

Agriculture in Graham and Greenlee Counties: *An Economic Contribution Study*

Ashley K. Bickel, Dari Duval, George Frisvold

Department of Agricultural & Resource Economics, University of Arizona Cooperative Extension

December 2020

What is the Issue? Graham and Greenlee counties, in eastern Arizona, are largely rural counties with agricultural industries that include crop production along the Gila River and livestock grazing throughout the region's remote and rugged public lands. The significance of agriculture in these counties' economies is not limited to *on-farm production*. By purchasing inputs such as seed, fertilizer, feed crops, banking services, and hiring labor, a "ripple" of economic activity is created in other industries providing those goods and services. Additionally, households that derive income from agriculture contribute to the local economy by purchasing household goods and services. Economists call these *indirect and induced multiplier effects*.

This study provides a *summary of current agricultural production* in Graham and Greenlee counties in 2017, and

conducts *economic contribution analyses* for each county to characterize and quantify economic activity attributable to agriculture. These economic contributions include the direct contributions of agriculture, such as sales of crops and livestock products and employment in agricultural industries, as well as the contributions supported through indirect and induced multiplier effects.

Finally, considering that availability of irrigation water is critical for crop production in this region, the study estimates reductions in crop acreage, on-farm sales, and *economics impacts due to hypothetical reductions in irrigation water supplies* for the Graham and Greenlee county economies.

What Did the Study Find?

Agriculture in Graham & Greenlee Counties

Graham County...

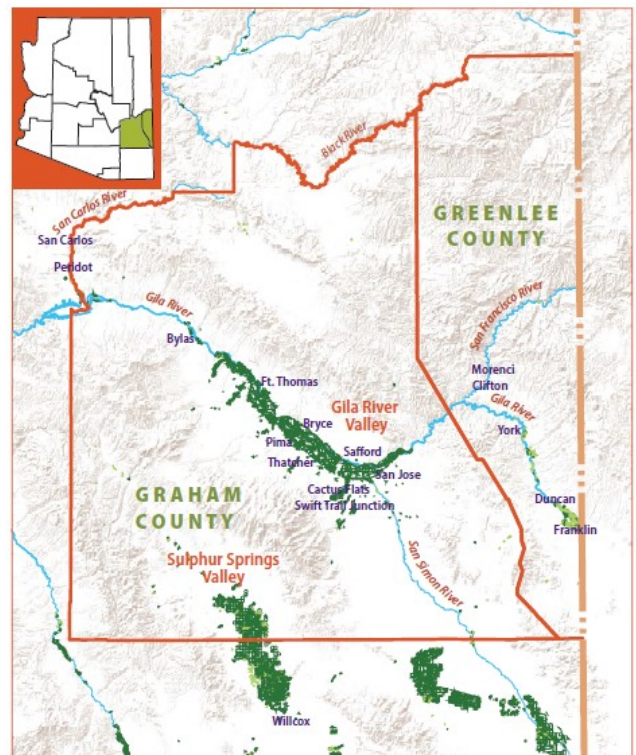
- Is a crop-dominant county by value of sales, with 88% of county agricultural cash receipts in 2017 from crop sales and 12% from livestock
- Had 448 farms in 2017, covering 43,056 acres of harvested cropland (98% irrigated) and 1,183,759 acres of pastureland (<1% irrigated)
- Generated \$62.1 million in agricultural sales in 2017
- Top commodities by sales: cotton & cottonseed (\$28.5 million); grains, oilseeds, dry beans, & dry peas (\$14.2 million); cattle & calves (\$6.8 million); nursery, greenhouse, floriculture, & sod (sales not disclosed), fruits, tree nuts, & berries (sales not disclosed)
- Encompasses part of the San Carlos Apache Reservation, with 198 total farms, most of which are beef cattle producers

Greenlee County...

- Is a livestock-dominant county by value of sales, with 75% of county agricultural cash receipts from livestock and 25% from crops in 2017
- Had 123 farms in 2017, covering 3,279 acres of cropland (100% irrigated) and 59,714 acres of pastureland (3% irrigated)
- Generated \$8.7 million in agricultural sales in 2017
- Top commodities by sales: cattle & calves (sales not disclosed); other crops & hay (\$1.9 million)

Source: 2017 Census of Agriculture

Map of Graham & Greenlee Counties



Economic Contribution of On-Farm Agriculture

Graham County

Direct contributions of on-farm agriculture in 2017...

- \$66.2 million in sales
- \$15.0 million in gross regional product
- 1,067 full- & part-time jobs
- \$16.4 million in labor income

Greenlee County

- \$10.9 million in sales
- \$5.5 million in gross regional product
- 225 full- & part-time jobs
- \$3.8 million in labor income

Total contributions of on-farm agriculture in 2017, including multiplier effects...

- \$84.3 million in sales
- \$23.7 million in gross regional product
- \$20.6 million in labor income
- 1,192 full- & part-time jobs

- \$11.8 million in sales
- \$6.2 million in gross regional product
- \$4 million in labor income
- 230 full- & part-time jobs

Economic Impacts of Hypothetical 20% County Agricultural Water Supply Reduction

- The study considers a hypothetical 20% reduction of current irrigation water use in each county, assuming producers would respond by fallowing fields, resulting in reduced crop production
- While potential economic impacts of less crop production would primarily be concentrated in agricultural industries, other industries could be affected through multiplier effects. For example, if inputs and workers are typically sourced locally, a reduction in crop acreage results in decreased economic activity in other sectors of the economy.
- Fallowing scenarios, estimated sales reductions, and total economic impacts, including multiplier effects, are presented in the table to the right

Following Scenarios & Estimated Economic Impacts

Data & Fallowing Assumptions	Graham County	Greenlee County
Annual water supply reduction (AF)	27,436	2,550
Crop fallowed	Cotton	Alfalfa
AZ avg. water application rate (2018)	4.6 AF/acre	5.8 AF/acre
Estimated acreage fallowed	5,964	440
2017 acreage	26,179	2,396
Percentage of 2017 acreage fallowed	23%	18%
County yield (2017)	1,213 lb./acre	4.3 tons/acre
AZ avg. price (2017)	\$0.73/lb.	\$172/ton
Estimated sales reduction	\$5.3 million	\$323,000
Total economic impact, including multiplier effects		
Employment	-23	-1
Labor income	-\$951,200	-\$98,500
Value added	-\$1,105,500	-\$175,000
Sales (output)	-\$6,594,600	-\$348,500

How was the study conducted? Economic contributions were estimated using the IMPLAN 3.1 input-output data and software. The models were modified using data from the 2017 Census of Agriculture to more accurately reflect production practices and economic conditions in Graham and Greenlee counties in 2017. Contributions are reported by value of sales, value added, labor income, and the number of full- and part-time jobs supported. To examine potential regional economic effects of reduced crop production in Graham and Greenlee counties due to hypothetical reductions in irrigation water supplies, the study considers a 20% reduction in current irrigation water supplies for each county: 27,436 AF in Graham County and 2,550 AF in Greenlee County. Crop budgets, water application rates, yields, and price data were used to identify crops for fallowing and estimate reductions in acreage and sales. Reductions in crop sales were modeled in IMPLAN to estimate resulting decreases in regional economic activity.