



FEED ^{THE} FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

South Asia Regional Request for Applications (RFA)

Horticulture Production Efficiency Enhancement in
South Asia (HoPE)

FEED THE FUTURE
INNOVATION LAB FOR HORTICULTURE



USAID
FROM THE AMERICAN PEOPLE

HORTICULTURE
INNOVATION LAB

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Questions and answers relevant to all possible applicants will be posted on the [South Asia Questions and Responses Page](#). **Deadline for questions is December 20, 2022** and questions and answers will be posted on a rolling basis.

Two webinars will be provided if there are any questions about the RFA:

1. First Webinar is December 9th at 11:15am Nepal Time and 11:30am BST. Link for Webinar: [South Asia Webinar One Link](#)
2. Second Webinar is scheduled for 15th December 11am - 12pm Nepal Time and 11:15am - 12:15am BST. Link for webinar: [South Asia Webinar Link Two](#) Meeting ID: 918 4673 8621

Timeline:

- Request for applications: December 5, 2022
- Deadline for application questions: December 20, 2022
- Applications due **January 10, 2023 5:00pm PST** to the Horticulture Innovation Lab via PiestarRFx ([RFA Piestar Submission Link](#)) or emailed if there are difficulties accessing Piestar as a PDF along with a budget in Excel to horticulture@ucdavis.edu
- Awarded Principal Investigators (PI) will be required to complete LASER PULSE designed video training sessions on research for and with disadvantaged groups, and locally-led research.
- Review of applications: January 12 – January 22, 2023
- Notification of funding: February 6, 2023
- Projects begin: March 15, 2023

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Introduction

The Feed the Future Horticulture Innovation Lab program advances bio-physical and social knowledge and innovation within the horticulture sector, specifically in Africa, South Asia, and Central America. Our global research network works with and promotes local leadership to advance horticulture and social innovations, empowering smallholder farmers to earn more income while better nourishing their communities.

The Horticulture Innovation Lab is currently soliciting full technical applications from local organizations in Nepal and Bangladesh **to conduct research designed to increase fruit and vegetable production efficiency in the horticulture sector of Nepal and/or Bangladesh through research and development.** The selected research projects will be funded at \$250,000 up to \$750,000 depending on the scope of work, over a period of up to 3 ½ years. A total of approximately \$1.2 million will be awarded, through which we aim to fund 2-4 projects. We encourage applications for a single subtheme, and collaborative projects that cover multiple sub-themes.

The Horticulture Innovation Lab is looking for research applications led by local organizations that are relevant to, and appropriate for smallholder farmers and disadvantaged populations in focus countries. The research should result in useful recommendations and key takeaways for future Horticulture Innovation Lab research and development. Successful teams will include multiple disciplines, including agribusiness and nutrition experts, as well as horticulturists, agronomists, sociologists and economists.

Eligibility Criteria

The lead applicant and principal investigator must be from these USAID Feed the Future countries from within the region - Nepal and Bangladesh. Applicants can be from academic institutions, government sectors (including national agriculture research services), private entities, or other community-based organizations. While international collaboration is allowable, intellectual lead and management should remain in the region. This includes but is not limited to leading efforts in determining research methodology, implementation, and information dissemination, such as publications and conference participation. Priority will be given to research projects with budgets that include a majority of funds to regionally based partners.

Regional Horticulture Context and Background

For additional information, please review the Horticulture Innovation Lab's South Asia Regional Horticulture Report Drafted by the Forum for Rural Welfare and Agricultural Reform for Development and Agriculture and Forestry University Nepal: [South Asia Report Link](#).

In South Asia, fruit and vegetable production can be below the demand of the market. For example, in Nepal more than 50% of vegetables and 70% of fruits are imported from neighboring countries (including India, Pakistan and Bangladesh) to meet the increasing demand from consumers who are now aware of the nutrition and health benefits from consuming fruits and vegetables. Alternatively, as is the case of Bangladesh, there is a lack of demand or access to affordable fruits and vegetables that needs to be addressed. Bangladesh exports significant amount of fruits (mango, jackfruit, banana) and vegetables (cabbage, cauliflower, brinjal, okra, tomato) to the Middle East and Europe. However, the consumption of fruits and vegetables in Bangladesh is low.

Overall, current production of fruits and vegetables lags in potential yield. In this context, increasing production and production efficiency of fruits and vegetables will help to meet market demand for fruits and vegetables and reduce costs to increase affordability for areas of low-consumption. Increasing yields addresses an important objective of the USAID Mission in Nepal as well as the priority of the Governments of Nepal and Bangladesh – reducing reliance on importing of fruits and vegetables.

For small-scale producers in Nepal and Bangladesh, barriers to improved production of horticulture crops includes: poor market access; lack of knowledge of or access to improved technologies or practices of which inadequate extension systems play a role; and, lack of access to inputs. These barriers could be addressed through research projects that seek methods to: improve access to improved germplasm; improve integrated pest management and disease management practices; and, improve post-harvest management practices to reduce loss of nutrient dense fruits and vegetables, thus increasing food security.

Horticulture Innovation Lab Background

The Horticulture Innovation Lab facilitates locally-led and globally supported research and networks that address regional horticulture challenges and opportunities and enable women, youth and other marginalized groups to successfully engage in horticulture value chains. Our research advances resilient, climate-smart horticulture production and agribusiness development. We support adaptive research, and research that enables farmers to have greater access to markets through innovation. Additionally, the Horticulture Innovation Lab is interested in addressing both supply and demand of fruits and vegetables which includes research questions concerning nutrition education, economics, behavior change, and social preferences.

The Horticulture Innovation Lab's goals associated with battling malnutrition, improving equity and inclusivity, engaging youth, enhancing resilience, and providing income to smallholder farmers aligns well with the U.S. Government's Feed the Future Initiative. Feed the Future pursues two paths: (1) addressing the root causes of hunger that limit the potential of millions of people; and (2) establishing a lasting foundation for change by aligning USAID resources with country-owned processes and sustained, multi-stakeholder partnerships. Through USAID leadership in this initiative, we advance global stability and prosperity by improving the most basic of human conditions – the need that families and individuals have for a reliable source of quality food and sufficient resources to access and purchase it.

Horticulture Innovation Lab projects and initiatives focus on three key Feed the Future Global Food Security Strategy (GFSS) objectives and five cross-cutting themes.

GFSS Objectives:

1. Inclusive and sustainable agriculture-led economic growth
2. Strengthened resilience among people and systems
3. A well-nourished population

GFSS Cross-cutting Themes:

1. Gender equality, equity and participation
2. Youth opportunities
3. Nutrition and food safety
4. Resilience and risk management
5. Inclusion

The Horticulture Innovation Lab focuses on resilient horticulture management systems and horticulture enterprise development and commercialization. The program emphasizes research where horticulture can complement and diversify staple crops, extend cropping and marketing seasons, systems approaches to horticulture value chains, and increase the production and consumption of nutritious horticultural products. Thus, the Horticulture Innovation Lab supports research projects to improve seed systems, sustainable production of horticultural crops, postharvest practices, food safety, market access and linkages, nutrition, and engagement of women, youth and other disadvantaged groups in the horticulture sector.

Feed the Future Information

Feed the Future and other U.S. government priorities – including global health and climate change – allow us to confront the growing challenges of global poverty, disease, water scarcity, climate change and depleting natural resources. By addressing these complex challenges, we protect our own security and lay the foundation for a more peaceful and prosperous future for all. More information on Feed the Future can be found at <http://www.feedthefuture.gov>.

Cross-cutting themes of Horticulture Innovation Lab

Gender Equity

The Horticulture Innovation Lab is committed to ensuring that our research projects are impactful for smallholder farmers and their communities, including women and those from other marginalized groups. Women play a critical role in horticultural production, processing and marketing, but often face constraints beyond those faced by men. They may have limited access to land, credit, information and inputs as well as greater time commitments and constraints in making decisions about the use of resources. Other factors such as ethnicity, caste/class, marital status, decision making ability, and age also affect one's ability to participate fully in the horticultural value chain. Research and intervention projects that do not factor in these differences or challenges along the value chain may not have the desired effect and may even exacerbate existing inequalities.

To ensure our projects will have the greatest impact on the wellbeing of people in smallholder households and to increase equality, the Horticulture Innovation Lab is committed to funding projects that thoughtfully assess and incorporate issues of gender and inclusion through all stages of research and implementation.

Please see Appendix I For Additional Information

Youth Engagement

Providing a path to meaningful economic engagement through horticulture is an integral focus of the Horticulture Innovation Lab. The Horticulture Innovation Lab recognizes that addressing challenges and opportunities for regional horticulture is an intergenerational mandate and demands the active engagement and integration of youth. As agriculture-based activities account for nearly 50% of youth employment, investments that support broad-based horticulture value chain growth are part of an effective youth livelihood strategy. To foster youth engagement, horticulture value chains need to promote and broaden opportunities that are profitable, less physically arduous, offer quick returns and have low asset requirements. Facilitating the capacity of youth to innovate is critical to increasing the production and consumption of nutritious horticultural products.

The Horticulture Innovation Lab is committed to funding projects that harness youth's potential through youth-focused initiatives that integrate a positive youth development approach, elevate youth voices, and segment and tailor interventions to the needs of the heterogeneous youth population.

Please see Appendix II for Additional Information

Nutrition and Horticulture

We will support research that improves understanding of nutritious crops from production to consumption. This includes furthering understanding of horticulture for nutrition interventions and their impact on behavior and dietary diversity. Food safety development and practices are essential in addressing health in the communities our networks serve. Research projects will be nutrition sensitive and incorporate appropriate nutrition objectives and benchmarks throughout the project term.

Please see Appendix III for Additional Information.

Climate change adaptation and mitigation

The productivity of many fruits and vegetables is sensitive to small variations in weather conditions. Untimely rainfall or too high or too low night time temperatures, for instance, can lead to flower drop in fruit trees. Heat stress also affects the viability of pollen in fruiting vegetables. Weather conditions and water supplies also affect fruit quality and shelf-life. As a result of these

issues, climate change significantly increases the production risk to smallholder fruit and vegetable farmers. Innovations that provide irrigation, good drainage, climate-smart varieties, grafting, and protected cultivation help farmers to reduce some of these risks by making farm output more predictable. Projects are therefore advised to promote the use of technologies that enable farmers to adapt to climate change.

Fruit and vegetable production systems are not major contributors to greenhouse gas emissions, but they can nevertheless use a lot of agrochemicals, water for irrigation, plastics for production and packaging, and energy for transport of fresh produce. Many vegetable systems are intensively cultivated and rely heavily on external inputs, especially pesticides, which may not be sustainable. There is much scope to employ more regenerative production practices in fruit and vegetable production systems to reduce the environmental footprint of these systems and increase resilience. For instance, it is recognized that good soil health, including ample amounts of organic matter and a healthy soil biome, can make plants more resistant to biotic and abiotic stressors and even improve the nutritional value of the produce. Projects should therefore emphasize the use of technologies and practices that help to regenerate soils and sustainable use of natural resources.

Resilience

The high value of fruit and vegetables offers attractive opportunities for smallholder farmers and other value chain actors to sustainably improve their livelihoods. However, the commercial production of fruit and vegetables requires significant investments, and market buyers can be unreliable, and market prices uncertain. This often leads to farmers being price-takers. As a result, production of fruit and vegetables is often associated with a high financial risk, which can form a major obstacle for smallholder farmers to engage in these crops despite the prospect of high returns. Projects therefore need to be aware of the various risks smallholder farmers face and reduce these risks to manageable levels. A reliable supply of affordable and high-quality inputs, a diverse portfolio of crops, effective and safe methods to manage crop pests and diseases, financial literacy and access to financial services, and predictable sales outlets and prices are key aspects of resilient and profitable smallholder production of fruits and vegetables.

Capacity Strengthening

The production of fruits and vegetables often requires more knowledge and expertise compared to most staple food crops. For instance, at the farm-level, vegetables may require seedling nurseries, fruit trees require careful pruning to optimize fruit yield and quality, and both fruit and vegetables require careful pre- and postharvest management. Lack of appropriate knowledge and skills can be a major constraint for smallholder farmers, particularly women and marginalized social groups, to engage in the fruit and vegetable sector. On a larger scale, the Horticulture Innovation Lab is interested in supporting and participating in healthy regional academic and expert eco-systems. To this end, our work aims to support peer to peer learning, curriculum development, networking of regional experts, and shared-knowledge activities to

support joint goals (e.g. farmer, extension, private industry connections, research interns). This applies to current experts and the next generation of scientists.

Horticulture Innovation Lab Consortium

UC Davis leads the Horticulture Innovation Lab Consortium. The Consortium consists of partners from Florida A&M University, Michigan State University, Texas A&M, and World Vegetable Center, along with subject matter specialists in gender, youth and nutrition, from Penn State University, Making Cents International, and the Institute for Global Nutrition at UC Davis. To learn more about this group please visit our [Consortium Partners webpage](#).

Recognizing horticulture's unique capacity to impact gender equity, youth engagement and household nutrition, the Horticulture Innovation Lab's consortium has three specialists dedicated to these themes. Their roles as specialists include, among other things, guiding overall programmatic activities toward positive impacts in these areas and providing expertise to research projects.

Research Description

Research Priority

Projects will be designed to increase fruit and vegetable production efficiency in the horticulture sectors of Nepal and/or Bangladesh through research and development. Increased production efficiency will promote profitable small-scale operations and access to affordable fruits and vegetables.

Agricultural extension and increased capacity strengthening are needed to increase horticulture production efficiency. However, research has shown that adoption of improved production practices has remained low, mainly due to a lack of technical knowhow and poor extension services. Extension methods, including Farmer Field Schools, a potential research approach, could allow farmers to "learn by doing" with the supervision of an expert to provide on-site coaching. Additionally, incorporating entrepreneurial training opportunities for youths as a component of the research application could provide capacity strengthening in their understanding of the fundamentals of running an agribusiness.

Technologies are needed to improve production efficiency. However, technologies are often imported from other parts of the world without being contextualized in the different agro-ecological zones, diverse soil types and topographies of Nepal and Bangladesh. New technologies and innovations aimed to increase production efficiency through research should be tested in the local context before being recommended. For example, there is a need for improved irrigation in Nepal and Bangladesh, therefore small-scale irrigation measures like solar

pumps could be promoted to deal with the scarce water resources, but the technology needs to be contextualized to ensure adoption and sustainability.

In efforts to increase production efficiency, there has been a haphazard use of pesticides by farmers in Bangladesh and Nepal. This includes improper application of pesticides, a lack of safety equipment, and a lack of knowledge about proper use of pesticides and waiting period, which in cumulation create health issues among producers and consumers in Bangladesh and Nepal. Research activities could include interventions that improve pest and disease management in Nepal and Bangladesh with an emphasis on IPM, including pest exclusion nets (PEN), traps, and lures, etc.

Youth need to be engaged to create sustainable change in production efficiencies in Bangladesh and Nepal. Some of the youth who have traveled abroad have made money that they could use to either revive their family's agribusiness or scale-out the agribusiness. In other cases, some of the youths might have lost their income abroad and are motivated to return to their abandoned rural lands for their livelihood. However, many youths in Nepal and Bangladesh do not have the technical or managerial capacity to run an agribusiness. Research on developing tailored training for young Nepali and Bangladeshis, based on their production area's ecological niche, the resources available and the market potential could significantly improve profitability. Training should also incorporate components of increasing gender equity as many of the existing producers of fruits and vegetable crops in Nepal and Bangladesh are women.

Poor inputs are constraining production efficiencies in Nepal and Bangladesh. For example, quality planting materials are believed to increase the potential yield of vegetables 15-20%. However, in Bangladesh and Nepal, sourcing quality planting materials is a challenge. Farmers can be compelled to use experimental varieties of vegetables brought illegally through open borders and can then suffer from low or no productivity from those varieties that are not suitable for the particular agri-ecological zone. Considering this, research projects could include varietal testing to determine their adaptability and potential yield to each agri-ecological niche in Bangladesh and Nepal. For fruit plantlets, such as banana, tissue culture for true-to-type plantlets could be optimized to meet market demand and the expectations of the banana growers. Additionally, research on suitable scions and rootstocks for grafted saplings of citrus and mango could achieve high yielding varieties that support high-density plantings and for vegetable seedlings, grafted tomato seedlings could be tested to determine if they grow and produce well and are practical for growers in Nepal and/or Bangladesh. Additionally, there may be few input suppliers in rural areas of Bangladesh, and the ones that are operating in these areas are focused on selling their product. Research could include training programs for youth to be input suppliers who are skilled so they can also expertise on improved, available, technologies and management practices as part of an embedded service.

Financing is a barrier to adopting new practices or technologies to increase production efficiency. Loans can be crucial for the start-up of or expansion of an agribusiness, but are difficult to obtain. Research projects could explore potential financing options that are suitable

for small-scale horticulture production. This could also be an avenue to engage youth and other marginalized groups. A youth savings group could serve as the saving and loan service for youth entrepreneurs.

Research projects should consider the policy implications of their findings. There are a number of policy hurdles impacting input and output supply chains in Nepal and Bangladesh. Improved policy approaches that grow the horticulture sector in South Asia should be understood and shared with authorities such as the Ministry of Agriculture, Land Management and Cooperatives.

Archetype Description

The project will aim to benefit youths (female and male) from marginalized communities. The youth group might have access to water, relatively little access to finance, and could be associated with formal groups and/or cooperatives. Agribusiness, in particular agribusiness involving horticulture, could be an attractive opportunity for youth in Bangladesh and Nepal. Proposed research projects should aim for youths to have increased capacity to start new agribusinesses or scale-out the farming that their parents have been engaged in for generations. This could include research helping youth employ appropriate technologies and management practices, and align production practices that are market-oriented.

A significant proportion of arable land in the hilly and mountainous regions of Nepal is abandoned mainly due to out-migration. The reluctance for migrants to return to farming in Nepal is predominantly due to difficulties in making a living in small-scale production. Among others, barriers to achieving profitable small-scale farms include: poor access to inputs; poor transportation options; unpredictable access to water for irrigation; high costs of production; high costs for accessing markets; and a lack of technical support through extension services. Considering these challenges, applicants to this RFA should include approaches to help migrant youths, both returning from abroad or remaining in country, to have successful agribusinesses, motivating them to utilize abandoned lands for the production of fruits and vegetables. This could include research activities to strengthen entrepreneurial capacity among migrant youths.

In Bangladesh, most of the arable land is under agricultural production. However, young Bangladeshis are not attracted to agriculture due to low yields and poor profits. Proposed research activities could aim to increase access to technologies, improved practices, markets, inputs, and improve entrepreneurial capacity to encourage young Bangladeshis to find opportunities within the horticulture sector.

Research Goals and Subthemes

Applicants should address one or more of the research subthemes outlined below. Goals for the subthemes are highlighted below.

1. **Subtheme:** Develop improved production practices for fruit and vegetables in Nepal and/or Bangladesh, including technology and innovation.

Goals: Improved production practices might include protected cultivation systems, soil-less culture, urban/peri-urban/rural agriculture, vertical farming, high-density planting, plant nutrition; irrigation strategies; and pest management, especially IPM practices. Projects may focus on market-oriented crops or nutritious indigenous fruits and vegetables. Extension methods, such as farmer field schools, should be incorporated to share research results. Paid research internships for youth, both students and non-students (prospective hortipreneurs), are encouraged.

- a) Test the efficacy of various production practices and technologies (e.g. irrigation, pest and disease control, recommended dose and type of fertilizers, planting density, protected cultivation systems) to optimize the production efficiency of fruits and vegetables
- b) Develop strategies for sustaining proposed practices and technologies beyond the life of the project
- c) Identify the barriers and determine the willingness to adopt improved production practices and technologies as well as mitigation strategies (i.e. incentive schemes)

2. **Subtheme:** Improve production of and access to quality horticulture planting materials, including seedlings, plantlets and saplings.

Goals: Research may address methods to produce high quality, disease-free planting materials (including grafted seedlings for vegetables or saplings for fruit, and biotechnological methods for micropropagation), assessment of germplasm to determine varieties best adapted to growing regions in Nepal and/or Bangladesh, and/or systems and policies for production and distribution of such materials. Research on citrus, banana, mango and/or lime in case of fruits would be relevant in both Nepal and Bangladesh.

- a) Identify high-performing varieties, including grafted seedlings or saplings, in different agro-ecological zones of Nepal and/or Bangladesh
- b) Enhance the capacity of quality sapling production and marketing facilities (e.g. micro-propagation facilities in citrus and banana, shoot tip grafting in citrus, grafting in mango and lime), keeping in mind potential opportunities for youth engagement
- c) Develop strategies for improving entrepreneurs' access to quality planting materials (seeds, seedlings and saplings) in Nepal and/or Bangladesh
- d) Identify barriers to adoption of improved planting materials as well as mitigation strategies, particularly for youth (i.e. incentive schemes)

3. **Subtheme:** Create an enabling environment for youths (male and female) to optimize horticulture production and handling, including capacity strengthening.

Goals: Research projects will determine the best ways to create an enabling environment for youth to engage in a broad range of horticulture sector activities; these could include technical training, skills support, entrepreneurship training, youth savings groups and other finance measures, and understanding policy barriers that impact input/output supply chains.

- a) Identify barriers (e.g. cultural, financial, technical, administrative, policy) to youth participation in horticultural enterprises and develop strategies (individual and collaborative) for mitigating those challenges
- b) Identify the best practices for engaging youth and developing capacity strengthening programs (e.g. curriculum, training materials, pedagogy)
- c) Strengthen capacity of youths - input suppliers, producers, and produce handlers

Trellis Fellowship Fund

The Horticulture Innovation Lab's Trellis Fellowship Fund project connects U.S.-based graduate students with organizations in Africa, South Asia, and Central America to help foster collaborative research and build networks globally. The Innovation Lab's Consortium Partner, Florida Agricultural and Mechanical University (FAMU), will be implementing the Trellis Fellowship Fund from 2023 to 2026. FAMU will annually select graduate students from 1890 Land Grant Universities in the U.S. to participate in a Trellis Fellow Fund Project. These students will be responsible for research activities both remotely - approximately 100 hours a year -and also in-country, through a two-week visit to research sites. Each year, a new group of students will be selected to participate in the project. In the first year, one Trellis Student will participate per region, then in subsequent years approximately three students per region will participate (a total of ten per region over four years).

The Trellis Fellowship Fund Project will also connect the U.S.-based graduate students with in-country graduate students. Typically, one U.S.-based graduate student is paired with one in-country student each year to work together on accomplishing the research goals. Applicants should highlight how they will work with and support in-country graduate students and connect them with U.S.-based graduate students to conduct the Trellis Fund related research. Generally, FAMU will cover all costs associated with the US based graduate student and the research project applicant will cover costs of in-country students.

As a part of the application to this RFA, applicants need to outline how these U.S.-based and local graduate students would be incorporated into the project's research activities. The research or activity that is designated to be part of the Trellis Fellowship Fund Project can be multi-year, as new students will have the opportunity to build on the prior research activities of their colleagues. The Trellis Fellowship Fund Project should: 1) explain the work to be conducted or contributed to remotely during the 100 hours the student will provide from the US; 2) explain the partnership between the US based and local student 3) provide a significant activity/output that contributes to overall goals of the research project during the two-week period that the student is in-country. Furthermore, there should be a brief discussion of how the U.S.-based student can be hosted while in-country. FAMU will cover the expenses for travel and lodging, but guidance should be provided in terms of locations that the students could stay, in-country ground logistics, and how the in-country organization will facilitate their involvement in the field. Not all funded research projects will be matched with a Trellis Fellowship Fund Student, so the Trellis Fellowship Fund Project should be additional and not critical to the overall goals of the research project.

The research designated to be part of the Trellis Fellowship Fund activities does not need to be a completely separate research activity. The goal of this Trellis-related research is to contribute to the overall research objectives stated in the application. Applicants need to consider what aspects of the overall research activities can benefit from a U.S.-based and local graduate student's contributions and describe how those students will be integrated into those aspects of the project.

Finally, more information on previous Trellis Fellowship Fund Projects can be found [here](#).

Application Preparation and Submission Instructions

Applications can be submitted:

1. Submitted through this link: [Piestar RFA Submission Link](#)
1. If you are not able to access Piestar, then 1) technical application can be submitted as a PDF document, 2) a budget justification as a PDF document, and 3) an excel document for the budget with annual and cumulative totals for the prescribed categories. These documents should be emailed to horticulture@ucdavis.edu.

Applications in PDF format should be formatted as 8.5" x 11" pages, single-spaced, 1-inch margins on all sides, Times New Roman, font size 12. Applications not submitted in the correct format will not be reviewed.

Important:

- ***Applicants can address one or more of the research goals and/or subthemes. The proposed budget should accurately reflect the cost of the proposed research activities. Applicants submitting applications addressing a subset of the RFA will be required to work collaboratively with other lead organizations conducting research on remaining components of the RFA. Subthemes and goals addressed need to be clearly defined in the application.***
- ***The selected research projects will be funded at \$250,000 up to \$750,000 depending on the scope of work, over a period of up to 3 ½ years. A total of approximately \$1.2 million will be awarded, through which we aim to fund 2-4 projects. We encourage applications for a single subtheme, and collaborative projects that cover multiple sub-themes.***
- ***The research projects must end by August 1, 2026, but can end earlier if applicant believes objectives can be achieved prior to that final end date. The start date of research activities should be approximately March 15, 2023.***

USAID LASER PULSE Training

All Principal Investigators submitting an application **are required** to take the LASER PULSE designed training.

Training 1: Embedded Research Translation <https://laserpulse.org/course/laser-pulse-introduction-to-embedded-research-translation-training/>

Training 2: Gender Analysis in Research and Application
<https://laserpulse.org/course/gender-analysis-in-research-and-application/>

PIs will need to create an account on laserpulse.org. On that home page there is a Join/Login radio button on the Welcome page. Each PI will need to be logged into laserpulse.org with an account to access the required course.

Upon completion, a digital certificate is automatically generated by the system when PIs complete the course. This certificate needs to be included in the Technical Narrative application package. *(Depending on network settings, applicants may need to check their SPAM folder)*

Sections of the application

I. Cover Page

The Cover Page can be made in accordance to your institution's requirements but must include the following:

- Project title
- Lead institution applying for the Award
- Names, titles, mailing addresses, email addresses, and telephone numbers of Principal Investigators and Collaborators
- Signature and contact information for authorized official from the Lead Institution
- Contact information for person to contact for application questions
- Contact information for person responsible for negotiating final contract
- Subthemes and research goals addressed in bullet point format

II. Project Summary Page

The Project Summary Page is limited to one page and should include only the following: 1) 200 to 250-word abstract (to be used when describing the project to USAID, reviewers, media, and other interested persons). 2) Up to five keywords. 3) List of countries and regions in each country where the project will take place. 4) Subthemes and research goals addressed in the application 5) Total amount of funds requested.

III. Technical Narrative

A) Introduction

Introduction should include, but is not limited to, a statement of the problem, project justification, research approach, including relevant literature and methodology, subthemes, and goals addressed, and expected outcomes. (~2 pages recommended)

B) Overall objectives addressed, with a focus on regional priorities and subthemes

Include a description of how the project fits with the objectives of Horticulture Innovation Lab, Feed the Future, and the Regional Priority, Archetype, Subthemes, and Research Goals. (~1 page recommended)

C) Specific project objectives

Include a list and description of project objectives based on Subtheme(s) addressed. Description of pathway to broad application and effects (~1 page recommended)

D) Activities and methodology

Outline the activities and methodologies required to accomplish each objective. Successful applications should include the project research plan and outline how research is to be conducted, analyzed and disseminated. (~5 pages recommended)

E) Roles of partners

Indicate the team members whose expertise is critical to each phase of the project and the role the partners or individuals played in project development. (~1 page recommended).

This section can also address areas of the research project that could benefit from expertise that may not be available within the applying organization or organizations. Revealing these areas that could be strengthened with outside expertise will not disadvantage the application as we will incorporate post-award an opportunity to build collaborations.

F) Timeline of activities

Include a timeline to accomplish activities and expected outcomes. (~1 page recommended)

G) Outreach, capacity strengthening, information dissemination

This section should include explicit details of how project outputs will be disseminated to local stakeholders as well as how the project strengthens knowledge, information, and extension eco-systems. Furthermore, thoughtful consideration of the modes of information delivery are crucial (i.e. if a workshop is planned, there should be concrete reasons as to why a workshop is a better outreach method than other methods). Provide a list of possible outreach activities and deliverables. Additionally, please discuss any relevant publications, who will be responsible for lead authorship, and plans to translate research results for public consumption and on-the-ground application. (~2 pages recommended)

H) Trellis Fellowship Fund Project Incorporation

Describe how the proposed project would incorporate the involvement of graduate and undergraduate students from Trellis Fellowship Fund and from focus country(ies) in the research activities (Please refer to Trellis Fellowship Fund section for more details). In this description, applicants should highlight how they will work with and support in-country graduate students and connect them with U.S.-based graduate students to conduct the Trellis Fellowship Fund related research. (~1 page recommended)

I) Additional Expertise as requested:

The Horticulture Innovation Lab has reserved funding for additional expert consultants as requested by successfully awarded projects. If successfully awarded, what additional expertise and/or networking might this project be interested in and why? For instance, is there benefit in having international knowledge sharing; peer-to-peer training; interdisciplinary collaborators; etc... that could be met through outside expertise? Please describe. (~0.5 page recommended)

J) Sustainability

Indicate how the project activities will be sustained beyond the funding cycle. (~1 page recommended)

K) Gender and social equity

Gender and social equity are central to achieving Horticulture Innovation Lab goals. This section should outline how gender and other inclusion issues were taken into consideration in developing this application, how constraints that limit women, urban poor, refugees and other vulnerable/marginalized groups' participation in horticultural development will be identified and addressed, and how household and community level gender issues will be approached to achieve gender parity and achieve project objectives. Successful applications will give meaningful consideration to gender and inclusion issues in the design of their program, and are reflected throughout the applications. Guidelines to the Horticulture Innovation Lab's gender and social equity principles can be found in Appendix I. (~1 page recommended)

L) Youth engagement

There is a critical need in agricultural research for a "pipeline" of interested youth who are willing to focus their careers on advancing agriculture in their home countries. Engaging youth and creating opportunities for youth from a variety of segments (from vulnerable communities, young mothers, etc.) in horticulture agribusinesses and other entrepreneurial activities is a priority for the Horticulture Innovation Lab. Please describe, **as appropriate**, the specific youth segmentation targeted and how their unique needs have been considered, and how your project plans to utilize a Positive Youth Development approach to positively engage with youth and support their families to create livelihood opportunities for youth through horticulture. See Appendix II for more information. (~1 page recommended)

M) Nutrition

A well-nourished population is one of the key objectives of the Horticulture Innovation Lab, and is uniquely important in poverty reduction. This section should highlight the ways in which the proposed project will integrate nutrition sensitive practices into the project design and activities. This section should include a plan to assess the possible nutrition-related outcomes of the project, both positive and negative. Please show how your project plans to address the specific nutrition deficiencies in the area of work. Successful applications will identify which of the 7 pathways between agriculture and nutrition will be addressed, how they will be targeted and the logic behind them (see Appendix III). Successful applications will show that they understand the causal links between their intervention and their outlined nutritional impacts. The intervention will be designed to optimize those linkages.

(~1 page recommended)

N) Monitoring and evaluation plan

Projects funded to address the goals of the Horticulture Innovation Lab will be evaluated based on a results-based (logical) framework and all applications must include a monitoring and evaluation (M&E) plan. As part of this framework, integrated into this M&E plan should be points to re-evaluate and reflect on progress in order to determine if alternative approaches are needed to achieve research objectives. Projects will address Objectives through defined Activities that will have specific Outputs/Deliverables and Indicators of Success. Monitoring and evaluation plans will be refined during the initial phases of the project and used to assess progress toward objectives. Applications must include baseline assessment in terms of the topic area and region. Within this framework, we define the following terms and provide a sample table below:

1) Objectives:

A statement of intention. Objectives should be specific, measurable, achievable, realistic and time-bound and address the Priority and specific Subtheme (e.g. identify strategies that will reduce food safety risks when using cow manure as fertilizer for vegetables; conduct a market analysis of tomatoes in Rwanda to identify opportunities for smallholder farmers).

2) Activities.

Research or training/outreach programs intended to achieve the objectives (e.g. determine the best size of compost pile to speed efficient composting; evaluate methods to capture urine for use as fertilizer, & conduct a 3-day workshop and demonstration for women's farmer groups)

3) Deliverables/Outputs.

Expected results of the activities (e.g., extension manual, publication of research results, number of men & women farmers trained in new technology).

4) Indicator of Success.

How will you decide if your activity was successful? These are usually expressed as targets (e.g., X number of trainees implementing improved practices, X number of households surveyed, report on topic Y produced, training participants increased their knowledge of topic Y by X%).

5) Documentation of Progress.

How will you objectively document the progress of your activities? The objective documentation will be a combination of periodic reports that include data on progress and additional information deliverables that are outward facing for broad information dissemination and sharing of impact. (e.g., results of pre- and post-training quizzes to document knowledge gained, attendance registers, report submitted to appropriate person, photos of trainees implementing improved practices, blogs describing a success or key moment of progress in the project, fact sheets)

6) Responsible Person or Party.

Who will be responsible for carrying out the activity and ensuring that the outputs/deliverables are achieved on time? Please also describe the time-points during the project when reflective action will be taken. For instance, how are the activities undertaken in the first year expected to influence the implementation of later activities? At what point will the success of an activity be judged? What steps or actions would be taken if an activity is deemed unsuccessful in order to keep the project as a whole on track?

7) Objectives and indicators instructions (matrix)

Applicants need to complete the Monitoring and Evaluation (ME) table below. Template for ME Table can be found through this link: [Template for ME Table.](#)

For every subtheme addressed in the proposed research project, list the specific objectives established to address the subtheme. Under each objective, capture key research activities proposed to address that objective, along with providing additional details about the activity across the columns of the table. Please add additional rows if more Objectives and/or activities are needed. If application addresses multiple subthemes, please duplicate the table to capture objectives and activities proposed to address that subtheme. These table(s) will not count toward any page limit set in the application.

Subtheme Addressed:

Objective 1:

Activities	Outputs/ Deliverables	Indicator of Success	Documentation of Success	Responsible Person/Party
List all activities that fall under this objective (one per line)	List all outputs associated with each activity	Describe how success of this activity will be gauged	Describe what documentation will provide the evidence of the activity's success	List the person or party responsible for this activity and monitoring its success

Objective 2:

Activities	Outputs/ Deliverables	Indicator of Success	Documentation of Success	Responsible Person/Party

Add more rows for additional Objectives or Activities as needed. And additional tables if multiple Subthemes are addressed in the application. This table will not count toward application page limit.

O) Statement of institutional experience

Include a description of the international development, horticulture, economic, sociological, and agribusiness experience, as appropriate, for each institution involved in the project and a description of successful projects conducted by institutions in similar project area(s). (1 page limit for each institution)

P) Curriculum vitae (CV)

Include one curriculum vitae or bio-sketch for the lead principal investigator, Co-principal investigator(s), and key project personnel. (2 pages maximum per CV)

Q) LASER PULSE Certificates of Completion

Certificate(s) verifying PI(s) took required LASER PULSE courses

Budget instructions

Template available to be used for the budget can be found using this link: [Budget Template](#)

I. Budget

Budget must be submitted in an Excel budget sheet with annual and cumulative totals for the prescribed categories. Please note that any funds to be spent in Ethiopia or Burma requires prior written approval from USAID, which will be requested if the project is selected for funding. Budget template available if desired.

II. Budget justification and cost sharing narrative

Prepare institutional budget justifications for the following categories in the order below (a separate budget justification is required for each institution receiving funds, no page limit). *Label the top of each budget justification with the name of the institution and the total dollar amount per year.*

Example Budget Justification Can be Found Using this Link: [Example Budget Justification](#)

A) **Sr. Personnel** (salary and fringe benefits)

Provide names and titles for all senior personnel, including those who are not being paid against the project. State the appropriate amount of effort as a percentage or calendar months for each key person on the project. Senior personnel from another institution should be reflected on the corresponding budget justification for that institution.

B) **Other Personnel** (salary and fringe benefits)

Provide the title/position/role for all support personnel. Administrative salary generally is not allowed as a direct cost.

C) **Materials and Supplies**

List specific supplies and costs if possible; if specifics are unknown, list specific categories of supplies. No miscellaneous or contingency categories are allowed. All goods and services must meet the source, origin, and nationality requirements set forth in [22 CFR Part 228 for the authorized geographic code 937](#). The following goods are restricted and may not be purchased without prior approval: agricultural commodities, motor vehicles, pharmaceuticals, contraceptives, pesticides, used equipment, fertilizer.

PRIOR APPROVAL will be deemed to have been met when:

- The item is of US source/origin;
- The item has been identified and incorporated in the program description or schedule of the award (initial or revisions), or amendments to the award; and
- The costs related to the item are incorporated in the approved budget of the award.

Please reference ADS 312 for a complete list of eligible and ineligible commodities: <https://www.usaid.gov/ads/policy/300/312>.

D) **Travel**

Domestic: Detail domestic travel using applicable rates (mileage, etc.).

Foreign: Provide a full explanation for each anticipated international trip—this explanation needs to include the following information (per trip):

- Names and/or number of travelers
- Destination country
- Duration of travel

Provide the method of calculation for each international trip including applicable per diem rates. All USAID funded travel must be purchased in compliance with the Fly America Act. Entry to and exit from the U.S. must be on a U.S.-registered carrier.

Travel budget must include air travel and lodging for the principal investigator plus at least one host country collaborator to attend the annual Horticulture Innovation Lab Annual Meetings during the project period, in 2023, 2024, 2025 and 2026 in Kenya, Nepal, Ghana, and Honduras, respectively. Please budget for these locations, but recognize they are subject to change.

E) **Equipment**

Equipment is defined as tangible, non-expendable property having a useful life of more than one year and an acquisition cost of \$5,000 or more per unit. Motor vehicles and used equipment are not allowed. All goods and services must meet the source, origin, and nationality requirements set forth in 22 CFR Part 228 for the authorized geographic code 937. Detail each piece of equipment by name/model/type. Construction costs are not allowable.

F) **Subawards**

Briefly list each subaward here and include yearly and cumulative budget amounts. Each subaward will have its own, separate budget justification.

G) **Participant Training**

Guidelines for participant training are found in ADS Chapter 253 – Training for Capacity Development. <https://www.usaid.gov/sites/default/agency-policy/253.pdf>

Note: Trainers and facilitators are not participants and should not be included in this section of the budget. Participants cannot be employees or collaborators on the project.

Detail each training program separately. Each training program must have a title/description, proposed country, approximate number of participants, and approximate dates. Costs for each program must be broken down into three categories:

1. **Travel** (cost of transportation to and from the training site and travel within the training site. All USAID funded travel must be purchased in compliance with the [Fly America Act](#). Entry to and exit from the U.S. must be on a U.S.-registered carrier.)
2. **Instruction** (books, equipment, supplies, course handouts, registration fees, academic tuition and fees)
3. **Participant costs** (per diem, medical exams, visa fees, health and accident insurance premia, federal/state/local income taxes)

- For all in-country training, costs and allowances may be proposed by the training provider for review and approval by the Management Entity.
- For third-country long-term training (6 months or greater), costs and allowances may be proposed by the training provider for review and approval by the Management Entity.

For U.S. long-term training (six months or greater), the Institute for International Education (IIE) for the Department of State researches and publishes the long-term training allowance rates for U.S. training sites which are available on request. USAID uses these rates to guide its long-term training monthly maintenance; however, Sponsoring Units have the flexibility to determine the final rate allowances that are reflected in the training budget. Allowances that are not considered appropriate are not to be paid. In some instances, a Participant may not need the entire range of potential cost elements. Not all Department of State allowances apply to USAID participants. Reference ADS 253 for a complete list of allowable costs.

H) **Other Direct Costs**

Some examples are non-participant graduate student tuition/fees, greenhouse fees, maintenance agreements, honoraria, repairs, analyses, services, and long-distance toll charges. All goods and services must meet the source, origin, and nationality requirements set forth in 22 CFR Part 228 for the authorized geographic code 937. Travel fees and insurance should be included under "Travel" or "Participant Training" as appropriate.

I) **Indirect Costs**

U.S. Institutions may recover their full federally-negotiated indirect cost rate (a copy of the current F&A agreement should be attached to the application). U.S. Institutions and foreign entities with no federally-negotiated rate may claim the de minimis of 10% of modified total direct costs for their indirect costs or budget for actual general/administrative costs as direct costs in proportion to their project needs.

J) **Cost-Sharing**

Cost-sharing is required at 25% of the total federal funds requested from the Horticulture Innovation Lab. This requirement may be waived for local organizations within the region of focus. Please contact the Horticulture Innovation Lab for further information. The cost-share must consist of non-federally funded contributions that meet the criteria detailed in 22 CFR 518.23. Cost-sharing may include, but is not limited to: 1) principal investigator/senior personnel effort; 2) in-kind contributions; 3) cash contributions; 4) unrecovered indirect costs; 5) indirect costs on principal investigator/senior personnel effort. **Cost-sharing documentation from the contributing entity must be provided at the time of application submission** (in most cases, this will be in the form of a letter signed by the authorized organizational representative). Some items that are ineligible for cost-sharing are existing equipment, administrative services, office and lab space, and administrative

fees in lieu of indirect costs. The required cost-share may come from any combination of the main institution and subaward(s) as appropriate. Provide a detailed cost-sharing narrative listing institution(s), dollar amounts, and descriptions.

III. Supporting Budget Letters

The following supporting budget letters must be attached.

- A) Federally-Negotiated Indirect Cost Rate agreements for any institution (main and sub) that requests indirect costs (if available).
- B) Signed letter(s) of commitment or support from all subawardees to the main applicant including any pledged cost-share dollars. The letter(s) should be signed by the authorized organizational representative(s).
- C) Signed letter of commitment or support from the main applicant's institution that supports the level of cost-sharing on the application. The letter should be signed by the authorized organizational representative.

IV. SAMS.gov and Unique Entity ID

A Unique Entity ID (UEI) number is required to receive funding from United States federal agencies, including USAID. **Awarded applicants for this RFA must have a UEI number in order to receive funding.** If your organization does not have a UEI number or only has a DUNS number, please initiate the application process to receive a UEI as soon as possible (even before your application is accepted). Note, that the UEI is not exclusive to this RFA, but can be used to apply for any US federal funding.

To learn more about this, please visit: <https://sam.gov/content/duns-uei>

V. Subrecipient Commitment Form and Mini Audit Form

For reference, these forms will be required by UC Davis for subawardees. Applicants can review to familiarize themselves with needed information if their applications are selected for funding. Link for documents: [Subrecipient Commitment Form](#) and [Mini-Audit Form](#)

Evaluation Criteria

Application Evaluation Process

Applications will be reviewed by at least three reviewers external to the Horticulture Innovation Lab Management Entity using a process developed by the LASER (Long-term Assistance and

Services for Research) PULSE (Partners for University-Led Solutions Engine), a five-year, \$70M Cooperative Agreement (#7200AA18CA00009) funded through USAID's Innovation, Technology, and Research Hub. Reviewers are solicited worldwide and have relevant experience to the topic areas and region. When possible, the external reviewers will be topical experts based in the relevant region. External reviewer ratings and comments will be combined to determine which applications best meet the criteria. Final approval of all Horticulture Innovation Lab projects is made by the Horticulture Innovation Lab Management Entity in consultation with the USAID AOR.

1. (35%) Research Merit: This criterion encompasses the potential to advance knowledge in the field, as well as the soundness of the methodology. The application will be judged on the following elements:

- a. **Scientific merit**: Is the technical plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? To what extent do the proposed activities appropriately build on existing, completed research or learning projects?
- b. **Novel ideas and approaches**: To what extent do the proposed activities explore creative, original, or potentially transformative concepts that will advance knowledge, understanding, and practice? To what extent do the proposed activities avoid duplication with on-going research or learning projects?
- c. **Resources and capacity**: Are there adequate resources and capacities for the PI (at the prime institution and through partnering/collaborations) to carry out the proposed research activities? Are the qualifications of the individuals, and the institutional experience, appropriate for the proposed activities? Is the budget for the proposed work sufficient?
- d. **User participation and application**: How are potential users involved in the identification of researchable challenges and possible solutions of this research? Are there appropriate mechanisms in place to ensure applicability of innovations / solutions that are developed through this research? What group of people does this research aim to benefit and are they accounted for?

2. (35%) Broad Effects: This criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired outcomes for the region; and will be judged based on these questions:

- a) **Potential positive outcomes**: To what extent does the project have the potential to deliver significant and effective solutions to opportunities presented in the sub-themes and broader regional goals?
- b) **Potential scale**: What is the likelihood that the research findings are translated into practice, policy, or products in the region? What partners are involved to ensure this translation?
- c) **Effective dissemination to users**: How well does the proposed research project identify relevant gender issues for the specific context and how has consideration of

these contributed to the overall research design? What other relevant social identities must be considered and how are they included? How does the research project plan on getting information about innovation / solutions generated by the project to potential users (e.g. rural women)?

3. (30%) Structure for success: This criterion focuses on the mechanisms in which the research project plans to achieve its research goals. The Horticulture Innovation Lab prioritizes research imagined and implemented by local food system actors. We aim to promote existing leadership and expertise and strengthen capacity and networks to support healthy innovation systems. In addition, the Horticulture Innovation Lab focuses on system-level challenges, and thus expects system-based approaches, such as interdisciplinary and intersectoral collaborations. Successful applications will consider these principles in application development, where appropriate.

- a) **Regional Leadership**: Are project leaders based in the region? Will regional research partners be conducting most of the on-the-ground activity, including trainings and capacity strengthening? Will in-country research leads be responsible for information dissemination such as publications and conference participation? Are local students being engaged? Additionally, is the added value of global network participation demonstrated? (For instance, knowledge exchange on a certain topic will foster development of new solutions or the project team does not have the required expertise in their network.)
- b) **Networks**: How does the project team strengthen local and regional research and innovation networks through engagement between universities, national partners, private sector, etc.?
- c) **Cross-cutting collaborations**: Does the project have an interdisciplinary and/or intersectoral research team and have they demonstrated the applicability and added value of each member of the team? Are there team members that will bring different regional perspectives?
- d) **Reflexive decision making**: Is there a monitoring and evaluation plan that indicates the stages of the project where reflexive action will be taken? Are benchmarks established so progress toward achieving objectives can be measured? Are the indicators of success measurable and the documentation of success legitimate?

Appendix

Appendix I - Gender and Social Inclusion Assessment

Principles

1. Gender refers to socially defined characteristics of men and women, including their different roles and responsibilities within the family, community or in agriculture, and the types of characteristics and behavior expected of them (for instance, women as caring and faithful; men as strong and independent). These issues speak to the ability of women and men in specific communities, among other things, to carry out certain farming activities, and to be able to travel

outside their immediate area for training and meetings, to have access to resources or to be sufficiently educated to take full advantage of training.

2. Gender norms vary among cultural groups and across time. It is necessary to be aware of how these norms function in the particular cultural group where you are working because they will affect specific constraints and opportunities for all genders, and they will affect your project's ability to meet outcomes. For instance, if you introduce a technology that is dependent on women's labor, but women do not control the income generated, they may withhold their labor. Also note these norms can be quite location specific, even within the same country and ethnic group so do not make a priori assumptions. Include in your application an explanation of how you will identify and address location-specific norms.

3. Gender issues also speak to who farms which crops and/or which practices do they do in the horticulture value chain, as well as who makes decisions about production, marketing and the use of income. This can also affect project outcomes. For example, women may want to adopt a technology, but lack the access to credit or the ability to make production decisions to do so. Gender norms also affect our 'theories of change.' We may anticipate that increased income will lead to better household nutrition, but numerous studies have found that that is more likely when women have decision-making power over the use of income.

4. All interventions, including technologies and practices, have gender implications. Assess how your proposed intervention will affect intra-household dynamics including labor-use, decision making, control of income or assets, etc. Applications must consider whether an intervention will exacerbate or alleviate intrahousehold inequities.

5. Gender issues also exist in regard to scientists, extension agents and students. Impacts among these groups can translate both quantitatively (numbers represented or involved), and qualitatively (men's and women's perspectives and priorities). Applications should address the role of gender at these professional levels, as well as at the farming level.

6. Applications must consider that one of the Horticulture Innovation Lab's goals is to sensitize host country stakeholders at all levels - farmers, extension agents, local and national government officials, researchers, university faculty, etc. - to gender issues and address this priority in applicant approach.

The Horticulture Innovation Lab Management Entity can provide further help in formulating gender-sensitive criteria and considerations for your specific project. It can also offer training of trainers for teachers and trainers so they can incorporate gender training in their courses throughout the course of your project.

Farm/Enterprise level:

1) Specifying the gender division of labor for relevant activities in the application's target area. Clarity in the application of what these are and the implications. If unknown, an application's explanation is needed addressing how the applicant will identify them.

- 2) An application's identification of constraints on women - mobility, resources, time, etc. – and approach for methods of addressing these.
- 3) Clarification in the application on whether applicants will be dealing with men or women producers, marketers, and other stakeholders, or both. If not with both, please explain why not.
- 4) In addition to being gender sensitive, we ask you to be farmer sensitive. Applications will be evaluated on methods for engaging or consulting with farmers and other stakeholders throughout various phases of implementation. An application's clarity in connecting proposed activities, research, and interventions to the expressed needs of the diverse farmers and other stakeholders.

Extension level:

- 1) Applications should aim to have at a minimum 50% women participation rate in project activities. If necessary, collaborate with appropriate women in or near the communities who might be able to work as assistant extension agents. An application's consideration of the constraints female trainers or participants may have is a selection criteria. For instance, a project may want to provide extension workers with bicycles but women in that area have traditionally not ridden bicycles. How will the proposed project or applicant handle this?
- 2) Discuss in your application the constraints in your research area; relevant constraints on women/men farmers could be part of the selection criteria. Reviewers will consider application's effectiveness in assessing whether it is more appropriate and beneficial to have mixed- or single-gender groups, ensuring that trainings are offered at times and locations that enable women's participation, and addressing constraints that women may face in participation such as childcare.
- 3) At the community level, an application's effectiveness in taking into account how men and women are organized into associations, how group activities are structured, and what tasks provide for informal group communication such as doing laundry by the stream, or drinking tea under the shade tree.
- 4) Clarity of an application's gender assessment of the information knowledge transmission systems and their association with a defined problem statement.

Training:

- 1) Short-term in-country training programs should be designed to include both sexes.
- 2) All courses should provide gender training at some level relative to the course subject and level.
- 3) Degree and certificate training should be offered to students of both sexes. The guidelines you should include in your application should be on the lines that 50% women is the desired percentage and the minimum percentage of female students should be 33%. If the percentage of women will be lower than 50% please provide an explanation for this and state what the project will do to ameliorate the situation.

Scientists:

- 1) Applications should include women scientists in both the US and host countries in project design and implementation. If this is not feasible, applications need to describe the constraints that have prevented this.

Appendix II – Youth in Development

Sizeable youth populations are both an opportunity and a challenge. Development can be accelerated when the majority of youth in any country are able to make significant contributions to economic, social, and political life in a way that lifts countries out of poverty, ensures greater stability and promotes healthier societies. Alternatively, peace, progress and prosperity are held back when countries are unable to meet the basic needs of their youth. With few exceptions, in the coming decades, developing countries have or will have a population age structure that favors economic growth. For some countries, the window to capitalize on this opportunity is short, while for others, it is just opening or still a few decades away.

Reaching youth potential depends upon their preparation for and participation in development efforts; leveraging investments in early childhood in order to set the stage for tomorrow's development outcomes.

Harnessing the energy, potential, and creativity of youth in developing countries is critical for sustainably reducing global hunger, malnutrition, and poverty while reducing the risk of conflicts and extremism fueled by growing numbers of marginalized and frustrated youth. Youth will be a growing population segment in Africa and Asia. Globally, young people are three times more likely to be unemployed, and working youth are more likely to be extremely poor than older adults.

To address this employment challenge and reach our poverty reduction goals, youth need to be empowered with profitable and desirable opportunities. Many of these opportunities are found within rural and urban food and agriculture systems. For those youth who see their best prospects and pathway out of poverty as being outside of agriculture and in urban areas, urban livelihoods and migration afford a degree of livelihood independence from climate risks and can provide a more stable source of income that can be used for investment on- and off-farm. This stability builds resilience both for those migrating and for those who remain in rural areas and are connected to them (via social capital and remittances).

Rural to urban migration has been a historically inexorable force as youth seek employment, education, and opportunity in cities. Nonetheless, rural and urban youth, particularly young women, can benefit from and drive inclusive agriculture-sector growth through employment and entrepreneurship opportunities across value chains.

Empowering youth with nutrition education and services is important to improve nutritional status and gender equality outcomes. As many pregnancies occur during youth, empowering adolescent girls is especially important, since pregnancy and birth in adolescence are related to a number of poor outcomes for mother and child, including low birth weight, which is associated with an increased risk for stunting.

Horticulture Innovation Lab projects will integrate youth issues, with particular attention to adolescent girls and young women, into programming and policy, and promote young people's role in their design and implementation to reduce poverty, improve nutrition, and help men,

women, and households become more resilient. Activities engaging youth will use proven methods that foster effective learning and excite young people, such as hands-on, experiential learning relevant to local needs and potential employment opportunities. In addition, we will promote digital technologies, which are proving to be a powerful pull factor for regaining the excitement of youth in agriculture, due to more dynamic information sharing, opportunities to think creatively, and new business models in the agricultural sector.

Examples of activities, we will support that contribute to this result include:

- Addressing barriers and risks that disproportionately affect young people's ability to enter into and profit from agricultural activities, including activities outside production
- Extending and innovating demand-driven agricultural education, extension, and applied research to build practical technical skills that empower youth in local agricultural systems and build resilience
- Applying technology to engage youth, with an emphasis on digital technologies such as mobile money, mobile devices, and the internet
- Agricultural business development and entrepreneurship skills training, including financial management and related skills needed for youth to succeed as producers, processors, input suppliers, or other entrepreneurial actors in the agriculture sector
- Developing youth-friendly nutrition services and nutrition-specific programming
- Developing innovative and appropriate business models and sources of capital to promote financial inclusion, business mentorships, and business advisory services

Appendix III - Nutrition and Horticulture

A well-nourished population is one of the key objectives of the Horticulture Innovation Lab, and is uniquely important to poverty reduction. Poor households often subsist on singular and staple-based diets that are lacking in many of the essential vitamins and nutrients needed for healthy growth. These populations often lack access to nutritious foods like fruits, vegetables (as well as animal source foods). Lack of diversity in the diet (low dietary diversity) is strongly associated with deficiencies of essential micronutrients such as vitamin A, folate (vitamin B9) iron, and zinc. We know that micronutrient deficiencies that start during childhood have long-term health and nutrition consequences that affect their cognitive and physical development, and overall well-being of those children. Children and women of reproductive age are especially vulnerable because they have particularly high micronutrient requirements.

Poor diet quality and micronutrient malnutrition affects not only the poorest of the poor, but also low/middle-income populations across the developing world. These families often rely on cheap sources of energy and consume excessive amounts of energy-dense, nutrient-poor foods, a situation that leads to increased risk of overweight, obesity, and related chronic diseases. Limited availability of nutritious foods such as fruits and vegetables, lack of disposable income, lack of knowledge and information, and general lack of demand for nutritious foods are critical factors that limit poor people's access to and consumption of fruits and vegetables.

Improvements in local and regional horticulture could help address two key components of food insecurity; inadequate access to and availability of micronutrient-rich fruits and vegetables. High-value horticulture improves access through income generation all along the value chain and by making nutritious foods more available in local and regional markets. The most successful horticulture interventions also address the third component of food insecurity; food use, through behavior change communication, nutrition counseling, and other avenues.

Key concepts to consider:

1. What is malnutrition? Malnutrition can be defined in two ways, chronic (long term) or acute (short term). Chronic malnutrition leads to stunting or low-height-for-age in children, whereas acute malnutrition leads to wasting, or low-weight-for-height children. Acute malnutrition is short term and can be immediately deadly. This type of malnutrition is best treated through clinical means where children can be closely monitored and cared for. Chronic malnutrition happens over the long term, when children do not have access to proper health and diverse diets. Their growth (physical and cognitive) becomes stunted and they are at a higher risk of additional health related difficulties for the rest of their life.
2. Dietary diversity—how many food groups a person routinely eats—can be used as a proxy for the nutritional adequacy of a diet. Eating a variety of fruits and vegetables is key to achieving dietary diversity and meeting daily micronutrient needs.
3. Double burden of malnutrition: As diets shift in developing countries, malnutrition can include both people who are undernourished and people who are overweight. Undernutrition and overnutrition can co-exist, even in the same household. Increasing fruit and vegetable consumption is one of the few dietary strategies that can help improve both situations.
4. The 7 pathways through which agriculture impacts human nutrition:
 - a. Own production -> food consumption
 - b. Income -> food purchase
 - c. Income->healthcare purchase
 - d. Food prices ->food purchase
 - e. Women's time use ->care capacity
 - f. Women's workload -> maternal energy use
 - g. Women's control of income -> resource allocation
5. Nutrition through the value chain: Along the value chain, there are many points to intervene to improve nutrition; some of these are described below.
 - a. Outreach- behavior change communication, nutrition counseling;
 - b. Inputs- diverse and quality seeds, water and sanitation, proper use of chemical inputs;
 - c. Production- nutritious crops, on farm diversification, nutritional value at harvest, women's time and labor;
 - d. Storage- food safety considerations, postharvest practices that can maintain nutritional quality of crops, reducing overall losses;
 - e. Processing- maintaining nutritional quality of final product, food safety, reducing overall losses, packaging;

- f. Distribution- food safety, proper cold storage and handling;
- g. Marketing- increasing demand of nutritious crops and products, creative marketing campaigns, market led production;
- h. Consumption- promotion of nutrition messages, behavior change, cooking classes, home gardens for consumption.