

POCKET FACTS 2023

Arkansas Agriculture Profile



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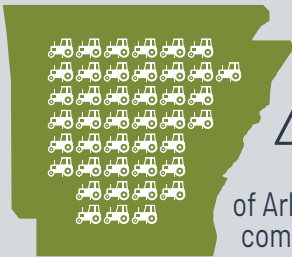
UofA **DIVISION OF AGRICULTURE**
RESEARCH & EXTENSION
University of Arkansas System

TABLE OF CONTENTS

QUICK FACTS	3
AHEAD OF THE CURVE	6
ARKANSAS COUNTS ON AGRICULTURE	8
Commodity Production and Value, 2022	10
Five-Year Production Highs, 2018-2022	11
Census of Agriculture Highlights	12
ARKANSAS AGRICULTURE SNAPSHOT	14
ECONOMIC CONTRIBUTION OF AGRICULTURE	18
Total Contribution	22
Value Added Contributions	23
Employment Contributions	24
Labor Income Contributions	25
PROMOTING AGRICULTURAL & RURAL SUSTAINABILITY	
Rice Research & Outreach Bolster Industry	26
Agriculture's Contribution Across the U.S.	36
ARKANSAS IS OUR CAMPUS	38
SOURCES	39

QUICK FACTS

Arkansas Agriculture contributed **13.9% of the state value added** WHICH IS APPROXIMATELY **\$20.9 Billion in value added^a.**



In 2022
42%
of Arkansas land was
comprised of farms.

41,900 Farms on 14.0 million acres
with an average farm size of 324 acres.

57% of the state is comprised of forests.

 = 1,000 FARMS

Source: IMPLAN, 2023; USCB, 2010; USDA NASS, 2023a; USDA FS, 2023
^aValue added includes labor income, plus indirect taxes and other property-type income generated by agricultural production, processing, and ag-related activities. Value added directly by food retail activities are excluded. Government payments are included.

QUICK FACTS

In 2022, Arkansas **average farm real estate value was \$3,550 per acre.**

- Total farm real estate value: \$49.7 billion
- Average cropland value: \$3,110 per acre
 - irrigated cropland: \$3,600 per acre
 - non-irrigated: \$2,320 per acre
- Average pasture land value: \$2,850 per acre

Organic production in Arkansas grew significantly from 2012 to 2017. By 2017, the number of farms selling organically produced commodities had increased from 32 farms to 69. During this time, **sales of organic products increased by almost 3,000 percent**, from \$789,000 in 2012 to over \$24 million in 2017.



Source: USDA NASS, 2022; USDA NASS, 2019

In 2021, Arkansas' top commodities

in terms of cash farm receipts^a were:



\$3,971 Million



\$1,635 Million



\$1,332 Million



\$693 Million



\$652 Million



\$537 Million



\$524 Million



\$443 Million



\$409 Million^b

Source: USDA ERS, 2023a; AFRC, 2023

^aCash farm receipt values do not include government payments received by farmers.

^bTimber value is listed in terms of stumpage value paid to landowners for standing timber.

AHEAD OF THE CURVE

Arkansas consistently ranks in the
top one-third of the nation
for agricultural cash farm receipts.

In 2021, Arkansas ranked
14th in the Nation

WITH

\$10.4
BILLION^a

for total agricultural cash receipts.

- **No. 10 in animals and animal products**, valued at \$5.8 billion.
- **No. 17 in crops**, valued at \$4.5 billion.

Source: USDA ERS, 2023a

^aThis estimate represents only crop and animal production; the value of government payments and timber are excluded.

Arkansas is in the top 25 states in the production of the following agricultural commodities:
(2022 Production Year)^a

- **No. 1 in Rice**
- **No. 3 in Broilers**
- **No. 3 in Cotton (upland)**
- **No. 3 in Cottonseed**
- **No. 4 in Catfish (foodsize)**
- **No. 4 in Turkeys**
- **No. 7 in Peanuts**
- **No. 8 in Chicken Eggs**
- **No. 10 in Soybeans**
- **No. 11 in Beef Cows^b**
- **No. 15 in Corn for Grain**
- **No. 22 in Oats**
- **No. 23 in Cattle & Calves**
- **No. 23 in Honey**
- **No. 24 in Hogs & Pigs**

Note: Beginning in 2016, the USDA stopped reporting values for blueberries, grapes, peaches, pecans, tomatoes and watermelons for Arkansas. In 2020 reporting was also discontinued for sweet potatoes and grain sorghum. Therefore, annual rankings are no longer available for these crops.

Source: USDA NASS, 2023b.

^a Data for some states are unavailable due to nondisclosure, especially for livestock and livestock products commodities. As a result, these states are not included in the rankings, which may affect Arkansas' actual rank.

^b Beef cows is a Jan. 1, 2022, inventory comprised of "beef cows that have calved" and "beef cow replacement heifers 500 pounds and over."



ARKANSAS COUNTS ON

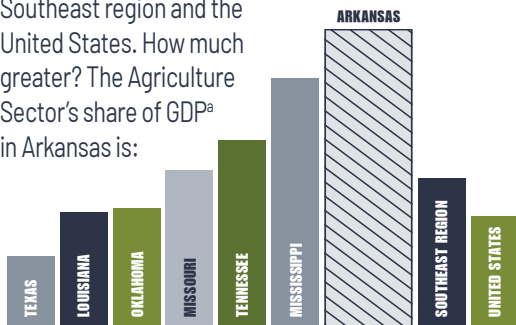
ARKANSAS' AGRICULTURAL SECTOR

is a vital and growing component of the state's economy.



AGRICULTURE

The Aggregate Agriculture Sector's share of the state economy is much greater for Arkansas than for any contiguous state and for the averages of the Southeast region and the United States. How much greater? The Agriculture Sector's share of GDP^a in Arkansas is:



The Agriculture Sector's Share of the State Economy

- 4.2 times greater than in Texas
- 2.6 times greater than in Louisiana
- 2.5 times greater than in Oklahoma
- 1.9 times greater than in Missouri
- 1.6 times greater than in Tennessee
- 1.2 times greater than in Mississippi
- 2.0 times greater than for the Southeast^b region
- 2.7 times greater than for the U.S. as a whole

Source: USDC BEA, 2022; English and Popp, 2022.

^aCalculations based on the percent contribution of the Agriculture Sector to state GDP in 2021. GDP by state represents the market value of goods and services produced by the labor and property located in a state. GDP does not factor in the impact of subsidies and/or taxes on products, which are captured in value added estimates.

^bThe Southeast is defined by BEA to include the states AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV, and is not the sum of Arkansas' contiguous states listed in the table.

Commodity Production and Value, 2022

Commodity	Acres Harvested	Production (thousands)	Value (thousands)
Broilers ^a	N/A	7,359,800 LBS	\$6,255,830
Soybeans	3,150,000	163,800 BU	\$2,358,720
Rice	1,084,000	80,340 CWT	\$1,373,814
Chicken Eggs ^a	N/A	4,151,100 EGGS	\$912,469
Corn for Grain	695,000	120,235 BU	\$799,563
Cotton (upland) ^b	630,000	1,570 BALES	\$500,390
Cattle & Calves	N/A	500,054 LBS	\$459,786
Timber	N/A	22,835 TONS	\$454,948
Turkeys ^a	N/A	556,400 LBS	\$593,679
Hay	1,093,000	2,188 TONS	\$291,676
Cottonseed ^b	N/A	495 TONS	\$188,595
Hogs & Pigs	N/A	96,095 LBS	\$71,926
Peanuts	32,000	166,400 LBS	\$41,766
Catfish (foodsize)	N/A	18,000 LBS	\$22,860
Wheat	150,000	7,950 BU	\$62,408
Honey	N/A	1,120 LBS	\$3,002
Oats	6,000	366 BU	\$1,647

Source: USDA NASS 2023b; AFRC, 2023

^aTotal Poultry Industry (Broilers, Turkeys, and Chicken Eggs): \$7,762M

^bTotal Cotton Industry (Upland Cotton and Cottonseed): \$689M



Five-Year Production Highs, 2018-2022

Commodity	Year	Production (thousands)
Beef Cows (inventory) ^a	2019	1,091 HEAD
Broilers	2021	7,464,200 LBS
Catfish (foodsize)	2019	18,600 LBS
Cattle & Calves	2018	528,300 LBS
Chicken Eggs	2021	4,256,800 EGGS
Corn for Grain	2021	152,720 BU
Cotton (upland)	2022	1,570 BALES
Cottonseed	2022	495 TONS
Grain Sorghum ^b	2018	770 BU
Hay	2019	2,760 TONS
Hogs & Pigs	2019	122,837 LBS
Honey	2018	1,400 LBS
Oats	2021	540 BU
Peanuts	2020	182,400 LBS
Rice	2020	108,107 CWT
Soybeans	2022	163,800 BU
Sweet Potatoes ^b	2018	1,056 CWT
Timber	2019	24,197 TONS
Turkeys	2020	595,200 LBS
Wheat	2021	8,410 BU

Note: Beginning in 2016, the USDA discontinued reporting for blueberries, grapes, peaches, pecans, tomatoes, and watermelons for Arkansas. Therefore, five-year production rankings are no longer available for these crops.

Source: USDA NASS 2023b; AFRC, 2023.

^aBeef cows is a Jan. 1, 2022 inventory comprised of “beef cows that have calved” and “beef cow replacement heifers 500 pounds and over.”

^bEstimates discontinued for Arkansas in 2020.

Release of the 2017 Census of Agriculture provides the opportunity to highlight additional crops where annual reporting is limited. The most recent Census indicates that Arkansas ranks in the top 25 states by value for the following 16 commodities.^a

Commodity	Value (thousands)	Rank
Baitfish	\$26,530	1
Sport or Game Fish	\$15,947	1
Greenhouse Fruits & Berries	\$245	3
Rabbits, Live	\$226	9
Other Aquaculture ^b	\$122	10
Mules, Burros, Donkeys	\$236	14
Other Livestock ^b	\$544	17
Meat Goats	\$1,921	18
Flower Seeds	\$15	19
Sod Harvested	\$15,918	20
Trout	\$2,717	20
Goats (All)	\$2,271	22
Other Floriculture & Bedding Crops	\$350	22
Other Food Fish ^b	\$10	22
Bulbs, Corms, Rhizomes & Tubers	\$57	25
Foliage Plants, Indoor	\$1,017	25

Additionally, the most recent Census of Agriculture indicates that Arkansas ranks in the top 25 states in acres harvested for the following 28 commodities.^a

Source: USDA, NASS, 2019

^aRankings were estimated from values disclosed in the 2017 Census of Agriculture.

Nondisclosure of values for some states may affect the ranking values shown in this table.

^bCommodities denoted as "other" refer to an aggregation of products not having a specific code on the census report within their respective categories.

Commodity	Acres Harvested	Rank
Sorghum for Syrup	43	4
Turnip Greens	734	4
Blackberries & Dewberries	501	6
Pecans	15,736	6
Fescue Seed	78	7
Green Southern Blackeyed Peas	284	11
Short Rotation Woody Crops	137	11
Okra	82	11
Figs	8	14
Watermelons	1,822	14
Hazelnuts	31	15
Mustard Greens	68	15
Tomatoes	952	15
Almonds	1	16
Other Non-Citrus Fruit ^b	26	16
Summer Squash	578	17
Forage	1,343,033	18
Other Nuts ^b	42	19
Persimmons	16	19
Collards	32	20
Grapes	956	21
English Walnuts	33	21
Squash, All	660	22
Peaches	669	23
Sorghum for Silage	1,021	23
Beans, Green Lima	6	24
Sweet Cherries	20	24
Blueberries	356	25

ARKANSAS AGRICULTURE

Arkansas' diverse portfolio of livestock products and crops supports the value of the Agriculture Sector year in and year out. In 2021, there were 42,000 farms in Arkansas (USDA NASS, 2023a). These farms generated a net farm income of \$2,828 million (USDA ERS, 2023b).

For 2021, Arkansas ranked 17th in total agricultural exports with a value of \$3.8 billion (USDA ERS, 2023c). Soybeans generated the highest export value for the state, bringing in \$911 million in 2021. That same year, Arkansas ranked in the top ten in the nation for exports of four commodities:

- **No. 1 in rice** (valued at \$790 million)
- **No. 3 in broilers** (valued at \$473 million)
- **No. 3 in cotton** (valued at \$462 million)
- **No. 4 in other poultry** (valued at \$203 million)



SNAPSHOT

In 2021 Arkansas ranked 35th in overall GDP at \$148.7 billion. However, when looking at the share of GDP generated by agriculture, forestry, fishing, and hunting, Arkansas ranked 8th overall in the nation (USDC BEA, 2022). In terms of agricultural cash farm receipts in 2021, Arkansas ranked 14th with a value of \$10.4 billion, contributing 2.4% to the U.S. total cash farm receipt value. Arkansas ranked 10th in total crop cash farm receipts at \$5.8 billion and 17th in total livestock cash receipts at \$4.5 billion (USDA ERS, 2023a).

In terms of value, Arkansas' top two commodities for 2021 were broilers and soybeans. Bringing in \$4.0 billion, broiler production represented 38.3% of all agricultural cash farm receipts in the state. At \$1.6 billion, soybeans contributed over 15.8% to total



ARKANSAS AGRICULTURE

Arkansas cash farm receipts in 2021. Rice also had a large contribution with 12.9% of total agricultural cash receipts (\$1.3 billion) for Arkansas.

On the national level, Arkansas continued to rank number 1 in rice and number 3 in broilers in the country, with cash receipts comprising almost 40.8% and 12.6%, respectively, of the U.S. total cash farm receipts for these commodities in 2021.

Arkansas' total cash farm receipt value increased 21.1% between 2020 and 2021.^a The animals and animal products sector grew 32.5% of its value, while the crops sector experienced an overall gain in value of 9.2% during this time.



^aPercentage comparisons between 2020 and 2021 values are based on real 2023 dollars. That is, our numbers are adjusted for inflation, which allows for a true “apples to apples” comparison.

SNAPSHOT

On the crop side, wheat saw the greatest gain with cash farm receipt value increasing 194.8% between 2020 and 2021. Oats, corn, hay, rice, cotton lint, peanuts, and cottonseed also showed increases in value, growing by 143.4%, 20.8%, 16.9%, 13.7%, 11.5%, 7.3%, and 5.1%, respectively. Soybeans showed no change.

On the animal production side, hog sales saw the greatest gain at 66.0%. This was followed by broilers (44.5%), chicken eggs (16.7%), cattle and calves (16.6%), catfish (3.8%), and turkeys (0.5%). All other animal sectors showed a decline in cash receipt value from 2020 to 2021. This includes: honey (-7.1%), farm chickens (-10.3%), wool (-10.3%), and mohair (-10.5%).



ECONOMIC CONTRIBUTION

The total economic contribution of the Aggregate Agriculture Sector includes three areas of wealth and job generation.

- **Direct Contributions** are generated by production and processing of crops, poultry, livestock and forest products.



- **Indirect Contributions** result when agricultural firms purchase materials and services from other Arkansas businesses – a very important part of the economy in many communities.



- **Induced Contributions** result when employees of agricultural firms and their suppliers spend a portion of their salaries and wages within Arkansas.



Government payments – payments made directly to some recipients in the farm sector – are included in the contribution analysis. Input providers (fertilizer, pesticide and equipment manufacturers) and retail locations (restaurants, grocery stores,

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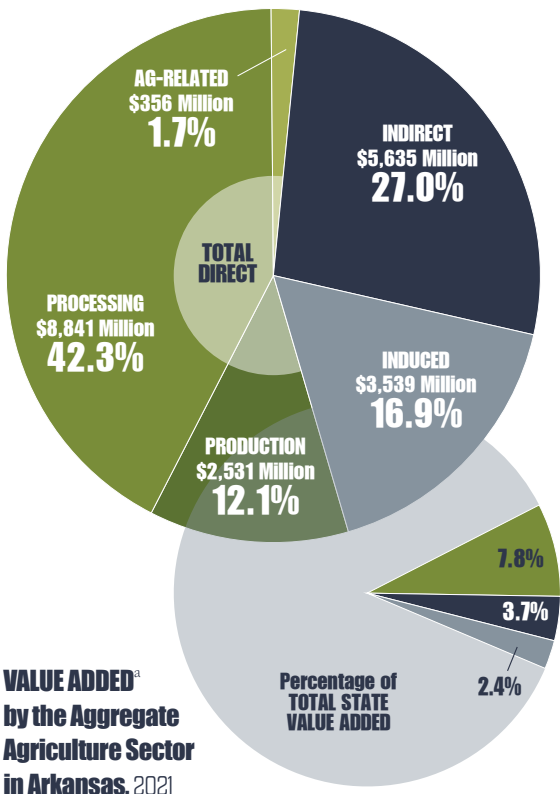
lawn and garden centers, etc.) are not considered part of the Aggregate Agriculture Sector, but some of the economic activity of these industries and other retail stores and input providers is picked up as indirect and induced effects and included in the total contribution.

These contributions are reported in terms of Jobs, Labor Income, and Value Added.

- **Jobs** include all wage and salary employees, as well as self-employed workers in a given sector.
- **Labor Income** consists of proprietary income – which includes all income received by self-employed individuals – and wages, which includes all payments to workers including benefits.
- **Value Added** includes Labor Income plus indirect taxes and other property-type income such as payments for rents, royalties and dividends. Value Added and Gross Domestic Product (GDP) are equivalent measures in theory but are estimated using different methods and data sources.



ECONOMIC CONTRIBUTION



Source: IMPLAN, 2023; English and Popp, 2023b. Note: Presented in 2021 \$'s.

^aValue added is the sum of employee compensation, proprietary income, other property type income and indirect business taxes. This includes contributions generated by agricultural production and processing, but excludes retail sales. Government payments are included

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**Agriculture contributes over
\$20.9 Billion in value added**

WHICH IS APPROXIMATELY

**1 in 7
every**

**VALUE
ADDED
DOLLARS**

and provides over 235,000 jobs

IN ARKANSAS

ECONOMIC CONTRIBUTION

Agriculture and associated agricultural activities are major contributors to the Arkansas economy. The total economic contribution of Arkansas' Aggregate Agriculture Sector includes all direct, indirect, and induced effects generated through agricultural production, processing, and agriculture-related activities within the state.

Total Contribution of Arkansas Agriculture, 2021

- **235,193 Jobs** — 1 out of 7 Arkansas jobs
- **\$10,069 Million in Wages** — 12.5% of the state total
- **\$11,206 Million in Labor Income** — 12.6% of the state total
- **\$20,902 Million in Value Added** — \$1 out of \$7 in Arkansas

Source: IMPLAN, 2023;
English and Popp, 2023.

Note: Previous publications include induced contributions from state and local government institutions.

We are no longer able to estimate these contributions, therefore induced values for 2021 appear lower than prior years.



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Value Added Contributions

Value Added By the Aggregate Agricultural Sector in AR, 2021			
Contribution Area	Value (Millions)	% of Total Contribution	% of State Total
Direct	\$11,728	56.1	7.8
Indirect	\$5,635	27.0	3.7
Induced	\$3,539	16.9	2.4
TOTAL	\$20,902	100.0	13.9

The far-reaching contributions of agriculture are seen in the distribution of Value Added^a throughout the economy.

Value Added Generated by Ag in Top Five NAICS Industries^b	
Industry	Value (Millions)
Manufacturing	\$8,948
Agriculture, Forestry, Fishing, and Hunting	\$2,887
Wholesale Trade	\$2,135
Real Estate Rental and Leasing	\$1,239
Transportation and Warehousing	\$967
Top Five Total	\$16,176
(77.4% of all Value Added generated by Agriculture)	

Source: IMPLAN, 2023; English and Popp, 2023.

^aValue added is the sum of employee compensation, proprietary income, other property type income and indirect business taxes. This includes contributions generated by agricultural production and processing, but excludes retail sales.

^bGroupings based on the U.S. Census Bureau's 2-digit North American Industry Classification System (NAICS) aggregation.

ECONOMIC CONTRIBUTION

Employment Contributions

Employment By the Aggregate Agricultural Sector in AR, 2021			
Contribution Area	Jobs	% of Total Contribution	% of State Total
Direct	148,882	63.3	9.1
Indirect	47,071	20.0	2.9
Induced	39,241	16.7	2.4
TOTAL	235,193	100.0	14.3

Arkansas' Aggregate Agriculture Sector generates employment in all 20 industries in the North American Industry Classification System (NAICS) used for economic analysis.

Jobs Generated by Ag in Top Five NAICS Industries^a	
Industry	Jobs
Manufacturing	81,082
Agriculture, Forestry, Fishing and Hunting	68,525
Transportation and Warehousing	10,985
Wholesale Trade	10,401
Health Care and Social Assistance	9,565
Top Five Total	180,558
(76.8% of all Jobs generated by agriculture)	

Source: IMPLAN, 2023; English and Popp, 2023.

^aGroupings based on the U.S. Census Bureau's 2-digit North American Industry Classification System (NAICS) aggregation.

OF AGRICULTURE

Labor Income Contributions

Labor Income By the Aggregate Agricultural Sector in AR, 2021			
Contribution Area	Value (Millions)	% of Total Contribution	% of State Total
Direct	\$6,194	55.3	7.0
Indirect	\$3,152	28.1	3.6
Induced	\$1,860	16.6	2.1
TOTAL	\$11,206	100.0	12.6

Value is further spread throughout the economy by the spending of labor income by individuals whose jobs are upheld by agriculture.

Labor Income Generated by Ag in Top Five NAICS Industries^a	
Industry	Value (Millions)
Manufacturing	\$4,772
Agriculture, Forestry, Fishing, and Hunting	\$1,475
Wholesale Trade	\$905
Transportation and Warehousing	\$732
Health Care and Social Assistance	\$597
Top Five Total	\$8,481
(75.7% of all Labor Income generated by Agriculture)	

Source: IMPLAN, 2023; English and Popp, 2023.

^aGroupings based on the U.S. Census Bureau's 2-digit North American Industry Classification System (NAICS) aggregation.

PROMOTING AGRICULTURAL

Rice Research & Outreach Bolster Industry

Arkansas has a long history with rice, beginning more than 200 years ago when the first Arkansas rice was grown at Arkansas Post in 1819. According to the Encyclopedia of Arkansas, farmers experimented with rice as a crop around 1840. However, being able to plant when dry and later maintain a flood for growth was difficult with the technology of the time. It wasn't until the early 20th century, with the efforts of William Fuller of Carlisle, that successful rice production methods were developed for the Arkansas Grand Prairie.

In 1926, ground was broken for the Rice Research and Extension Center in Stuttgart on land that had been in rice production since 1908. Operated by the Arkansas Agricultural Experiment Station of the University of Arkansas System Division of Agriculture, the center continues to refine production techniques and breed rice that suits the needs of Arkansas farmers.



& RURAL SUSTAINABILITY

During the late decades of the 20th century, rice production was expanding into the Arkansas River Valley, in addition to Arkansas' northeastern corner.



In 2017, the Division of Agriculture initiated a new rice research and extension center in Harrisburg to research production techniques for the area's unique climate and soil.

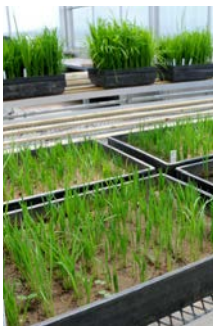
The Division of Agriculture is deeply involved in rice growing and milling, as well as industry economic analysis.

The long history of production and ideal growing conditions propelled Arkansas to the top spot nationally in rice production, with more than 1.4 million acres are harvested annually in over 40 counties. The value of Arkansas rice production in 2020 was nearly \$1.4 billion.

Breeding Program

The division's experiment station has a long history in rice breeding, releasing 53 public varieties since 1936. The program has released 16 new rice varieties in total since 2013. These varieties are bred to stand up to

PROMOTING AGRICULTURAL



CLM05 is a new medium-grain Clearfield® rice developed by the U of A System Division of Agriculture rice breeding program.

Arkansas' subtropical climate, diseases and insects, while providing grain that mills well and meets grower and buyer needs. From 1983 to 2016, the breeding program has contributed an estimated \$1.05 billion to rice grower revenues.

The breeding program includes short-, medium- and long-grain varieties. Taurus, a medium-grain variety released in 2022, has significantly outyielded other medium-grain varieties in testing.

In 2023, the experiment station released CLM05, a Clearfield® medium-grain rice cultivar that has averaged 192 bushels per acre in two statewide trials. For comparison, the state average yield in 2022 was 164.7 bushels per acre.

& RURAL SUSTAINABILITY

ARoma 22, the third and latest aromatic rice developed by the Arkansas Rice Breeding Program, offers increased aromatics and color consistency over its predecessor.



The experiment station's Rice Breeding Program also began working to meet a growing demand for aromatic, jasmine-style rice varieties in 2010. ARoma 22 is the latest aromatic rice variety from the program. Sensory tests conducted in February 2022 at the experiment station's Sensory Science Center found ARoma 22 to compare favorably to other jasmine-type varieties.

Boots on the Ground

Extension rice specialists are the boots on the ground, working in agronomy, weed science, soil fertility, entomology, plant pathology and irrigation.

Each season, extension specialists conduct applied research trials and demonstrations focused on finding the best answers to grower questions and laying the foundation for best management practices for rice production.

PROMOTING AGRICULTURAL



Specialists are responsible for generating production-oriented publications, including the Rice Production Handbook, Rice Management Guide, and others.

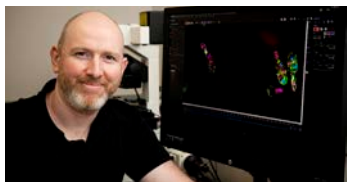
During the winter, specialists travel the state presenting research and information to growers and consultants, as well as participating in regional and national meetings to share information and gather new information from others.

Specialists field countless phone calls, text messages and emails from stakeholders looking for production recommendations and help with problems. Specialists travel miles throughout Arkansas' rice-producing regions, supporting growers, consultants and county agent programs.

Fighting Pests

Like any other crop, rice has disease, weed and insect foes. The Division of Agriculture continues to find better ways to manage these problems.

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Plant pathologist Martin Egan investigates the molecular mechanisms that make the fungal pathogen that causes rice blast.

In 2022, Martin Egan, assistant professor of plant pathology, was awarded \$943,941 as part of the National Science Foundation's Faculty Early Career Development Program to aid in research of the inner workings of *Magnaporthe oryzae*, the fungal pathogen that causes rice blast.

"Annual yield losses attributed to rice blast disease alone have been estimated to be large enough to feed an additional 60 million people for an entire year," Egan said. "There is a need to develop new strategies to control blast diseases. This demands a more complete mechanistic understanding of the pathogen's infection biology."

In 2023, Nick Bateman, associate professor and extension entomologist, and Christian De Guzman, assistant professor and rice breeder, were awarded \$547,842 as part of a four-year, \$10 million grant from the USDA's National Institute of Food and Agriculture.

PROMOTING AGRICULTURAL



(l-r) Division of Agriculture entomologist Nick Bateman and rice breeder Stan De Guzman have been awarded \$547,842 grant to improve the sustainability and profitability of rice farming.

Louisiana State University is the lead institution on the grant to improve the sustainability and profitability of rice farming through research innovations.

De Guzman will work to develop rice lines with heat stress tolerance using advanced genetic techniques. Bateman's role is to conduct a study that monitors the changes in insect pressure when moving from flooded rice to the alternate wetting and drying method for water savings.

Post-harvest

What happens to the grain once it leaves the fields has been the subject of the Arkansas Rice Processing Program, which has been conducting research on milling and other topics since it was founded by the late Terry Siebenmorgen in 1994.

The Arkansas Agricultural Experiment Station's Rice Processing Program released new recommendations

& RURAL SUSTAINABILITY

in 2022 to guide on-farm, in-bin rice drying in Arkansas to maximize quality and energy savings.

Griffiths Atungulu, director of the Rice Processing Program and associate professor of grain processing and post-harvest system engineering, said the new guidelines are intended to balance rice quality, energy use and weather considerations.

“The real problem is that the weather may not allow complete drying of the rice, particularly the upper layers, in a timely manner,” said Atungulu. “When this happens, there is a great possibility for mold growth in the grain mass, with potential mycotoxin development and quality deterioration including staining, milling yield reduction, and sensory and functional problems.”



Arkansas rice farmers are adopting technologies that allow more efficient drying of rice on the farm.

PROMOTING AGRICULTURAL

Using data compiled over nearly a decade, Atungulu's team created an easy-to-read chart that offers guidelines for "suitable" and "unsuitable" drying operation ranges for Arkansas rice farmers during the harvesting months of August to October. Armed with this decision tool, producers will be in a better position to evaluate their rice drying needs, Atungulu said.

Division of Agriculture economists are also concerned with what happens to rice after harvest. Economists model rice production and consumption throughout the world to develop the annual International Rice Baseline Report. This information on the global rice market makes its way into a comprehensive report produced by the Office of the Chief Economist for the USDA, which goes on to help facilitate Farm Bill planning.

Baseline reports help set the guardrails for budgeting the Farm Bill. Alvaro Durand-Morat, assistant professor of agricultural economics and agribusiness for the experiment station, is responsible for the report, which is a 10-year outlook on global rice production and consumption.

Out of This World

One of the more out-of-this world aspects of rice research has come from a multi-disciplinary team mentored by

& RURAL SUSTAINABILITY



Dr. Vibha Srivastava, left, and research technician Shan Zhao inspect rice plants that have been gene edited.

Vibha Srivastava, professor of plant biotechnology with the Arkansas Agricultural Experiment Station.

As outlined in the team's abstract, "Rice Can Grow and Survive in Martian Regolith with Challenges That Could be Overcome Through Control of Stress-Related Genes," one of the biggest challenges to growing food on Mars is the presence of perchlorate salts, which have been detected in the planet's soil and are generally considered to be toxic for plants.

Their findings suggest that there might be a way forward for genetically modified rice to find purchase in Martian soil.



PROMOTING AGRICULTURAL

Agriculture's Contribution Across the U.S.

Economic impact and contribution analyses are an increasingly popular method for illustrating the importance of food, fiber, and forestry to state and local economies. In 2015, Center for Agricultural and Rural Sustainability (CARS) researchers conducted a survey of agricultural economists which showed vast differences in methods used to conduct contribution studies. The survey results suggested a need for further discussion, as well as the development of additional resources to aid researchers in conducting these types of studies.

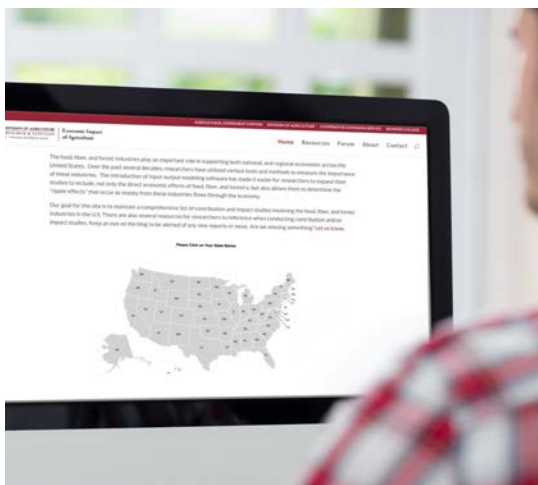
CARS researchers have taken the lead in opening this discussion and are working to develop resources for enhancing the consistency and clarity of contribution of agriculture research. To provide a central location for ongoing discussion and research, they have launched a website called The Economic Contributions and Impacts of U.S. Food, Fiber, and Forest Industries.

The website contains a list of known contribution and impact studies involving the food, fiber, and

& RURAL SUSTAINABILITY

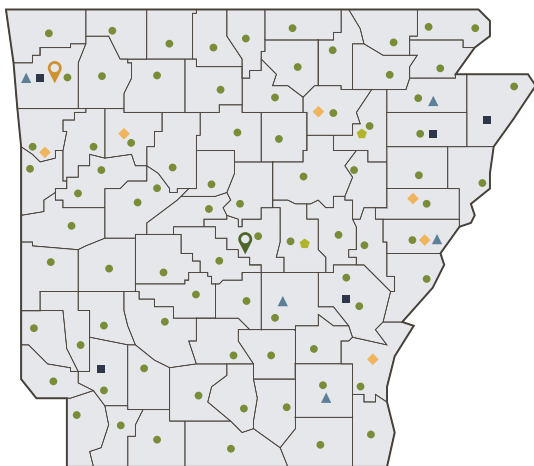
forest industries in the U.S. There are also several resources for researchers to reference, as well as a forum to discuss various topics. It can be found by visiting **economic-impact-of-ag.uada.edu**








To have your study listed on the website, or to join the discussion regarding the development of common methodologies for agricultural contribution studies, send us an email at jhpopp@uark.edu.



ARKANSAS IS OUR CAMPUS

The U of A System Division of Agriculture conducts research and extension programs to support Arkansas agriculture in its broadest definition. Our employees include Cooperative Extension Service faculty in all 75 counties and Agricultural Experiment Station scientists, extension specialists and support personnel on five university campuses, at five research and extension centers, six research stations, and two extension centers.



-  Division & CES Headquarters, Little Rock
-  AAES Headquarters, Fayetteville
-  Research Stations
-  Research & Extension Centers
-  Associated Research & Extension Units
-  Extension Centers
-  County Extension Offices

SOURCES:

AFRC (Arkansas Forest Resources Center). 2023. Production and value data for 2018-2022. Data by request only. <http://www.afrc.uamont.edu/default.htm>

English, L and J. Popp. 2022. Economic Contribution of Agriculture and Food to Arkansas' Gross Domestic Product 1997-2021. Research Report 1008. Arkansas Agricultural Experiment Station, University of Arkansas System Division of Agriculture, Fayetteville https://bpb-us-e1.wpmucdn.com/wordpressua.uark.edu/dist/9/350/files/2022/11/1008_Econ_Contrib_Agri_Food_to_Ark_GDP_1997-2021.pdf

English, L. and J. Popp. 2023. Economic Contribution of the Agricultural Sector to the Arkansas Economy in 2021. Research Report 1010. Arkansas Agricultural Experiment Station, University of Arkansas System Division of Agriculture, Fayetteville. https://bpb-us-e1.wpmucdn.com/wordpressua.uark.edu/dist/9/350/files/2023/05/AR2023_Economic_Contribution_of_the_Agricultural_Sector_to_the_Arkansas_Economy_in_2021.pdf

IMPLAN (IMPLAN Group LLC). 2023. IMPLAN System (data and software): 2021 Arkansas state package. www.implan.com

USCB (United States Census Bureau). 2010. Quick Facts: Arkansas. <https://www.census.gov/quickfacts/AR>.

USDA ERS (U.S. Department of Agriculture Economic Research Service). 2023a. Annual cash receipts by commodity, U.S. and States, 2008-2021F. <https://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics/>

USDA ERS (U.S. Department of Agriculture Economic Research Service). 2023b. Value added by U.S. agriculture (includes net farm income). <https://www.ers.usda.gov/data-products/farm-income-and-wealth-statistics/data-files-us-and-state-level-farm-income-and-wealth-statistics/>

USDA ERS (U.S. Department of Agriculture Economic Research Service). 2023c. State Agricultural Exports, U.S. agricultural cash receipts-based estimates. <https://www.ers.usda.gov/data-products/state-export-data/>

USDA FS (U.S. Forest Service). 2023. Forests of Arkansas, 2021. Forest Inventory and Analysis: State Fact Sheets. https://public.tableau.com/views/FIA_OneClick_V1_2/StateSelection?%3AshowVizHome=no

USDA NASS (U.S. Department of Agriculture National Agricultural Statistics Service). 2022. Land Values 2022 Summary. <https://usda.library.cornell.edu/concern/publications/pn89d6567>

USDA NASS (U.S. Department of Agriculture National Agricultural Statistics Service). 2019. 2017 Census of Agriculture. <https://www.nass.usda.gov/Publications/AgCensus/2017/index.php>

USDA NASS (U.S. Department of Agriculture National Agricultural Statistics Service). 2023a. Farms and Land in Farms: 2022 Summary. <https://usda.library.cornell.edu/concern/publications/5712m6524>

USDA NASS (U.S. Department of Agriculture National Agricultural Statistics Service). 2023b. NASS Quick Stats. Production and values data 2012-2023. <https://quickstats.nass.usda.gov/>

USDC BEA (U.S. Department of Commerce Bureau of Economic Analysis). 2022. Regional Economic Accounts: Annual Gross Domestic Product (GDP) by State. <https://www.bea.gov/regional/>

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DIVISION OF AGRICULTURE
RESEARCH & EXTENSION

University of Arkansas System

University of Arkansas System
Division of Agriculture

2404 North University Avenue

Little Rock, Arkansas 72207

(501) 686-2540

www.uada.edu