Irrigation Impact and Trends in Kansas Agricultural[1]

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Abstract: Total irrigated acreage in Kansas remains at approximately 3 million acres, which is about 15 percent of total annual harvested cropland acres, based on year 2000 data. This acreage represents over 25 percent of the total value of Kansas crop production. However, regional analysis show the impact of irrigation is much more significant and in an example county, exceeded over 90 percent of the value of crop production.

Keywords: Kansas, irrigation trends

Introduction

Irrigated agricultural remains an important segment of the total Kansas economy, but even more important when irrigation impacts are viewed on smaller regional scales.

Kansas Irrigated Acreage, Crop Value System, Crops, and Water Use

Irrigated Acreage and Crop Value

The Kansas irrigated acreage base in 2000 was reported to be almost 3.2 million acres (Table 1, Figure 1) and produced over 25 percent of the total crop value produced of $2.8 billion (Table 2). Irrigated acreage percentage of crop value produced was similar to previous analysis, (Rogers, 2000). The total value of crop production was less in 2000 than previously.

Irrigation Systems

Center pivot irrigation systems increased their acreage dominance in the state and now represent over 80 percent of all irrigated acreage (Table 3, Figure 1). Subsurface Drip Irrigation (SDI) is the newest irrigation system option. While SDI acreage is increasing, SDI still represents less than one percent of all irrigated acres.

Irrigated Crops

Corn remains the most popular irrigated crop, representing 50 percent of all irrigated acreage (Figure 2). Wheat still remains the second most commonly irrigated crop, but its acreage trend continues downward. Alfalfa and soybean have been gaining acreage, while grain sorghum acreage has been decreasing. Alternative crops of cotton, sunflower and dry beans have been increasing in acreage but the number of irrigated acres is not reported separately from dryland production. However, total acreage of irrigated cotton, sunflower and dry bean are still relatively small.

Irrigation Water Use

The total volume of irrigation water reported pumped in 2000 was 3.86 million ac-ft (Table 1) and reflects the largest volume pumped in five years, and reverses a generally downward trend in applied application depth (Figure 3). Region 1 of Figure 2 represents the western third of Kansas, Region 2, the middle third, and Region 3 is eastern Kansas. Most of the irrigated acres are in western Kansas and concentrated in southwest Kansas.
The downward use trend is likely attributed to the continued conversion of irrigated lands from surface flood irrigation to center pivot irrigation and relatively favorable climatic conditions during the late 1990's. Data collected from the Garden City weather station at the Southwest Research and Extension Center shows that annual precipitation and July-August rainfall amounts were above normal during this period (Figure 4). 2000 annual

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precipitation was above normal but 2000 July-August rainfall was less than normal with high crop water use demand as reflected by the pan evaporation. Increases in pan evaporation reflect increases in temperature, solar radiation, and wind that also increase crop water use requirements. Weather data for 2001 and 2002 are also plotted and indicate that high irrigation water use demand is likely for those two years.

Regional Irrigation Impacts

Western Kansas: Irrigated Acres and Value of Production

The western region of Kansas, representing the western 4 or 5 tier of counties (31 of 105 Kansas counties) has 2.1 million irrigated acres or about two-thirds of all Kansas irrigated acres. Within the region, about one-third of all harvested cropland in 2000 was irrigated and produced 61 percent of the total crop value (Table 4).

Southwest Kansas: Irrigated Acres and Value of Production.

The southwest Kansas region represents a 14 county area. In 2000, about 48 percent of all harvested acres were irrigated and produced nearly 73 percent of the total crop production value (Table 5).

Haskell County: Irrigated Acres and Value of Production

Haskell county is the middle county of southwest Kansas and has the second largest irrigated acreage base in Kansas of 206,000 acres (Table 6). Irrigation was applied to 77.4 percent of all harvested acres in 2000 and 92 percent of all crop production value was produced on irrigated acreage.

Summary

Irrigated agriculture makes important contributions to the Kansas economy. These impacts become increasingly significant for heavily irrigated regions.

References

Division of Water Resources. Annual Reports. Kansas Irrigation Water Use. Kansas State Board of Agriculture, Division of Water Resources, Topeka, KS

Kansas Agricultural Statistics. Annual Report. Kansas Farm Facts. Kansas State Board of Agriculture. Topeka, KS.

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Table 1: 2000 Kansas Selected Crop Statistics

Total Cropland (Harvested) Acres*	Total Irrigated Acres +	Irrigation Water Use (AF)
21,656,900	3,183,983	3,885,805
Irrigation Percentage of Total Cropland	14.7 %	

+ 2000 DWR Kansas Irrigation Water Use Report

Table 2: 2000 Kansas Irrigated Crop Production

Crop	Production	Farm Value $	Cost
Alfalfa	1,222,400 Tn *	117,075,000	$95.77/tn
Wheat	22,724,000 bu	60,218,600	$2.65/bu
Grain Sorghum	9,785,000 bu	1,751,515	$1.79/bu
Corn	284,300,000 bu	568,680,000	$2.00/bu
Soybeans	17,150,000 bu	77,175,000	$4.50/bu
Total Farm Value		724,820,115	
Total Farm Value of all Kansas Crops		$2,871,398,000	
Irrigation Percentage of Total Farm Value		25.2 %	

* only includes the 3 western crop reporting districts from 2002 Kansas Farm Facts for alfalfa

Table 3: 2000 Kansas Irrigation System Acreage Estimates+

Surface Irrigation Acres	Center Pivot Acres	Other Sprinkler Acres	SDI Acres
549,946	2,592,244	29,276	12,500
%	%	%	%
17.3	81.4	0.9	0.4

+ 2000 DWR Kansas Irrigation Water Use Reports

Table 4: 2000 Western Kansas Crop Production Statistics for Wheat, Grain Sorghum, Corn, Soybeans, and Alfalfa*

	Irrigated		Dryland	
Crop	**1000's of Acres**	**Crop Value 1000's of $**	**1000's of Acres**	**Crop Value 1000's of $**
Wheat	**455**	**53,720**	**3,210**	**277,423**
Grain Sorghum	**71**	**11,806**	**925**	**82,170**
Corn	**1,215**	**435,700**	**517**	**48,990**
Soybeans	**134**	**25,848**	**25**	**2,165**
Alfalfa	**249**	**117,075**	**---**	**---**
Total	**2,124**	**644,149**	**4,677**	**410,748**
Total of Irrigated and Dryland	**1000's of Acres**	**Total Value 1000's of $**		
	6,801	**1,054,897**		
Irrigation Percentage	**31.2%**	**61.1%**		

* other crops not included are sunflower, cotton, and dry beans.

Table 5: 2000 Southwest Kansas Crop Production Statistics for Wheat, Grain Sorghum, Corn, Soybeans and Alfalfa*

	Irrigated		Dryland	
Crop	**1000's of Acres**	**Crop Value 1000's of $**	**1000's of Acres**	**Crop Value 1000's of $**
Wheat	**349**	**41,716**	**1,101**	**97,223**
Grain Sorghum	**48**	**7,991**	**475**	**39,527**
Corn	**829**	**308,620**	**65**	**5,600**
Soybeans	**82**	**16,907**	**55**	**770**
Alfalfa	**249**	**1,388**	**---**	**---**
Total	**1,557**	**376,622**	**1,696**	**143,120**
Total of Irrigated and Dryland	**1000's of Acres**	**Total Value 1000's of $**		
	3,253	**519,742**		
Irrigation Percentage	**47.9%**	**72.5%**		

* other crops not included are cotton, sunflower, and dry beans.

Table 6: 2000 Haskell County Crop Production Statistics for Wheat, Grain Sorghum, Corn, Soybeans, and Alfalfa *

	Irrigated		Dryland	
Crop	**1000's of Acres**	**Crop Value 1000's of $**	**1000's of Acres**	**Crop Value 1000's of $**
Wheat	**56**	**7,139**	**40**	**3,620**
Grain Sorghum	**4**	**532**	**15**	**1,570**
Corn	**125**	**51,322**	**4**	**430**
Soybeans	**16**	**3,312**	**0.4**	**56**
Alfalfa	**5**	**2,634**	**---**	**---**
Total	**206**	**64,939**	**60**	**5,676**
Total of Irrigated and Dryland	**1000's of Acres**	**Total Value 1000's of $**		
	266	**70,615**		
Irrigation Percentage	**77.4%**	**92.0%**		

* other crops not included are cotton, sunflowers, and dry beans

Figure 1. Irrigated Acres VS. Sprinkler and SDI Irrigated Acres in Kansas- 1970 to 2000

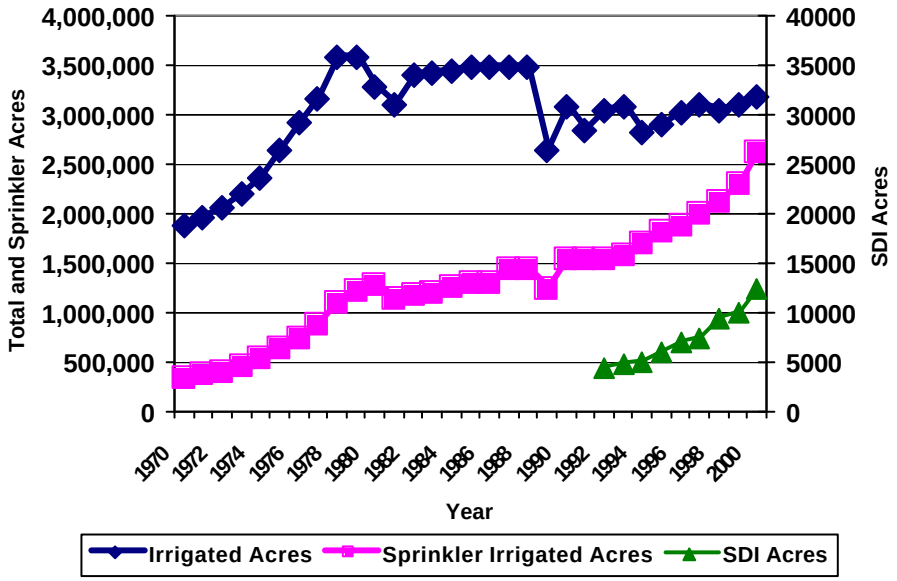

Figure 2. Major Kansas Irrigated Crop Acreage- 1974 to 2000

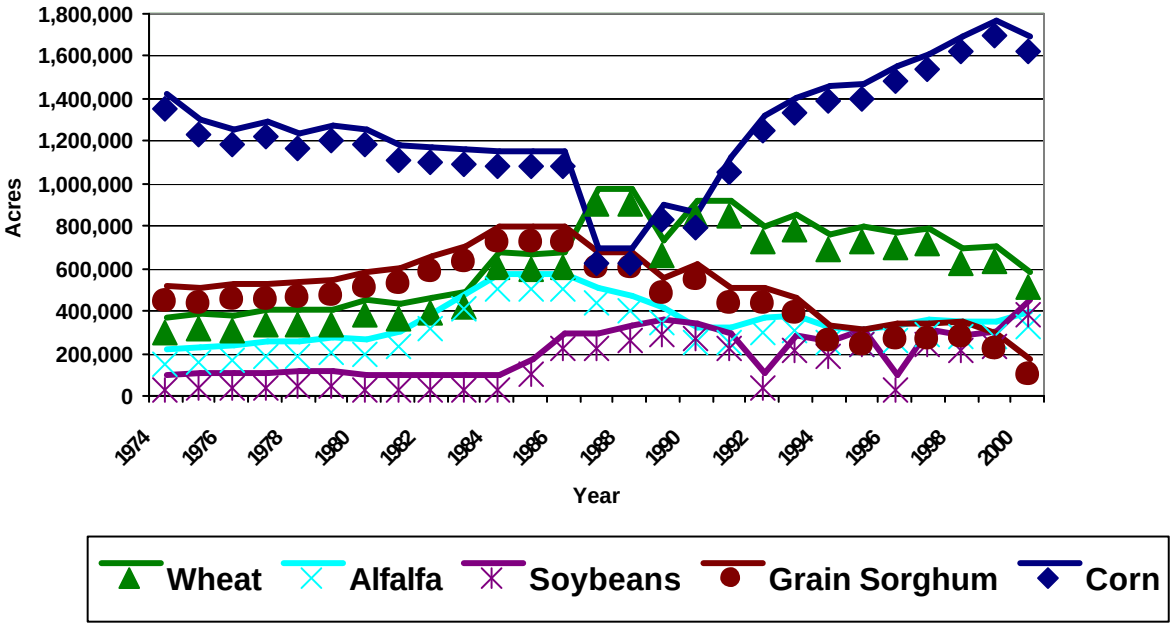

Figure 3. Acre-feet of Water Pumped per Acre by Region for the State of Kansas

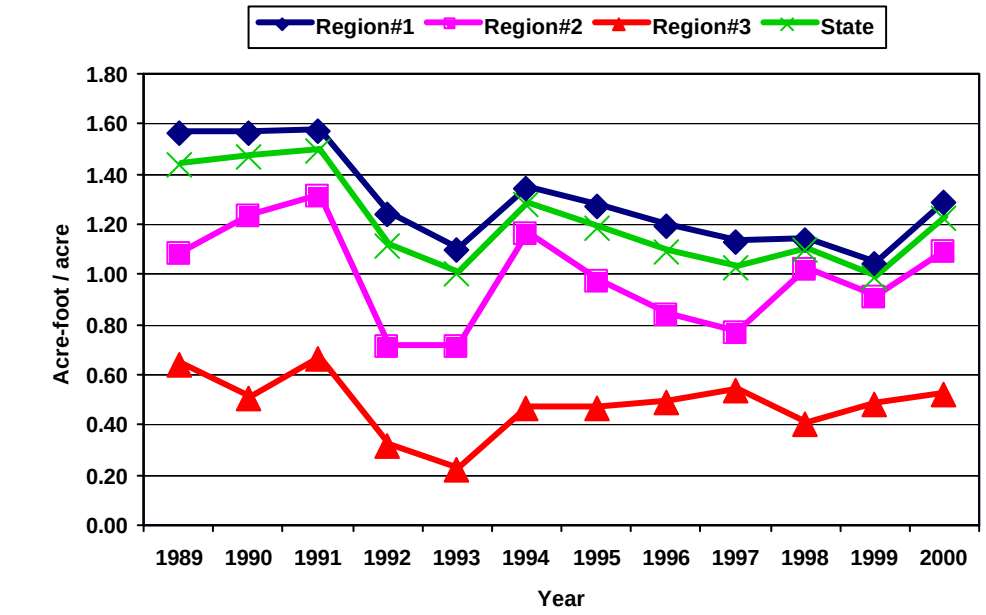

Figure 4. Irrigation, Evaporation, and Rainfall Totals for SW Kansas: July-August