POCKET FACTS 2022

Arkansas Agriculture Profile

DIVISION OF AGRICULTURE
RESEARCH & EXTENSION
University of Arkansas System

TABLE OF CONTENTS

QUICK FACTS

Arkansas Agriculture contributed

14.3% of the state value added

WHICH IS APPROXIMATELY

$19.0 Billion in value added[a].

In 2021

42%

of Arkansas land was comprised of farms.

42,000 Farms on 14.0 million acres with an average farm size of 333 acres.

57% of the state is comprised of forests.

= 1,000 FARMS

Source: IMPLAN, 2022; USCB, 2010; USDA NASS, 2022a; USDA FS, 2022

[a]Value 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 2021, Arkansas **average farm real estate value was $3,390 per acre.**

- Total farm real estate value: $47.5 billion
- Average cropland value: $2,930 per acre
  - -irrigated cropland: $3,420 per acre
  - -non-irrigated: $2,130 per acre
- Average pasture land: $2,700 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, 2021; USDA NASS, 2019

In 2020, Arkansas' top commodities

in terms of cash farm receipts[a] were:

$2,682 Million

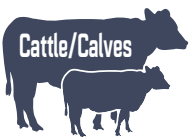
$1,565 Million

$1,118 Million

$568 Million

$516 Million

$476 Million



$426 Million

$422 Million

$368 Million[b]

Source: USDA ERS, 2022a; AFRC, 2022

[a]Cash farm receipt values do not include government payments received by farmers.

[b]Timber 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 2020, Arkansas ranked
15th in the Nation
WITH
$8.2 BILLION[a]
for total agricultural cash receipts.

- **No. 13 in animals and animal products** valued at $4.2 billion.
- **No. 16 in crops**, valued at $4.0 billion.

Source: USDA ERS, 2022a
[a]This 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: **(2021 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. 5 in Turkeys**
- **No. 7 in Peanuts**
- **No. 8 in Chicken Eggs**
- **No. 11 in Beef Cows**[b]
- **No. 11 in Soybeans**
- **No. 17 in Corn for Grain**
- **No. 17 in Hay**
- **No. 20 in Oats**
- **No. 23 in Cattle & Calves**
- **No. 24 in Hogs & Pigs**
- **No. 25 in Honey**

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, 2022b.

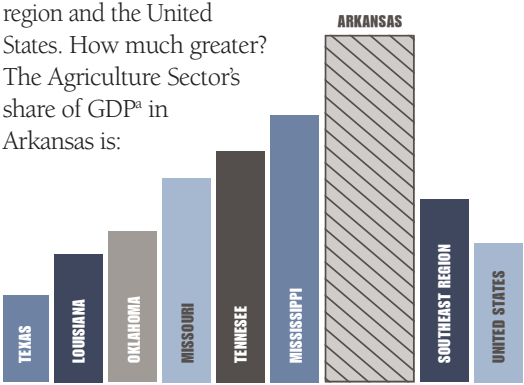
[a] Data for some states are unavailable due to nondisclosure, especially for livestock and livestock products commodities. As a result, these states are not included in the rankings, which may affect Arkansas' actual rank.

[b] Beef cows is a Jan. 1, 2021, inventory comprised of "beef cows that have calved" and "beef cow replacement heifers 500 pounds and over."

Arkansas Counts on Agriculture

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

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

- 4.0 times greater than in Texas
- 2.7 times greater than in Louisiana
- 2.3 times greater than in Oklahoma
- 1.7 times greater than in Missouri
- 1.5 times greater than in Tennessee
- 1.3 times greater than in Mississippi
- 1.9 times greater than for the Southeast[b] region
- 2.5 times greater than for the U.S. as a whole

Source: USDC BEA, 2021; English, Popp, and Miller, 2021.

[a]Calculations based on the percent contribution of the Agriculture Sector to state GDP in 2020. 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.

[b]The 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, 2021

Commodity	Acres Harvested	Production (thousands)	Value (thousands)
Broilers[a]	N/A	7,464,200 LBS	$3,970,954
Soybeans	3,010,000	153,510 BU	$1,949,577
Rice	1,194,000	91,136 CWT	$1,257,677
Corn for Grain	830,000	152,720 BU	$824,688
Chicken Eggs[a]	N/A	4,248,700 EGGS	$692,829
Turkeys[a]	N/A	540,000 LBS	$443,340
Cotton (upland)[b]	475,000	1,250 BALES	$442,800
Timber	N/A	22,696 TONS	$408,795
Cattle & Calves	N/A	504,488 LBS	$384,617
Hay	1,183,000	2,606 TONS	$300,540
Cottonseed[b]	N/A	397 TONS	$100,441
Hogs & Pigs	N/A	106,526 LBS	$74,822
Wheat	145,000	8,410 BU	$55,086
Peanuts	35,000	175,000 LBS	$42,000
Catfish (foodsize)	N/A	15,500 LBS	$19,530
Oats	6,000	540 BU	$2,214
Honey	N/A	850 LBS	$1,760

Source: USDA NASS 2022b; AFRC, 2022
[a]Total Poultry Industry (Broilers, Turkeys, and Chicken Eggs): $5,107M
[b]Total Cotton Industry (Upland Cotton and Cottonseed): $543M

Five-Year Production Highs, 2017-2021

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	4,248,700 EGGS
Corn for Grain	2021	152,720 BU
Cotton (upland)	2019	1,506 BALES
Cottonseed	2019	472 TONS
Grain Sorghum[d]	2018	770 BU
Hay	2019	2,760 TONS
Hogs & Pigs	2019	122,837 LBS
Honey	2017	1,972 LBS
Oats	2017	680 BU
Peanuts	2020	182,400 LBS
Rice	2020	108,107 CWT
Soybeans	2017	178,500 BU
Sweet Potatoes[cd]	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 2022b; AFRC, 2022.
[a]Beef cows is a Jan. 1, 2021 inventory comprised of "beef cows that have calved" and "beef cow replacement heifers 500 pounds and over."
[b]Estimates discontinued for Arkansas in 2016.
[c]Estimates undisclosed for Arkansas in 2016 and 2017
[d]Estimates 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

[a]Rankings 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.

[b]Commodities 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 Snapshot

Arkansas' diverse portfolio of livestock products and crops supports the value of the Agriculture Sector year in and year out.

Arkansas Ag Exports

In 2020, there were 42,200 farms in Arkansas (USDA NASS, 2022a). These farms generated a net farm income of $1,192 million (USDA ERS, 2022b).

For 2020, Arkansas ranked 15th in total agricultural exports with a value of $3.6 billion (USDA ERS, 2022c). Soybeans generated the highest export value for the state, bringing in $977 million in 2020. That same year, Arkansas ranked in the top ten in the nation for exports of four commodities:

- **No. 1 in rice** (valued at $742 million)
- **No. 3 in broilers** (valued at $379 million)
- **No. 4 in cotton** (valued at $489 million)
- **No. 4 in other poultry** (valued at $147 million)

In 2020 Arkansas ranked 36th in overall GDP at $130.8 billion. However, when looking at the share of GDP generated by agriculture, forestry, fishing, and hunting, Arkansas ranked 15th overall in the nation (USDC BEA, 2021). In terms of agricultural cash farm receipts in 2020, Arkansas ranked 15th with a value of $8.2 billion, contributing 2.3% to the U.S. total cash farm receipt value. Arkansas ranked 13th in total crop cash farm receipts at $4.2 billion and 16th in total livestock cash receipts at $4.0 billion (USDA ERS, 2022a).

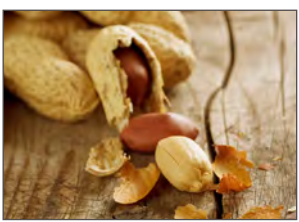
In terms of value, Arkansas' top two commodities for 2020 were broilers and soybeans. Bringing in $2.7 billion, broiler production represented 32.5% of all agricultural cash farm receipts in the state. At $1.6 billion, soybeans contributed over 19.0% to total Arkansas cash farm receipts in 2020. Rice also had a large contribution with 13.6% of total agricultural cash receipts ($1.1 billion) for Arkansas.

Arkansas Agriculture Snapshot

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 39.3% and 12.4%, respectively, of the U.S. total cash farm receipts for these commodities in 2020.

Arkansas' total cash farm receipt value decreased 3.7% between 2019 and 2020[a]. The animals and animal products sector lost 17.3% of its value, while the crops sector experienced an overall gain in value of 16.7% during this time.

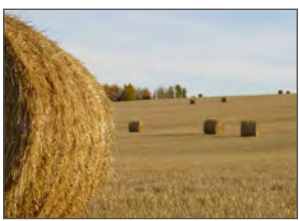
On the crop side, wheat saw the greatest gain with cash farm receipt value increasing 89.9% between 2019 and 2020. Soybeans, peanuts, cotton lint,



[a]Percentage comparisons between 2019 and 2020 values are based on real 2022 dollars. That is, our numbers are adjusted for inflation, which allows for a true "apples to apples" comparison.

cotton seed, corn, oats, hay, and rice also showed increases in value, growing by 29.0%, 28.0%, 27.4%, 18.4%, 10.1%, 8.0%, 6.4%, and 3.6%, respectively.

On the animal production side, turkey sales saw the greatest gain at 24.9%. This was followed by chicken eggs (12.3%) and mohair with no change. All other animal sectors showed a decline in cash receipt value from 2019 to 2020. This includes farm chickens (-55.3%), hogs (-31.6%), broilers (-26.7%), catfish (-16.0%), cattle and calves (-6.9%), wool (-6.7%), and honey (-4.1%).



Economic Contribution of Ag

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, lawn

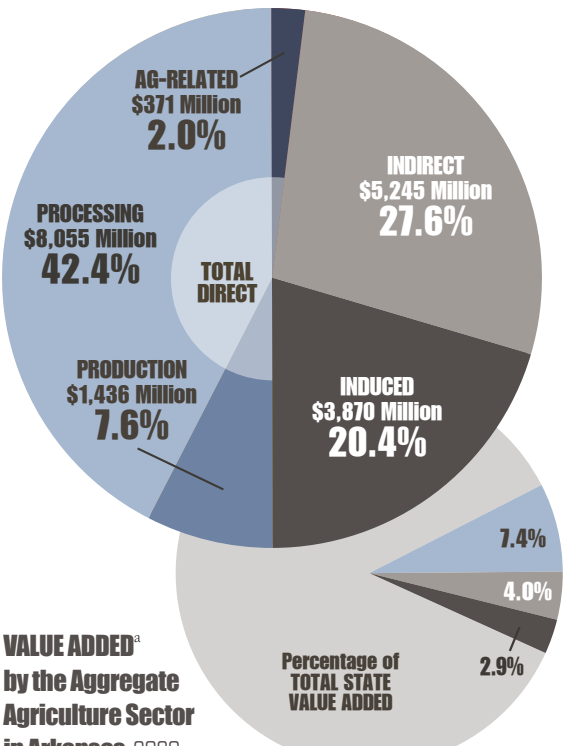
and garden centers, etc.) are not considered part of the Aggregate Agriculture Sector, but some of the economic activity of these industries and other retail stores and input providers is picked up as indirect and induced effects and included in the total contribution.

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 of Ag



VALUE ADDED[a] by the Aggregate Agriculture Sector in Arkansas, 2020

Source: IMPLAN, 2022; English and Popp, 2022. Note: Presented in 2020 $'s.
[a]Value 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

Agriculture contributes almost

$19.0 Billion in value added

WHICH IS APPROXIMATELY

1 in 7

every

VALUE ADDED DOLLARS

and provides almost **243,100 jobs**

IN ARKANSAS

Economic Contribution of Ag

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, 2020

- **243,165 Jobs** – 1 out of 7 Arkansas jobs
- **$10,178 Million in Wages** – 13.6% of the state total
- **$12,079 Million in Labor Income** – 14.6% of the state total
- **$18,977 Million in Value Added** – $1 out of $7 in Arkansas

Source: IMPLAN, 2022; English and Popp, 2022.

Value Added Contributions

Contribution Area	Value (Millions)	% of Total Contribution	% of State Total
Indirect	$5,245	27.6	4.0
TOTAL	$18,977	100.0	14.3

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	$8,167
Wholesale Trade	$1,900
Agriculture, Forestry, Fishing, and Hunting	$1,807
Real Estate Rental and Leasing	$1,348
Transportation and Warehousing	$897
Top Five Total	$14,118
(74.4% of all Value Added generated by Agriculture)	

Source: IMPLAN, 2022; English and Popp, 2022.
[a]Value 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.
[b]Groupings based on the U.S. Census Bureau's 2-digit North American Industry Classification System (NAICS) aggregation.

Employment Contributions

Employment By the Aggregate Agricultural Sector in AR, 2020			
Contribution Area	Jobs	% of Total Contribution	% of State Total
Direct	144,358	59.4	8.9
Indirect	50,534	20.8	3.1
Induced	48,273	19.9	3.0
TOTAL	243,165	100.0	14.9

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	81,040
Agriculture, Forestry, Fishing and Hunting	64,130
Transportation and Warehousing	11,873
Health Care and Social Assistance	10,732
Wholesale Trade	10,643
Top Five Total	178,418
(73.4% of all Jobs generated by agriculture)	

Source: IMPLAN, 2022; English and Popp, 2022.
[a]Groupings based on the U.S. Census Bureau's 2-digit North American Industry Classification System (NAICS) aggregation.

Labor Income Contributions

Labor Income By the Aggregate Agricultural Sector in AR, 2020			
Contribution Area	Value (Millions)	% of Total Contribution	% of State Total
Direct	$6,816	56.4	8.3
Indirect	$3,104	25.7	3.8
Induced	$2,159	17.9	2.6
TOTAL	$12,079	100.0	14.6

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	$4,769
Agriculture, Forestry, Fishing, and Hunting	$2,102
Wholesale Trade	$881
Transportation and Warehousing	$736
Health Care and Social Assistance	$638
Top Five Total	$9,127
(75.6% of all Labor Income generated by Agriculture)	

Source: IMPLAN, 2022; English and Popp, 2022.
[a]Groupings based on the U.S. Census Bureau's 2-digit North American Industry Classification System (NAICS) aggregation.

From Satellites to Soil Tests...
PRECISION AGRICULTURE RESEARCH

Innovation has long been a driver for increased productivity in agriculture. Between 1770 and 1800, following the introduction of metal-chisel and mold-board plows, the number of hours to produce 100 bushels of wheat dropped by 30 hours. By 2020, technologies would help reduce that to just 1.1 hours.

Researchers at the University of Arkansas System Division of Agriculture are harnessing technology and developing innovative uses for continued productivity improvements.

One of the most fertile fields for innovation is remote sensing with satellites and drones. Researchers use this technology to help farmers manage fertility, disease, and irrigation issues more efficiently, in less time.

Whether you call them unmanned aerial systems (UAS), or unmanned aerial vehicles (UAV), or simply drones, these machines are increasingly important tools for agriculture.

Dr. Larry Purcell demonstrates the use of drone remote sensing in soybean research.

"Today's UAS can provide field elevation models for irrigation planning, multi spectral imagery for plant vigor estimations, and high-resolution color imagery used as field scouting aids," said Jason Davis, extension application technologist. "While this data has been available for some time via satellite platforms, the ability to collect this imagery on the fly and at unprecedented spatial resolutions enable field level management decisions that were previously impractical."

With advances in data management, Davis said "sub-field management workflows may soon become scalable with the increasing automation of data collection, processing, interpretation, and field application of this data which will likely lead to better optimization of inputs and potential cost savings."

Spotting Diseases

Terry Spurlock, extension plant pathologist, has worked with satellites and drones for a decade to spot plant disease in the field.

"Our overall goals are to understand the distributions of plant diseases, how much money they may cost growers, and gain a better understanding of how we might recommend changes to management that add value to a crop or field above the cost of some application, because we have a clearer understanding of the acreage affected," he said.

Spurlock sees excellent potential in combining the right software, hardware, and satellite imaging to simplify scouting fields. He is working to develop a field scouting tool that uses publicly available satellite imagery to identify areas that should be

scouted before a farmer has to be in that field. He said this could improve scouting efficiency, even as farms grow larger and the number of farm workers decreases, by delivering weekly field information using only smartphones and a geolocation app.

"Over the almost decade-long time that our lab has been involved in remote sensing, we have learned that drones are wonderful research tools offering high resolution imagery and flexibility in operations," Spurlock said. "Changes to regulations have also made acquiring data from drones much easier. However, because they can only cover a few fields in a reasonable amount of time, scaling them to farm-sized applications is problematic.

"With satellite imagery, we don't have that issue, where we get entire images of the Delta each week. However, the resolution isn't as high as it is with drones, and sometimes cloud cover can hinder our ability to 'see' what is on the ground," he said. "Still, we have high hopes for satellite imagery as a usable tool for our stakeholders."

Seeing Genetic Potential from Above

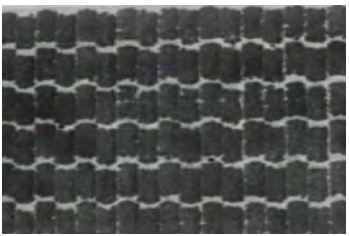
Larry Purcell, Distinguished Professor of soybean physiology, has used an off-the-shelf aerial drone to identify soybean plants with the genetic make-up, or genotype, for high nitrogen fixation rates. This biological function is essential for producing grain with high protein concentrations.

Nitrogen is a major component in chlorophyll and a plant enzyme known as RuBisCO, both key in producing fuel for plant growth and seed development.

Nitrogen and chlorophyll concentrate in plant tissues, and the concentrations in the leaves are indicative of those throughout the plant. Traditional means of measuring those concentrations require taking plant tissue samples for analysis in a lab.

Using a color index developed by Arkansas turfgrass researchers, Purcell links a plant's green depth to specific genetic markers. His data help breeders know

Aerial images of soybean plots showing differences among genotypes in the intensity of greenness, which is measured using the dark green color index.



Infrared image of soybean plots photographed from 400 feet. Soybean plots appear as dark rectangles, which are relatively cool.

which soybean genomes are good candidates for crossbreeding. Moreover, the genetic markers help track which offspring from those crosses have the desired nitrogen fixation trait.

Additional research in the Purcell laboratory has used an infrared camera on a drone to measure soybean canopy temperature during drought. A cooler canopy of a soybean variety indicates that the plant still has access to soil moisture compared to varieties with a warm canopy. This research has identified additional genetic markers that are being used to transfer the "cool canopy markers" to a high-yielding variety.

Decision Tool

Aurelie Poncet, assistant professor of precision agriculture, is collaborating with colleagues to create a web-based decision tool that uses drone or satellite images to help farmers pinpoint the field sections that require additional nutrients. The team

Graduate students download soil data collected using Time-Domain Reflectometry (TDR) sensors.

includes Trent Roberts, professor-soil fertility; Larry Purcell, Distinguished Professor of soybean physiology; and Jason Kelley, extension corn and feed grains agronomist.

Roberts said farmers usually take plant tissue samples to make the determination. The web-based tool would enable farmers to use off-the-ground images to determine the timing and quantity of nitrogen needed. Sounds easy, but Poncet said the equations involved in making those decisions are not.

"We have done the research — about half of it," she said. "Now the question is, how do we make it easily usable by the farmer."

When released, the tool will provide a "yes" or "no" answer on whether corn nitrogen fertilization is adequate. Roberts said the team is working on fine-tuning the tool to provide recommendations on the amount of nitrogen per acre.

Help During Disasters

The Division of Agriculture has also used public satellite imagery and information from the National Agricultural Statistics Service to aid disaster reporting and recovery efforts. Vic Ford oversees agriculture and natural resources for the Cooperative Extension Service. Ford and Davis worked during several major floods to assess the damage and provide accurate information to regulatory agencies, elected officials, and the farmers themselves.

"We turned this information over to the economists. We had quantified affected acreages in 48 hours after the flood and economic impact within 72 hours," Ford said. "This is a drastic decrease in the time required which was 10-14 days.

"We used county agents and agronomists to ground-truth our estimates and made adjustments

if needed while the preliminary figures were reported," he said.

Ford said he found out early how important it was to develop a means to determine the effects of flooding.

"When I first started this job, a flood event started Friday night and continued through Sunday," he said. "I was getting calls from administrators, media, and regulatory agencies on the extent of damage on Saturday.

"The only method I had was field reports from agents and agronomists, which takes time and effort as the water recedes," he said. Satellite images proved to be the tool which made this possible.

Gauging Forest Health

Hamdi Zurqani, assistant professor of geospatial science at the University of Arkansas-Monticello's College of Forestry, Agriculture and Natural Resources, is using a drone to assess forest health.

"This drone will be utilized to characterize key indicators of forest health and investigate statistical relationships between forest health, such as individual forest trees and species, and vegetation indices derived from the drone imagery," he said. "It will also be utilized to calculate the trees' heights and crown widths and use this information to calculate how much carbon is held in its above-ground biomass."

Students and Dr. Hamdi Zurqani get a drone ready for take off.

Equipped with sensors that can read visible light and near-infrared bands, “this drone can be used to monitor forest health and detect early signs of stress,” Zurqani said. “Also, with the LiDAR system, we can obtain fine-resolution 3-D data on forest structure.”

LiDAR stands for light detection and ranging. It is a remote sensing method that uses a pulsed laser to measure range and generate precise 3-D data. UAM’s LiDAR system comes with eight lasers. The LiDAR software and data package can process and convert the measurements into maps and graphics.

Combined with a Global Navigation Satellite System receiver, Zurqani is able to achieve centimeter-level accuracy.

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, 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.

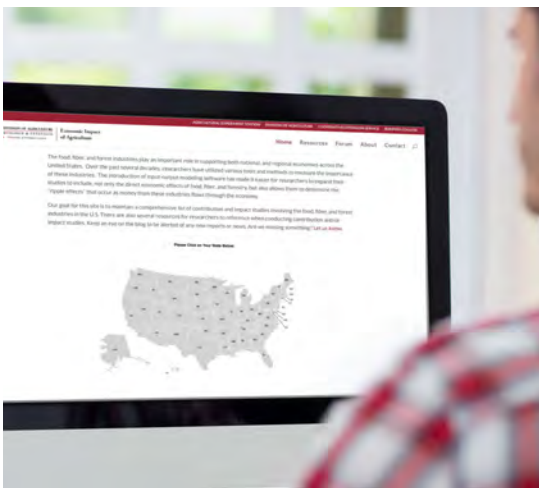
CARS researchers have taken the lead in opening this discussion and are working to develop resources for enhancing the consistency and clarity of contribution of agriculture research. To provide a central location for ongoing discussion and research, they have launched a website called The Economic Contributions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

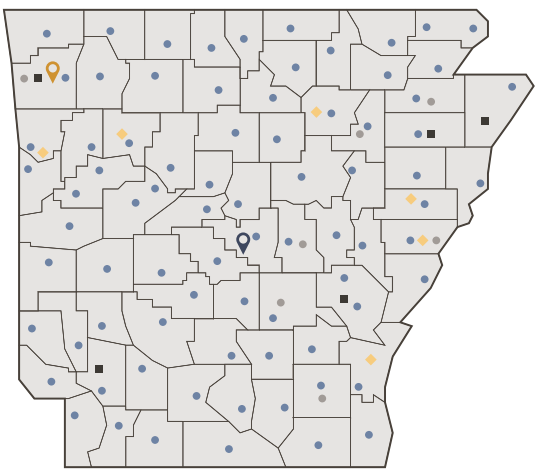
To have your study listed on the website, or to join the discussion regarding the development of common methodologies for agricultural contribution studies, send us an email at cars@uark.edu.



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 & Extension Centers
- Research Stations
- Associated Research & Extension Units
- County Extension Offices

SOURCES:

AFRC (Arkansas Forest Resources Center). 2022. Production and value data for 2017-2021. Data by request only. http://www.afrc.uamont.edu/default.htm

English, L, J. Popp and W. Miller. 2021. Economic Contribution of Agriculture and Food to Arkansas' Gross Domestic Product 1997-2020. Research Report 1005. Arkansas Agricultural Experiment Station, University of Arkansas System Division of Agriculture, Fayetteville https://agcomm.uark.edu/agnews/publications/1005_Econ_Contrib_Agri_Food_to_Ark_GDP_1997-2020.pdf

English, L. and J. Popp. 2022. Economic Contribution of the Agricultural Sector to the Arkansas Economy in 2020. Research Report 1007. Arkansas Agricultural Experiment Station, University of Arkansas System Division of Agriculture, Fayetteville. https://agcomm.uark.edu/agnews/publications/1007_Contrib_Agri_sector_Ark_Econ_2020.pdf

IMPLAN (IMPLAN Group LLC). 2022. IMPLAN System (data and software): 2020 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). 2022a. 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). 2022b. 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). 2022c. 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). 2022. Forests of Arkansas, 2020. Forest Inventory and Analysis: State Fact Sheets. https://public.tableau.com/views/FIA_OneClick_V1_2/Factsheet?%3AshowVizHome=no.

USDA NASS (U.S. Department of Agriculture National Agricultural Statistics Service). 2021. Land Values 2021 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). 2022a. Farms and Land in Farms: 2021 Summary. https://usda.library.cornell.edu/concern/publications/5712m6524

USDA NASS (U.S. Department of Agriculture National Agricultural Statistics Service). 2022b. NASS Quick Stats. Production and values data 2012-2022. https://quickstats.nass.usda.gov/.

USDC BEA (U.S. Department of Commerce Bureau of Economic Analysis). 2021. Regional Economic Accounts: Annual Gross Domestic Product (GDP) by State. https://www.bea.gov/regional/.

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