DAFVM

Annual Report

2022

DIVISION OF AGRICULTURE, FORESTRY, AND VETERINARY MEDICINE

TAKING CARE OF WHAT MATTERS

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TAKING CARE OF WHAT MATTERS

Dear friends:

Mississippi State University recently launched a new tagline, "**TAKING CARE OF WHAT MATTERS**." While this phrase may be new to the university, the concept is ingrained in who we are and why we exist.

Our land-grant university was established on the premise of educating students in agriculture, horticulture, and the mechanical arts. For 145 years, we've remained rooted in our mission while growing to meet the needs of our state.

Throughout 2022, the six units in the Division of Agriculture, Forestry, and Veterinary Medicine (DAFVM) worked tirelessly to conduct research, train future leaders, and provide outreach in all 82 Mississippi counties. To address the challenges facing our state and nation, DAFVM faculty leverage state-appropriated funding with extramural grants and contracts, which, in 2022, reached a record level of nearly $117 million. Those achievements translate into DAFVM's taking care of the people in our state because that's what matters.

Our research is increasing productivity in catfish farming, helping raise healthier livestock, and tackling current and future farming challenges. Our faculty have received national recognition for their conservation work, and the expanded Doctor of Veterinary Medicine and Veterinary Medical Technology programs are bolstering the number of future veterinary professionals.

While we continue to make strides, our work is never complete. DAFVM's commitment to serving our state is unwavering, and your support is appreciated as we focus on taking care of what matters.

Hail State,

Dr. Keith Coble
DAFVM Vice President

Points of Pride

The National Science Foundation ranks **MSU 13th** nationally for natural resource and conservation research funding and **11th** for agricultural research.

Since 2017, **CVM** graduates have had a national board examination passage rate of **98 percent**—3 points higher than the U.S. average.

DAFVM faculty wrote **950** proposals, resulting in a record of **$116.7 million** in grants and contracts awarded to expand research, education, and outreach.

MSUES served almost **1 million** direct contacts—more than one in four Mississippians.*

Over the past decade, **MAFES** research and **MSUES** outreach have contributed to a **59%** productivity increase in a crucial stage of catfish farming.

FWRC scientists developed Mill Site, software that has increased the recruitment and expansion of forest products companies across the state.

CALS is consistently ranked among the best in its field by college ranking systems.

Ninety-seven percent of **MSUES** agents are trained in Mental Health First Aid to locally identify and respond to signs of mental-health problems.

CFR is the only nationally accredited educational program in Mississippi developing future leaders in natural resources.

CVM's Shelter Medicine Program, a no-cost service for animal shelters, surpassed **100,000** surgeries since it began in 2007.

Some individuals participated in more than one program and may be counted more than once.

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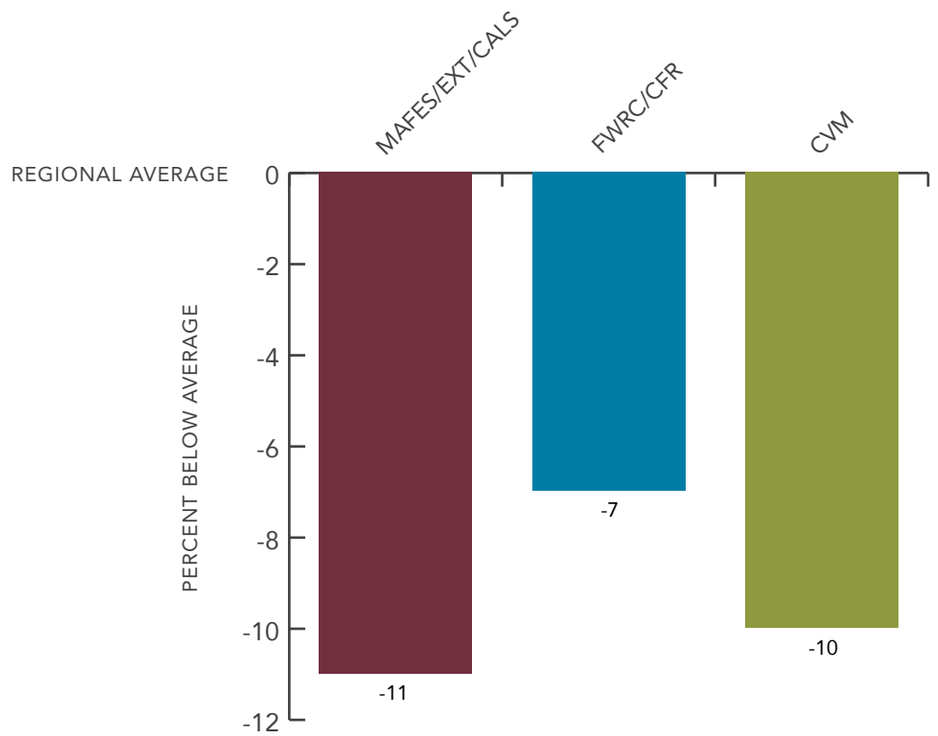
Funding for MSU DAFVM enables learning, research, and service to continue

Our 2024 funding request includes an increase because DAFVM must remain competitive in attracting the best faculty to teach the agricultural, forestry, and veterinary medicine professionals of the future.

With new funding for faculty pay raises, DAFVM will be able to continue moving faculty salaries to the Southern Regional Education Board average. Currently, DAFVM salaries are 91 percent of the regional average, or more than $13,000 below the regional average.

DAFVM plays a vital role in moving the state forward because of its sustained impact on Mississippi's top industry, agriculture. The $9.72 billion ag industry includes more than 34,700 farms on 10.4 million acres of farmland and 19.2 million acres of forestland. Eighty-seven percent of these operations are family farms.

DAFVM Faculty Salaries
(as a percent of the regional average)



Renovating facilities will enhance research, learning, and service

Cutting-edge technology in a modern environment ensures Mississippi State University remains competitive while training the next generation of industry leaders. New and updated facilities support education and research opportunities for our faculty and students; however, improvements are still needed to learn and teach without boundaries. Renovations that modernize infrastructure and incorporate state-of-the-art technology will expand research capacity and help to produce an industry-ready workforce.

Constructed in 1939, Bedenbaugh Hall houses a lab and offices for graduate students in the Department of Food Science, Nutrition, and Health Promotion. Research is limited in this lab because the current conditions prohibit the lab from being biosafety level 2 (BSL2) certified.

An increase in funding will assist DAFVM in managing the inflation impacting our operational costs, as well as addressing facilities repair and renovation needs.

When we can extend the useful life of older buildings, our students and partners receive the benefits. Important repair and renovation projects must continue, and securing these funds will allow DAFVM to address facilities' needs promptly.

TAKING CARE OF WHAT MATTERS

Despite space and power limitations in the current lab, Dr. Shecoya White, assistant food science professor in CALS/MAFES, provides experiential learning opportunities for her students and applies innovative research strategies. Her research in pathogenic rapid testing methods has the potential to transform integrated food safety procedures to reduce food-related recalls and public illness outbreaks. *Photo by Kevin Hudson*

"We could be even more productive if we had the space and technology. Our graduate students are only here for 2 years, and I want to make sure they are learning all the skills they need to equip them to be successful after graduation."

DR. SHECOYA WHITE
assistant food science professor in CALS/MAFES

Dr. Caleb Lemley (left), associate animal and dairy sciences professor in CALS/MAFES, met with U.S. Senator Cindy Hyde-Smith and MAFES Interim Assistant Director Dr. Jamie Larson at the Senator's October visit to MSU's new Animal and Dairy Sciences Building. Lemley demonstrated how the thermal imaging technology is used during Senator Cindy Hyde-Smith's campus visit. *Photo by Kevin Hudson*

"The new facility has allowed us to have everything right at our fingertips. We're able to expose students to technology and project it on the big screen, so they can see it and interact with the equipment in the classroom before they use it on the farm. We didn't have that capability in our previous facility."

DR. CALEB LEMLEY
associate animal and dairy sciences professor in CALS/MAFES

MAFES

Mississippi Agricultural and Forestry Experiment Station

The mission of the Mississippi Agricultural and Forestry Experiment Station (MAFES) is to advance agriculture and natural resources through research and discovery, teaching and learning, and service and engagement to enhance economic prosperity and environmental stewardship, build stronger communities, improve the health and well-being of families, and serve people of the state, region, and world.

Chickens see light and color better than humans, so MAFES scientists studied how blue and red LED light regimens impacted layer hens' performance, behavior, egg quality, and hormonal concentrations during their growing and laying phases. Results showed that blue light was beneficial during the pullet phase, with birds having a significantly higher body weight from 1 to 18 weeks of age. They began laying eggs nearly 2 weeks earlier. During the production phase, a higher relative egg yolk percentage was observed in the red LED environment. Ishab Poudel, a graduate student in the Department of Poultry Science, and Dr. Pratima Adhikari, assistant professor of poultry science, examine a laying hen at the MAFES Poultry Facilities. *Photo by David Ammon*

TAKING CARE OF WHAT MATTERS

How we're taking care of what matters:

"The work that the division does daily is critical to the positive outcomes of agriculture and our rural communities, and that is why Delta Council places such a high priority on its continued strength and success. Furthermore, when our region faces crippling social and economic challenges, such as the Yazoo Backwater flooding, the pandemic, a large grain elevator bankruptcy, or a massive rain event, among many others, we can always count on the Division of Agriculture, Forestry, and Veterinary Medicine to come in and help lead the efforts to solve the challenges and produce positive results."

FRANK HOWELL
member of
Delta Council

MAFES scientists in the Meat Science and Muscle Biology Laboratory conduct research to increase the shelf life of meat products while also enhancing food quality and safety. Dr. Derris Burnett, associate professor in animal and dairy sciences, inspects meat products with graduate students. *Photo by Dominique Belcher*

MAFES scientists, along with other MSU collaborators and USDA-ARS scientists, are making a big splash in catfish production, with research and outreach contributing to a 59 percent increase over the past decade in food-fish productivity, the final stage of farmed catfish development before harvest. A regional survey found that emerging catfish farming technologies, many developed and validated by MAFES scientists, are increasing efficiency. Troy Lindsey, a MAFES research technician in the Department of Wildlife, Fisheries, and Aquaculture, catches a catfish at the South Farm Aquaculture Research Facility. In addition to the South Farm facility, scientists conduct research at the Thad Cochran National Warmwater Aquaculture facility at the Delta Research and Extension Center. *Photo by David Ammon*

Mississippi Agricultural and Forestry Experiment Station

New switchgrass varieties are gaining ground in the South because of plant breeding by MAFES scientists who have developed a seed that germinates quickly and is being released through Roundstone Seed, a Kentucky-based company. Native switchgrasses, which are used for conservation and biofuel, have a high seed dormancy, meaning that the seeds fail to germinate even in optimal growth conditions. Dr. Brian Baldwin, professor, and Dr. Jesse Morrison, assistant research professor, both in plant and soil sciences, look at 'Robusto' switchgrass growing at the MAFES R. R. Foil Plant Science Research Center. Dr. Brett Rushing, associate MSUES and research professor in plant and soil sciences at the MAFES Coastal Plain Branch Experiment Station, is a codeveloper of the patented switchgrasses. *Photo by David Ammon*

The MAFES Pontotoc Ridge-Flatwoods Branch Experiment Station is one of the nation's six National Clean Plant Network centers, a program overseen by USDA-APHIS that ensures farmers have access to virus-tested sweet potato slips for planting. The station focuses on scientific research to maintain seed quality at all stages of the clean foundation seed program, including the lab, greenhouse, field, and storage environments. *Photo by Karen Brasher*

Unmanned aerial vehicles and ground-based autonomous robots play an increasingly vital role in modern precision agriculture; MAFES scientists are ensuring that these technologies can be used to provide more accurate data on row crops. After calibrating a UAV's camera to a ground-based robot's fixed outputs, researchers were able to drastically reduce the margin of error for temperature, height, and color measurement. The margin of error for temperature dropped from 20 degrees Fahrenheit to just 2 degrees, and the margins of error for height and color measurement were cut in half. Collin McLeod, research associate, and Kha Dan, research engineer, both in the Department of Agricultural and Biological Engineering, test the all-terrain robot in an agricultural field at MSU. Working under the direction of Dr. Alex Thomasson, the scientists are reducing the margin of error presented through UAV imagery alone. *Photo by Dominique Belcher*

FWRC

Forest and Wildlife Research Center

The mission of the Forest and Wildlife Research Center (FWRC) is to expand, through research, the fundamental and applied knowledge upon which forestry, forest products, and wildlife and fisheries disciplines are based; and to assist in conserving, developing, and using the forest, forest products, wildlife, and fisheries resources of Mississippi, the nation, and other countries through research, technology transfer, and other service activities.

FWRC scientists are studying vultures, which often travel through civilian and military air space, and their habitats to provide suggestions to the Department of Defense and civilian airport authorities on vultures' timing and flight patterns so planes and birds can better share the skies. Dr. Scott Rush, associate professor in the Department of Wildlife, Fisheries, and Aquaculture, places a wing tag on a vulture to track it for further research. Approximately 30 vultures have been equipped with GPS trackers to study their movement patterns. *Photo by David Ammon*

TAKING CARE OF WHAT MATTERS

How we're taking care of what matters:

"Working with MSU's College of Forest Resources is of great benefit because it allows CFR to do what it does well, in terms of forest and wildlife management and research, while also accomplishing the goals we have as an agency, in terms of water quality and coastal restoration. Having Mississippi State as the expert in forest land management is a perfect fit."

CHRIS WELLS
executive director of the Mississippi Department of Environmental Quality

FWRC forestry scientists work to predict which invasive insect species—like the emerald ash borer or the redbay ambrosia beetle—will impact North American trees before the insects kill millions of trees, destroy ecosystems, and cost millions of dollars in management and lost revenue. Dr. Ashley Schulz, assistant professor in the Department of Forestry, examines a green ash tree at the John W. Starr Memorial Forest. Schulz is part of a team working to predict the next invasive species before it arrives in North America. *Photo by Karen Brasher*

FWRC wildlife biologists have developed a new decision-making software that identifies precise locations where conservation practices are most economically beneficial to farmers on specific tracts of land; the study across 52 fields showed economically targeted conservation increased revenue by 24 percent. Ryan Mann, a research associate in the Department of Wildlife, Fisheries, and Aquaculture, demonstrates the software to John Mark Curtis, Quail Forever farm bill biologist, on a farm in north Mississippi. *Photo by David Ammon*

In efforts to develop environmentally friendly wood preservatives that extend the service life of wood products, FWRC researchers in the Department of Sustainable Bioproducts study natural enemies of wood, including decay fungi, termites, and other wood-devouring insects. Dr. Tammy Franca, assistant professor of sustainable bioproducts, evaluates wood preservative systems to determine their effectiveness. FWRC scientists also are working on nonbiocidal methods to prevent fungi or insect colonization on wooden building components. *Photo by Dominique Belcher*

Forest and Wildlife Research Center

FWRC scientists study adhesives to determine how engineered lumber—including particle board, plywood, oriented-strand board, and cross-laminated timber—holds together in different environmental conditions, what preservatives can extend its usability, and which building techniques ensure the structure has maximum durability. Dr. Mostafa Mohammadabadi, assistant professor of sustainable bioproducts, works with student Jordan Miller to make engineered lumber, extending the use of wood. The aluminum foil keeps adhesives from sticking to the molds. These wood products store massive amounts of carbon, preventing its release into the atmosphere. *Photo by Dominique Belcher*

FWRC students are learning how bottomland forests reduce the risk and severity of downstream flooding by providing areas to store flood water. T. J. Gatlin, a forestry graduate student, and Drew Fletcher, a forestry undergraduate student, learn how bottomland forests store large amounts of carbon in trees and the soil while providing critical habitat for waterfowl, migratory birds, wild turkeys, and other wildlife. These wetlands also improve water quality by filtering and flushing nutrients, processing nitrates and organic wastes, and reducing sediment before it reaches open water. *Photo submitted*

Cross-laminated timber (CLT), a sustainable building material formed by layering lumber, can be an affordable alternative to masonry, concrete, or steel in the construction of larger buildings; FWRC scientists are studying how moist, damp environments affect the performance of the adhesive used to create CLT. Franklin Quin, a research associate in sustainable bioproducts, dries CLT after it has been immersed in water to determine how well the adhesive holds. *Photo by David Ammon*

MSUES

Mississippi State University Extension Service

The Mississippi State University Extension Service (MSUES) provides research-based information, educational programs, and technology transfer focused on issues and needs of the people of Mississippi, enabling them to make informed decisions about their economic, social, and cultural well-being.

In 2022, MSUES natural resource experts reported that more than 39,000 individuals participated in conservation-education initiatives. MSUES's partnership with the Mississippi Aquarium continues, enhancing the education, research, and reach of the popular destination. At the same time, local conservation workshops and field days attract thousands of Mississippians who want to maintain the state's abundant, beautiful wildlife, plants, and landscapes. Dr. Marcus Drymon, MSUES marine fisheries specialist, partnered with Kurt Allen, Mississippi Aquarium president and CEO, to develop an educational guide on the sharks and rays of Mississippi. *Photo by Kevin Hudson*

TAKING CARE OF WHAT MATTERS

How we're taking care of what matters:

"Our most precious resource is our youth. It is up to us as adults to offer guidance, leadership, and mentorship to be sure they are positioned to be responsible adults and make a positive difference in our society.

"4-H is teaching young people leadership, giving them a chance to interact and be competitive with others, and instilling self-confidence."

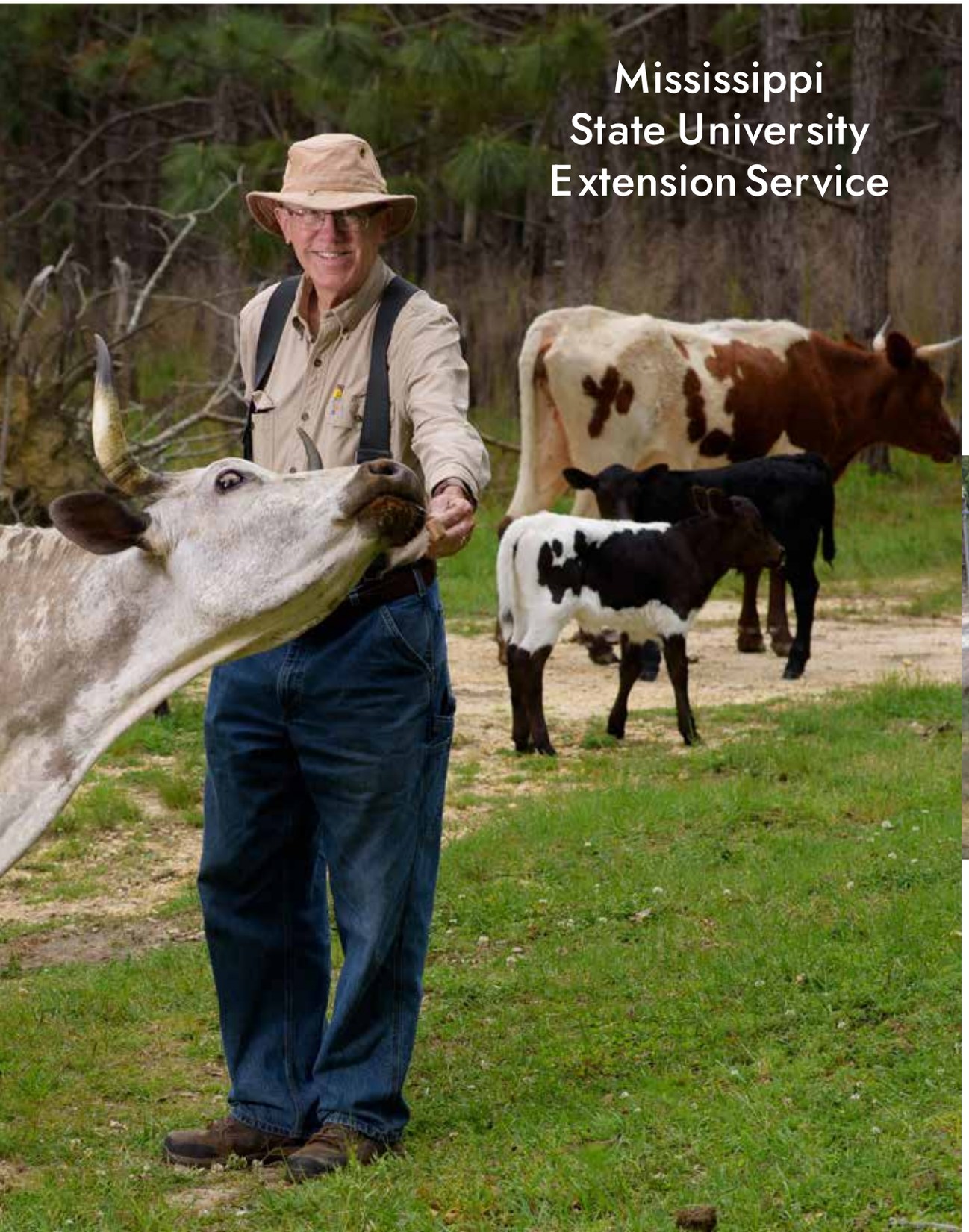
HARRY DENDY
member and former chair of the Mississippi 4-H Foundation and former president of the Mississippi 4-H Advisory Council

Thanks to a generous donation from Walmart, 40 Mississippi 4-H kayak and fishing clubs located around the state received paddles and lifejackets. Along with thousands of recorded contacts in these clubs during 2022, 4-H also had approximately 74,000 interactions with students at livestock shows, 47,000 in programs to teach safety skills in shooting sports, 41,000 through citizenship studies, and 24,000 in curricula to encourage STEM skills in science, technology, engineering, and math. *Photo by Kevin Hudson*

MSUES's volunteer programs logged more than 426,000 individual service hours in 2022. Popular programs resumed in-person meetings and services, including Master Gardener, Mississippi Homemaker Volunteers (MHV), Junior Master Wellness, and Master Floral Designer. These volunteer programs are open to anyone willing to learn and share their expertise with other Mississippians. Lillian Edney is one longtime MHV member who has served Adams County residents for decades. *Photo by Kevin Hudson*

MSUES served almost 1 million individual contacts in 2022.* Popular services include consultations with row-crop and livestock producers, support for home gardeners, and activities of the 4-H youth development program. MSUES also offers education and training services for families and individuals interested in conservation, natural resources, healthy living, and/or community development. Jim Currie, for example, works with MSUES to enhance his forest and livestock production. *Photo by Kevin Hudson*

**Some individuals participated in more than one program and may be counted more than once.*



With more than 50,000 4-H'ers enrolled in the youth development program delivered by MSUES in 2022, Mississippi children from age 5 to 18 are learning by doing. 4-H Junior Master Gardeners are growing produce at their own schools, and 4-H Junior Master Wellness Volunteers are delivering reliable health information to their peers. 4-H'ers are also learning leadership skills, animal-showing techniques, and proper firearms handling in their local county clubs. At Mannsdale Upper Elementary School in Madison, all third-, fourth-, and fifth-graders, about 650 children, are enrolled in the 4-H Junior Master Gardener program. *Photo by Kevin Hudson*

Thousands of Mississippi childcare providers, both state-certified and home-based, have improved their skills by participating in MSUES training in 2022. From literacy programs to indoor safety training, MSUES agents and specialists are equipping the people who care for the state's most precious resource—its children—with research-based information and developmentally appropriate materials. In Pike County, at least half the childcare providers, from Summit to the state line, participate in free childcare training. *Photo by Kevin Hudson*

Mike Wagner, a Tallahatchie County rice and soybean producer, was nominated by MSUES as Mississippi's 2022 Swisher/ Sunbelt Ag Expo Southeastern Farmer of the Year. He uses environmentally sustainable practices to grow top-quality rice and non-genetically modified soybeans, while protecting soil and conserving water on his farm in the Delta. Feeding the world is important to Wagner. He annually donates about 80,000 pounds of rice to food banks. *Photo by Kevin Hudson*

MISSISSIPPI STATE UNIVERSITY™
DIVISION OF AGRICULTURE, FORESTRY, AND VETERINARY MEDICINE

TAKING CARE OF WHAT MATTERS

Almost 316,000 individual activities were recorded in 2022 for Mississippi 4-H'ers around the state. Thousands of 4-H'ers learned by doing at statewide and national 4-H events, like State 4-H Congress, 4-H Legislative Day, Dixie National Sale of Junior Champions, National 4-H Week, and 4-H Day at State Fair. However, 72 percent of 4-H individual activities—more than 199,000—were on the local level. 4-H Summer Camp Explore introduced archery to junior 4-H'ers. *Photo by Kevin Hudson*

"DAFVM is an integral part of our university and the excellent service it provides to the entire state. I am grateful for the many opportunities it has to provide education, training, guidance, and support to our citizens.

"The education I received within DAFVM prepared me for the work I do with elected officials, clients, and business leaders on a daily basis. I look forward to seeing the growth and impact of DAFVM in the years to come."

CAMILLE SCALES YOUNG
principal and director at Cornerstone Government Affairs, 4-H Foundation member, and alumna of MSU Classes of 1994 and 1996

MSUES directly delivered health, wellness, and nutritional information to more than 50,000 individuals during the year. From the Rural Medical and Science Scholars (RMSS) program for teens interested in pursuing medical careers to Fun with Food nutrition and cooking education, thousands of young people are learning how to live healthier. Likewise, adults are participating in the Walk-A-Weigh and Eating Smart, Being Active programs to learn better diets and increase their physical activities. Former RMSS participant Carey Williams shares knowledge. *Photo by Kevin Hudson*

Over the last few decades, sulfur deficiency has been an increasing problem for corn farmers; MAFES scientists are studying the interaction of sulfur and nitrogen concentrations in corn plants, as well as whether optical sensors can predict sulfur deficiency in the crop. Camden Oglesby, research associate; Dr. Jagman Dhillon, assistant professor; and Ramandeep Sharma, agronomy graduate student, all in plant and soil sciences, analyze data from optical sensors to determine levels of sulfur, a key macronutrient in healthy corn plants. *Photo by Dominique Belcher*

CFR graduate students in sustainable bioproducts work with scientists to examine the effectiveness of wood preservatives at preventing wood decay caused by fungi, which costs an average of $10 million annually in the U.S. Tom Norman and Mercy Ogunroku, graduate students in sustainable bioproducts, work with a fungal decay test to measure decay, deterioration, and the overall efficacy of wood preservative systems. *Photo by Dominique Belcher*

CVM

College of Veterinary Medicine

The mission of the College of Veterinary Medicine (CVM) is to protect and improve the health and well-being of animals and humans, while contributing to the economic development of Mississippi and surrounding regions by providing quality professional veterinary education, advancing research in veterinary and biomedical fields, and serving the community through excellent diagnostics, clinical care, and shared learning.

The CVM Enhanced Clinical Practicum (ECP) program allows Doctor of Veterinary Medicine (DVM) students to enrich their clinical skills in a private-practice setting while ensuring that they gain additional hands-on exposure to large-animal medicine, an area currently underserved throughout the state. In addition, the program also enables students to refine their client-communication and business-management skills. The ECP program currently partners with 44 private practices in 11 states. Class of 2024 student Madi Young is participating in the pilot ECP program, which will be incorporated into the required clinical curriculum with the Class of 2025. *Photo by Tom Thompson*

TAKING CARE OF WHAT MATTERS

How we're taking care of what matters:

"The division has an outstanding staff who want to be helpful. Large-animal veterinarians are disappearing, and here in Noxubee County, we lost our veterinarian whom we had used for years, and the MSU Vet School is our closest veterinarian. They help us out there, whether I'm taking bulls for breeding soundness exams or getting fish samples. We get the quick responses we need. The people there are so personable and open. It's been a real blessing that the MSU Vet School is so close and so convenient."

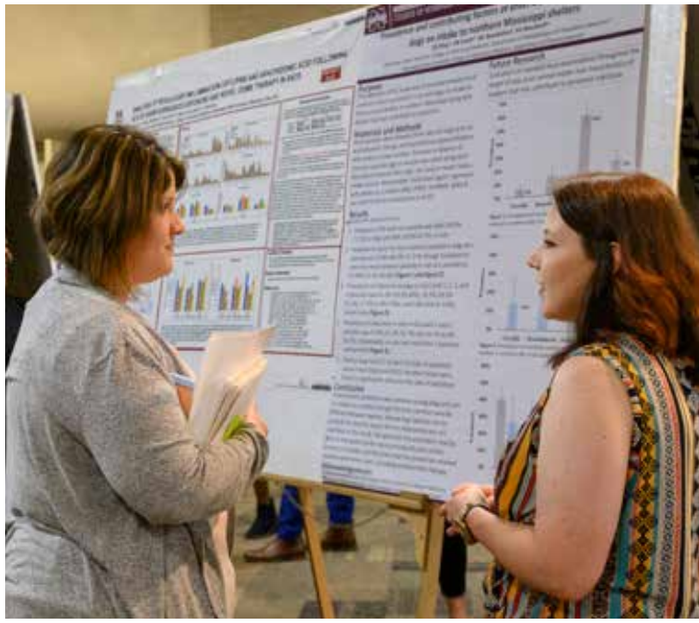
PHILIP GOOD
row crop and livestock producer in Macon

All CVM DVM students begin performing spay and neuter surgeries during their second year of education; by the time they graduate, most students have completed an average of 60 or more spay and neuter surgeries. This is just one of the many ways the college is ensuring the state has access to veterinarians who are practice-ready on day one. The sterilization surgeries are performed on local shelter animals under the supervision of faculty surgeons. DVM student Caitlin Mendiola prepares to make an incision on her patient in the college's sophomore surgery lab. *Photo by Tom Thompson*

DVM students completing their clinical rotations are responsible for many aspects of patient care, including the most important aspect—TLC. Studies indicate that more than 65 percent of Mississippi households have pets, and owners often consider the health and well-being of their animals to be almost as important as that of their human family members. Dr. Mimi Pelanne, class of 2022 DVM graduate, slows down for a little quality time with a patient before beginning afternoon rounds. *Photo by Tom Thompson*

CVM's Center for Environmental Health Sciences is working to provide biochemical toxicology information to help professionals understand more about how much danger environmental chemicals might pose to animals or humans and what levels of contact with such toxicants can be considered safe. This information is useful in predicting how some of these chemicals might display as pesticides or chemical threat agents, as well as how the tissues of animals and humans can protect themselves from the toxic nature of the chemicals. Dr. Jan Chambers, CVM Giles Distinguished Professor, and doctoral student Thomas Burke conduct a biochemical assay for this research. *Photo by Tom Thompson*

Each summer, CVM hosts a 12-week investigative program to provide veterinary students with training in biomedical research and encourage careers in the field. Each student in the program works with a faculty mentor who has a matching research interest on a relevant medical or veterinary problem. Participants conduct research in their mentors' labs to gather data and analyze and interpret their findings before presenting the results at the Boehringer-Ingelheim NIH Veterinary Scholars Symposium and CVM research day. Dr. Dallas Riley, CVM population medicine resident, and Dr. Alicia Olivier, veterinary pathologist, discuss data from a research project conducted by Riley during the Vet Med Research Scholars Program. *Photo by Tom Thompson*



Catfish production is one of Mississippi's top industries, and CVM is at the forefront of fish health. One of the college's four diagnostic laboratories, the Aquaculture Research and Diagnostic Laboratory in the Thad Cochran National Warmwater Aquaculture Center, plays a vital role in industry efforts to produce high-quality, economical, and profitable products by focusing on the management of important bacterial, parasitic, and viral diseases that affect farm-raised catfish. Dr. Stephen Reichley, CVM assistant professor and associate director of the MSU Global Center for Aquatic Health and Food Security, accompanies a group of doctoral students on a visit to one of the state's many catfish farms. *Photo by Tom Thompson*

CALS

College of Agriculture and Life Sciences

The mission of the College of Agriculture and Life Sciences (CALS) is to advance agriculture and natural resources through teaching and learning, research and discovery, and service and engagement, which will enhance economic prosperity and environmental stewardship and build stronger communities, improve the health and well-being of families, and serve people of the state, region, and world.

Food science, nutrition, and health promotion majors learn to feed a crowd in the Quantity Food Production course, which includes following a budget, purchasing food, preparing the meal, and serving guests. Malone McGhee, Maddie Devine, and Samantha Moore, all food science, nutrition, and health promotion majors, participated in the course taught by instructor Vicki Leach. The four-course meal included tomato soup with parmesan toast; spinach salad with feta and pine nuts; a chicken piccata, angel hair pasta, and asparagus entrée; and berry cheesecake with graham cracker crust. *Photo by David Ammon*

TAKING CARE OF WHAT MATTERS

How we're taking care of what matters:

"Mississippi's poultry industry relies on MSU's Division of Agriculture, Forestry, and Veterinary Medicine in so many ways, whether it is hiring graduates of the poultry science department or incorporating the latest research.

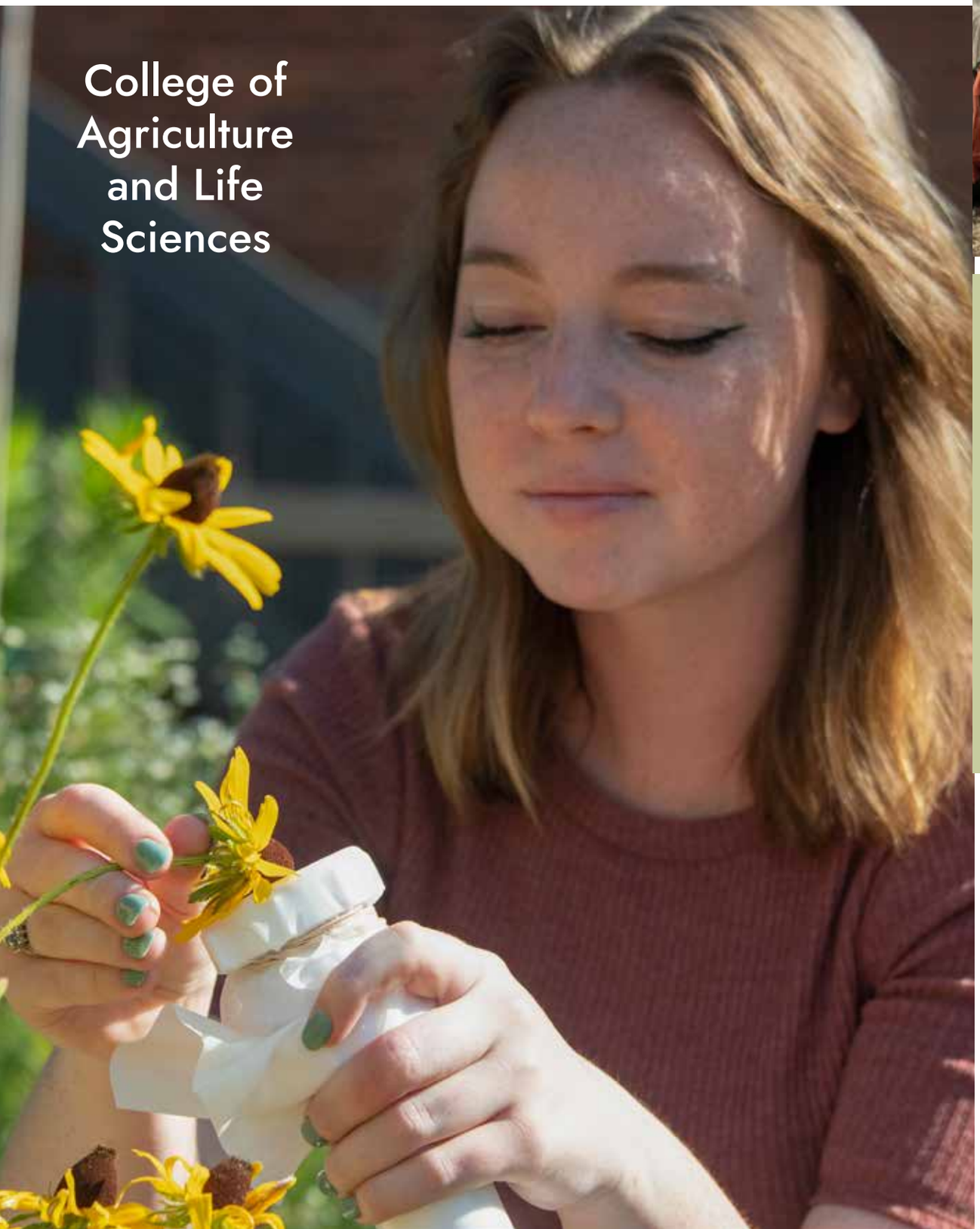
"Other departments that the industry works with include agricultural and biological engineering. Experts from MSU speak at all our seminars for growers and processors and are available to solve problems on the farm or in the plant. The Poultry Research and Diagnostic Lab is vital to helping us quickly respond to disease outbreaks.

"Since Mississippi ranks fifth in broiler production and is home to the largest egg producer in the world, having all this expertise in the state keeps Mississippi in the top tier of poultry production."

MARK LEGGETT
president of the Mississippi Poultry Association

CALS Undergraduate Research Scholars are working with scientists on early, farm-level detection of *Camplobacter jujuni*, a pathogen found in poultry that is a common source of food poisoning. Mackenzie Ripper, a senior poultry science major, conducted this research. She used loop-mediated isothermal amplification (LAMP), a testing method that ultimately proved unworkable in industry settings because of the potential for cross-contamination. However, the project provided insight into the meticulous details and strategies that can be incorporated into future approaches for this research. *Photo by Dominique Belcher*

Bees, butterflies, moths, beetles, flies, hummingbirds, and other species are dwindling, primarily due to the loss of native plants and habitats. Lauren Jennings, a graduate student in the Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology, collects pollen from flowers in the pollinator garden at the Clay Lyle Entomology Building. The pollen will be analyzed, and its nutritional profile will be added to a plant database being built by Dr. Priyadarshini Chakrabarti Basu, one of the MAFES scientists working to understand the nutrition provided by different sources of pollen to help create bee habitats. *Photo by Dominique Belcher*



College of Agriculture and Life Sciences

CALS teaches students the skills they need to compete in the workforce. Majors, minors, and certificates are designed to meet the needs of the industry. Mari Lamkin, a fashion design and merchandising major, completed the retail certificate, based on standards set by the National Retail Federation, to improve her skills. She observes retailing strategies and merchandising at a store on campus. *Photo by Dominique Belcher*

The MSU Equestrian Team hosted two 2-day interactive summer camps, Bridle Up Bulldogs, to teach 9- to 14-year-old campers basic riding skills and animal care and safety techniques. Lauren Wickline, a member of the Equestrian Team, works with a young student on riding skills. The team, open to students from all majors, is housed in the CALS Department of Animal and Dairy Sciences. Ashley Glenn, the facilities supervisor for the MAFES equine unit, serves as the team's head coach. *Photo by Dominique Belcher*

Many row-crop farmers use poly-pipe as a supplemental irrigation system. They line the pipe across their fields and puncture it to allow water to flow out and irrigate crops, but poly-pipe can burst when it's not thick enough to handle the water pressure. Dru Carey, an agricultural engineering technology and business major, runs water through a poly-pipe at varying water pressures to determine how it reacts to increased pressurization. Carey's research will lead to the development of a user guide to assist farmers in selecting the correct thickness of poly-pipe to prevent bursting. *Photo by Dominique Belcher*

CFR

College of Forest Resources

The mission of the College of Forest Resources (CFR) is to promote, support, and enable the management, conservation, and utilization of forest and other natural resources to benefit the stakeholders of Mississippi, the nation, and the world.

Together, CFR and MSUES sponsor natural resource camps offering students in grades 8 to 12 hands-on experience in wildlife science and outdoor recreation. The camps allow students to experience college life and learn about conservation careers. Manuel Coffill-Rivera and Josh Neary, both graduate students in the Department of Wildlife, Fisheries, and Aquaculture, demonstrate how to use a seine net to sample fish in a pond at the MSU Conservation Camp. *Photo by Dominique Belcher*

TAKING CARE OF WHAT MATTERS

How we're taking care of what matters:

"The Nature Conservancy is thrilled to partner with MSU as a leader in applied conservation and land management. It's one thing to read about land management and habitat restoration in a textbook. It's quite another experience when students can touch, feel, and see that management being put into motion right in front of them."

ALEX LITTLEJOHN
state director of the Mississippi chapter of The Nature Conservancy

Students in the CFR Undergraduate Research Scholars Program quantify how much carbon is sequestered in forest soils. Forests improve air quality and mediate climate change. In addition to quantifying the carbon stored in soil, students learn how different approaches, like planting trees for bioenergy and existing forest restoration programs, can increase soil carbon sequestration. Lucas Evanko, a forestry major, examines a pine seedling in the new forestry greenhouse complex at MSU. Evanko is an Undergraduate Research Scholar working under the direction of Dr. Courtney Siegert, associate professor of forestry. *Photo by Dominique Belcher*

Students in the Conservation Physiology Laboratory, a partnership of CFR, FWRC, and MAFES, aim to improve fertility and reproduction in amphibian captive breeding programs so species can be reintroduced to the wild. Nearly 40 percent of amphibian species are in danger of extinction and are suffering population loss from environmental degradation. Namia Stevenson, a graduate student in wildlife, fisheries, and aquaculture, holds a Fowler's toad, a common toad native to Mississippi that serves as a model species in her research. Stevenson used the techniques developed in the Conservation Physiology Laboratory to help Colorado River toads that struggle to reproduce in captivity. Working with the North Carolina Zoo, her work resulted in the hatching of 12 toads. *Photo by David Ammon*

CFR students learn about white-tailed deer from biologists in the MSU Deer Lab, the premier deer research unit in the U.S., to address management issues of regional and national importance. White-tailed deer hunting is a billion-dollar business in Mississippi, and understanding deer ecology and habitat is important for future wildlife biologists. Dr. Steve Demaris, Taylor Chair in Applied Big Game Research and Instruction, explains how antlers are formed and measured to CFR students Lyndsay Culpepper, wildlife, fisheries, and aquaculture major; Jacob Duke, forestry major; and Caitlin Consago, wildlife, fisheries, and aquaculture major. *Photo by Dominique Belcher*

CFR students in the Department of Sustainable Bioproducts work in laboratories where scientists study new methods of developing water-resistant, paper-based packaging materials that use metal ions to repel water and increase paper's usability as a natural resource. Madeline Gnann, a sustainable bioproducts student, places water on hydrophobic paper samples to measure the contact angles of the liquid on the material. She also works with chemical solutions to help find the best coating applications for paper to resist water. *Photo by Dominique Belcher*

Growing southern pine timber is an economic investment for 125,000 landowners throughout the state, and CFR students learn to support that industry by studying environmental factors, such as how seedlings are spaced at planting, to manipulate how trees form as they grow. Max Schrimpf, a forestry graduate student, takes a core sample from a loblolly pine tree planted in 1985 at the John W. Starr Memorial Forest. Schrimpf hopes to determine how the trees grew and how their spacing changed. *Photo by Karen Brasher*

DAFVM Map

RESEARCH & EXTENSION CENTERS

1. Hiram D. Palmertree North MS Research & Extension Center VERONA
2. Delta Research & Extension Center STONEVILLE
3. Frank T. (Butch) Withers Central MS Research & Extension Center RAYMOND
4. Coastal Research & Extension Center BILOXI

MAFES BRANCHES & UNITS

5. North Mississippi Branch HOLLY SPRINGS
6. Pontotoc Ridge-Flatwoods Branch PONTOTOC
7. Northeast Mississippi Branch VERONA
8. Black Belt Branch BROOKSVILLE
9. Delta Branch STONEVILLE
10. Coastal Plain Branch NEWTON
11. E.G. (Gene) Morrison Brown Loam Branch RAYMOND
12. Truck Crops Branch CRYSTAL SPRINGS
13. South Mississippi Branch POPLARVILLE
14. Seafood Processing Lab PASCAGOULA
15. Prairie Research Unit
16. Beaumont Unit
17. White Sand Research Unit
18. McNeill Unit

MSUES UNITS

19. Crosby Arboretum PICAYUNE
20. MSU Horse Park STARKVILLE

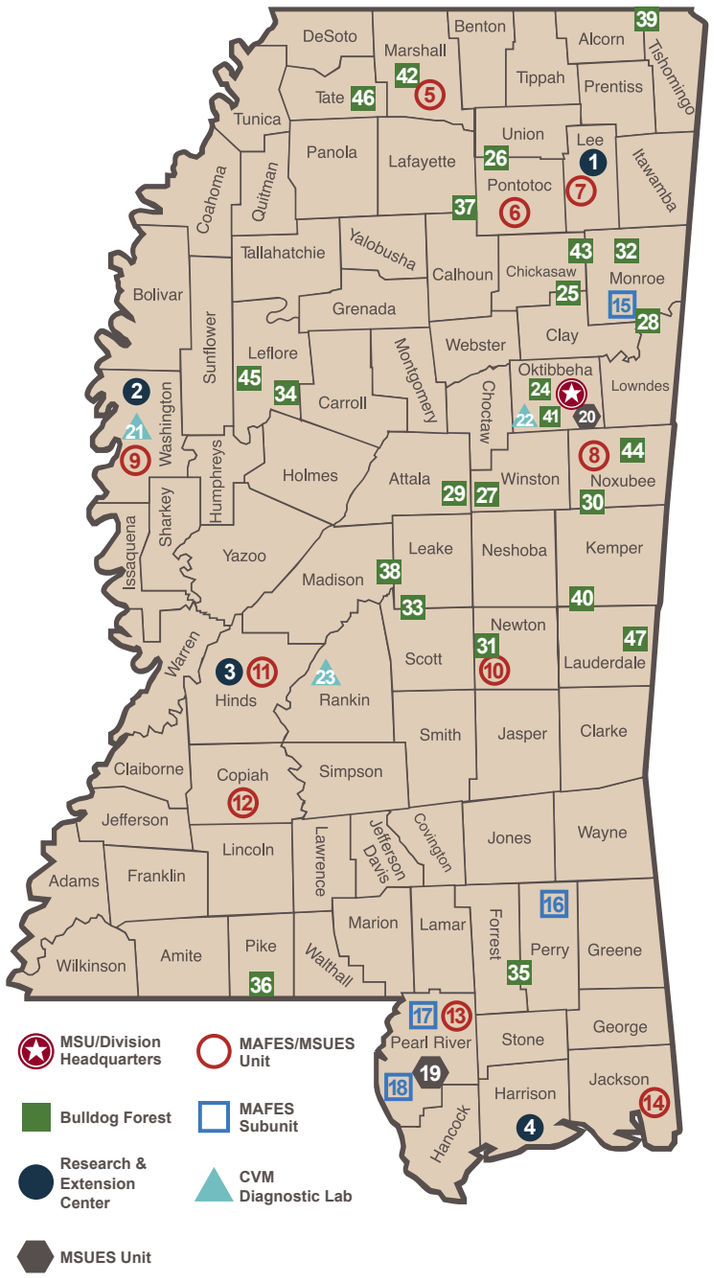
CVM DIAGNOSTIC LABS

21. Aquatic Research & Diagnostic Laboratory STONEVILLE
22. CVM-Diagnostic Laboratory Services MSU
23. Research & Diagnostic Lab/ Poultry Lab PEARL

BULLDOG FORESTS

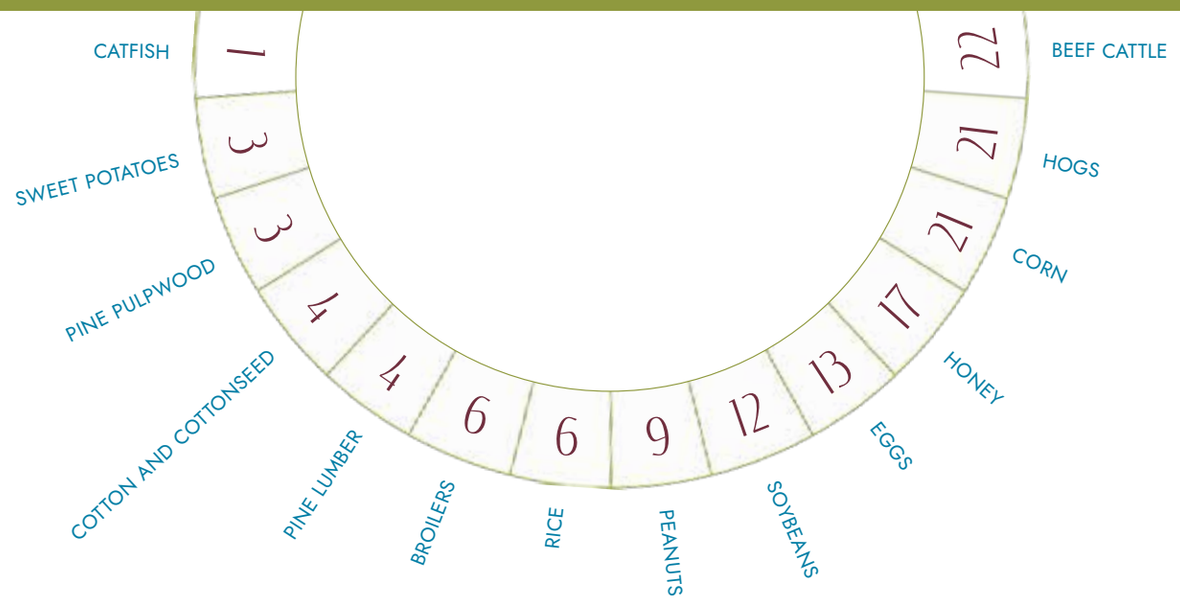
24. Andrews Forestry & Wildlife Laboratory
25. Brand Forest
26. Brooking Forest
27. C.M. Chafee Forest
28. Columbus Air Force Base Property
29. Gober Forest
30. Hall Timberlands Forest
31. Harris Forest
32. H.K. & J.K. Holloway Reserve
33. Col. K.D. Johnson Forest
34. McGeary Sidon Plantation
35. Mortensen Forest
36. Norma Lea O'Quin Forest
37. Phillips Memorial Forest
38. John & Jane Player Property
39. Sharp Forest
40. Shaw-O'Reilly Property
41. J.W. Starr Memorial Forest
42. Annie Seal Matthew–Porter Forest
43. Margaret Demoville Forest
44. The Triplett Forest
45. The Gulledge Forest
46. The Bowen Forest
47. Toomsuba Educational Forest

Three additional forests are unidentified at the request of anonymous donors.



An MSUES office is located in each of the 82 counties.

Commodities



Mississippi ranks among the top **25** states in the production of **14 agricultural** commodities.

$9.72 billion
2022 farm-gate value of **ag** and **forestry** production (includes government payments)

$16.05 billion
2020 value added to the **Mississippi** economy by **ag** and **forestry**

$116.7 million
Grants & contracts received by **MSU** in agricultural sciences and natural resources and conservation FY 2022

Soybean Yields
56 bushels/acre

Cotton Yields
1,033 pounds/acre

Cotton Production
1.13 million bales

Peanut Yields
4,100 pounds/acre

Corn Yields
167 bushels/acre

Corn Production
92 million bushels

Soybean Production Value
$1.78 billion

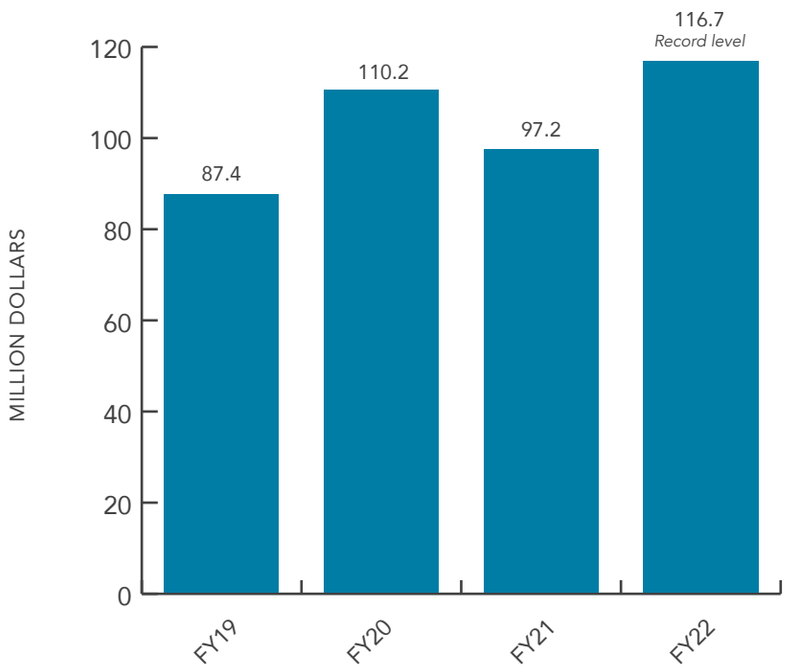
Forestry Production Value
$1.30 billion

Poultry Production Value
$3.84 billion

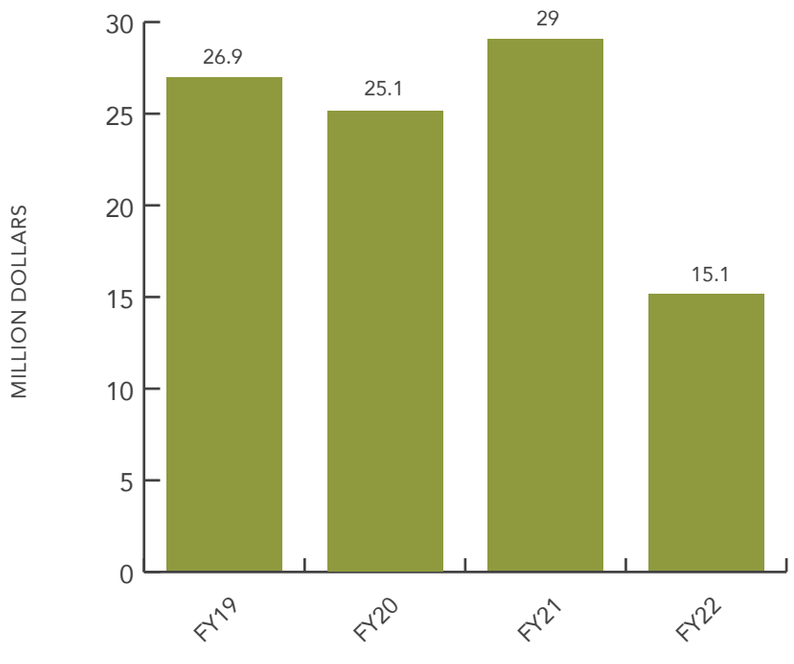
TAKING CARE OF WHAT MATTERS

Budget Overview

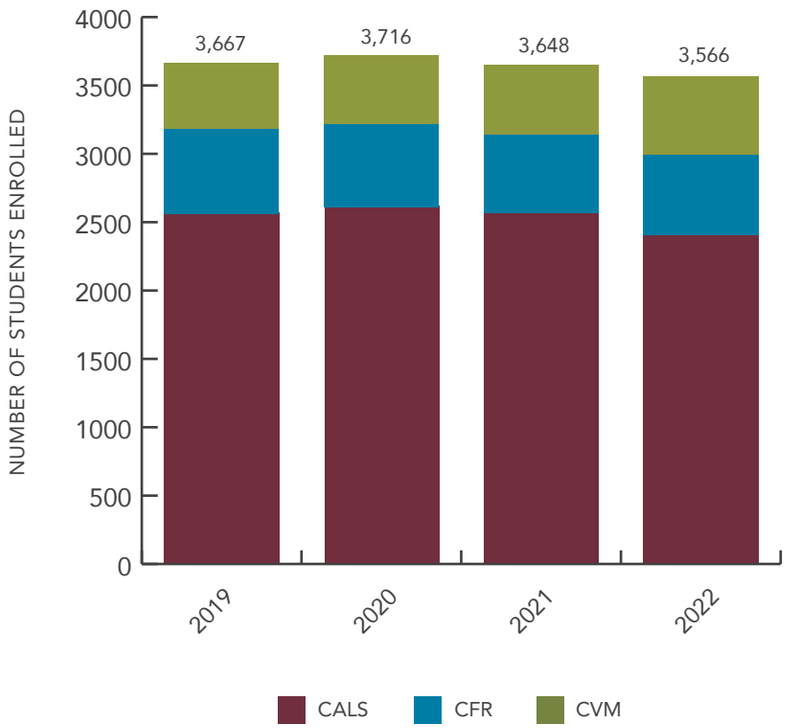
Grants & Contracts Received



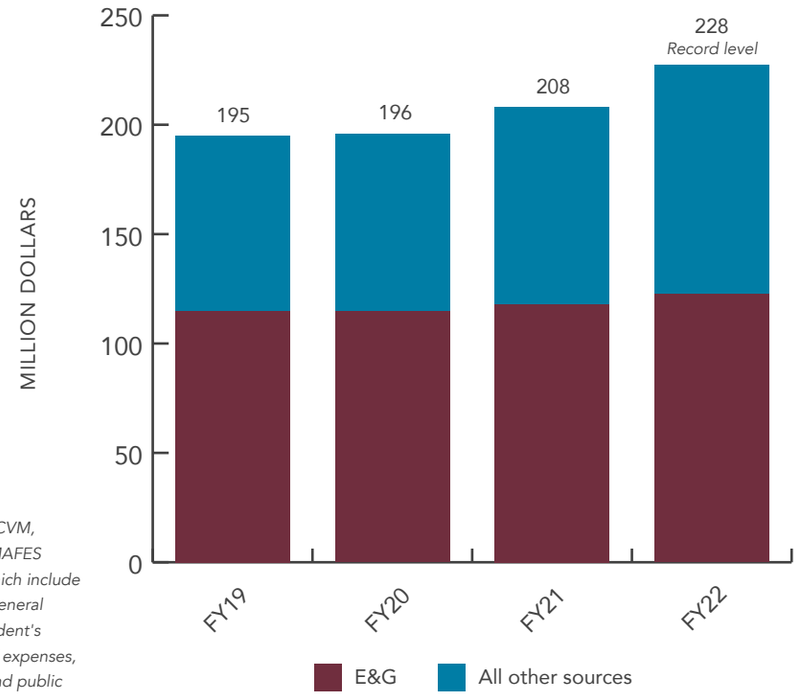
Private Contributions



Enrollment



Total Expenditures



This graph combines CVM, FWRC, MSUES, and MAFES E&G expenditures, which include the educational and general spending for each student's education and related expenses, organized research, and public service. E&G funds include state, federal, tuition, sales, etc. All other sources include restricted and designated funds.


MFF
2022
Dr. George M. Hopper CFK
MFA Student Development Endowment Fund
$ 50,000.00
fifty thousand and 00/100
growing leaders in natural resources
2200


FARMJOUR
FOUNDAT

Giving Opportunities

Minorities in Agriculture, Nature Resources, and Related Sciences (MANRRS)

College of Agriculture and Life Sciences

MANRRS fosters and prioritizes diversity, equity, and inclusion for students through internships, professional development, and networking opportunities.

Photo submitted

MSU Deer Lab Outdoor Science Center

College of Forest Resources

An expansion of the Center's deer research facility will incorporate the latest deer-processing equipment and handling knowledge to allow deer lab scientists to conduct specialized research on foraging, nutrition, reproduction, and behavior.

Photo by Kevin Hudson

Companion Animals Require Excellence (CARE) Fund

College of Veterinary Medicine

Gifts to the CARE Fund help provide a more comfortable space for patients and their owners, as well as upgraded and expanded treatment areas and equipment for clinicians. The CARE Fund also eases the financial burden for pet owners during desperate emergency situations. Gifts can be made in any amount and can also honor or memorialize a person or pet.

Photo by Tom Thompson

SCAN TO MAKE A GIFT.

Produced by Agricultural Communications.

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