Water Use and Economic Impact of the Cotton Industry in the Southern Ogallala Region

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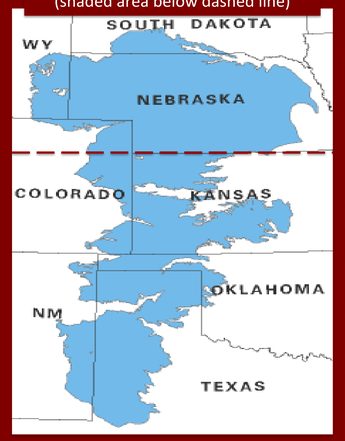
Introduction

Upland cotton is one of the four primary crops grown in the Southern Ogallala Region. In 2014, cotton constituted approximately 20 percent of all the planted crop acreage in this region and required less water than alternative grain crops.

The Southern Ogallala Region is defined in this study as the 97,000 square miles of the Ogallala Aquifer that stretches from the northern border of Kansas to just north of the Midland-Odessa area of Texas. As they plan for the future of the Ogallala Aquifer, local leaders are concerned about the demand for water by agricultural sectors.

Study Area
Southern Ogallala Region
(shaded area below dashed line)



Objectives

Evaluate the cotton industry in terms of:

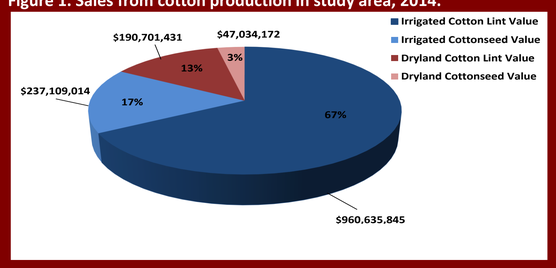
- Water use
- Contribution to regional economy

Cotton Production

In 2014, irrigated cotton production was approximately 1.4 billion pounds. Total cotton production (irrigated and dryland) was estimated at more than 1.6 billion pounds. Dryland cotton production was included in the analysis as it also contributes to the regional economy without affecting water use from the Ogallala Aquifer in the region.

The value of production was estimated to be $1.15 billion for cotton lint and $284 million for cottonseed. The resulting total value of cotton production was $1.4 billion.

Figure 1. Sales from cotton production in study area, 2014.



Methods

Irrigated cotton water use was estimated with information from the 2015 Texas Crop and Livestock Enterprise Budgets regarding yields and irrigation applied per acre. Average production per acre-inch of water applied was estimated by dividing cotton crop yield by irrigation applied. Total water applied was estimated by dividing the irrigated cotton production by the respective production per acre-inch.

A socio-economic model, IMPLAN (IMpact analysis for PLANning), was used to estimate the cotton industry's economic contribution to the Southern Ogallala Region as well as the ripple effects on sectors directly and indirectly related to the industry. The regional economic contribution of cotton was evaluated along with the industry's water use to get a value generated per acre-foot of water. This value is an important measurement as it will allow policymakers to make comparisons with alternative uses.

Table 1. Estimated water use for irrigated cotton production in the study area, 2014[a].

	Cotton (pounds)	Cottonseed (Tons)
Yield/Acre	1,250	0.9
Irrigation Applied (ac-in per acre)	12	12
Production/ac-in	104	0.075
Production	1,408,584,852	1,014,181
Total Water Applied (ac-ft)	1,126,868	

[a] Source: Texas A&M AgriLife Extension Service, 2015

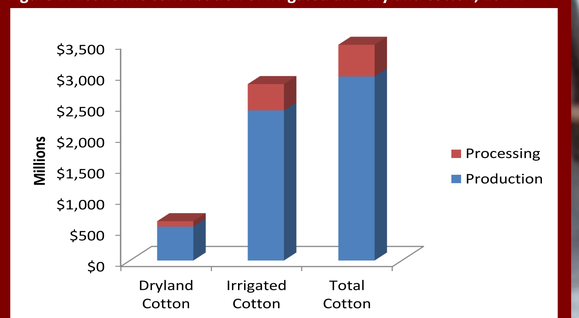
Table 2. Economic contribution of the cotton industry to the study area, 2014.

	Direct	Indirect	Induced	Total
	Cotton Production			
Output	$1,435,480,462	$1,216,612,040	$310,350,857	$2,962,443,359
Value Added	$362,610,714	$545,359,869	$179,758,580	$1,087,729,163
Employment	10,919	11,479	2,679	25,077
	Cotton Processing			
Output	$336,427,261	$141,617,287	$32,567,000	$510,611,548
Value Added	$100,162,786	$49,834,174	$18,579,300	$168,576,260
Employment	1,227	674	312	2,213
	Total Cotton Industry			
Output	$1,771,907,723	$1,358,229,327	$342,917,857	$3,473,054,907
Value Added	$462,773,500	$595,194,043	$198,337,880	$1,256,305,423
Employment	12,146	12,153	2,991	27,290

Results

The cotton industry, including production and processing sectors, generated an estimated $3.4 billion in annual economic output and supported 27,290 jobs in the region during 2014. The regional economic impact of irrigated cotton is $2.4 billion of the total $2.9 billion for cotton production. Irrigated cotton generated **$2,144 per acre-foot** of water when considering only the economic impacts of production, or **$2,528 per acre-foot** of water use with both the production and forward-linked processing sectors included.

Figure 2. Economic contribution of irrigated and dryland cotton, 2014.



Discussion

- ✓ Irrigated cotton acreage will fluctuate with cotton prices and weather conditions.
- ✓ Irrigated cotton acreage may increase as it uses less water than other irrigated crops.
- ✓ Dryland cotton may increase as the aquifer declines due to more conversion to dryland and the drought tolerant characteristics of the crop.

References

Texas A&M AgriLife Extension Service. *Texas Crop and Livestock Enterprise Budgets, Southern High Plains, Projected for 2015*. College Station, TX. http://agecoext.tamu.edu/budgets/. Accessed July 7, 2015.

IMPLAN Group, LLC. *IMPLAN System (data and software)*. 16740 Birkdale Commons Parkway, Suite 206, Huntersville, NC 28078.

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Ogallala Aquifer
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