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## Agricultural Impacts of Texas's Driest Year on Record

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The year 2011 set two unwelcome records in Texas: the driest one year drought and the hottest year, as measured by 24 hour average temperature. The lack of rainfall eclipsed earlier marks set for dryness in 1956, the peak of the 1950s drought, long regarded as a watershed drought event in Texas, and 1918. The lack of rain was exacerbated by the extreme heat. Texas set a record for the contiguous United States for the hottest average 24 hour temperature.

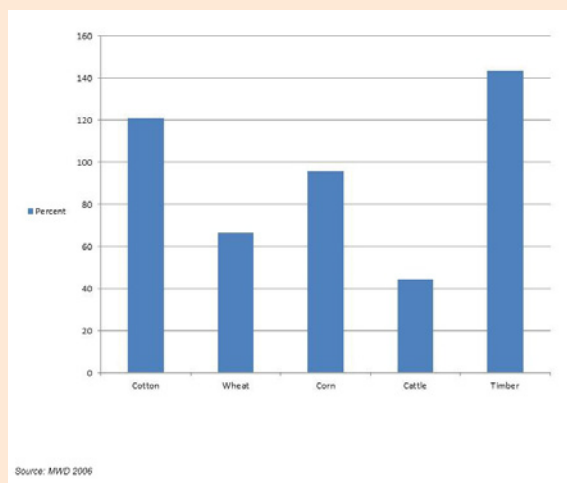
Extreme weather events, such as drought, floods, hurricanes, and other calamities, are news. Many in the general public are interested in these events and their implications. Beyond the general public, policy makers, businesses, news media, and others want to know the financial losses or impacts of the drought. Extreme weather events also provide an opportunity to educate the general public about agriculture and the business of agriculture and how it can affect their daily lives.

This article examines the estimated direct financial impact of the Texas drought on agriculture, some challenges in estimating these impacts, and a few lessons learned from the impacts of a number of droughts.

### 2011 Agricultural Losses

The 2011 direct financial losses for Texas crop and livestock agriculture are estimated to total \$7.62 billion. That is more than \$3.5 billion larger than the loss estimated for the 2006 drought, which was the previous costliest drought. The losses represented about 43% of the average value of Texas agricultural receipts over the last four years. Texas produces, on average, about \$16 billion in cash receipts annually, which equals close to 6% of the nation's

**Figure 1: 2011 Drought Loss As a Percent of Average Annual Cash Receipts from 2005-2009**



agricultural cash receipts. Drought losses are summarized in Figure 1 for some major agricultural products and discussed below by crop and livestock category.

### Cotton

In August 2011, the USDA projected a relatively low average cotton yield of 636 pounds per harvested acre, which they subsequently revised down to 557 pounds per acre by December. In Texas, cotton growers abandoned a historically high number of acres, equivalent to 55 percent of planted acres. Compared to five year average yields and abandonment, 2011 represented a huge loss in potential

production. Applied to USDA's measure of 7.1 million planted cotton acres in Texas, and valued at USDA's projected price of 91 cents per pound, this loss added up to \$2.2 billion. It is noteworthy that \$1.8 billion is the ten year average total value of cotton lint and cottonseed production in Texas. Therefore, Texas cotton growers lost more market income in 2011 than they would normally make for an entire cotton crop.

### Grains and Hay

The drought of 2011 lowered grain production in Texas to about half of normal levels and is estimated to have cost wheat, corn, and sorghum grain farmers in Texas over \$1.4 billion. Revised USDA acreage and yield estimates continually reduced the size of the crop as the season progressed.

#### Wheat

Texas wheat production in 2011 was 49.4 million bushels compared to a five-year average of 92.4 million, down 47%. Wheat yields were down from a five-year average of 30 bushels to 26 bushels per acre and acreage abandonment was up. The five-year average of wheat planted acres that are harvested for grain is 50%; only 36% of planted acres were harvested in 2011. That reduced the number of wheat acres for harvest by over a million compared to normal years. The combination of yield losses and reduction in harvested acres put the value of Texas wheat for grain losses at \$314 million.

#### Corn

As the drought progressed in severity through the year, corn acres and yield projections were revised lower. Texas corn production was an estimated 136.7 million bushels compared to a five-year average of 255.4 million, down 46%. Harvested acres were 23% lower than usual due to higher abandonment rates and yields were down 30% statewide.

The combination of yield losses and reduction in harvested acres put the value of lost Texas corn for grain at \$736 million.

#### Sorghum

Texas grain sorghum production was estimated at 56.4 million bushels compared to a five-year average of 119.5 million, down 60%. The 1.6 million acres planted in the Spring of 2011 was the fewest in Texas' history. Then the drought further lowered yields and raised abandonment rates. The combination of yield losses and reduction in harvested acres put Texas grain sorghum losses at \$385 million.

#### Hay

The value of hay production lost due to the drought was estimated to be \$750 million. The lack of rain throughout the year led to the lack of hay to harvest. Corn stalks, grain sorghum, and wheat stubble from either failed grain crops or post-harvest residue is often baled during drought years, and was commonly done in 2011. The quality of these feeds is often very low and its value is commensurate with its quality. Although, in years like 2011, even the lowest quality feeds are used along with other supplemental feeds.

#### Livestock

Livestock losses due to the 2011 drought were estimated to be \$3.23 billion. Losses include the increased cost of feeding livestock due to the lack of pastures and ranges and market losses. Market losses included the impact of fewer pounds sold per calf and the impact of relatively lower market prices due to the large number of cattle sold in a very short time period.

#### Timber

The historic drought took a severe toll on trees across the state. The commercial timber forested area of East Texas was among the hardest hit. An estimated \$558 million of standing

merchantable trees (diameter of 5 inches or larger) on forestland in East Texas have succumbed to the drought. The loss is roughly twice the stumpage value of annual timber harvest in Texas over the past three years. The drought also had a devastating impact on seedlings and saplings, which are normally more susceptible to severe drought of this scale. Economic loss to these premerchantable timber stands was estimated to be an additional \$111 million. Taking the impacts to merchantable and premerchantable trees into account, the direct economic loss of East Texas Forest from the recent drought was estimated to be around \$669 million measured in stumpage values (sale value of standing trees).

### Challenges in Estimating Economic Losses

A number of questions always arise when doing these estimates of economic loss including:

- Time period to include reflecting drought starting date.
- Crops and livestock to include.
- Baseline for comparison.
- Regional and state-wide impacts.
- Multiyear effects.
- Avoiding double counting.

For the 2011 drought, a start date of the Fall of 2010 was used due to the drought stunted winter wheat crop that struggled to become established and to develop. The estimated drought losses, then, included wheat yield losses, but also the lost value of grazing stocker cattle on wheat pasture over the winter.

Being a large state, with many crops, the discussion involves what crops and livestock to include. Because financial estimates of droughts had been made in the past, estimated costs for the current drought were made including the same crops and livestock. In doing so, the estimates did not include losses to crops such

as fruits and vegetables, peanuts, horticultural and nursery crops—all important crops in Texas. Urban forestry or urban losses were also not included. However, for the first time timber and forestry losses were included as a side report. The crops and livestock included represent about two-thirds of the agricultural cash receipts generated by Texas agriculture.

The size of Texas can result in more regionally located droughts. The drought of 2006 hit South Texas much harder than other parts of the state. But, the 2011 drought impact occurred state-wide.

Baselines for comparison must be defined. In many cases, average yields and prices over a number of years are used to provide a comparison base. Using multiple years allows avoidance of individual year's extraordinary events that can skew the results one way or another.

Care must be taken in estimating drought impacts in order to avoid double counting losses. It can be easy to count both the value of lost grazing and the effect of lost hay production, for example. Care must also be taken to clearly articulate what is included in estimates and what is not.

It is possible that one farmer's loss is another's gain. This is illustrated by the 2012 year drought affected commodity prices. Those with grain in storage benefit from the high prices while those whose crop has been destroyed by a drought might experience financial loss.

Even one-year droughts have multiyear impacts. It is common for the effects of drought in one year to result in lower conception rates and fewer calves born the next year. It can take years for pasture and range grasses to recover from drought resulting in continued reduced stocking rates for several years. Even through the severity of the 2011 drought, rice farmers receiving water from the Lower Colorado River Authority, which controls water

on the Colorado River (the Texas Colorado River), were able to continue to irrigate. But, the lack of rainfall lowered water levels in the reservoirs resulting in no water allocated for crop irrigation in 2012. The financial impacts of surviving a drought can persist for years on a ranch or farm's cash flow and balance sheet.

Analyses of droughts also require assessments of "downstream impacts." Assessments of losses at the farm gate, or direct economic impacts, can miss significant financial impacts. Examples include effects on the cotton gins that had no cotton to gin, truckers that did not have grain or bales to haul, and compresses, oil mills, and exporters that had reduced business.

### Some Lessons Learned Over the Years

Texas is a big state and experiences extreme weather events that necessitate understanding drought's impact on agriculture. Although this article was written before the 2012 crop year, the 2012 drought would provide a similar set of lessons. Given that 2011 was not a "first rodeo," a few important lessons have been gleaned over the years. A brief list of lessons learned includes:

- A transparent report that says what is and what is not included is important. However, it is very difficult to include everything.
- Keep everyone in the loop. The key is to communicate early that the drought impact estimates are being developed so that no one is caught off guard. Surprises are not often appreciated by those in authority. Although informing authority, publication to the public through a news release developed with Extension agricultural communications personnel has been the primary mode of delivery of information about the impacts of drought in Texas.

- The general public has an interest in this news and it is an opportunity to help educate people about agriculture, the drought impact on agriculture and work at the university.
- The results educate and inform decision makers who make decisions that have real effects on people. For example, these estimates are often used in petitions for disaster declarations, triggering policy responses to aid those impacted by drought.

### For More Information

Nielson-Gammon, J.W. (2011). *The 2011 Texas Drought*. A Briefing Packet for the Texas Legislature. The Office of the State Climatologist, Texas A&M University. October 31.

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