Estimated Regional Economic Impacts of the 2022 Drought in the

Texas Northern and Southern High Plains: Row Crop Agriculture

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Introduction

In 2022, there has been a severe drought in the Texas High Plains region. This drought has had a great impact on the agricultural sector of the economy in this region. The area of this drought is shown in Figure 1 below. Several crops suffered significant losses through the year. The main row crops in the Northern and Southern High Plains are cotton, wheat, sorghum, peanuts, and corn. Crop insurance is predicted to play a large role in the economy of the region this year because the drought has caused large losses in production. In this paper, we examine the economic impacts of the 2022 drought on the row crops in the Northern and Southern High Plains and estimate the economic benefits of crop insurance during this drought.
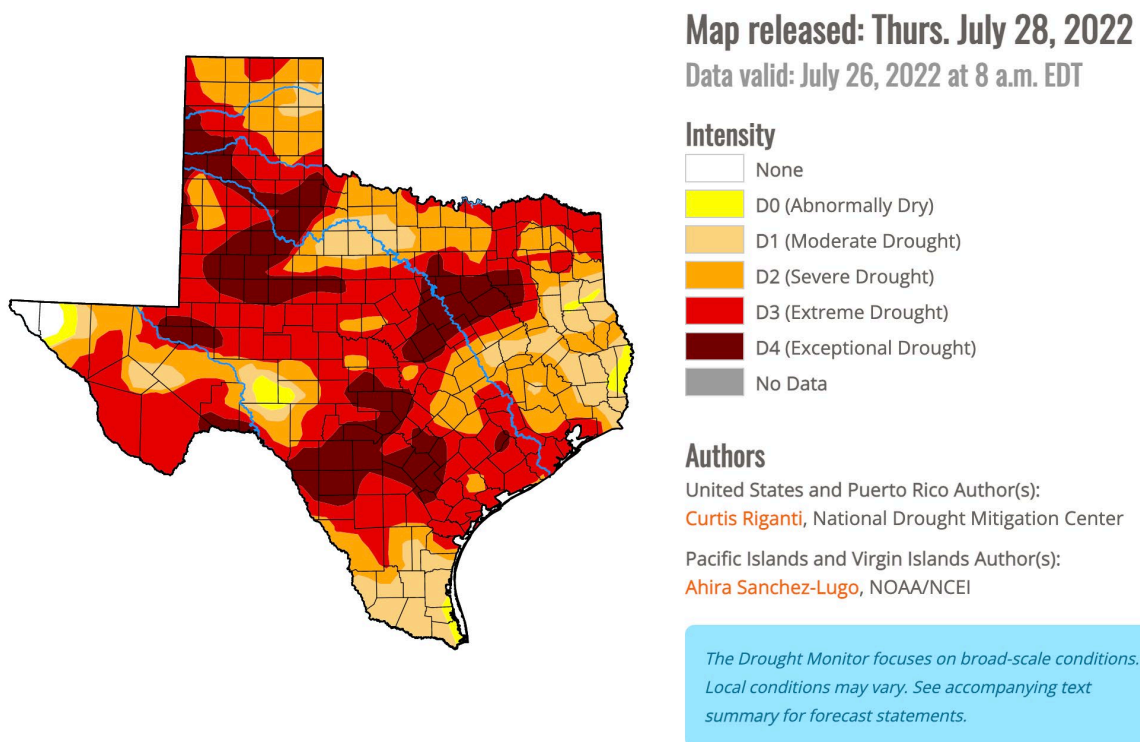

Figure 1. Texas Drought Monitor Map, July 28, 2022.

Methods

  The crops assessed in this paper are cotton, wheat, sorghum, peanuts, and corn. Data for the baseline numbers of these crops were obtained from the NASS database (3. Quickstats.nass.usda.gov, 2022) for the 1N and 1S crop reporting districts. For each crop, the average production was estimated over a 10-year period (from 2012 to 2021) and then multiplied by its respective 2022 insurance price to establish the potential revenue for each crop and region. The insurance prices were $9.19 for wheat, $5.88 for sorghum, $0.2399 for peanuts, and $5.90 for corn for the 2022 year. The production averages were 32,280,310 bu for wheat, 38,229,800 bu for sorghum, 364,093,333 lbs for peanuts, and 142,110,480 bu for corn, resulting in baseline production values of $296,656,049 for wheat, $224,791,224 for sorghum, $87,345,991 for peanuts, and $838,451,832 for corn.

  In the case of cotton, the value of cottonseed was also considered by multiplying the estimated amount of cotton lint produced by a factor of 1.276 of seed per pound of lint and the insurance price of cottonseed of $0.11 to estimate the baseline production value for cottonseed as $234,404,591. For cotton lint, the production was measured in 480 lbs bales each year and those total production values, in pounds, were averaged together over the same 10-year period as the other crops, resulting in an average production value of cotton lint to be $1,802,035,594. By adding both baseline cotton lint and cottonseed values resulted in a total average cotton baseline estimate of $2,036,440,185.

  The predicted loss as a result of the 2022 drought was 65% for cotton, 65% for wheat, 51% for sorghum, 50% for peanuts, and 30% for corn in the Northern and Southern High Plains region of Texas. Loss estimates were provided by Plains Cotton Growers, Texas Wheat Producers, National Sorghum Growers, Texas Peanut Producers Board, and Texas Corn

Growers. This region includes the counties of Andrews, Armstrong, Bailey, Briscoe, Carson, Castro, Cochran, Crosby, Dallam, Dawson, Deaf Smith, Floyd, Gaines, Glasscock, Gray, Hale, Hansford, Hartley, Hemphill, Hockley, Howard, Hutchinson, Lamb, Lipscomb, Lubbock, Lynn, Martin, Midland, Moore, Ochiltree, Oldham, Parmer, Potter, Randall, Roberts, Sherman, Swisher, Terry, and Yoakum shown in Figure 2 (2. Mapchart.net, 2022).
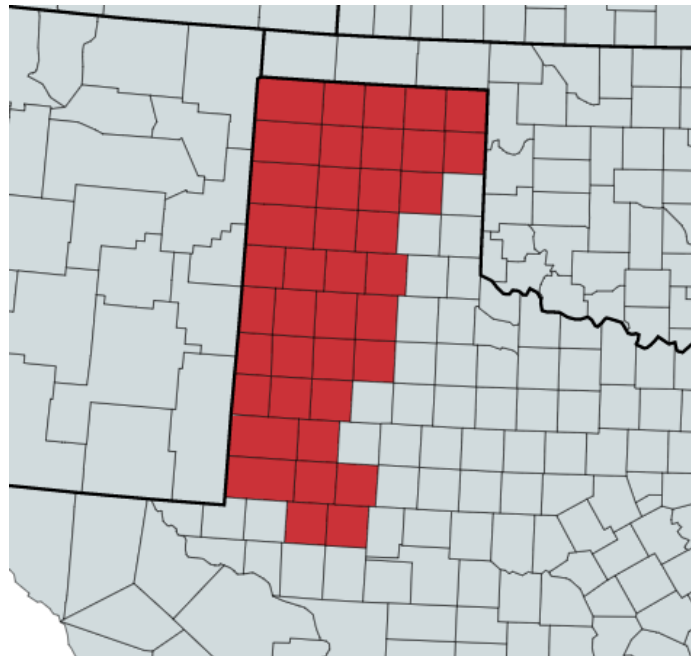

Figure 2. Study Area (Shaded Counties) of the Texas High Plains Corresponding to the Northern and Southern High Plains USDA-NASS Reporting Districts.

The economic impacts of both the baseline and loss scenarios were estimated using the IMPLAN economic impact estimation software (1. IMPLAN.com, 2022). Three scenarios were estimated: (1) baseline, (2) assumed crop losses without insurance, and (3) assumed crop losses with a capped loss at 65% with crop insurance. For example, the assumed regional loss of cotton was 65%, meaning the region was expected to produce only 35% of average. In scenario 2 above, economic losses were estimated assuming only 35% of average production was realized.

In scenario 3, we estimated economic losses using 65% of average production assuming crop insurance made up the difference in regional revenue. The difference between scenarios 2 and 3 is the regional economic benefit of crop insurance. All crops except corn suffered losses below the insurance threshold. It is important to note that individual producers may or may not have experienced losses. This is a regional average. The <u>level</u> of a 65% insurance coverage level is <u>arbitrary</u> but represents a reasonable approximation of the regional average coverage level.

Results

        Cotton crops had an estimated average loss of 65% due to the drought. Insurance covers up to 65% of the baseline crop production. As shown in Table 1, the 65% loss in cotton resulted in a total output of roughly $1.2 billion compared with the baseline of $3.3 billion. With the insurance, there was a total output of approximately $2.1 billion. The difference of approximately $1 billion is regional economic activity that is preserved through crop insurance. Cotton production in 2022 is estimated to account for about 17 thousand jobs in the region, about 8,000 of those were preserved as a result of crop insurance.

Table 1. Cotton: Resulting Total Output Effects on the Texas High Plains Economy Under Predicted Drought Loss Scenarios for the 2022 Crop Year

Output	Baseline	65% Loss	With Insurance	Difference
Direct	$2,036,440,185	$712,754,065	$1,323,686,120	$610,932,055
Indirect	$749,304,462	$262,256,562	$487,047,900	$224,791,338
Induced	$510,832,109	$178,791,238	$332,040,871	$153,249,633
Totals	$3,296,576,756	$1,153,801,864	$2,142,427,783	$988,625,919
Total Employment	26,353	9,224	17,130	7,906

Note: Columns may not sum to totals due to rounding.

Wheat crops had a predicted average loss of 65% due to the drought. As shown in Table 2, the 65% loss in wheat resulted in a total output of $119,701,923 compared to $0.6 billion in the baseline. With insurance, there was a total economic activity of about $371 million into the economy of the High Plains. The difference of approximately $0.25 billion was preserved as a result of crop insurance.

Table 2. Wheat: Resulting Total Output Effects on the Texas High Plains Economy Under Predicted Drought Loss Scenarios for the 2022 Crop Year

Output	Baseline	65% Loss	With Insurance	Difference
Direct	$296,656,049	$103,829,617	$192,826,432	$88,996,815
Indirect	$204,758,730	$71,665,555	$133,093,174	$61,427,619
Induced	$69,162,144	$24,206,750	$44,955,394	$20,748,644
Totals	$570,576,922	$119,701,923	$370,875,000	$251,173,077
Total Employment	2,835	992	1,843	851

Note: Columns may not sum to totals due to rounding.

Sorghum crops had a predicted average loss of 51%. As shown in Table 3, the 51% loss in sorghum resulted in a total output of roughly $213 million versus $432 million in the baseline. With insurance, there was a total economic output of roughly $281 million. The difference between the insurance output and the output from the loss of half the sorghum crop shows approximately $68 million preserved as a result of crop insurance.

Table 3. Sorghum: Resulting Total Output Effects on the Texas High Plains Economy Under Predicted Drought Loss Scenarios for the 2022 Crop Year

Output	Baseline	51% Loss	With Insurance	Difference
Direct	$224,791,224	$110,932,080	$146,114,296	$35,182,216
Indirect	$155,155,999	$76,567,836	$100,851,399	$24,283,563
Induced	$52,407,638	$25,862,613	$34,064,965	$8,202,352
Totals	$432,354,861	$213,362,529	$281,030,660	$67,668,131
Total Employment	2,149	1,060	1,397	337

Note: Columns may not sum to totals due to rounding.

Peanuts had a predicted loss of half of all peanut production. As shown in Table 4, the

50% loss in peanut resulted in a total output of roughly $68 million versus the $137 million in

the baseline. With insurance, there was a total output of roughly $89 million. This difference

shows an approximate $20.5 million of economic output preserves as a result of crop insurance.

Table 4. Peanut: Resulting Total Output Effects on the Texas High Plains Economy Under
Predicted Drought Loss Scenarios for the 2022 Crop Year

Output	Baseline	50% Loss	With Insurance	Difference
Direct	$87,345,991	$43,672,995	$56,774,894	$13,101,899
Indirect	$35,453,518	$17,726,759	$23,044,787	$5,318,028
Induced	$14,074,341	$7,037,170	$9,148,322	$2,111,152
Totals	$136,873,849	$68,436,925	$88,968,002	$20,531,077
Total Employment	1,706	853	1,109	256

Note: Columns may not sum to totals due to rounding.

Corn had a predicted average loss of 30% due to the drought. Insurance does not cover a

30% loss of a crop and so there is no insurance effect for corn. As shown in Table 5, the 30%

loss in corn resulted in a total output of roughly $1.1 billion compared to the $1.6 billion

baseline.

Table 5. Corn: Resulting Total Output Effects on the Texas High Plains Economy Under
Predicted Drought Loss Scenarios for the 2022 Crop Year

Output	Baseline	30% Loss	With Insurance	Difference
Direct	$838,451,832	$586,916,282	$586,916,282	$0
Indirect	$578,718,461	$405,102,923	$405,102,923	$0
Induced	$195,475,961	$136,833,173	$136,833,173	$0
Totals	$1,612,646,254	$1,128,852,378	$1,128,852,378	$0
Total Employment	8,014	5,610	5,610	0

Note: Columns may not sum to totals due to rounding.

Conclusions

Although the 2022 drought had a considerably large impact on the region a significant part of the region's economic outputs were preserved as a result of crop insurance. Shown in Table 6, the loss resulted in a total output of $2.7 billion compared to the $6 billion baseline. With crop insurance, there was a total estimated output of roughly $4 billion. Therefore, insurance preserved roughly $1.3 billion of economic activity in the High Plains as shown through the difference between the loss and the output with insurance.

Table 6. Resulting Total Output Effects on the Texas High Plains Economy Under Predicted Drought Loss Scenarios for the 2022 Crop Year

Output	Baseline	Loss	With Insurance	Difference
Direct	$3,483,685,281	$1,558,105,039	$2,306,318,024	$748,212,985
Indirect	$1,723,391,170	$833,319,635	$1,149,140,183	$315,820,548
Induced	$841,952,193	$372,730,944	$557,042,725	$184,311,781
Totals	$6,049,028,642	$2,684,155,619	$4,012,153,823	$1,327,998,204
Total Employment	41,057	17,739	27,089	9,350

Note: Columns may not sum to totals due to rounding.

Citations

1. IMPLAN® model, using inputs provided by the user and IMPLAN Group LLC, IMPLAN System (data and software), 16905 Northcross Dr., Suite 120, Huntersville, NC 28078 www.IMPLAN.com

2. *United States - counties: Create a custom map.* MapChart. (n.d.). Retrieved March 15, 2022, from https://www.mapchart.net/usa-counties.html

3. *USDA/Nass QuickStats AD-hoc query tool*. USDA/NASS QuickStats Ad-hoc Query Tool. (n.d.). Retrieved 2022, from https://quickstats.nass.usda.gov/

4. Figure 1: https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?TX, collected August 3, 2022.