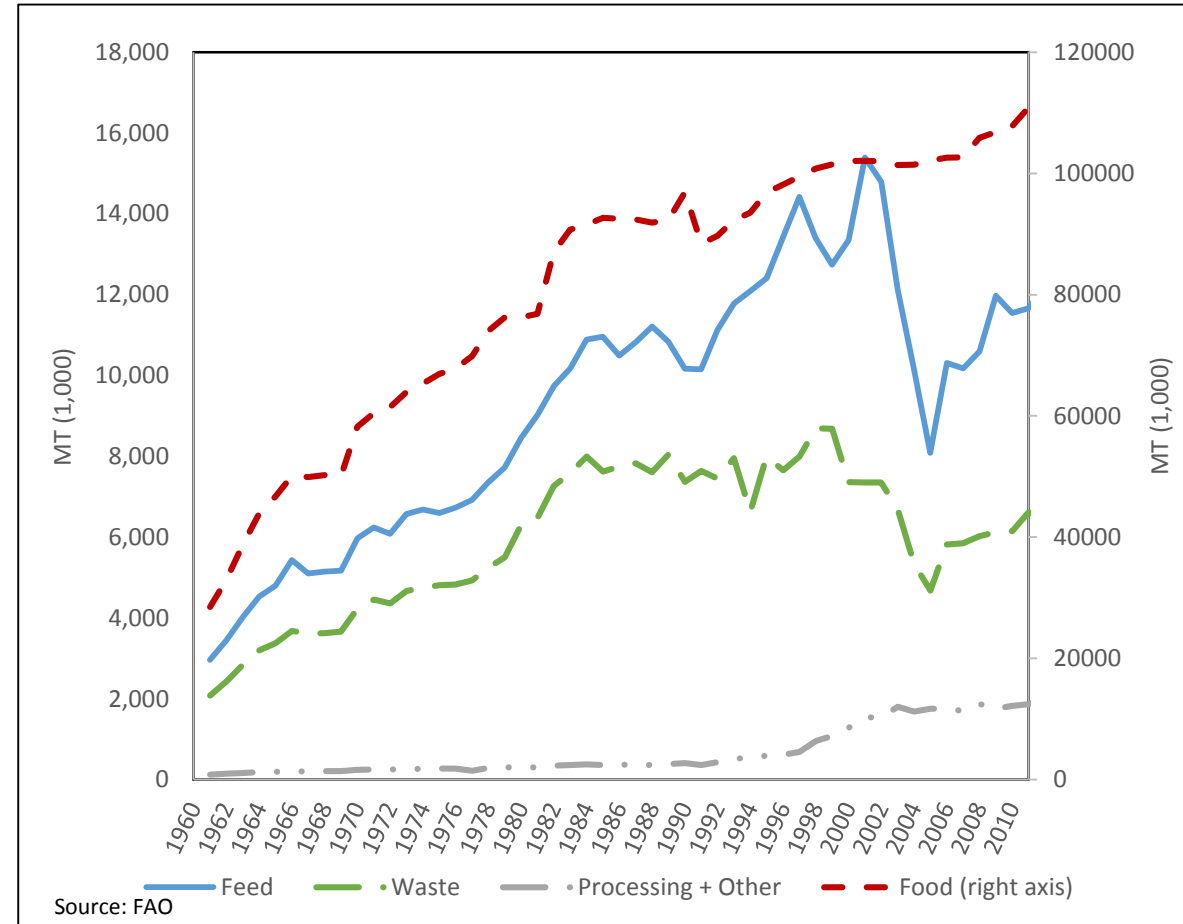
High market prices have made China's rice uncompetitive in the global market

- Due to the support program keeping prices above the world average, rice imports have increased; USDA estimates that China will import 5.0 million MT of rice, just 150,000 MT below the 2015 record. China has been the largest rice importer since 2013
- Production incentives coupled with imports have led to significant stocks buildup. USDA projects 2016/17 ending rice stocks in China at 69.69 million MT, the highest since 2001/02

A release of rice stocks as feed could affect US feed grain exports

- The Government of China may eventually decide to release their stocks. It is likely that much of these will not be suitable for human consumption and will be sold at a substantial loss
- China is a major importer of U.S. agricultural products, and imports distiller's dried grains with solubles, corn, wheat, and other coarse grains

Rice consumption distribution



Effect of rice feed on feed grain markets

The total supply of rice can be directed into consumer markets for food consumption or into storage

- Decisions to store include consumption smoothing or arbitrage (i.e., rice to be released into food markets in the future), excess production, or due to policies that disallow market penetration

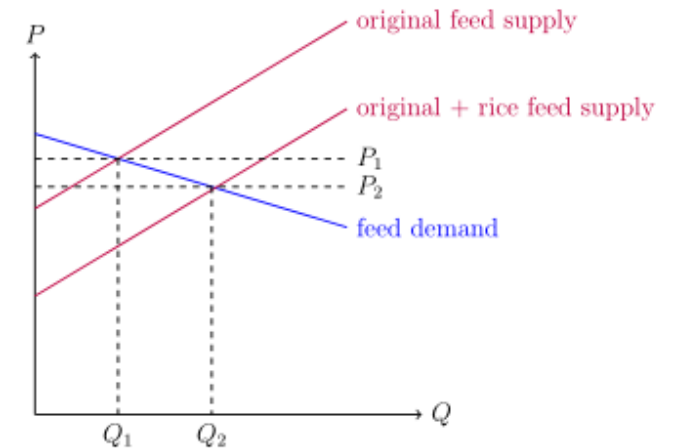
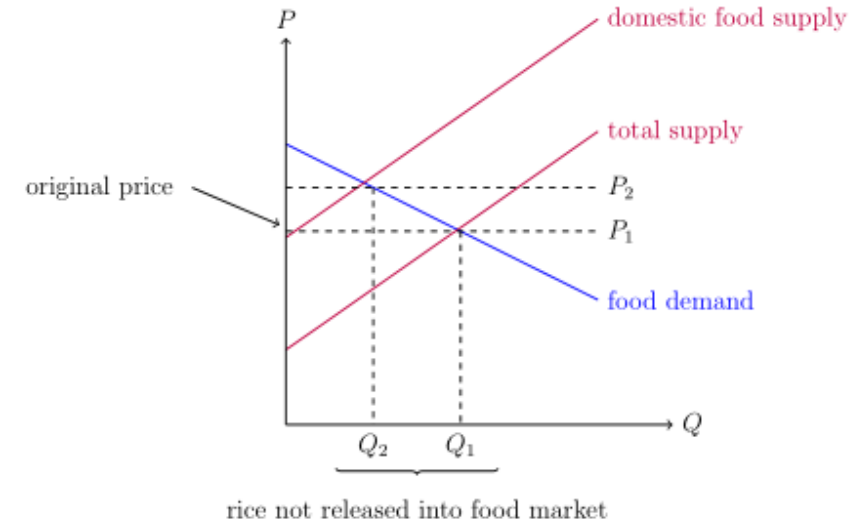
Typically, rice is not a competitive feed grain

- Rice prices tend to be above those of typical feed grains
- However, if the quality degraded while in storage, it is released into feed or other markets at a discount

The amount of rice diverted from food to feed shifts the supply of feed grains rightward, decreasing the equilibrium price of feed

- If rice is priced below alternative feed grains, the quantity demanded of alternative feed grains will decrease

Figure 5: Effect of disallowed rice on feed markets



Methodology

To consider the possible effect of a policy change that would increase feed use of rice starting in 2018/19, we use the USDA baseline model, a multi-country and multi-commodity dynamic partial equilibrium simulation model

China Model

- Includes 28 commodities
- Solves for domestic production, consumption, ending stocks, trade and prices for all commodities
- Yearly harvest decisions are based on expected net revenue or gross revenue
- Domestic prices for corn, wheat, and rice are protected from international market shocks
- Livestock activity is modeled as backyard, specialized, or commercial, while feed demand is dependent on type of livestock operation, production, and feed prices

Global Model

- The global model links 44 countries/regions, including the U.S. (known as the “Linker System”)
- Solves model via dynamic partial equilibrium, such that prices and trade that clear world and country commodity markets

Assumptions

- Current international laws, policies, and trade agreements hold
- Population growth slows in developing countries (though remains high in Africa), and the urbanization trend continues

Scenarios for Policy Analysis

Two Scenarios for Policy Analysis

- Baseline: current policies maintained
- Scenario 1:
 - China imposes policy which transfers rice stocks to feed use
 - Policy forces substitution from corn to rice, offsetting corn stocks
- Scenario 2:
 - China imposes policy which transfers rice stocks to feed use
 - Policy forces substitution from corn to rice, offsetting corn imports

Results

Effect on the global corn price

- Scenario 1: When we assume that the offset in corn feed demand causes an increase in corn stocks, global prices are not significantly affected – relative to the baseline model, the global price decreases by 0.35%
- Scenario 2: If decreases in corn feed demand are offset by lower imports, the effect on the global price is slightly larger. The simulation predicts the global price to be 1.73% below the baseline projections for 2026/27

In both scenarios, China's corn imports decrease, causing the lower global price. The second scenario leads to an import decrease of 85%. The lower global corn price causes imports to increase for major importers

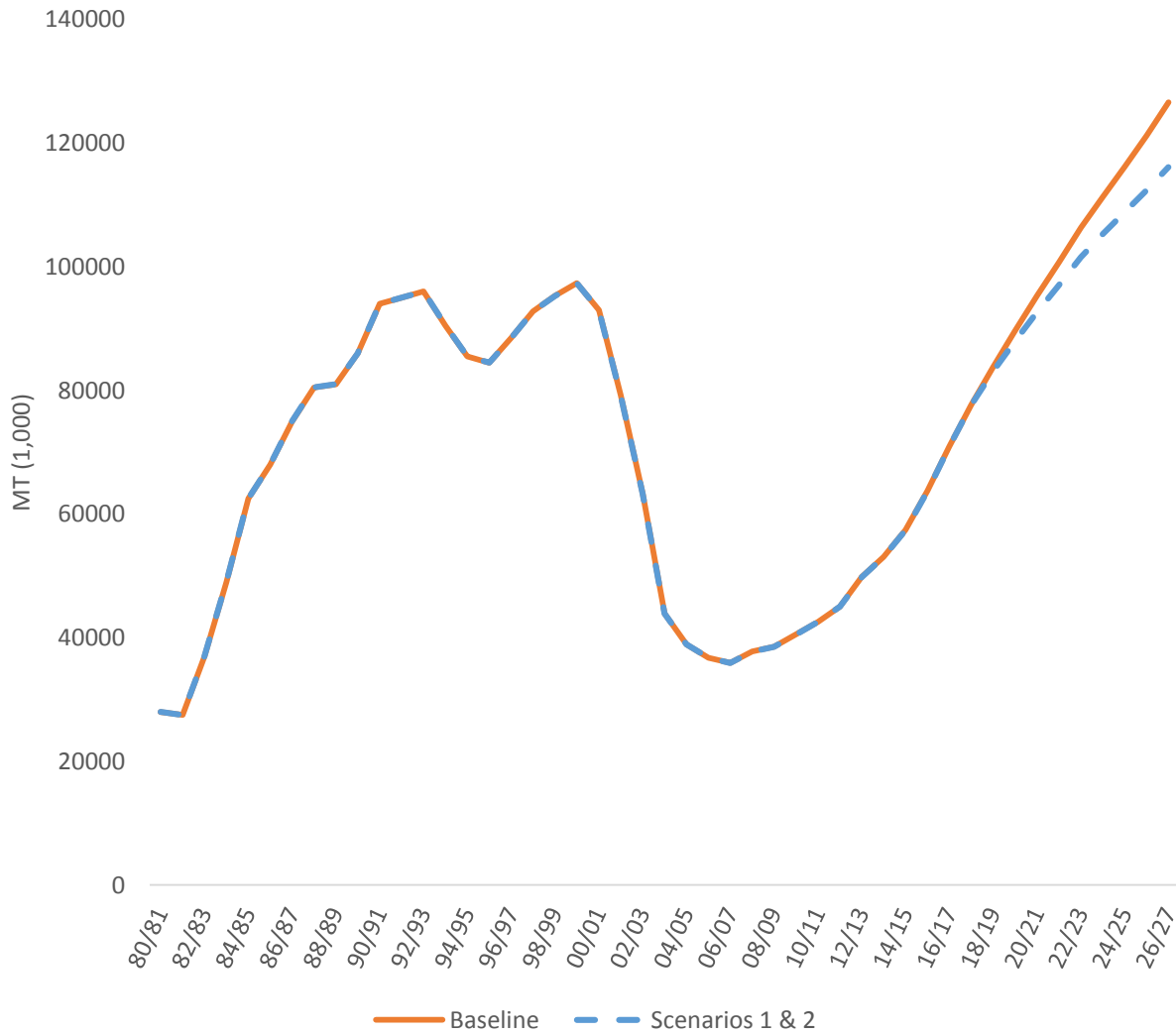
Baseline projections estimate the U.S. will export 55.2 million MT of corn in 2026/27. Both scenarios cause US corn exports decrease, though the effect is limited

- Scenario 1: US corn exports are 442,000 MT lower than baseline projections of 55.2 million MT, a decrease of 0.8%
- Scenario 2: US corn exports are 2.636 million MT lower than baseline projections, a decrease of 4.78%

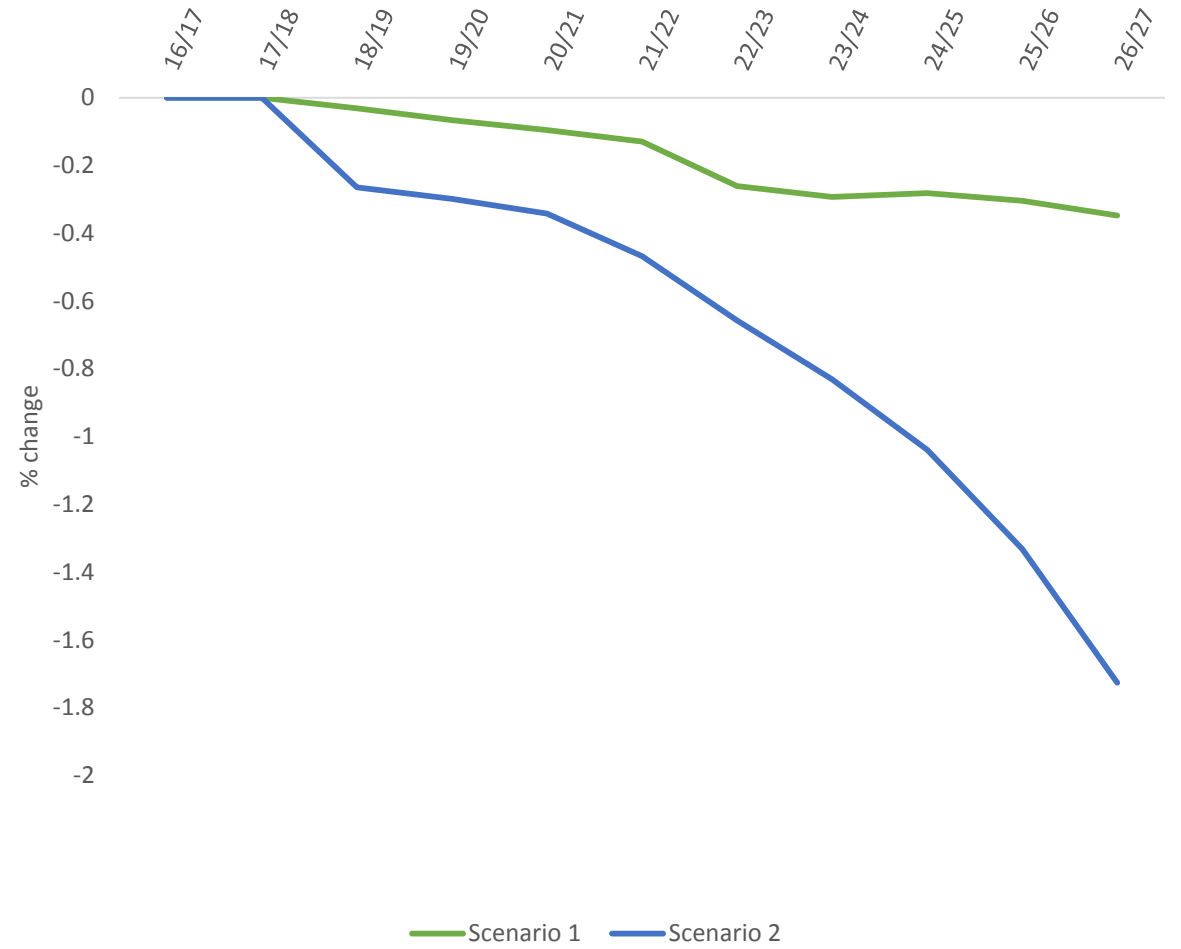
Results overview, percentage change from baseline

	Scenario 1 2026/27	Scenario 2 2026/27
Corn production	-2.57%	-1.29%
Corn feed consumption	-4.25%	-4.26%
Corn ending stocks	17.9%	3.57%
Corn imports	-14.04%	-84.69%
Corn producer price	-8.43%	-1.95%
Corn global prices	-0.28%	-1.73%
Rice stocks	-8.27%	-8.41%

China's rice stocks



Global prices (percentage difference from baseline projections)



Difference corn exports from baseline projections, thousand MT

	Scenario 1				Scenario 2			
crop year	USA	Argentina	Brazil	India	USA	Argentina	Brazil	India
2018	-18.3	-1.4	-2.9	0.1	-233.9	-19.4	-34.5	0.2
2019	-49.3	-4.5	-4.6	-0.2	-317.1	-35.6	-30.1	-3.5
2020	-87.6	-8.3	-7.1	-0.8	-469.4	-44.4	-52.9	-6.6
2021	-139.9	-12.3	-13.6	-1.7	-664.6	-55.7	-86.6	-9.8
2022	-252.7	-21.4	-33.7	-2.8	-898	-77.9	-130.7	-14.9
2023	-305.8	-27.6	-37.8	-5.0	-1156.1	-104.3	-169.4	-20.9
2024	-346.4	-28.1	-50.9	-7.0	-1517.7	-133.9	-231.9	-28.3
2025	-398.8	-28.3	-71.9	-8.3	-2005.6	-173.2	-314.7	-37.9
2026	-441.9	-32.1	-90.6	-10.1	-2636.1	-228.8	-420.1	-49.6

Difference in imports from baseline projections, thousand MT

	Scenario 1									Scenario 2								
crop year	China	EU	Indonesia	Iran	Japan	Mexico	Thailand	Turkey	Vietnam	China	EU	Indonesia	Iran	Japan	Mexico	Thailand	Turkey	Vietnam
2018	-38.6	3.6	0.2	0.5	0.3	-1.1	0.3	0.3	2.5	-468	43.8	3.2	5.9	3.5	0.7	3.5	3.9	7.6
2019	-97.5	8.9	0.7	1.4	0.3	-2.7	-0.5	0.8	7.2	-658.1	76.3	5.9	8.9	3.1	2.9	5.0	5.9	15.5
2020	-163.8	14.1	1.7	2.2	0.4	-4.9	-2.3	1.3	12.2	-908.6	98.7	8.1	10.5	5.0	1.7	4.5	6.9	22.7
2021	-253	19.9	2.8	3.3	0.8	-6.0	-3.5	1.9	16.4	-1256.3	124.5	10.9	14.5	6.7	0.8	5.0	9.2	29.8
2022	-477.4	39.2	4.9	6.5	2.3	-7.9	-3.1	3.7	22.2	-1740.3	172.1	15.2	21.3	9.3	1.6	7.7	13.1	39.1
2023	-592.3	54.8	6.7	8.6	2.6	-8.7	-2.9	4.8	27.5	-2272.1	230	20.4	28.7	12.0	3.3	11.3	17.3	49.6
2024	-661.9	60.6	7.6	9.0	3.0	-9.3	-3.4	4.9	31.7	-2973.8	297.2	26.3	37.4	15.4	5.2	15.8	22.1	61.3
2025	-754.6	62.8	8.0	9.9	3.3	-10.7	-4.4	5.4	35.7	-3915.9	383.4	33.8	49.7	19.9	7.3	21.8	28.8	75.9
2026	-856.8	68.9	8.9	11.6	3.5	-11.4	-5.0	6.3	40.1	-5169.1	502.3	44.2	66.8	25.8	10.5	30.5	38.1	94.5