Advancing Research, Partnership & Impact

2021 IMPACT REPORT

FOUNDATION FOR FOOD & AGRICULTURE RESEARCH

Bold science for big challenges

Bold Science for Big Challenges

Thank you for supporting the Foundation for Food & Agriculture Research (FFAR). Connect with us to learn about funding opportunities, grant updates, impacts and the latest food and agriculture industry news.

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FFAR

Letter from Our Board Chair

Welcome

Dear Friends of FFAR,

Last year saw a series of transitions for FFAR. We learned in 2021 that FFAR's inaugural Executive Director Dr. Sally Rockey planned to retire. We celebrated her pioneering career with events that properly showcased her commitment to food and agriculture research and her legacy of supporting early-career scientists.

FFAR's Board of Directors renamed the FFAR Fellows Program as the Rockey FFAR Fellows Program to honor Dr. Rockey's commitment to preparing the future scientific workforce. FFAR also established the Rockey FFAR Fellows Fund to make professional development opportunities more accessible to students from all backgrounds.

Additionally, board members have recognized Dr. Rockey as FFAR's executive director emeritus. The emeritus title is an honor reserved for individuals who demonstrate the highest level of service and commitment to an organization. Dr. Rockey has earned such a title through her leadership, which established FFAR as a food and research powerhouse; her research legacy, which created research opportunities at the National Institutes of Health, the United States Department of Agriculture, and FFAR that are improving countless lives; and her enduring commitment to support the next generation of scientists.

The Board of Directors worked collaboratively to name Dr. Saharah Moon Chapotin as FFAR's next executive director. We are looking forward to welcoming Dr. Chapotin to FFAR this August.

The FFAR Board of Directors also experienced changes in 2021. We were saddened to see Bob Stallman, past president of the American Farm Bureau Federation, and Dr. Deborah Delmer, professor emeritus at the University of California, Davis, leave the FFAR Board of Directors. We are grateful for their insights and contributions. We also welcomed Krysta Harden, president and CEO of the U.S. Dairy Export Council, to the board this year. I would like to express my appreciation to my fellow board members, who contribute their time, energy, and effort to ensure FFAR's continued success.

> As the first and only public-private partnership model for public agriculture research, FFAR's model is working. FFAR surpasses the match requirements, garnering on average $1.40 in non-federal funding for every federal dollar.

Not only does investing in FFAR produce a powerful return for taxpayers, but our research equips farmers with the tools, strategies, and technologies they need to increase sustainability. FFAR is designing research with the agriculture community and private-sector funders to ensure results address an existing problem farmers face and that the private sector can utilize these results to develop products that benefit farmers, consumers, and the environment. FFAR is also preparing today's scientific workforce with the knowledge they will need to solve the challenges of tomorrow.

Thank you for supporting FFAR as we continue to advance audacious research addressing the biggest food and agriculture challenges.

Sincerely,

Mark E. Keenum, Ph.D.
Chairman and Inaugural Member, FFAR Board of Directors
President, Mississippi State University

Letter from Our Interim Executive Director

Dear Friends of FFAR,

The retirement of FFAR's inaugural Executive Director Emeritus Dr. Sally Rockey left large shoes to fill. I am honored to serve both as interim executive director and chief operating officer at an exciting time in the organization's history. The research we funded starting in 2016 is yielding new knowledge, strategies, tools and technologies that can transform the future food system. The following Impact Report highlights some of these pioneering results.

In 2021, FFAR continued building collaborative partnerships, funding bold research and supporting scientific workforce development.

> Our talented staff awarded 42 grants and seven programs and consortia in 2021 while also elevating existing programs.

We celebrated the one-year anniversary of AgMission™ and welcomed PepsiCo, McDonalds USA and The Nature Conservancy as Founding Partners. FFAR also awarded a $10 million grant to support the dairy industry's efforts to adopt technologies that improve environmental health and launched the Greener Cattle Initiative to reduce enteric methane emissions.

FFAR is also building on the Diversity, Equity and Inclusion Commitment we announced in 2020. The Kirchner Food Fellowship launched its first Historically Black Colleges and Universities (HBCU) cohort. We are working to ensure all applicants have equal access to FFAR funding and are getting new insights on our applicants. In 2021, 39 percent of the applicants for our scientific workforce development programs are women and 39 percent are people of color.

Going forward, you will see more on the investment FFAR is making in understanding the impact of our research and ensuring this investment gets back to the producers to increase productivity and sustainability. This annual Impact Report is the first of many efforts to ensure our stakeholders are benefiting from the bold science FFAR funds. Thank you to our partners, grantees and supporters who work with us to advance this research that benefits farmers, consumers and the environment.

Reflecting on the past year, I am proud of the work we have done, and more importantly, our talented team. We are a stronger, more agile organization because of the FFAR staff who bring audacious food and agriculture research to life.

Sincerely,

Julie Reynes
Interim Executive Director and Chief Operating Officer

Who We Are

Our Vision

We envision a world in which pioneering, collaborative science provides every person access to affordable, nutritious food grown on thriving farms.

Our Mission

We build collaborative partnerships to support audacious science addressing today's food and agriculture challenges.

Strategic Plan

FFAR's Strategic Plan includes five organizational goals that influence all aspects of our work.

Goal 1

Build inclusive public-private partnerships to fund innovative food and agriculture research.

Goal 2

Serve as a leading voice representing food and agriculture research.

Goal 3

Develop the scientific workforce for food and agriculture.

Goal 4

Further FFAR by strengthening the core and achieving financial sustainability through expanding resources.

Goal 5

Further FFAR's mission by honing a high-performing organizational culture and living our values.

Our Values

Audacity | Collaboration | Rigor | Pioneer | Agility

What We Do

FFAR builds public-private partnerships to support bold science. Our research, co-created with the agriculture community, increases public agriculture research investments, fills critical research gaps and complement USDA's research agenda. We also invest in the future scientific workforce.

FFAR's pioneering science provides everyone access to affordable, nutritious food grown on thriving farms. We do this in two ways:

We Conduct Research in Key Challenge Areas

Food and agriculture systems are complex, requiring collaboration among many disciplines and experts. Our Challenge Area research targets urgent food and agriculture topics. The actionable results of this research aim to benefit producers, consumers and the environment.

- Soil Health
- Advanced Animal Systems
- Sustainable Water Management
- Health-Agriculture Nexus
- Next Generation Crops
- Urban Food Systems

We Invest in the Scientific Workforce

Pioneering science is only possible with a diverse, creative scientific workforce. We have fellowship, grant and award programs to recognize scientific leaders, provide unique research opportunities, support young faculty and inspire the next generation of scientists.

2021 Progress

Advancing Audacious Research

We identify gaps in food and agriculture research where increased investment propels science into action. Then, we convene a wide range of diverse partners to fund and conduct research. The FFAR model is yielding results.

6
CHALLENGE AREAS

1
CLIMATE INITIATIVE
AgMission™

42
GRANTS AWARDED

8
CONVENING EVENTS

7
NEW PROGRAMS & CONSORTIA LAUNCHED

FFAR's partnerships successfully increase investment in food and agriculture research.

550+
TOTAL FUNDING PARTNERS SINCE 2014

$53M
MATCHING FUNDS GRANTED IN 2021*

$50M
FFAR FUNDS INVESTED IN RESEARCH*

$1:$1.4
AVERAGE RATIO OF FFAR TO MATCHING FUNDS

**Due to the strength of our partners and staff, FFAR leveraged $50 million of its federal funding to grant $53 million in match funding.*

Developing the Scientific Workforce

FFAR prepares the scientific workforce to address future food and agriculture challenges.

1
NAS PRIZE WINNER

9
NEW INNOVATORS

26
ROCKEY FFAR FELLOWS

14
VET FELLOWS

3
KIRCHNER FOOD FELLOWS

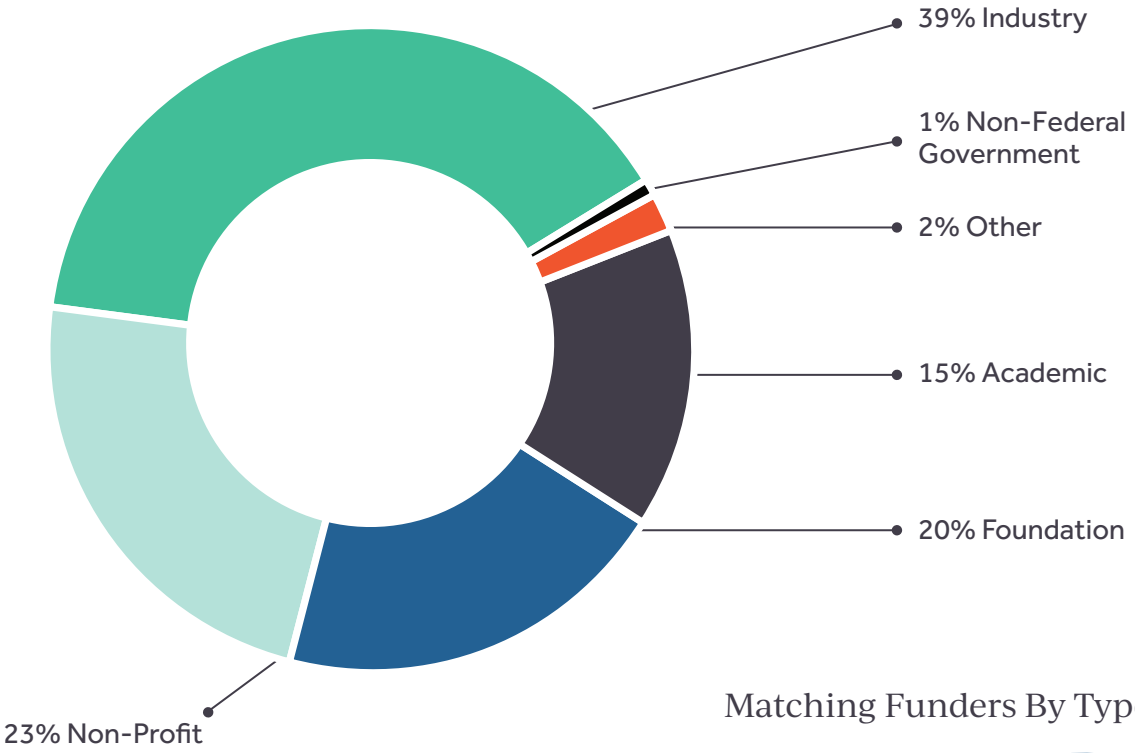
Matching Funding

The 2014 Farm Bill provided FFAR with $200 million, and the requirement that FFAR match every federal dollar with a dollar from a non-federal source. As a result of FFAR's successes, Congress further provided $185 million in the 2018 Farm Bill.

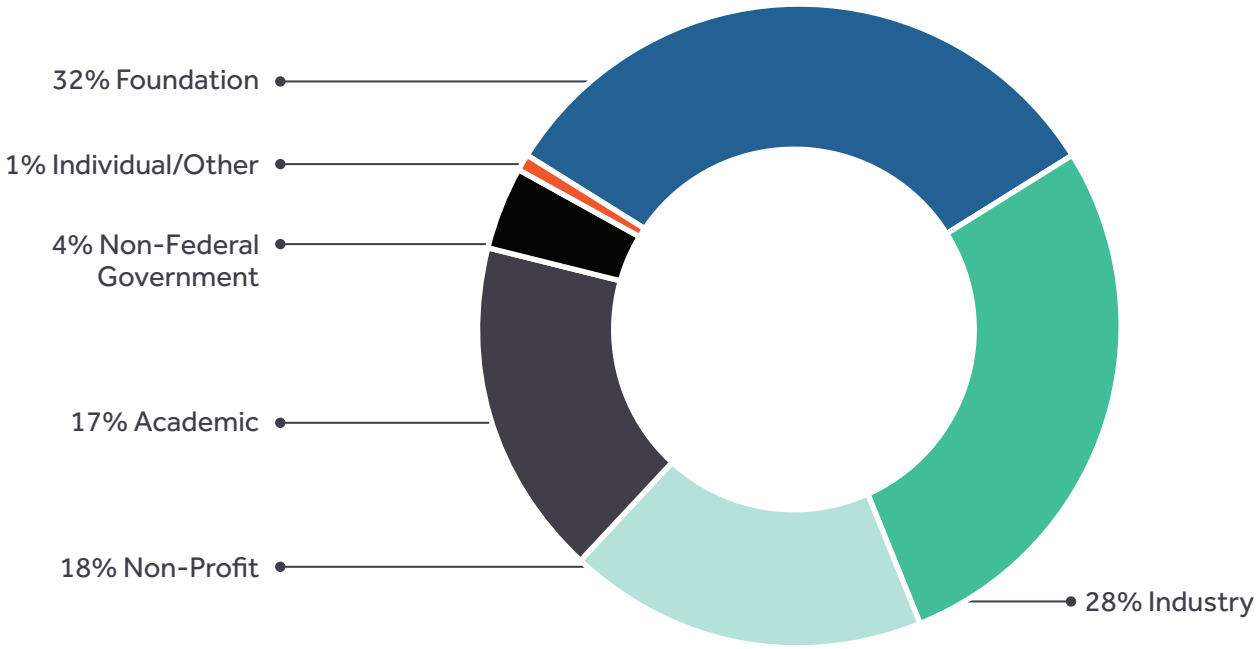
To build collaborative public-private partnerships, FFAR operates at the nexus of industry, academia and the public, bringing together a vast network of stakeholders to support the audacious food and agriculture science. In 2021, we continued to outperform, raising over $75 million in matching funds in 2021, $53 million of which were granted out within the year.

FFAR's network of matching partners spans academia, non-profits, foundations, industry, and state and local governments. In 2021, industry comprised the largest portion of matching funds at 39 percent.

2021 Matching Funders By Type (USD)



Matching Funders By Type Cumulative (USD)



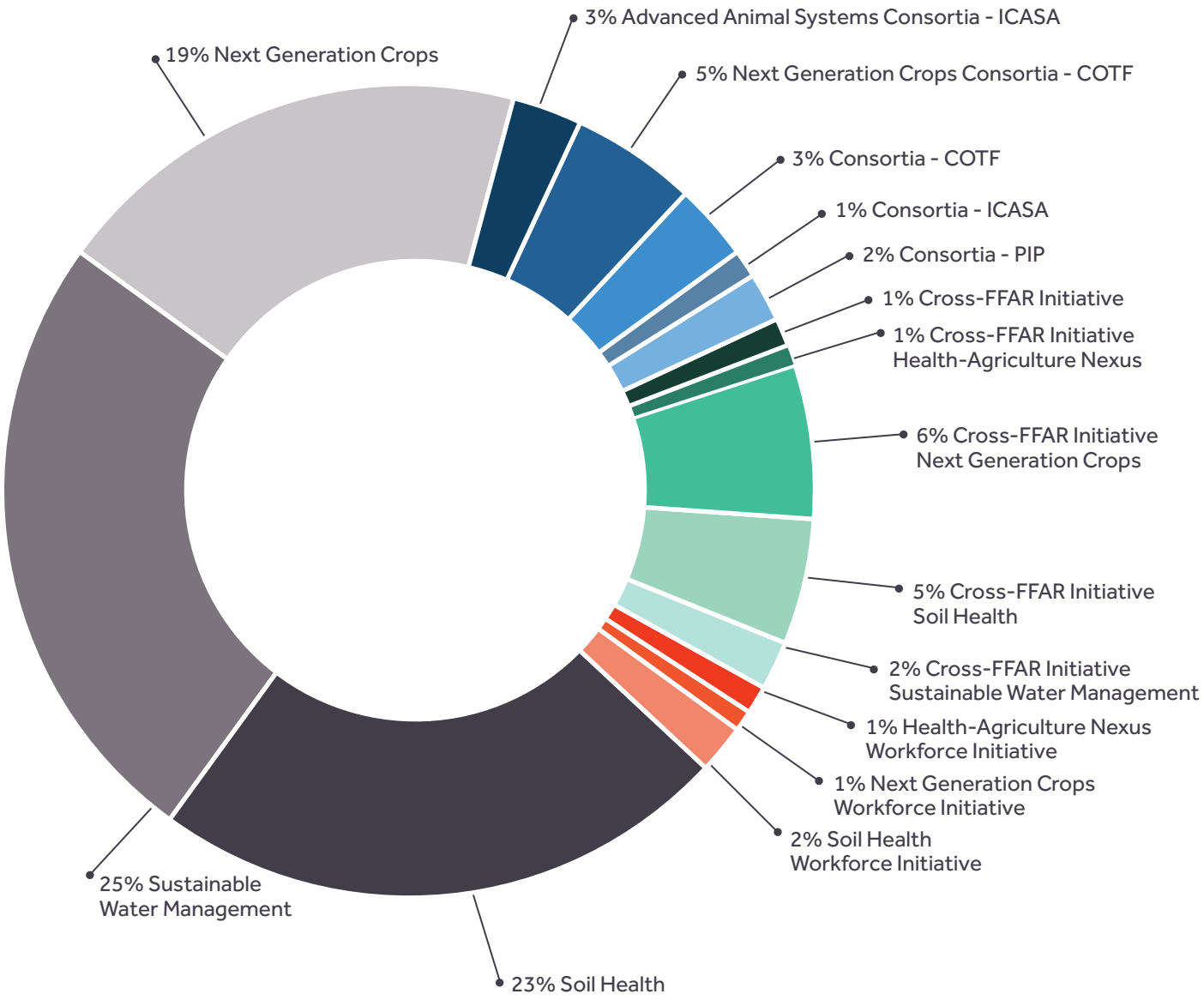
While foundations still comprise the largest portion of cumulative matching funds, industry matches are catching up and now comprise 28 percent of the cumulative total.

FFAR

2021 Grants Breakdown

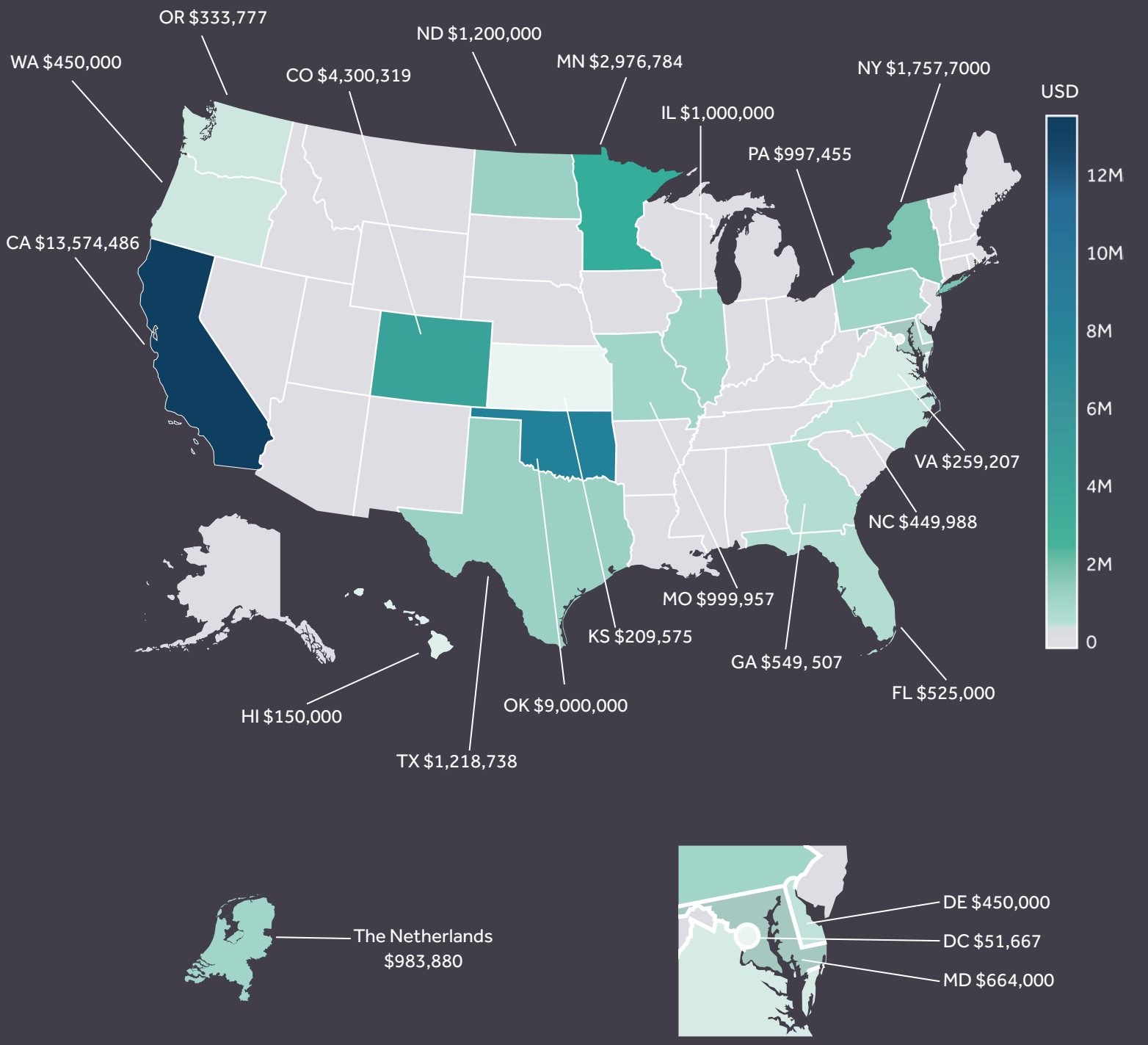
This year, FFAR directly funded nearly $50 million in grants.

2021 Grants by Challenge Area or Program (USD)



Geographic Reach

2021 grants by location of recipient institution



Research Impact Highlights

In pursuit of audacious science, we always have a wide range of grants in process. Given the nature of the scientific process, grants typically cover a period of a few years. This means that significant impacts or breakthroughs often emerge near the end of the grant period or continue to emerge in the years after grant closure.

This report offers a snapshot of key research impacts that emerged in 2021. For more information on all grants FFAR to date, please see our awarded grants page.

Impact Highlight

Modeling the Future of Food in Your Neighborhood

Challenge Area
Urban Food Systems

$936,418
FFAR Award Amount

$1.9 million
Total Award Amount

Matching Funders
Albert Einstein College of Medicine, Case Western Reserve University School of Medicine – Center for Health Affairs, City of Cleveland Mayor's Office of Sustainability, Cleveland State University, Greater Cleveland Food Bank, Hunger Network of Greater Cleveland, The Ohio State University (OSU) Extension Cuyahoga County, OSU John Glenn School, OSU SNAP-Ed, Saint Luke's Foundation, The Food Trust, Unify Project and University Hospitals Cleveland Medical Center

Challenge

In Cleveland, nearly two out of three residents have limited access to full-service supermarkets. This lack of access has an impact on nutrition and health.

Research

In 2018, as part of FFAR's Tipping Points program, FFAR awarded a grant to Dr. Darcy Freedman of Case Western Reserve University to develop decision-making computational models to maximize the equity of food system initiatives in and around Cleveland. Dr. Freedman and her team explored the synergistic relationships between initiatives to improve nutrition, food security and economic opportunity among residents.

Impact

The research team actively worked with communities and specifically examined racism and redlined neighborhoods. Together with communities, they identified potential levers for systems change that are often ignored by practitioners – factors such as economic development, incarceration rates and social connectivity. As a result of this research, Cleveland has access to a stronger model for lasting food systems change.

Impact Highlight

Integrating Community & Modeling Efforts to Evaluate Impacts & Tradeoffs of Food System Interventions

Challenge Area
Urban Food Systems

$1.0 million
FFAR Award Amount

$2.0 million
Total Award Amount

Matching Funders

Colorado Food Policy Network, Colorado Fruit and Vegetable Association, Colorado Potato Advisory Committee, Colorado Wheat Research Foundation, Colorado State University, City/County of Denver, LiveWell Colorado, Denver Museum of Nature and Science, Denver Urban Gardens, Field to Market, Institute for People, Place and Possibility and Kaiser Permanente

Challenge

Cities across the US implement food policies to support vibrant, healthy communities. However, generally, these policies only consider urban areas and do not specifically address ways to support the broader region, including rural communities. Thus, food policies may ignore potential outcomes that could be a win-win for both cities and rural areas.

Research

In 2018, FFAR awarded a Tipping Points program grant to Dr. Becca Jablonski of Colorado State University to examine how a specific Denver food policy, the Denver Food Vision, could impact not only food security and health within the city but also environmental, economic and farm viability outcomes within the region. Dr. Jablonski and her team developed models to understand the tradeoffs that policymakers need to make and how they can impact the entire region.

Impact

The models developed from this research empower urban food councils to make more impactful policy that can increase profit to farmers and have other positive impacts even beyond urban areas. The team is now advising city officials to broaden the impact of Denver food policy for vibrant, healthy communities in both the city and the broader region.

Impact Highlight

Understanding & Reducing Consumer Food Waste

Challenge Area
Health-Agriculture Nexus

$336,000
FFAR Award Amount

$673,000
Total Award Amount

Matching Funder
Walmart Foundation

Challenge

Each US consumer wastes, on average, a pound of food every day. Food waste is not only a financial loss, but it also creates a loss of nutrients and a loss of the inputs that went into growing the food.

Research

To better understand consumer food waste, FFAR awarded a grant to the National Academies of Science, Engineering and Medicine to identify how consumers behave toward food and determine opportunities for system change. Professor Emirita Dr. Barbara O. Schneeman chaired the multidisciplinary, expert committee that examined existing data, information and research to conduct this study.

Impact

As a result of this grant, in 2021, the National Academies of Sciences, Engineering and Medicines released a report articulating a national strategy to reduce food waste. The research team also published a detailed paper on their work, exploring the many causes of food waste in the US through a holistic, systems perspective.

Impact Highlight

RIPE: Realizing Increased Photosynthetic Efficiency for Sustainable Increases in Crop Yield

Challenge Area
Next Generation Crops

$15 million
FFAR Award Amount

$60 million
Total Award Amount

Matching Funders
The Bill & Melinda Gates Foundation, the Foreign, Commonwealth & Development Office (formerly the UK Department for International Development) and the University of Illinois

Challenge

Over the last century, the Green Revolution in science enabled a new generation of plants that feed millions of people across the world. However, these advances have reached their biological limits and will not be sufficient to sustain a growing population, projected to be 11.2 billion by 2100.

Research

In 2017, FFAR made its largest grant to date to support RIPE. This research is dedicated to engineering crops to be more productive by improving photosynthesis. The research team is hacking the 170-step photosynthetic process to enable farmers to produce more and meet the food needs of the global population.

Impact

The following impactful studies from the RIPE project were published in 2021:

- In today's densely planted crops, there are many fluctuations in the sunlight that leaves receive. Slow adjustment to light changes costs up to 40 percent of potential crop productivity. The RIPE team developed a model that can improve the response time of plants such as corn to adjust more rapidly to fluctuations in light, potentially leading to a 10 – 20 percent increase in yield.
- By analyzing almost 20 years of crop yield data, Dr. Peng Fu and his team determined that corn and soybeans have drought "memory." This means that when these crops experience drought conditions or extreme temperatures early on, they are better able to withstand these conditions later in their growth. This opens the possibility for breeding to achieve a similar outcome to mitigate the effects of climate change.
- Rubisco is an important enzyme that drives photosynthesis, but it operates at a notoriously slow pace that slows photosynthesis. Dr. Ben Long and his team used a mathematical model to learn more about how Rubisco functions. RIPE Researchers determined that they could speed up Rubisco by increasing the amount of available carbon dioxide. The outcomes of this study, published in PNAS, provide insight into the correct function of Rubisco and give us a better understanding of how we expect it to perform in plants.

Impact Highlight

Improving Simulations of Water Dynamics & Crop Yield in the Corn Belt

Challenge Area
Soil Health

$300,000
FFAR Award Amount

$600,000
Total Award Amount

Matching Funder
Iowa Crop Improvement Association

Challenge

70 percent of crop yield losses in the Midwest are related to inefficient water use. Unfortunately, crop models that predict yields and how crops respond to climate change ignore the contribution of groundwater. As a result, climate change predictions on grain yield are uncertain, especially in environments with significant groundwater, such as parts of the Midwest Corn Belt.

Research

In 2017, FFAR awarded a grant to Dr. Sotirios Archontoulis at Iowa State University to improve crop models to better understand how groundwater, especially excess groundwater, affects yields.

Impact

The Iowa State University team's findings show that the existence of water tables provides a buffer against weather variability such as drought. Over a 30-year period in central Iowa, for example, shallow water tables increased maize grain yields by 15 percent and yield stability by 13 percent compared to soil with no water table. However, they also found that for row crops such as corn and soybean, moisture above 95 percent saturation can limit yield. Based on their research, the team improved crop models to account for groundwater and released web-based tools to help growers and other researchers better predict crop yields based on the availability of soil water..

Impact Highlight

Improving Dairy Feed Efficiency, Sustainability & Profitability by Impacting Farmer's Breeding & Culling Decisions

Challenge Area
Advanced Animal Systems

$1 million
FFAR Award Amount

$2 million
Total Award Amount

Matching Funder
Council on Dairy Cattle Breeding

Challenge

Feeding dairy cows is a major expense, accounting for more than half of dairy farm costs. By selecting cows that consume less feed while still producing the same or more milk, dairy farmers could significantly lower their costs.

Research

In 2018, FFAR awarded a grant to Dr. Mike Van de Haar at Michigan State University to understand how farmers can select the most efficient cows. To predict feed intake, researchers monitored cows' temperature, feeding behavior and locomotion, along with milk spectral data for thousands of cows.

Impact

Through this grant, Dr. Van de Haar's team developed the "feed saved" trait, which allows famers to select the most efficient dairy cows. Selecting the most efficient cows not only saves farmers feed costs, but also provides positive environmental impacts. As a result of the success and impact of this research, the results have been incorporated into the national dairy cow breeding program. Selecting for the "feed saved" trait can increase US dairy producer profitability by $8 million per year.

Scientific Workforce Impact

In addition to building public-private partnerships to fund pioneering science, FFAR also invests in developing the scientific workforce. The challenges facing agriculture are ever changing and we must prepare the workforce today to address the food and agriculture challenges of tomorrow.

FFAR

Scientific Workforce Development Programs

Kirchner Food Fellowship

This year, the FFAR-supported Kirchner Fellowship launched its first Historically Black Colleges and Universities (HBCU) cohort. The 2021 cohort of three students serve as impact investors for one year, investing real money in an early-stage, minority-owned business in the agriculture in the agriculture and food ecosystem.

Rockey FFAR Fellows Program

Hosted in partnership with North Carolina State University, the Rockey FFAR Fellows Program provides professional development training and mentorship to doctoral students conducting research that aligns with FFAR's Challenge Areas. In 2021, FFAR announced our fourth cohort of 26 awardees. The program was renamed to honor the retirement of FFAR's Executive Director Emeritus, Dr. Sally Rockey.

National Academy of Sciences Prize in Food & Agriculture Sciences (NAS Prize)

This award, endowed by FFAR and the Bill & Melinda Gates Foundation, recognizes a mid-career scientist at a US institution who has made an extraordinary contribution to agriculture or food production. The 2021 NAS Prize went to Dr. Christina Grozinger of Penn State University for her work addressing the pollinator crisis and supporting bees in urban, agricultural and natural landscapes.

New Innovator in Food & Agriculture Research Award

The New Innovator Award supports early-career scientists conducting research in one of FFAR's Challenge Areas. In April, FFAR announced the 2021 recipients, who collectively received $3,503,992 in FFAR grants for a total of $4,174,475 including matching funds.

FFAR Vet Fellows

Partnering with the Association of American Veterinary Medical Collages, FFAR awarded the 2021 cohort of Veterinary Student Research Fellowships. The Vet Fellows Program offers veterinary students an opportunity to pursue research on agricultural productivity, public health and environmental sustainability. In response to the COVID-19 pandemic, the parameters were also extended to include zoonotic and pandemic research.

Scientific Workforce Snapshot

53
SCIENTIFIC WORKFORCE DEVELOPMENT GRANTS AWARDED

39%
OF APPLICANTS ARE WOMEN

39%
OF APPLICANTS ARE PEOPLE OF COLOR

Additional 2021 Highlights

FFAR is proud of several other announcements and impacts this year, including:

- AgMission, a global partnership of farmers, ranchers and scientists co-creating and rapidly expanding innovation, adaptation and the adoption of climate-smart farming practices, announced the addition of PepsiCo, McDonald's USA and The Nature Conservancy as Founding Partners.
- FFAR participated in Agriculture Innovation Mission for Climate (AIM for Climate), which launched at the 26th annual UN Climate Change Conference of Parties (COP 26). AIM for Climate is accelerating investment in climate-smart agriculture and food systems over the next five years.
- FFAR funded a Noble Research Institute grant that brings together 11 researchers from nonprofit organizations to understand how grazing management decisions impact the soil health of grazing lands.
- The Advanced Animal System Challenge Areas launched the Greener Cattle Initiative, an industry-oriented consortium that is awarding approximately $5 million over the next five years to fund research that provides beef and cattle producers with solutions for enteric methane, which is the largest source of direct greenhouse gas emissions in the beef and dairy sectors.

Looking Ahead

In 2022, FFAR plans to continue expanding AgMission's projects and partnerships, launch a new scientific workforce development program dedicated to fertilizer efficiency research and either develop several new programs and consortia including the following:

FFAR partnered with the Global Alliance for Improved Nutrition (GAIN) to launch Harvest for Health initiative in March 2022 that is accelerating the development of underutilized crops, increasing the diversity of foods in the marketplace.

GREENER CATTLE INITIATIVE

The Greener Cattle Initiative, formed in 2021, is issuing its first request for applications in spring 2022.

FFAR, the Walton Family Foundation and the National Fish and Wildlife Federation are launching a new funding opportunity in summer of 2022: Achieving Conservation through Targeting Information, Outreach and Networking (ACTION).

Additionally, FFAR continues to develop diversity, equity and inclusion policies, initiatives and outreach.

Contributors

In 2021, FFAR actively fundraised for three initiatives. As in past years, FFAR fundraises to support investment in our research grants. This fundraising effort is ongoing. FFAR continues to fundraise for AgMission and bring on Founding Partners. Lastly, FFAR's Board of Directors renamed the Rockey FFAR Fellows Program in honor of our Executive Director Emeritus Dr. Sally Rockey and her commitment to supporting young scientists. FFAR also established the Rockey FFAR Fellows Fund to make the Program's professional development opportunities more accessible to all participants. FFAR fundraised for the Rockey FFAR Fellows Fund in 2021.

FFAR maintains a full list of Contributors on our website.

FFAR Financials

ASSETS	
Cash and equivalents	$ 14,181,516
Certificate of deposit	200,248
Contributions receivable	17,413,865
Award match receivable	114,042,059
Investments	286,842,885
Security deposits	141,587
Total assets	$ 432,822,160
LIABILITIES AND NET ASSETS	
Liabilities	
Accounts payable and accrued expenses	$ 842,770
Grants payable	190,079,183
Conditional grant	100,930,142
Deferred rent	602,877
Total liabilities	$ 292,454,972
Net assets	140,367,188
Total liabilities and net assets	$ 432,822,160

STATEMENT OF ACTIVITIES

Year Ended December 31, 2021

REVENUE	
Recognition of Federal appropriation	$ 75,332,739
Matching award revenue	72,560,841
Investment income	18,442,380
Consortia revenues	575,858
Contributions	2,196,040
Total revenue	$ 169,107,858
EXPENSES	
Program	
Grants and awards program	$ 105,201,454
Supporting services	
General and administrative	2,068,575
Development	1,557,396
Total expenses	$ 108,827,425
TOTAL REVENUE LESS EXPENSES	$ 60,280,433

FFAR

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