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XINJIANG COTTON PRODUCTION AND ITS IMPACT TO CHINA'S COTTON MARKET

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Abstract

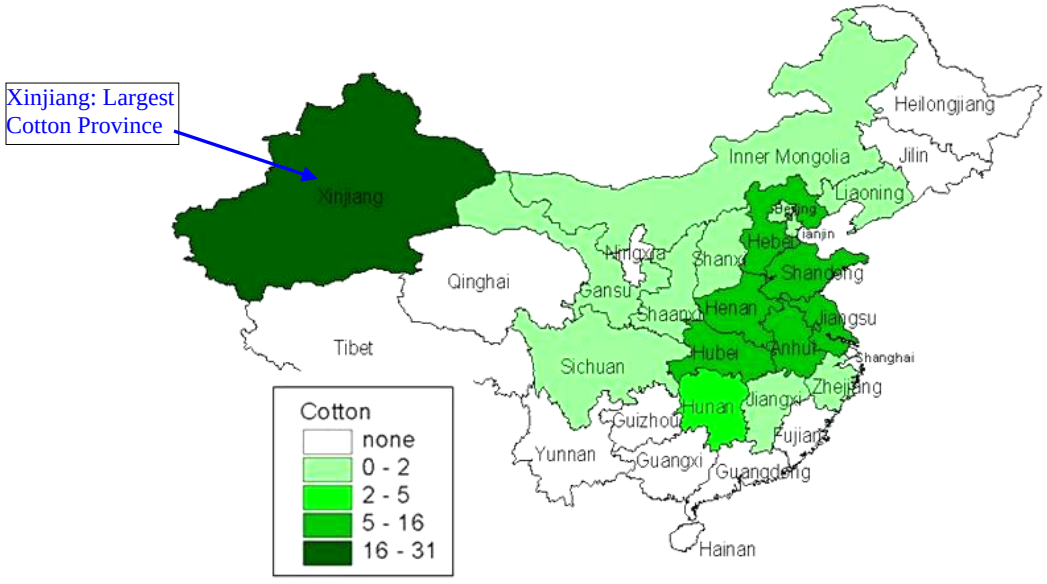
This study addresses the importance of Xinjiang cotton production to China and the international market, and to evaluate the comparative advantage of cotton production in Xinjiang by using Efficiency Advantage Index (EAI). It helps to understand the performance and shift of cotton production in China in the past decades.

Introduction

Xinjiang locates in the northwest of China. It is the largest province in China and has an area of 1,600,000 sq km (625,000 square miles), which is one-sixth of China's landmass and four times of the size of California. Xinjiang has a population of more than 16 million. The climate of Xinjiang has between 2,500 to 3,000 hours of sunshine each year. The average mean annual precipitation is a mere 150 milliliters (ml). Thus, humidity is quite low, which is suitable for the production of high quality agricultural products.

Xinjiang led the country in agricultural outputs. Its agricultural production has had 15 successive years of good harvests with total grain output reaching 7.06 million tons and over 34.59 million head of livestock in 2004. The output of staple crops increased significantly, with unprecedented figures recorded for the output of cotton and sugar beets.

The cotton industry is one of the most important industries to Xinjiang's economic development. Weather conditions and soil types of Xinjiang along with adequate water resources make it an appropriate region for cotton production. South Xinjiang is relatively more productive than north Xinjiang, thus south Xinjiang produces 50% more revenue than that of north Xinjiang. Overall, Xinjiang cotton production accounted for 32% of China's cotton total output in 2004 (Figures 1 and 2). Since 1994, the cotton yield, total output, quality and merchandise measures all ranked first in China. Cotton production improved the farm income, which raised the standard of living of rural area and resulted in economic development and social stability in the area. Taxes on revenue from cotton and related industries account for 1/6th of the total revenue in Xinjiang.



Sources: USDA/FAS/PECAD, May 2005

Figure 1. China Cotton Distribution (Percent of Total Production).

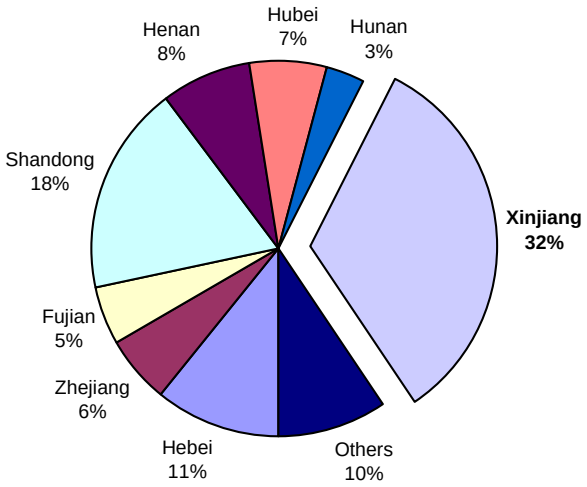


Figure 2. China Cotton Production Distribution in Different Provinces in 2004.

Extensive cultivation of cotton in Xinjiang began in the 1950s and now ranks first among China's provinces in production area and output of cotton, and has achieved a world-record yield of 7.3 bales per acre of cotton. The cotton grown in Xinjiang can match that from the Nile Valley in Egypt and the Mississippi Valley in the United States in many technical criteria including fiber length.

The History of Cotton Production in Xinjiang

China is the largest cotton producer and consumer in the world. Its production reached a record 28.7 million bales in 1984-85, and its highest consumption was 29.8 million bales in 1991-92. In 2003, China produced 22.7 million bales of cotton. Figure 3 shows China Cotton Production and Area from 1989 to 2003. Figure 4 indicates China Cotton Yield from 1995 to 2005. By comparison, U.S. produced 16.3 million bales of Upland and 674,000 bales of Pima in 1999.

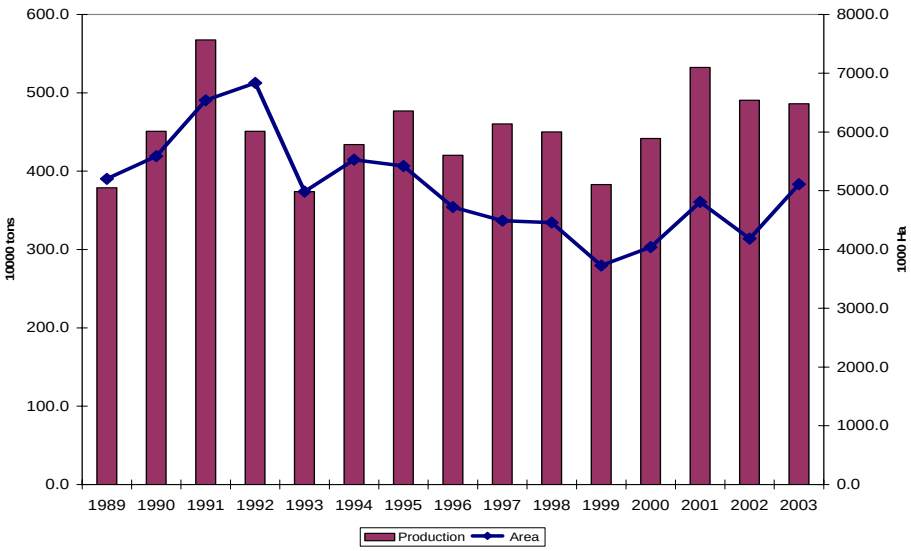
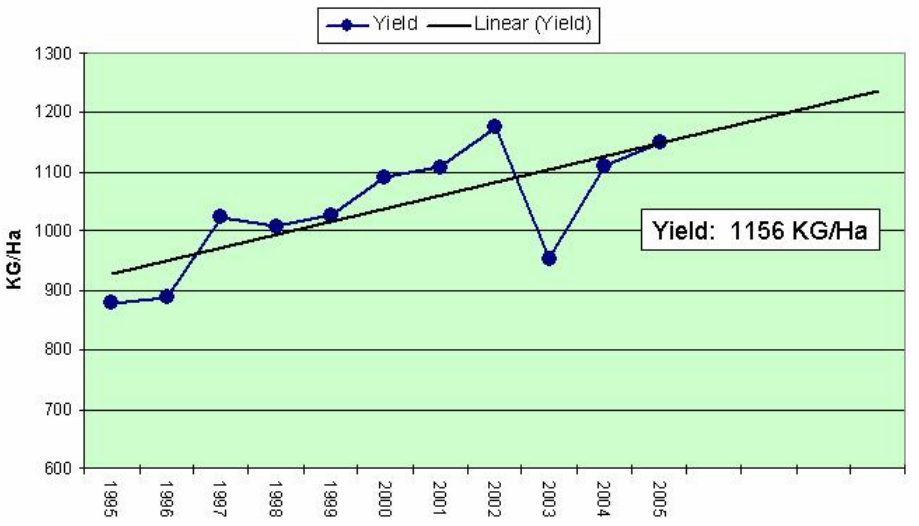


Figure 3. China Cotton Production and Area 1989-2003.



Sources: USDA/FAS/PECAD, May 2005

Figure 4. China Cotton Yield (1995-2005).

Xinjiang is situated in the northwestern part of China. The province, where the climate averages are about 80 degrees in the summer with large swings between daytime and nighttime temperatures, has 8.3 million acres under cultivation, of which cotton claims about 2.5 million acres. Production of cotton in Xinjiang reached 6.2 million bales in 2004, which was 17 times more than the output of 1980-81's. The average yield reached 2.5 bales per acre.

Government is still playing an important role in cotton market and deciding market prices. In recent years, provincial government set the procurement price at $.405 per pound, which was close to international market pries.

Rainfall in the province ranges from about 1.5 inches annually in the southern portion to about 6 inches annually in the north. So, the crop is entirely irrigated, some by sprinkler or drip, but mostly by furrow. Water supplies are from snow runoff through dams and reservoirs in the Tian Mountains. Annual water costs per acre are the equivalent of $15 U.S.

Xinjiang cotton production increased dramatically in the last two and a half decades. Cotton output increased 26.87 times from 1980 to 2003, an annual growth of 14.7% (Figure 5). At the same time period, cotton planted acres increased 4.84 times, while cotton yield increased 3.74 times (Figure 6).

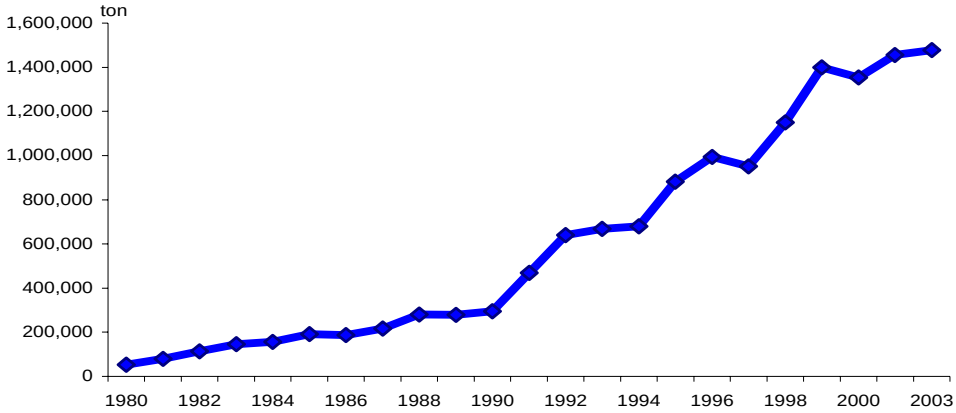


Figure 5. Cotton Harvested Amount in Xinjiang, China, 1980-2003.

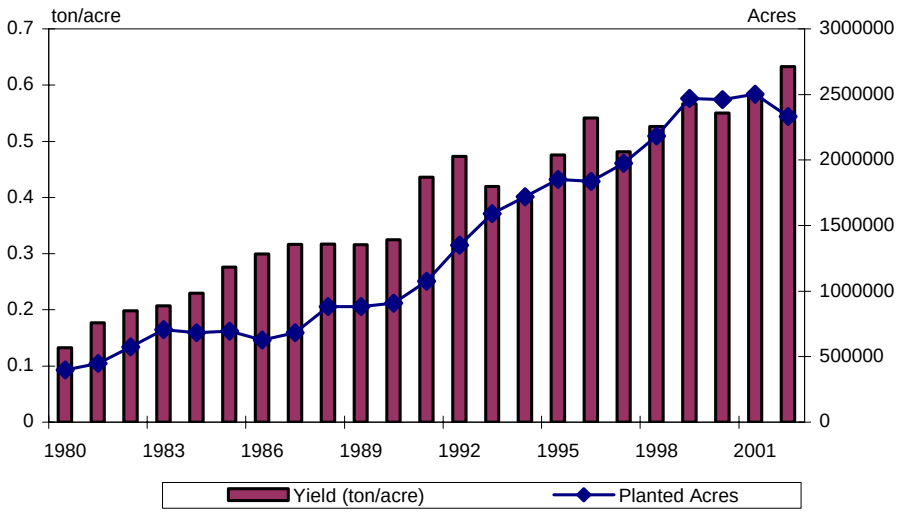


Figure 6. Xinjiang Cotton Yield and Planted Acres, 1980-2003.

The Comparative Advantage of Xinjing Cotton Production

Efficiency Advantage Index (EAI) is an indication of how efficiently a crop grows in one specific region. It is calculated by using the relative yield of one crop in one region related to the average yield of all crops in the same region to the yield of same crop in the nation related to the average yield of all crops in the nation. EAI can be expressed following:

$$EAI_{ij} = \frac{Y_{ij} / Y_i}{Y_{nj} / Y_n} \quad (1)$$

where, EAI_{ij} represents the Efficiency Advantage Index of the *j*th crop growing in the *i*th region; Y_{ij} is the yield of the *j*th crop in the *i*th region; Y_i represents the average yield of all crops in the *i*th region; Y_{nj} is the national average yield of the *j*th crop; and Y_n is the national average yield of all crops. If $EAI_{ij} > 1$, then the yield of the *j*th crop in the *i*th region, relative to all other crops' yield growing in the same region, is higher than that of the national average. It can be interpreted as in the *j*th region, there is a yield or an efficiency advantage in growing the *i*th crop. If $EAI_{ij} < 1$, then the yield of the *j*th crop in the *i*th region, relative to all other crops' yield growing in the same region, is lower than that of the national average. It can be interpreted as in the *j*th region, there is no yield or efficiency advantage in growing the *i*th crop. By assuming a competitive market structure and no significant barriers for technology diffusion and adoption in agricultural production in the country, the EAI_{ij} can be taken as an indicator of relative efficiency due to natural resource endowments and other local economic, social and cultural factors.

Based on the Xinjiang and China cotton and crop production history, EAI were calculated from 1996 to 2003 (Table 1). It can be seen that except 2002, the remaining seven years, Xinjing had an efficiency advantage comparing to cotton growing in other parts of the nation (Figure 7). The average EAI from 1996 to 2003 was 1.23, which means on the average, cotton production in Xinjing was 23% more efficiency compared to other parts of nation.

Table 1. Cotton Yield and Efficiency Advantage Index (EAI), Xinjiang, China, 1996-2003.

Year	Yield (kg/ha)	EAI
1996	1337	1.60
1997	1176	1.12
1998	1301	1.27
1999	1400	1.25
2000	1360	1.11
2001	1438	1.13
2002	1291	0.93
2003	1565	1.39
Average	1358.5	1.23

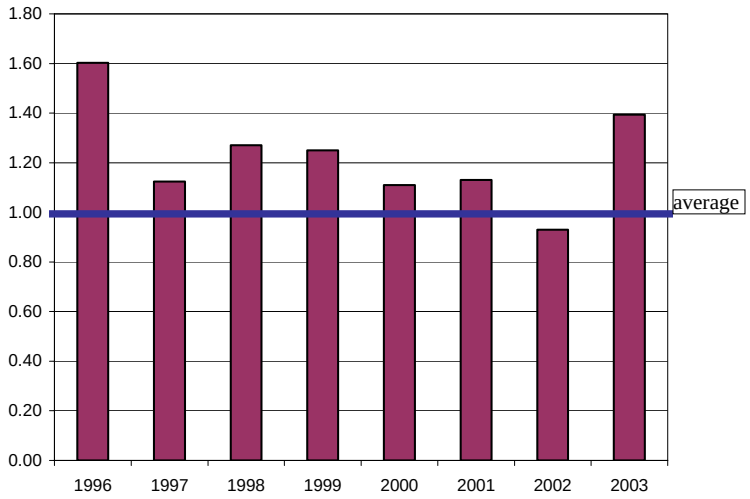


Figure 7. The Efficiency Advantage Index of the Xinjiang Cotton Production, 1996-2003.

Conclusions and Discussion

In the past 20 years, cotton production in Xinjiang increased dramatically, which makes it become the most important cotton production region in China. While Xinjiang keeps expanding its cotton production, its shortsighted agricultural policy makes some researchers worry about the future growth of the area's cotton production. For some years, policy makers in Xinjiang have pushed cotton production as the Xinjiang's motor of economy growth. But, agricultural experts warn that the ecology of Xinjiang is very fragile. Especially by using too much chemicals which results in short-term gains will cause soil fertility deterioration over the longer term and a gradual decline in economic marginal return for cotton.

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