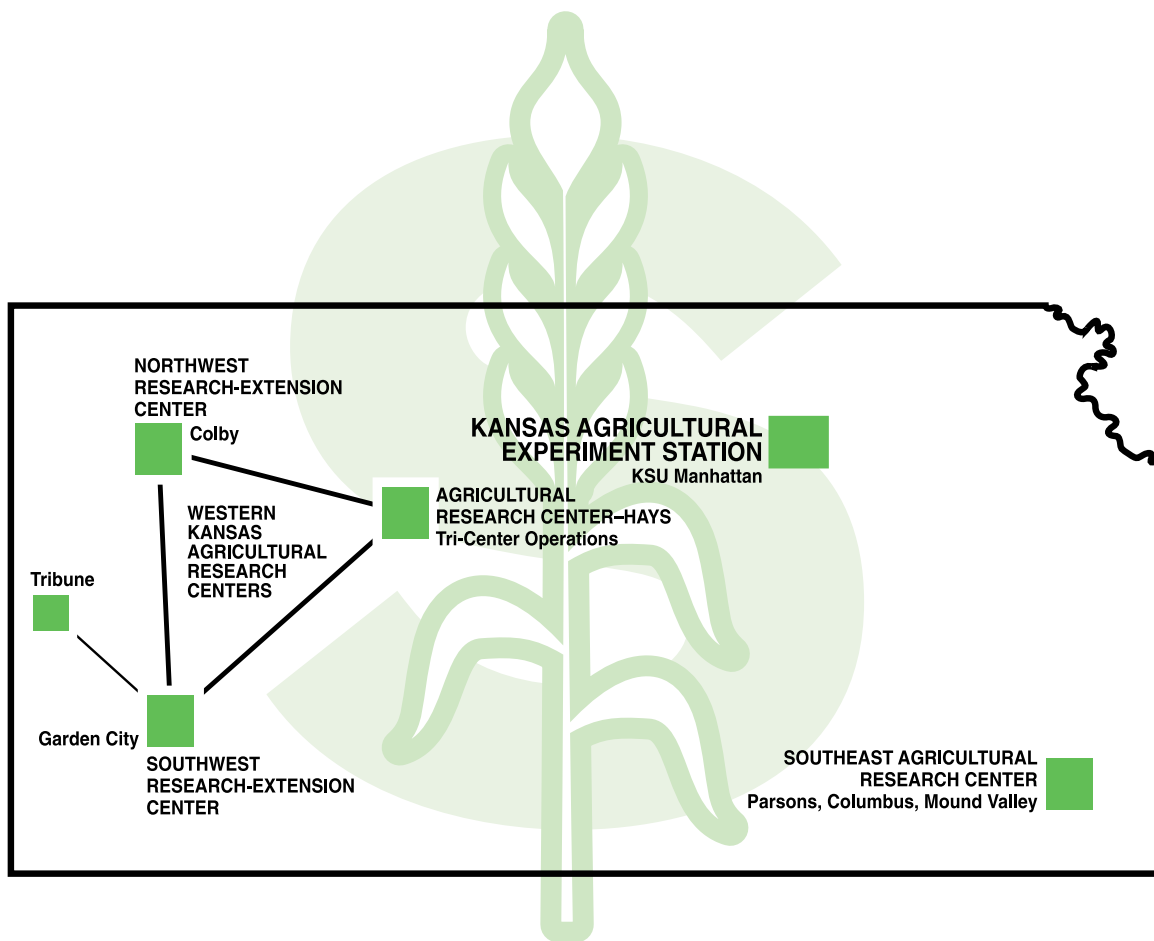


Economic Issues with White Corn



Agricultural Industry Competitiveness

Enhance the value of Kansas Agricultural goods

Economic Issues with White Corn

Historically, wheat has been the dominant cereal grain of the Great Plains. Better dryland hybrids, different tillage practices, and changes in farm policy have led to an increase in corn production in Kansas. Some producers have begun to consider corn hybrids with specific end-use traits as a means of enhancing revenues. K-State Research and Extension publication *Economic Issues with Value Enhanced Corn*, MF-2430, addressed this issue in Kansas. There is a new interest in Kansas about domestic and international markets for white corn. This publication presents trends in white corn production and marketing in recent years.

Characteristics of White Corn

Pure-white kernel color is the distinguishing trait of white corn. White corn is dry milled or alkaline processed to produce high quality, light-colored flour for food use. Some white corn is used in food-grade starch and paper. Domestic white corn is used to produce snack foods, such as tortilla chips, and food wraps, such as tortillas. However, exported white corn is mainly used for corn-based flour products: tortillas, muffins, and breads.

Processors of white corn desire pure-white color; large, uniform kernels; and high specific gravity, as well as other basic attributes for processing efficiency.

White corn yields have significantly improved within the last few years. According to the U.S. Grains Council, seed companies have reported that white corn yield has increased to 95 percent or more compared to yellow dent corn. Similar results have been noted in Kansas trials (see MF-2430 *Economic Issues with Value-Enhanced Corn*).

Market Size for White Corn

Since 1997, the U.S. Grains Council has annually published a *Value-Enhanced Grains Quality Report*. The reports indicate a steady domestic demand for white corn, which is approximately 50 million

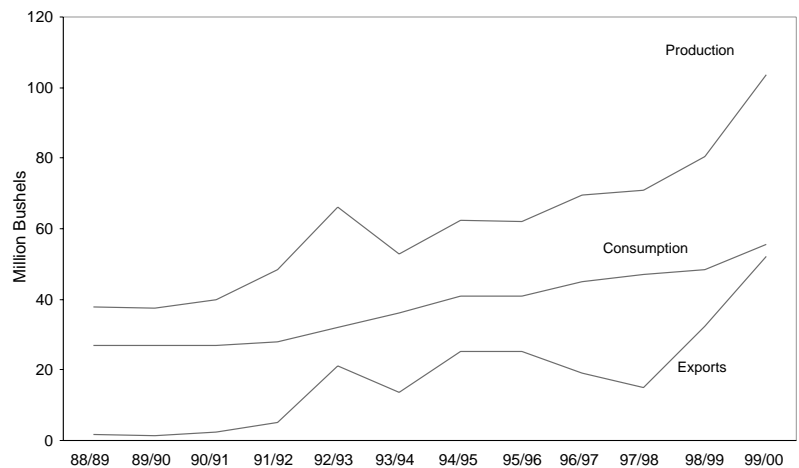
bushels annually, or the equivalent of about 400,000 acres. The domestic market uses white corn in dry milling plants. Because those plants are operating at capacity, unless milling capacity increases, any significant white corn production more than 50 million bushels must be exported.

Many of these dry milling plants use contractual arrangements with local producers to purchase their white corn. Major dry milling plants are located in central California, western Nebraska, eastern Illinois, Texas, Oklahoma, southern Indiana, and Kentucky. Most plants are able to buy corn locally, so production outside these areas must be exported.

Production Trends in the United States

Production of white corn in the United States has been trending steadily upward over time and reached an all-time high in 1999 as shown in Figure 1. (USDA estimates for the 2000 harvest are significantly lower than 1999.) Exports have more than doubled since 1992 and wholesale disappearance, which is a proxy for consumption, has increased significantly. Production and exports spiked in 1992 due to poor weather in South Africa.

Figure 1. U.S. White Corn Production, Consumption (Wholesale Disappearance), and Exports, 1988/89 to 1999/00



Source: USDA

Table 1. U.S. White Corn Acreage by State, 1997 to 2000

State	1997	1998	1999	2000
Kentucky	108,000	150,000	225,000	180,000
Nebraska	108,500	155,000	235,000	164,500
Texas	110,500	107,000	170,000	157,500
Illinois and Indiana	42,000	66,000	100,000	80,000
Iowa	36,000	68,000	105,000	68,250
Ohio River Valley	50,000	55,000	65,000	65,000
Missouri	35,000	64,000	85,000	59,500
Southeast ^a	31,000	45,000	65,000	45,000
Kansas	19,000	40,000	55,000	41,250
California	16,000	25,000	23,000	23,000
U.S. Total	556,000	775,000	1,128,000	884,000

^aSoutheast comprises Mississippi, Georgia, North Carolina, South Carolina, Virginia, and Tennessee.

White corn acreage is concentrated in several states, as seen in Table 1. Acreage for 2000 represents the U.S. Department of Agriculture estimates for harvested acres as of June 2000. Kentucky and Nebraska had the largest acreage, with between 200,000 and 250,000 acres in 1999. Other states where acreage has almost doubled since 1997 include Illinois and Indiana (combined), Iowa, Missouri, and Kansas.

Production in Texas is concentrated in the Panhandle, which has historically had almost half of that state's production, with the remainder being produced in the Rio Grande and west of San Antonio.

Average yield information for 1999, in bushels per acre, was 140 (California), 135 (Nebraska, Kansas, Missouri, and Iowa), 133 (Kentucky, Ohio River Valley, Illinois, and Indiana), 127 (Southeastern U.S.), and 122 (Texas).

U.S. Export Trends

Exports of white corn have been concentrated primarily in Central and South American countries. Mexico has been the largest importer of white corn (Table 2) and has more than doubled its imports since 1994, when the North American Free Trade Agreement (NAFTA) began. White corn exports to Mexico, however, are highly dependent on Mexico's own domestic production and the government issuance of import permits, called *Cupos*.

South African and U.S. white corn production are linked, as these are the world's two largest producers of white corn. Each has a comparative advantage in transportation costs when exporting within their geographic region. Thus, U.S. exports to African countries depend on the size of the South African harvest. However, there is more competition for the South American market. South Africa is on a different harvest cycle than the United States; their harvest occurs in late April through July. Additionally, South African corn is harder, which enables processors to achieve greater yields for flour-based food items, such as corn muffins and tortillas. Thus, while white corn from the United States and South Africa are very close, they are not perfect substitutes for one another.

Marketing of White Corn

According to the U.S. Grains Council, approximately 60 percent of U.S. white corn is produced under contract, with the rest being sold on the cash market. White corn is typically sold at a premium to yellow corn, although the premium at harvest for the 1999 harvest was small in the Western Corn Belt due to production acreage increases. This premium offsets the additional costs required to produce white corn because the corn must be identity preserved and separated in the marketing channel.

Annual, calendar-year western Corn Belt price data for white and yellow corn is presented in Figure 2. When compared to the production data in Figure 1, it is evident that the price spread between white and yellow corn declines with large increases in production. For example, 1992 and 1999 represented the two years with the largest increase in production from the previous years, and in both cases the premiums (1993 and 2000) decreased significantly. This suggests that the cash premium for white corn is sensitive to the amount of white corn in storage from the previous year, the time of year, and other factors related to demand.

Figure 3 presents weekly western Corn Belt prices for white and yellow corn from 1997 to the spring of 2000. Production increased significantly in 1998 and 1999 due to increased acres and higher yields. Thus, the cash price spread between white and yellow corn decreased and was almost zero for much of the latter half of 1999 and spring of 2000. However, the U.S. Grains Council reported \$0.25 to \$0.35 per bushel premiums for some marketing contracts for fall 2000. USDA acreage estimates for 2000 reflect this decline in price with about 30 percent fewer acres in 2000 than in 1999.

Export Quality Issues

The quality required to export in the international market is U.S. No. 2 or better. However, many importers have begun to require a grade of U.S. No. 1 white corn. The maximum moisture allowed ranges from 14 to 14.5 percent. The maximum stress cracks allowed ranges from 10 to 15 percent, and the maximum aflatoxins allowed are 20 parts per billion. There may be contractual exceptions on the moisture and stress cracks, but aflatoxin requirements are strictly enforced for both white and yellow corn.

The Mexican White Corn Industry

Approximately 95 percent of white corn in Mexico is used for masa, or corn flour. This corn flour is then used for tortillas, which is the staple bread in most consumers' diets.

Domestic Subsidies

In order to help domestic producers, the Mexican government established a consumption subsidy. The government established a price for domestic production based upon the average domestic consumption and allows buyers to bid for the amount of subsidy they will need for a certain amount of volume. The government then begins with the lowest bids and makes purchases until the entire domestic white corn production has been bought. White corn users who need to import white

Figure 2. Annual Western Corn Belt White and Yellow Corn Cash Prices, 1985 to Spring 2000

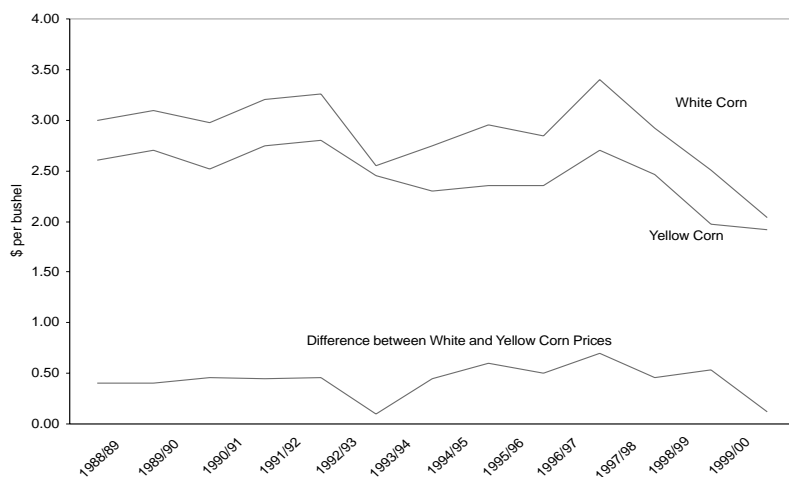
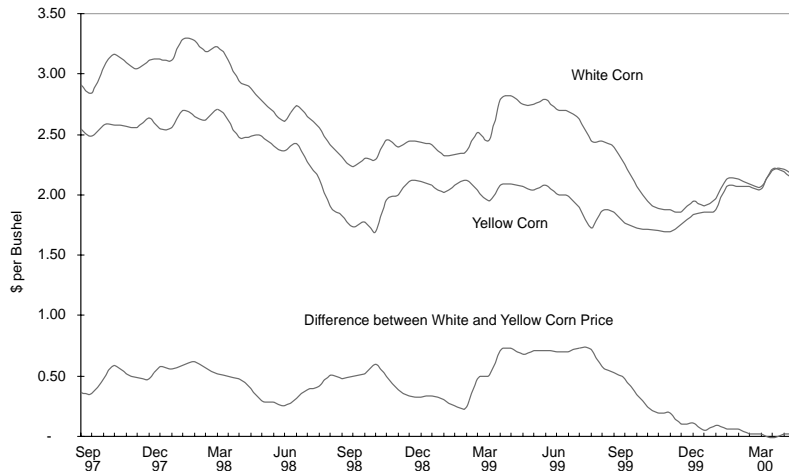


Figure 3. Weekly Western Corn Belt Yellow and White Corn Prices, 1997 to 2000



corn must participate in this auction in order to receive an import license. The import licenses are distributed only after the domestic production has been completely sold. The time when the import licenses will be distributed and the quantity that each importer will receive are uncertain from year to year. This makes long-term contracting for U.S. corn very difficult because processors cannot practice just-in-time delivery and must carry larger inventories.

Production

Mexico produces white corn throughout the country. The largest white corn harvest in June and July is from the state of Sinaloa in the northwest with 2 million metric tons (Figure 4). In June and July, the state of Tamaulipas, located in the

Figure 4. Map of the Republic States of Mexico.



northeast, harvests approximately 0.2 million metric tons. However, these two regions are located far from where the corn is milled and consumed, which is the center of the country in the Mexico City area. The white corn harvest in west central and southern Mexico begins in November and December (around Jalisco and Chiapas) with annual production of approximately 1.4 million metric tons.

The distance between production and consumption areas is further exacerbated because of the lack of storage capacity. Almost all storage is located near urban regions, which means that producers sell their corn immediately after harvest. Finally, the white corn produced in southern Mexico is not considered good tortilla quality. Mexican importers of white corn

from the United States have indicated that the quality of the corn found in the two countries is similar, although Mexican corn does tend to be drier than corn from the United States.

Summary

Domestic and international markets for white corn are increasing. However, like many value-enhanced grains, early economic incentives for white corn disappear as supply increases to meet demand. In 1999, few, if any, premiums were available on the open market, although some food firms paid premiums under marketing contracts. Thus, access to marketing contracts is likely to be more important in the future. Domestic production is likely to be located near dry milling plants, such as those operated by food companies.

The largest export market is Mexico, which imports about 60 percent of U.S. production. White corn exports to Mexico are dependent on the annual Mexican domestic production. Thus, producers who are contemplating growing white corn and are not located near domestic millers will likely be dependent on export markets (and the South African harvest) and the government policies of these importing countries. There may be small niche markets for corn-based flour products as the Hispanic population in the United States increases. However, it is small relative to dry milled corn products.

Table 2. Volume in Metric Tons for Importers of U.S. White Corn by Country, 1988 to 1999 (calendar year)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Mexico	9,422	3,968	36,865	48,567	24,105	3,200	484,661	195,056	253,670	100,152	599,807	1,019,609
Japan	28,609	33,912	19,200	51,869	65,257	50,448	17,451	35,993	31,090	49,886	34,823	84,049
South Korea	0	0	0	0	0	0	0	0	0	0	0	1,016
Philippines	0	0	0	0	0	0	0	0	0	26,391	34,950	0
Canada	0	0	0	0	0	0	4,623	0	0		30,963	4,166
Belgium	0	0	2,617	0	0	0	0	0	0	0	0	0
Italy	0	0	0	0	0	0	0	0	1,499	0	0	0
Netherlands	2,694	2,678	2,550	2,692	533	0	0	0	0	0	0	0
Colombia	9,538	0	0	0	13,793	27,942	38,762	24,995	9,500	21,590	3,962	132,588
Costa Rica	0	0	0	0	5,512	0	0	0	10,998	7,620	11,125	29,849
EL Salvador	0	0	0	24,359	0	0	38,941	0	15,570	26,721	9,906	27,457
Grenada	0	0	0	0	330	0	0	0	0	0	0	0
Guatemala	0	0	2,753	0	0	0	2,997	0	7,315	5,512	15,011	16,815
Honduras	0	0	0	14,453	0	9,600	6,782	2,743	2,896	36,932	10,998	0
Nicaragua	0	0	0	0	0		5,487	0	0	0	0	0
Venezuela	0	0	0	0	2,998	162,903	108,261	57,483	56,998	0	0	0
Cameroon	0	0	0	0	0	0	0	0	0	2,896	0	0
Cape Verde	0	0	0	0	0	0	0	0	5,004	7,329	3,861	0
Ghana	0	0	0	0	0	0	0	0	0	32,029		0
Kenya	0	0	0	0	117,430	43,132	0	0	0	83,668	124,384	0
Malawi	0	0	0	0	2,693	0	0	3,099	0	0	0	0
Mozambique	0	0	0	0	24,868	0	0	0	0	0	0	21,996
Namibia	0	0	0	0	0	29,034	0	0	0	0	0	0
Rwanda	0	0	0	0	0	10,796	0	0	0	0	0	0
South Africa	0	0	0	0	218,759	31,905	0	387,497	137,668	0	26,238	0
Tanzania	0	0	0	0	0	9,907	0	0	0	19,202	0	99,492
Zimbabwe	0	0	0	0	128,911	0	0	0	0	0	0	24,206
Total Metric Tons	50,263	40,558	63,985	141,940	605,189	378,867	707,965	706,866	532,208	419,928	906,028	1,461,243
Total Bushels ^a	1,978,747	1,596,682	2,518,952	5,587,874	23,824,994	14,915,182	27,871,065	27,827,800	20,951,889	16,531,666	35,668,381	57,526,006

Source: USDA

^aBushels conversion was done by multiplying metric tons by 2,204.6 to convert to pounds and then dividing by 56 to convert to a bushels basis.

Michael Boland
Assistant Professor
Department of Agricultural Economics

Kevin Dhuyvetter
Associate Professor
Department of Agricultural Economics

Maria Marshall
PhD Graduate Research Assistant
Department of Agricultural Economics

This research was funded by Kansas corn growers through the Kansas Corn Commission.

Brand names appearing in this publication are for product identification purposes only. No endorsement is intended, nor is criticism implied of similar products not mentioned.

Publications from Kansas State University are available on the World Wide Web at: <http://www.oznet.ksu.edu>

Contents of this publication may be freely reproduced for educational purposes. All other rights reserved. In each case, credit Michael Boland, Kevin Dhuyvetter, Maria Marshall, *Economic Issues with White Corn*, Kansas State University, November 2000.

Kansas State University Agricultural Experiment Station and Cooperative Extension Service

MF-2497

November 2000

It is the policy of Kansas State University Agricultural Experiment Station and Cooperative Extension Service that all persons shall have equal opportunity and access to its educational programs, services, activities, and materials without regard to race, color, religion, national origin, sex, age or disability. Kansas State University is an equal opportunity organization. Issued in furtherance of Cooperative Extension Work, Acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and United States Department of Agriculture Cooperating, Marc A. Johnson, Director.