

Seeding Solutions Request for Application

The Foundation for Food and Agriculture Research (FFAR) is once again seeking applications through our Seeding Solutions funding opportunity. FFAR, as a core component of our mission, is putting a call out to the community in an effort to encourage the development of unique partnerships that support innovative and potentially transformative research focused on our newly updated Challenge Areas. For 2020, FFAR anticipates funding at least one meritorious and transformative application in each of FFAR's six [Challenge Areas](#). FFAR is placing priority on those projects that demonstrate strong partnerships and significant agricultural advancements through innovation.

Key Dates

Pre-Application Open: January 22, 2020 at 12:00pm ET

Pre-Applications Due: February 26, 2020 at 5:00 PM ET

Submitting a pre-application is required to submit a full application.

Full Application Invitation: April 22, 2020

Full Application Receipt Open: April 22, 2020 at 12:00pm ET

Only open to applicants invited to submit a full application.

Full Applications Due: June 24, 2020 at 5:00 PM ET

Award Notification: Fall 2020

Anticipated Project Start Date: Early 2021

We encourage applicants to reach out to the appropriate Scientific Program Director for their Challenge Area of interest to hone their ideas prior to submitting a pre-application (details below).

To be considered, applications must address and provide solutions to an intractable problem and/or accelerate innovation within FFAR's Challenge Areas.

Requirements:

*Applications **must** describe transformative research that addresses and provides solutions to an intractable problem and accelerates **innovation** within FFAR's Challenge Areas through partnership.*

We define innovation for this request for applications (RFA) in three categories:

1. Applied Innovation: Application and validation of **new or emerging** technologies, processes or management strategies to address major challenges in food and agriculture.
2. Re-imagined Innovation: Adaptation of **existing** technologies, processes or management strategies for use in entirely new agricultural applications.
3. Radical Innovation: **Development** of **new** technologies, software, algorithms, methodology or products.

We are actively seeking projects that foster innovation with the potential for transformative impact in each of FFAR's Challenge Areas. FFAR will only consider research applications that:

1. Have the potential for a transformative impact within the selected Challenge Area:
 - [Health- Agriculture Nexus](#)
 - [Advanced Animal Systems](#)
 - [Sustainable Water Management](#)
 - [Soil Health](#)
 - [Next Generation Crops](#)
 - [Urban Food Systems](#)
2. Demonstrate fully-integrated partnerships with different sectors (private, NGOs, governments, academia, end-users, etc.), such that research outcomes may be scalable and applicable to food and agriculture systems. **The development of public-private partnerships is central to FFAR's vision and core mission: *building unique partnerships to support innovative science addressing today's food and agriculture challenges.* Applications that demonstrate strong partnerships by way of matching from external sources outside the applicant institutions are strongly encouraged.** These partners may include but are not limited to private sector, non-profits, commodity and trade groups, state governments, and others that do not traditionally work in agriculture.
3. Contribute to the goal of sustainable food and agriculture, defined as practices that, "satisfy human food and fiber needs; enhance environmental quality and the natural resource base upon which the agricultural economy depends; make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls; sustain the economic viability of farm operation; and enhance the quality of life for farmers and society as a whole." (Food and Agriculture, Conservation and Trade Act of 1990, Public Law 101-624, Title XVI, Subtitle A, Section 1603).
4. Serve the public good by making data open and accessible to the public, creating unique economic development opportunities, and/or contributing to food and agriculture workforce development.

Eligibility

The Foundation for Food and Agriculture Research welcomes applications from all U.S. institutions of Higher Education, non-profit and for-profit organizations, government-affiliated researchers, and domestic and international organizations.

Any individual(s) with the skills, knowledge, and resources necessary to carry out the proposed research as Program Director(s)/Principal Investigator(s) is invited to work with his/her organization to develop an application for support.

Award Information

Anticipated Project duration: Between 12 and 60 months

Minimum Request from FFAR per Application: \$300,000

Maximum Request from FFAR per Application: \$1,000,000

Applicants are advised not to interpret the maximum allowable amount under this opportunity as a suggestion that they should expand their anticipated budget to this level. Reasonable budgets clearly work in favor of the applicant. Budgets that are not commensurate with proposed work or poorly justified will likely have a negative impact on the overall evaluation of the application.

- The number of projects selected for funding may vary by Challenge Area.
- At least one-to-one match is required for this opportunity. Matching funds must come from a non-federal source. Our Matching Guidelines can be found [here](#).
- Matching funds must correspond to line items in the full application budget. At least 50% of matching funds must be cash match. The remainder could be in-kind match. Matching funding must supplement and not supplant any pre-existing funds for the project. FFAR encourages applicants to reach out early in the process to work through any issues with how the funds will meet FFAR's matching requirements. Establishing a relationship with FFAR will ease the process going forward for this and future interactions the two organizations may have.
- Indirect Expenses: A maximum of 10% of the total award may be used for indirect costs. FFAR's indirect cost allotment is not an indirect cost rate applied to the total modified direct costs but instead it is an overall allotment from the Total Funds Request, also known as the Total Project Costs, to be used for IDC. This means 90% of the total funds requested must go directly to the proposed research. For example, if you request the maximum, the total direct cost available to the project is $\$1,000,000 / 1.1 = \$900,000$. Indirect costs cannot exceed 10% of the total.
- Indirect costs cannot exceed 10% of the total budget (FFAR contribution+ grantee's matching funding). Please carefully review our IDC policy in the Instructions Tab of the budget template.
- Estimated Number of Awards: to be determined. The number of awards depends on the quality and the total funds requested of successful application. The number of applications funded is left totally to the discretion of FFAR including choosing not to fund any applications under this opportunity.

Anticipated Award Date: Late Fall 2020

Application Components

The Seeding Solutions application requires a two-step process. **Applicants must** complete the online application form and submit a project description document. Guidance for the project description is provided below. All submissions should be formatted using Calibri or Times New Roman, 11pt font, single spaced, 1-inch margins. Figures may be included as a separate file. If you have questions, please contact the FFAR Grants Management staff at grants@foundationfar.org.

To view the application, please download the application template [here](#). Note that all applications must be submitted through FFAR's grant management system to be evaluated.

Pre-Application Components

Required components

- Project title (*up to 250 characters*)
- Key personnel involved in the project – name(s), affiliation, expertise, role on the project
- Proposed project overview/description
 - What is the issue the project is trying to address? (*up to 500 words*)
 - What research gaps will the project fill? (*up to 500 words*)
 - Innovation: Please describe how the approach, methodology, technologies, or products will significantly advance the food and agriculture sector, provides solutions to an intractable problem and accelerates **innovation** within FFAR's Challenge Areas. (*up to 500 words*)
- Budget
 - Total FFAR funding request
 - Total matching funds (*at least 50% cash match, required*)
 - Total proposed budget (*FFAR funds + matching funds*)
- Proposed project start date
- Proposed project duration (*in calendar months*)
- Funding partners: List any committed or potential funding partners, describe why they are an appropriate source of matching funds, and any prior contact you have had or relationship you have developed with them about this project.

Applications that demonstrate strong partnerships by way of matching from external sources outside the applicant institutions are encouraged. These partners may include but are not limited to private sector, non-profits, commodity and trade groups, state governments, and others that do not traditionally work in agriculture.

Full Application Components

Required components

- Project title (*up to 250 characters*)
- Key Personnel

- Public abstract (*up to 500 words*)
- Project Executive Summary (*up to 500 words*)
- Goals and objectives (*by year; up to 500 words*)
- Project Description and Approach (*up to 5000 words*)
- Why is FFAR ideally positioned to fund this project? (*500 words*)
- Innovation to be developed or accelerated (*up to 500 words*)
- Anticipated outcomes or outputs (*up to 1,000 words*)
- Data Management Plan (*up to 500 words*)
- Barriers to adoption of your research outcome(s) (*Note: FFAR strongly encourages applicants to address social and economic factors in the project design, evaluation processes, and outcomes, where applicable.*) (*up to 500 words*)
- Organization Assurances
 - Research involving human subjects
 - Research involving vertebrate animals
 - Research involving Recombinant DNA
 - Research involving National Security implications
 - Research involving hazardous materials
 - Research involving human fetal tissue
 - Research involving NEPA review
- Proposed budget
 - Total FFAR funding request
 - Total matching funds (*at least 50% cash match, required*)
 - Total proposed budget (*FFAR funds + matching funds*)
- Budget justification (*up to 1000 words*)
- Current and Pending Support Form: complete for everyone listed as PI or Key personnel on the project

Attachments

- Required Attachments
 - [Budget Form](#)
 - [PI and Key Personnel Biosketch](#): three-page limit per individual listed as PI or key personnel in the project
 - Project timeline (by year)
 - References cited
 - 5-slide summary/description of project
- Optional attachments to support project description: This section should not be used to circumvent the page/word limit for the Research Program Plan Section.
 - Letters of Support: Applicants can provide letters of institutional, collaborator, or stakeholder support for the proposed project, especially from matching funders. Please combine all letters of support into a single PDF document before uploading as an attachment.
 - Graphics, Figures, Equations, and Tables: The textbox for the Research Program Plan does not support equations, tables, graphics, and figures. Applicants may upload a PDF document with graphics, figures, tables, or a list of equations to

support the research program plan. **Five-page limit.**

Application Submission Guidelines

Applications must be submitted through FFAR's online application receipt system. If you are a new user, register for an account by clicking the green "Register" button at the top right corner of the [home page](#). You will receive a confirmation email to activate your account before you can sign-in to your account. Once you log in, click on the corresponding program to start your application.

Only applications submitted through this portal will be considered eligible for evaluation. FFAR will not accept applications submitted by any other medium. There is a two-hour grace period for all deadlines. Applications that are not submitted by the deadline or within the grace period will not be accepted. To be fair to all our applicants, FFAR cannot grant an extension to applicants who missed the deadlines posted in the [Key Dates](#) section.

Application Review Process

Pre-Application Review

All submitted pre-applications will go through an internal review process to ensure that the proposed project is relevant to the RFA and suitable to FFAR's mission. Only the most innovative and cutting-edge projects with significant potential for advancing agricultural research will be invited to submit a full application. Applicants should expect e-mail notification of the application status no later than April 20, 2020. ***The pre-application is a prerequisite, therefore only applicants submitting a pre-application are eligible to receive an invitation to submit a full application.***

Full Application Review

Full proposals are due June 24, 2020. Successful applicants invited to submit a full application will undergo further review using a two-stage peer review process: (1) External Peer Review, and (2) FFAR Advisory Council review. In the first review stage, applications will be evaluated by an independent, external peer review panel of scientific experts using the application review criteria below. In the second review stage, applications judged to be most meritorious by external peer review panels will be evaluated and recommended for funding by the FFAR Advisory Council based on comparisons with applications from the same cycle and FFAR's program priorities. All reviewers are required to read and acknowledge acceptance of FFAR's [Conflict of Interest Policy](#) and [Non-Disclosure Agreement](#). We make reasonable efforts to ensure that applications are not assigned to reviewers with a real or apparent conflict with the applicant or project personnel. Reviewers with a conflict of interest are recused from evaluating or participating in the discussions of applications with which they have a conflict. Each stage of the review is conducted confidentially, and as such, FFAR is responsible for protecting the confidentiality of the contents of the applications. Applications recommended for funding by the Advisory Council will go to the Scientific Program Director and FFAR's Executive Director to consider program priorities set by the Advisory Board, portfolio balance across programs, and available funding. FFAR's Executive Director will approve each grant award recommendation made by the Science Program Director.

Review Criteria

Full applications are evaluated based on scored primary review criteria and unscored secondary review criteria. The bullets under each criterion may serve as a guideline to applicants when writing their applications, and as a guideline to reviewers on what to consider when judging applications. The bullets are illustrative and not intended to be comprehensive. Reviewers will evaluate and score each primary criterion and subsequently assign a global score that reflects an overall assessment of the application. The overall assessment will not be an average score of the individual criteria; rather, it will reflect the reviewers' overall impression of the application. Evaluation of the scientific merit of each application is within the sole discretion of the peer reviewers, and they may raise additional factors to consider that are not covered in the bullets for each criterion.

Primary Review Criteria

Primary criteria will evaluate the scientific merit and potential impact of the proposed project. Concerns related to these criteria potentially indicate a major flaw in the significance or design of the proposed work. Examples of primary review criteria include: Significance and Impact, Research Plan, Scientific Merit, Innovation or Novelty, Qualification of Project Personnel, and Outcomes.

Novelty, Innovation, and Originality

- Has the applicant demonstrated that this research has not been done elsewhere, or that this research accelerates a current research challenge or addresses an agricultural challenge in a new or innovative manner?
- Does the applicant propose new paradigms or challenge existing ones?
- What research gaps will the application address?
- How well has the applicant described the need for the project?
- How is this application meeting that need through innovation [as defined by FFAR](#) this RFA?

Potential Impact

- Will the results of this research, if successful, significantly impact the current challenge to sustainably feed the 9.7 billion people projected to populate the world by 2050?
- If the research project is successful, will it lead to truly substantial advances in the field rather than add modest increments of insight?
- How effectively does the applicant align the proposed project with FFAR's Challenge Areas?
- How well did the applicant identify how FFAR is uniquely positioned to fund this project versus other Federal agencies or non-governmental funding organizations?

Feasibility

- Are the aims/objectives of the proposed project outlined clearly?
- Are the methods outlined to achieve the project's aims feasible? Are the methods appropriate, and are potential experimental obstacles and unexpected results discussed?
- What risks could inhibit the success of the project and how well did the applicant describe their plan to avoid/overcome them?
- Is the timeline appropriate for the proposed work?
- Is the budget commensurate with the proposed work?

Research Environment and Institutional Support

- How qualified is the team conducting the proposed activities?
- Are the levels of effort of the key personnel appropriate?
- Does the team have the needed facilities and resources to accomplish all aspects of the proposed research?
- Is there evidence of institutional support of the research team and the project?

Outcome

- What is the potential of the proposed research outcomes to have a significant impact on U.S. food and agriculture systems?
- How well did the applicant address what segment of the food and agriculture community this project will impact and how is it likely to affect it/them?
- What would be the tangible outcomes of this project? How well did the applicant describe those outcomes?

Barriers to Adoption or Scaling of Research Outcome(s)

- Did the applicant identify barriers that might inhibit the uptake and adoption of research outcome(s) and proposed to address them?
- Did the applicant identify barriers that might hinder the optimal or intended use of research outcome(s) and propose to address them?
- Will the research outcome(s) be scale neutral? If not, did the applicant identify barriers that might obstruct them from scaling up or down, and proposed to address these barriers?

Intellectual Property and Data Dissemination

- What potential intellectual property or proprietary information concerns might arise because of this project?
- How well did the applicant describe how they plan to handle potential proprietary information or intellectual property?
- In the case of projects producing proprietary information/technology, how effectively did the applicant describe the funding of the production of proprietary information and/or judicious use of public funding?
- How will the grantee manage and disseminate data generated by this project?
- How adequate is the dissemination plan outlined by the applicant to share results of the project with the food and agriculture community during and at the end of the project?
- How did the applicant describe, where applicable, how they would implement or incorporate results and/or products into existing food production systems?

Partnerships

- How effectively did the applicant detail the partnerships involved in the project?
- Did the applicant include industry, nonprofit, state or local partnerships?
- How integral are those partners to the proposed project?
- Do the letters of recommendation detail the potential for the research to make a significant contribution to field in the specified Challenge Area?

Secondary Review Criteria

Secondary criteria contribute to the global score assigned to the application. Concerns with these criteria potentially question the feasibility of the proposed research. Examples of secondary review criteria include: Budget, Duration of the project, Scalability and Dissemination, Protections for Human and Animal Subjects, and Previous Project Performance.

Award Administration

Selection Notice

Following the full application review, the principal investigator and the authorized organization representative listed on the project will be officially notified by email whether (1) the application has been selected for funding pending award negotiations, or (2) the application has not been selected for funding. If an application is selected for funding, the Foundation for Food and Agriculture Research reserves the right to request additional or clarifying information for any reason deemed necessary, including, but not limited to, matching funds, or other budget information. Potential grantees are free to accept or reject the Grant Agreement as offered.

Award Notice

FFAR notifies applicants of whether they are selected for funding through email. The notice does not constitute an award or obligate funding from FFAR until there is a fully executed Grant Agreement.

Grant Period(s)

Upon receipt of the Grant Agreement, the potential grantee should note the Start Date and the End Date. Grantees may only use FFAR funds on project expenditures on or after the Grant Agreement is fully executed, or with prior approval of pre-award expenditure. Charging expenditures to the grant prior to the fully executed date is strictly prohibited. Likewise, grantees may not use FFAR funds after the End Date except to satisfy obligations to pay allowable project costs committed on or before that date. Grantees may have up to the last day of the month of expiration to fulfill obligated expenses.

Once the Grant Agreement is fully executed, the Start Date cannot be changed. The End Date may be changed with a written approval of a no-cost extension request by FFAR. If a no-cost-extension request is approved, FFAR will issue an amendment to the Grant Agreement.

If the grantee requires additional time beyond the Grant Period and the established End Date to assure adequate completion of the original scope of work within the funds already made available, the grantee may request a one-time no-cost extension of up to 6 months. The request must be submitted to FFAR at least thirty (30) days prior to the End Date of the grant.

The request must explain the need for the extension and include an estimate of the unobligated funds remaining and a plan for their use. This one-time extension will not be approved merely for using the unexpended funds.

Post-award Management

Reporting Requirements

After a grant is conferred, the grantee shall provide an annual financial report to FFAR showing grant expenditures to date. The grantee shall also provide an annual progress report to FFAR showing activities being carried out under the grant, including but not limited to project accomplishments to date and grant expenditures. Within 90 days of completion of all grant activities, the grantee shall provide a final progress report. The final progress report should address the original objectives of the project as identified in the application, describe any changes in objectives, describe the final project accomplishments, and include a final project accounting of all grant funds.

Scientific Integrity

FFAR's ability to pursue its mission to build unique partnerships to support innovative science addressing today's food and agriculture challenges depends on the integrity of the science on which it relies. A fundamental purpose of FFAR is to facilitate the advancement of knowledge and the application of the science to address challenges relevant to the FFAR's mission. All FFAR grants must be conducted with the highest standards of scientific integrity.

Grant Terms and Conditions

The Foundation for Food and Agriculture Research expects applicants to have reviewed the Grant Agreement prior to applying to ensure that the applicants are aware of the applicable terms under which the grant is offered. FFAR will only entertain potential modifications to the Grant Agreement under the most exceptional circumstances. Successful applicants are strongly encouraged to sign the Grant Agreement as presented.

Requirement to Demonstrate Matching Funds

The match share requirement is a one-to-one FFAR-to-awardee ratio. Therefore, for every dollar FFAR awards, the grantee or a third-party institution must contribute a newly dedicated, non-federal dollar towards the project costs. For example, if an application requested two hundred thousand dollars (\$200,000) of FFAR funds, the applicant or a third-party must be able to come up with an additional two hundred thousand dollars (\$200,000) to match the request, for a grand total project budget of four hundred thousand dollars (\$400,000).

The applicant agrees to identify and certify matching funds annually prior to disbursement of award funds. At least fifty percent (50%) of the required matching funds must be a cash match, while the remainder can be in-kind match. The match share is intended to supplement, not supplant existing funding for the principal investigator (PI). The applicant will abide by FFAR's [Matching Guidelines](#) to meet FFAR's matching requirements. To constitute a valid match, all matching funds on a FFAR grant must be expended during the grant period.

Contact Information

Technical Help Contact

Mon–Fri: 8AM EST – 8PM EST, **Weekends:** 10AM EST – 6PM EST

Phone support upon request Mon–Fri: 9AM EST – 7PM EST

Email: support@smapply.com

Grants Questions Contact

Email: grants@foundationfar.org

Scientific or Programmatic Questions Contact

Challenge Area

Health and Agriculture Nexus

Advanced Animal Systems

Sustainable Water Management

Next Generation Crops

Soil Health

Urban Food Systems

Email

lkurtyka@foundationfar.org

tkurt@foundationfar.org

kboomer@foundationfar.org

jrosichan@foundationfar.org

lodom@foundationfar.org

jreich@foundationfar.org

We only accept scientific or programmatic, and grants inquiries by email. We strive to respond to inquiries within two business days, but our response time depends on the volume of questions received and the complexity of the questions asked. Please note that we do not monitor this mailbox on evenings, weekends, or federal holidays.

Challenge Area Priority – Health-Agriculture Nexus

The Health-Agriculture Nexus Challenge Area supports innovative, systems level approaches (both technological and non-technological) aimed at reducing food and nutritional insecurity and improving human health in the United States and around the globe.

In the 2020 Seeding Solutions program, this Challenge Area is seeking ground-breaking research leading to viable alternative distribution mechanisms to increase efficiency in the distribution of and access to affordable produce and protein products. Projects should take into consideration ecosystem factors needed to provide a viable, scaled solution such as affordability, food safety, consumer behavior, material sustainability (i.e., packaging), ability to scale and/or replicate nationally, as well as the social, environmental and economic impacts. Projects that emphasize these food distribution/access issues in underserved population(s) are strongly encouraged.

As noted in its [mission](#), FFAR seeks “not only brilliant minds, but also fresh perspectives tackling today’s challenges in food and agriculture. We embrace diversity and promote inclusiveness in all we do, from the teams we build to the grantees we support.” FFAR also understands that the outside-the-box thinking needed to drive innovation occurs when researchers with different skillsets and experience collaborate. With that spirit of diversity and inclusiveness in mind, cross-disciplinary research teams, especially those that include disciplines not traditionally associated with food or agriculture science, to develop innovative solutions to address current agricultural challenges are strongly encouraged to apply to this Challenge Area.

[Return to RFA](#)

Challenge Area Priority – Advanced Animal Systems

The Advanced Animal Systems Challenge Area aims to support the development and adoption of new technologies and practices that improve animal health and welfare, producer viability, and environmental and public health.

FFAR will not seek to limit pre-applications to specific topics within the Advanced Animal Systems Challenge Area. Pre-applications should describe innovative research, coupled with transformative partnerships, with the potential to shift paradigms in livestock production.

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[Return to RFA](#)

Challenge Area Priority – Sustainable Water Systems

The Sustainable Water Management Challenge Area aims to enhance and protect an adequate supply of healthy natural waters to sustain long-term agricultural production and human/environmental health. FFAR seeks to fund cross-disciplinary research that directly informs decisions related to water management challenges throughout the production food chain, and that fosters broad-scale adoption of advanced management practices.

While FFAR will not limit pre-applications to specific target areas within this Challenge Area, we encourage applications related to the following research topics:

- Evaluation of Potential or Unrecognized Threats to Ground- and Surface-Water Resources
- Innovative Designs and Techniques for Sustainable Water Management
 - Crops, cropping strategies, or agroforestry practices to increase water use efficiencies or mitigate downstream impacts under variable field conditions.
 - Natural and engineered solutions to enhance groundwater recharge and recondition natural water supplies
- Decision Tools and Modeling Systems to Support Sustainable Water Management
 - Advanced precision agriculture, irrigation, and conservation technology
 - Improved watershed and aquifer protection planning through precision technology
 - Practice performance across different locations, under shifting climate conditions
- Understanding Stakeholder Concerns and Broadening Engagement in Advanced Water Resource Management
- Integrated Monitoring and Research to Evaluate Outcomes and Inform Sustainable Water Management
 - Novel integration of remotely-sensed and ground monitoring data to compare observed vs. expected outcomes and to reduce uncertainty in system models.

Application should identify the white spaces/research gaps which are not being suitably addressed at differing state or federal levels.

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[Return to RFA](#)

Challenge Area Priority – Next Generation Crops

FFAR supports the advancement of novel, nutritious, profitable and resilient on-farm crops. There is a strong emphasis on increasing crop diversity and use of new technologies to benefit consumers, producers and the environment. FFAR seeks to fund projects with an emphasis on innovative technologies and environmentally-sound production practices, as well as the discovery and development of new end uses for both conventional and non-traditional crops. We also prioritize advanced breeding methods and development of biotic and abiotic stress tolerance for crops grown in organic and conventional cropping systems with the aim of providing increased farmer profitability and environmental resilience.

FFAR is seeking ground-breaking research leading to increasing adoption of innovations across the U.S. food system.

While FFAR will not seek to limit pre-applications to specific target areas within this Challenge Area, we encourage research applications that address any of the following areas:

- Crop diversification
- Crop resiliency
- Accelerated breeding methodologies

Preference will be given to applications that take a holistic approach to address diversified cropping systems utilizing increased biodiversity, genetic diversity and improved genetics to optimize soil health, crop inputs and land management.

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[Return to RFA](#)

Challenge Area Priority – Soil Health

The Healthy Soils, Thriving Farms Challenge Area aims to increase soil health by building knowledge, fueling innovation, and enabling adoption of innovative practices. FFAR is expanding and exploring transdisciplinary approaches that draw linkages between soil health and farm productivity, economics, human health, management practices and other areas. FFAR will continue to support research that provides open, data driven, innovative science that allows farmers to make the most productive and sustainable decisions to conserve and improve soil health while supporting thriving farms.

While FFAR will not seek to limit pre-applications to specific target areas within this Challenge area, we encourage applications that propose innovations that address the following research topics:

- Climate resilient soil management practices
- Assessments of the Soil Microbiome
 - Measurements of microbial processes
 - Investigations of microbial communities at different scales, including spatial, temporal and molecular
- Soil Enhancing Techniques
 - Alternative Soil Amendments
 - Optimization of Nutrient Use Efficiencies
- Linkages between farm productivity and soil health
 - Quantitative assessments that demonstrate Soil health practice adoption and their connection to or impact on economic, socioeconomic, and physical health
- Novel/innovative strategies to address barriers to adoption of soil health practices

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[Return to RFA](#)

Challenge Area Priority – Urban Food Systems

The Urban Food Systems Challenge Area explores areas of innovation with the potential to transform urban food systems to improve food and nutritional security, human health outcomes, economic opportunities, and food system resiliency. FFAR supports innovative, systems-level approaches aimed at creating healthy and equitable food systems. Emphasis is placed on transdisciplinary approaches that take into account the connections between urban food systems and the urban environment, in addition to the connections between rural and urban communities to achieve this goal.

While FFAR will not seek to limit pre-applications to specific target areas within urban food systems, we strongly encourage applications that take advantage of data and infrastructure that spans different sectors to address the following research topics:

- Advancing/development of novel production systems, or collection of production systems, as part of an overall strategy that promotes urban health and well-being in addition to climate variability risk mitigation
- Technologies and/or interventions that promote food and nutritional security within urban populations, including:
 - Utilizing existing interventions in novel ways
 - Transportation and/or the delivery of healthy and nutritious food
 - Increasing the affordability of healthy and nutritious food
 - Utilizing data across sectors to develop novel solutions
- Increasing our understanding of where our food comes from in the context of an urban environment
- Systems and technologies that advance the food and agriculture economy within a region, including:
 - Products: regional production, high-value products
 - Circular Economy: food production/system byproducts
 - Urban environment: design/organization to promote economic viability and efficiencies that enhance farmer profitability

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[Return to RFA](#)