

USDA Revision of China Grain Stock Estimates

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Highlights: On May 10, 2001, USDA released a new set of ending stock estimates for China wheat, corn, and rice that more accurately reflected world market conditions. Total grain stocks were raised 164 million tons, a net increase of 250 percent from April 2001's estimates. For years, the earlier estimates performed well as an indicator of tightness in Chinese and world markets for grain. However, new information from China's agricultural census, various government statements, and inconsistencies between stock estimates and China's trading patterns made it apparent that a revision of China grain stock estimates was needed.

The U.S. Department of Agriculture's (USDA) April 2001 World Agricultural Supply and Demand Estimate (WASDE) report carried an estimate of 65.78 million tons of ending grain stocks in China, including 13.75 million tons of wheat, 32.03 million tons of corn, and 20 million tons of rice. USDA must estimate China grain stock levels from sparse information, because China's government considers its grain stocks to be a state secret and does not publish any information on actual grain inventories. USDA's April 2001 stock estimates were much lower than published reports in the Chinese press and considerably lower than target levels mandated by China's internal grain policies. USDA's estimates suggested a low ratio of stocks-to-use, yet China did not give any indication of intent to make significant grain purchases from the world market. Therefore, USDA concluded that current grain stock estimates needed a significant revision to more accurately reflect the true supply-and-demand balance in China.

Major revisions of China's agricultural statistics following the country's 1997 agricultural census also made it necessary to revise grain stock estimates. China's National Bureau of Statistics (formerly known as the State Statistical Bureau) revised downward its estimates of animal inventories and meat output. The revised series implied that USDA had previously over-estimated feed use of coarse grains, as well as low-quality wheat and rice feeding, thus underestimating stocks.

After reviewing data and consulting with knowledgeable experts, USDA more than tripled its 2000/01 China grain stock estimate from 65.7 million tons to 229.7 million tons (table J-1). USDA also revised estimates for earlier years. This revision had a noticeable effect on world grain supply estimates because China accounts for a large share of world grain stocks.

USDA's substantial upward revision of China's grain inventory estimates more accurately reflects the supply-and-demand situation in China. A spokesman for China's Ministry of Agriculture commented that the new estimates were "close to reality." The revisions were widely anticipated by commodity traders and analysts, although the magnitude of the changes was surprising to some observers. However, publication of the revised estimates on May 10, 2001, had little impact on markets.

Grain stocks are held by government entities, the commercial sector, and farm households. Although China's grain stocks are a large share of its total grain supply (as compared with the United States), only a small share of those stocks are likely to enter the market in response to price fluctuations. Farmers own the largest portion of total grain stocks and would like to keep the grain for own-consumption when rising prices cause food insecurity. It should be noted that the ratio of stocks-to-use for grain in China is higher than in most other countries. China holds large grain stocks

Table J-1—USDA revised estimates of China's grain ending stocks, crop year

	New series (May 2001)				Old series (April 2001)			
	Wheat	Corn	Rice	Grains	Wheat	Corn	Rice	Grains
<i>Million tons</i>								
1995/96	59.8	89.6	84.5	233.9	24.3	36.7	21.7	82.7
1996/97	60.9	102.3	88.5	251.7	24.2	51.0	25.5	100.7
1997/98	71.1	87.7	93.0	251.8	33.5	36.0	27.0	96.5
1998/99	66.4	102.1	96.0	264.5	27.9	51.6	27.5	107.0
1999/00	65.2	102.3	98.5	266.0	25.2	52.9	26.5	104.6
2000/01	54.2	80.5	95.0	229.7	13.7	32.0	20.0	65.7

Source: U.S. Department of Agriculture, *World Agricultural Supply and Demand Estimates*.

Complete table accessible at <http://www.usda.gov/oce/waob/wasde/wasde.htm>

as insurance against catastrophic crop failures or other disruptions that could affect China's food supply or force the country to rely on imported grain. China has a strong preference for self-sufficiency in grain.

This article provides background information used by USDA in revising estimates of China's grain inventories. Because insufficient data were available to make direct estimates, USDA had to rely on publicly announced grain stock numbers, knowledge about China's grain reserve policy, and information about the roles of on-farm, commercial, and government-mandated reserves in grain markets.

Other Estimates of China's Grain Stocks

China released several grain stock figures to the public in the months prior to the revision. The deputy director of the Rural Economy Department of Development Research Center under China's State Council said that China had 250 million tons of state grain reserves plus an estimated 135 million tons or more in on-farm storage (*China Daily*, December 6, 2000). Several months later, *China Daily* (March 13, 2001) reported that China's total grain reserve was about 500 million tons. Each of these officially sanctioned reports of China's grain reserves is far above the 65.78-million-ton estimate reported by USDA prior to the revision. The United Nations Food and Agricultural Organization (FAO) made a critical review of China's historical supply and demand balances for cereals and concluded that China may have had 362 million tons of cereals at the end of crop year 2000/01 (FAO, *Food Outlook*, February 2001).

None of these estimates reported the composition of grain stocks (by type of grain), nor was a date given for the inventories, so analysts cannot determine

whether the figures are for the beginning, middle, or end of crop years. USDA used these aggregate figures as a benchmark and then estimated the composition of the stocks among individual commodities, including corn, wheat, and rice, using other sources of information and analysts' judgment.

China Sets High Grain Reserve Targets

China maintains a much larger grain inventory than other countries. FAO suggested that world grain reserves should be around 17-18 percent of world consumption (FAO, *Approaches to World Food Security*, Chapter 2, pp. 19-37, Rome, 1983). This reserve is the quantity that should be on hand when inventories are at their lowest level (before new crops are harvested) and is equivalent to 1.5 months of food consumption. If the reserve can be maintained at this level, the world will have a 95-percent chance of avoiding chaotic market prices during a crop failure. Using FAO's suggested grain reserve figure for China, and assuming that China's annual grain consumption is 450 million tons, then China should maintain a reserve target of 76-81 million tons.

China's officials argue that the reserve levels recommended by FAO are too low. They gave four reasons why China needs higher reserve levels:

- ◆ Mobility of grain is limited within China. China cannot move grains from specific surplus areas to deficit areas quickly enough to avert food shortages.
- ◆ FAO's figures did not consider the possibility of multiple-year crop disasters. Managing a single-year crop failure is much easier than managing consecutive crop failures. Historically, China has experienced multiple-year crop failures.

- ◆ Substitutability among various grain types is limited. Reserve levels should be set separately for each type of grain, since one grain cannot be perfectly substituted for another.
- ◆ Production technology and price elasticities could change from time to time as market conditions change. The reserve target should be flexible to accommodate these changes.

All indications are that China aims for grain reserves that are much higher than the FAO targets. The 1995 grain policy reform, known as the Governor's Grain Bag policy, mandated a minimum reserve of 3 months of grain consumption for grain-surplus provinces and 6 months for grain-deficit provinces. These reserve targets are much higher than FAO's recommendation of 1.5 months.

A recent publication on China's grain policy provides some guidance on how China sets inventory targets for different grains (table J-2). The grain stock is targeted to include 50 percent wheat, 30 percent rice, and 20 percent coarse grain. USDA used these targets as a basis for allocating total grain stock estimates among individual grains at the national level. USDA does not know how many individual provinces actually met their mandatory reserve targets. However, these reserve targets are the only source of information available to allocate grain stocks by type of grain.

Key Components of Grain Storage

China has at least five major categories of grain reserves, each with a distinct function in Chinese society.

1. **Central government (state) reserves.** The reorganization of the State Administration of Grain Reserve in 2000 separated policy-formulating entities from

grain trade business operations. The government set up 14 grain companies in selected production and consumption areas, and all companies became operational in 2000. These grain companies now directly control and operate 2,800 grain warehouses with an estimated storage capacity of 25 million tons.

2. **Government grains in circulation.** These reserves include grain purchases based on protection (procurement) prices, which can be resold at market prices. Generally, two-thirds of the government procurement amount is circulated each year, including food supplies to military and government facilities. Grains in circulation could be five times higher than the 2-million ton government reserve.
3. **Local government reserves.** These reserves protect against region-specific grain shortages that may not be immediately alleviated due to the poor transportation infrastructure within China. China would like to see a separate local grain reserve (county, township, and village) as a buffer against short-term price fluctuations. The government set the target at 20 million tons, equivalent to 1- to 1.5-month consumption needs.
4. **Retail and wholesale grain stores.** Small private enterprises and retailers (including processors and food retailers) can purchase grain directly from farmers. Retail and wholesale grain stores exist in numerous places. These reserves are considered to be true "free market" grain in the commercial pipeline. Grain is fresh and consumers pay premium prices for quality. However, no government surveys were conducted for this segment of the total storage.
5. **On-farm storage.** Farmers can store their grain at home or at local mills when home storage space is limited. Statistical publications from China indicate that grain stocks kept by rural households range from 350 to 400 kilograms (770 to 880 pounds) per

Table J-2—China's reserve target by specific grains

Table 3.2 China's reserve target by specific grains				
	Sown area	Production	Stock level	
		% of total	(average 1996-98)	Targeted
Grains	% of total crops	grain output	% of total grains	share of total grain
Percent				
Rice	22-24	42-44	Indica, 40 Japonica, 10	30
Wheat	20-23	20-23	40	50
Coarse grain	14-16	18-20	10	20
Total	56-63	80-87	100	100

Source: Dai, Yuanchen et al., *Reforms of China's Grain Circulation System*, Guangdong Economic Publications, September 1999.

capita. Based on a sample of farm households, China's Grain Bureau estimated that on-farm storage was 90 million tons for 1995/96 (a 300-percent increase from the early 1980s).

Excluding on-farm and free market stocks, China's authorities consider that the combined total of central and provincial grain reserves should be no less than 75 million tons at the end of May every year. USDA took this specific point of time to begin the adjustment of annual ending stocks.

Only a Fraction of On-farm Stocks Will Enter Commercial Channels

Farm households hold most of China's grain inventories. According to some estimates, on-farm grain stocks exceeded 450 million tons in 1994 and 1995 (Crook). Farm households hold considerable grain stocks because they are largely self-sufficient in food and rural food markets are still relatively undeveloped in rural China. In other words, households must store enough grain to satisfy their family consumption needs and have a buffer against crop failures or natural disasters. The lack of insurance and the poorly developed market and transportation infrastructure in China make it difficult to move grain to address region-specific shortages. Finally, farmers use grain as a store of wealth since the poorly developed financial system provides little or no means for farmers to save for retirement or obtain credit when personal financial needs arise.

In 1995/96, China's Grain Bureau surveyed a small sample of 160 farm households to assess the amount of grain stored and farmers' motives for storage. The survey found that the largest number (nearly one-third) of households had stored grain equivalent to 6-12 months of consumption. About 20 percent of households had 6 months or less, and 16 percent had no grain stored. Another 18 percent had storage of 12-18 months, 9 percent had storage of 18-24 months, and 4 percent had enough grain for 2 years or more. The overall weighted average of households was 9 months of storage.

A much higher stock number can be derived from the National Bureau of Statistics annual rural household survey, which showed an average of 470 kg per capita of grain held on farms at the beginning of 1997. This amount was 1.87 times the per capita rural consumption of 251 kg reported for 1997, equivalent to 22 months of consumption. With China's 1997 rural

population at 846 million, this per capita amount would translate to total on-farm stocks of 407 million tons in 1997. This number is within the range of on-farm stock estimates for 1991-94 made by Crook.

USDA analysts determined that only a fraction of on-farm grain inventories should be included in estimates of commercial grain stocks. A 1995/96 Grain Bureau survey of China's on-farm storage indicated that most rural households stored grain for household use only or as a form of long-term savings. A relatively small minority held grain for reasons related to speculation (16.6 percent) or price stability (10.4 percent). China's Grain Bureau analysts estimated that 20 percent of on-farm stocks could potentially reach the commercial market if prices rose. Using these results for guidance, USDA included a 20-percent share of on-farm stocks in its total grain stock estimate.

Estimates Based on Sparse Information

The true quantity of China's grain stocks remains unknown except to select officials within the Chinese government. The USDA numbers are rough estimates based on sparse data. Even if the true numbers were revealed, there would still be disagreement about which components of China's grain stocks should be included when assessing commercial grain supplies. Much of the on-farm stock and perhaps a large portion of government reserves will not enter commercial channels. USDA believes that the new estimates are a better reflection of market conditions, but additional adjustments may be made as new information becomes available.

Reference

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