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# **Economic Impacts of the 2011 Drought on the Southern High Plains**

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# Economic Impacts of the 2011 Drought on the Southern High Plains

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## Abstract

As droughts become more severe and frequent with changing climate, farmers of the Southern High Plains (SHP) of Texas may be forced to adopt new agricultural practices which will enable them to adapt to severe climate conditions. During 2011, scorching temperatures coupled with record low precipitation resulted in catastrophic drought conditions in the SHP. An analysis of the impact of the 2011 drought on producers in the TAWC demonstration sites has shown that producers made in-season crop management decisions to mitigate the effects of drought, which also impacted their 2012 crop mixes.

## Project Background

The Texas Alliance for Water Conservation (TAWC) has worked directly with producers in Hale and Floyd counties in the Southern High Plains of Texas since 2005. There are currently 29 demonstration sites covering 4,300 acres representing monoculture, multi-crop, and integrated crop-livestock systems that also incorporate the full spectrum of irrigation systems including Subsurface Drip Irrigation (SDI), Low Energy Precision Application (LEPA), Low and Mid Elevation Spray Application (LESA and MESA), and furrow, as well as dryland or non-irrigation practices. These field level demonstrations incorporate technologies, genetics, and management practices to conserve water from the Ogallala aquifer. Producers keep detailed records of their management plans, production decisions, and budgets. These budgets were analyzed in this study to determine the impacts of the 2011 drought.

## In-Season Management

Across the TAWC sites in 2011, 30% of the total system acres were abandoned or fallowed, primarily affecting 790 acres of cotton, 161 acres of corn, 62 acres of wheat, and 19 acres of grass seed production. The percentage lost by crop was 30%, 45%, and 69% for cotton, corn, and wheat, respectively. Corn yields per harvested acre were 121 bushels; 58% lower than the average of previous years. Cotton lint yield was 1,166 pounds per harvested acre, representing 90% of the previous six-year average. Thirteen out of the 29 sites collected a total of \$406 per acre in crop insurance due to reduced yields as a result of the drought.

### Irrigation Applied

Due to the intensity of the heat and lack of rainfall, the amount of irrigation applied to the primary crops in 2011 was 74% greater than the average of previous years. The previous six year average of precipitation was 20.5 inches. Total precipitation received across all TAWC sites in 2011 was 5.3 inches. Table 1 shows the annual and growing season precipitation received at the TAWC sites.

Table 1. Precipitation Received at TAWC Project Sites

Precipitation	2010	2011	2012	Mean
Annual	28.9	5.3	10.3	14.8
Growing Season	24.8	1.3	8.9	11.7



(Steffy, 2012)

Table 2 shows the comparison of applied irrigation for 2010, 2011 and the 7-year average for selected crops in the project.

Table 2. Irrigation Applied on TAWC Project Sites

Crop	Irrigation 2010	Irrigation 2011	Change 2010 to 2011	7-year average
Cotton	7.4	23.2	214	12.8
Corn Grain	12.8	27.1	112	18.8
Corn Silage	18.0	34.7	93	21.9
Wheat	2.6	11.3	335	6.5
Grain Sorghum	6.1	27.8	354	10.6

### Producer Profitability

The drought heavily impacted producer profitability from production. Indemnities from crop insurance were vital in maintaining producer's incomes during 2011. Seven cotton fields received insurance indemnities that averaged \$340 per acre. Average gross margin (cash income less cash expenses) over the 35 cotton fields in 2011 was \$428 per acre, which included crop insurance indemnities. This compares to \$531 per acre in 2010, and \$296 per acre for the 6 years 2005-2010. It should be noted that the higher gross margins for 2010 and 2011 compared to the 6 year average were due to higher cotton lint prices received in those years.

Corn profitability was more severely diminished by the drought. Average gross margins for the eight corn fields in 2011 was \$154 per acre, compared to \$473 per acre in 2010, and \$455 per acre for the 6 years (2005-2010). Of the eight corn fields in 2011, five received insurance indemnities that averaged \$422 per acre.

## Post-Drought

Producer reaction to the 2011 drought also manifested in changes in their 2012 crop choices. In 2012, producers planted 603 fewer acres of cotton than compared to 2011. Corn grain acreages remained the same, while corn silage acreage increased by 81. Planted wheat increased by 71 acres and grain sorghum increased by 228 acres.

Table 3. Crop Acreage Comparisons for 2011 and 2012

Crop	2011	2012
Cotton	2,571	1,968
Corn Grain	404	408
Corn Silage	297	378
Wheat	141	212
Grain Sorghum	18	246



(Taylor, 2012)

## Conclusions

- Producers are shifting from traditional cotton monoculture to multi-crop production systems due to extreme weather variability.
- Grain sorghum production increased significantly in response to the drought.

## References

- Steffy, L. 2012. "Texas Drought Takes its Toll on Cotton Planting." <http://blog.chron.com/lorensteffy/2012/02/texas-drought-takes-it-toll-on-cotton-planting/>
- TAWC. "Site Information." [http://www.depts.ttu.edu/tawc/site\\_info.html](http://www.depts.ttu.edu/tawc/site_info.html)
- Taylor, A. 2012. "The Drought of 2012." *The Atlantic*. <http://www.theatlantic.com/infocus/2012/08/the-drought-of-2012/100360/>
- Texas Water Development Board. 2013. "Groundwater Conservation Districts." <http://www.twdb.state.tx.us/mapping/maps.asp>

## Acknowledgements

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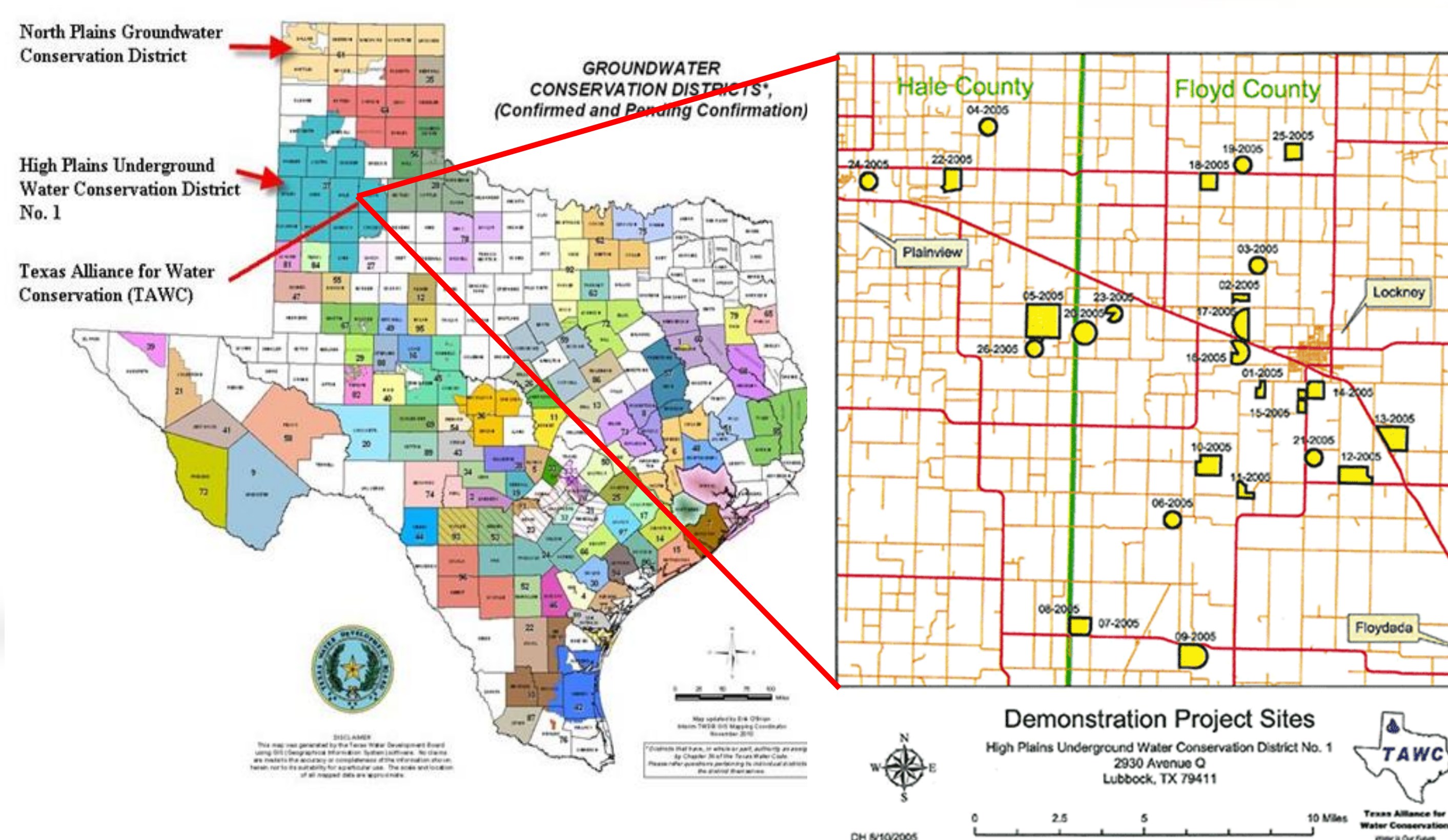


Figure 1. Groundwater Conservation Districts (TWDB, 2013)

Figure 2. TAWC Demonstration Sites (TAWC, 2013)